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Digital Platform Capabilities and Consumer Participation in the Circular Economy: The Mediating Role of Customer Green Pressure in the Beauty and Cosmetics Industry

Alice Erni Husein ✉[1] **and Inda Sukati** [2]

[12] *Universitas Putera Batam, Indonesia*

Corresponding Author: Alice Erni Husein**, E-mail:** alice.husein@puterabatam.ac.id

ABSTRACT

This study attempts to investigate the effect of perceived digital platform capability (PDPC) on consumer circular economy behavior (CCEB), with an exploration of the mediating effect of perceived customer green pressure (PCGP). From the Stimulus-Organism-Response theory perspective, it is hypothesized that PDPC fosters circular consumption. A quantitative cross-sectional study was carried out on consumers, and partial least squares structural equation modeling with bootstrapping assessed both direct and indirect relationships. The influence of PDPC is positive on CCEB and PCGP, and the influence of PCGP is also positive on CCEB. PCGP mediates between PDPC and CCEB. This research paper has made an important contribution to the circular economy body of knowledge by introducing customer green pressure as a mediator between digital platform capability and circularity.

KEYWORDS

Digital platform capabilities; Customer green pressure; Consumer circular economy behavior; Circular economy; Beauty and cosmetics industry; S-O-R theory.

ARTICLE INFORMATION

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1. Introduction

Transitioning from the "take-make-dispose" model into a circular economy involves not only changing how products are manufactured and supplied but also altering consumer habits. The involvement of consumers is critical to implementing a CE because it relies on actions such as acquiring, using, reusing, repairing, recycling, and disposing (Shevchenko et al., 2023; Vidal-Ayuso et al., 2023). This is especially true in the case of beauty and cosmetic industry wherein packaging is highly associated with consumption and circular approaches involve use of refillable, reusable, and recyclable packages (da Silva et al., 2024; Kazançoğlu et al., 2024). It has been found through research that the factors influencing consumer's interest in the refillable package of cosmetics include environmental consciousness, social influences, marketing communication, and product availability; however, price and greenwashing are some of the challenges (Kazançoğlu et al., 2024).

The use of digital platforms is becoming more important in linking consumers to product, environmental, and sustainability information. OECD (2025) emphasizes the importance of digital technologies in increasing access to information on sustainable alternatives and facilitating the involvement of consumers in the circular economy. Likewise, recent studies have found out that digital platforms may be used to promote circular consumption by minimizing information gaps and consumer involvement in circular alternatives (Blackburn et al., 2026; Sahamies et al., 2026). In their study, Zeng et al. (2026) have also found out that information transparency on digital platforms and omnichannel experience may promote circular consumption through consumer awareness and value co-creation.

Nevertheless, most research on digital platforms and the circular economy has focused on organizational capabilities and performance. For instance, Sahoo et al. (2026) studied the digital platform capabilities of manufacturing organizations and related them to frugal innovation and circular economy performance, where customer green pressure was included as a moderator. Little knowledge is known regarding how customers perceive the capabilities of digital platforms and how customer green pressure could be used as a behavioural mechanism.

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This paper aims to fill this research gap by turning the focus on the consumer-platform interface of the beauty and cosmetics sector. Perceived digital platform capability is the consumer perception of platform availability, integration, interactivity, and flexibility, whereas perceived customer green pressure refers to the environmental expectations of brands. From an extension of the organizational view of customer green pressure (Sahoo et al., 2026) and consumer circular economy studies (Shevchenko et al., 2023; Vidal-Ayuso et al., 2023), this study develops the mediating role of customer green pressure between digital platform capabilities and consumer circular economy behavior. In line with this study's objectives, the study asks the following questions: (1) How does the perceived digital platform capabilities affect consumer circular economy behavior? and (2) Does customer green pressure mediate this relationship?

2. Theoretical Background and Hypotheses Development

2.1 Theoretical Foundation: Stimulus–Organism–Response Theory

The study employed the Stimulus-Organism-Response (S-O-R) model by Mehrabian and Russell (1974) to investigate the relationship between digital platform experience and consumers' circular economy actions. According to this model, external stimuli impact the psychological state of an individual, which in turn influences the behavioural response (Mehrabian & Russell, 1974). Its applicability to digital and sustainable consumption has been illustrated in empirical evidence where online environmental platform services affect green consumption behavior by using internal psychological mechanisms (Ma & Liu, 2022). Recently, a review of 228 studies confirmed the effectiveness of the S-O-R approach in explaining consumer behavior in the circular economy, including marketing, micro-level, and macro-level stimuli and psychological, personal, and social organismic mechanisms (Yetkin Özbük & Oktay Bayhan, 2025).

As a result of the above logic, the current study proposes PDPC as the stimulus, CGP as the organism, and CCEB as the response to the process. The PDPC variable will incorporate consumers' perception of the accessibility, integration, interactivity, flexibility, and sustainability-related information of digital platforms used by beauty and cosmetics firms. CGP is the consumers' perceptions of growing expectations of customers for brands to enhance their environmental performance, whereas CCEB denotes participation in activities such as recyclable packaging, refilling, reusing, recycling, and take-back programs. This consumer-level perspective builds on Sahoo et al. (2026), which analysed digital platform capabilities and customer green pressure from an organizational perspective, by investigating whether consumer green pressure perception is a psychological mechanism through which digital platform capabilities induce circular consumer behaviours.

2.2 Hypotheses Development

2.2.1 PDPC and CCEB

Digital platforms serve as an ever-more critical link between consumers and brands, in that they allow access to information regarding products and the environment, communication, comparison, and interaction with opportunities for sustainable consumption (Cenamor et al., 2019; OECD, 2025). In the circular economy, digital platforms will help lower informational barriers and allow consumers' participation in circular processes such as reuse, repair, recycling, and resource circulation (Sahamies et al., 2026; Blackburn et al., 2026). Platform capabilities refer to information and relationship integration and resource reconfiguration in the face of evolving demands (Cenamor et al., 2019) and such platform capabilities increasingly becoming consumer experiences through platform information and functionalities. This is significant considering that consumer participation plays an integral role in the development and adoption of circular strategies throughout the product life cycle (Shevchenko et al., 2023). With respect to the beauty and cosmetics industry, digital information becomes critical for circular solutions like refillable packaging, as social media, marketing communication, environmental awareness, knowledge, and product availability emerge as vital influences in the purchase of refillable cosmetics packaging (Kazançoğlu et al., 2024).

Accordingly:

2.3 H1: PDPC positively influence CCEB

2.3.1 PDPC and Customer Green Pressure (CGP)

The second association involves the impact of digital platform capabilities on customer green pressure perceptions. Customer green pressure has been defined by Lin and Ho (2011) as "an organization's perception of customer pressure toward green behavior". Later, Sahoo et al. (2026) studied customer green pressure in conjunction with digital platform capabilities and circular economy outcomes, concluding that customer green pressure positively moderates certain associations related to digital platform reconfiguration and frugal innovation. The current research builds on this framework to develop the construct of perceived customer green pressure, which refers to consumers' perceptions of increasing customer expectations for and pressure on beauty/cosmetics companies to enhance their environmental performance.

Digital platforms can enhance the awareness of these expectations by making environmental information available to consumers and also allowing consumers to interact with others, discuss brands, make evaluations, and learn about collective environmental expectations (OECD, 2025; Sahamies et al., 2026). Digital platforms play an even more important role for the beauty and cosmetics sector, where consumers are regularly exposed to environmental information regarding packaging, refilling, recycling, green claims, and eco-friendly brands (Sahamies et al., 2026; Sahoo et al., 2026)

Thus:

2.4 H2: PDPC positively influence CGP

2.4.1 CGP and CCEB

Customer Green Pressure is believed to affect consumers' behavior in a circular economy. Though usually investigated from the firm's point of view, the basic idea of this concept is about how the environmental pressure affects market players. Lin & Ho (2011) showed that Customer Environmental Pressure is one of the most important determinants of green practices adoption by firms, while Sahoo et al. (2026) proved its importance for digital-driven circular economy approach.

From the consumers' viewpoint, customer green pressure perception refers to the degree to which people perceive growing demands on brands to minimize their impact on the environment and offer environmentally-friendly options. Perceptions of this type could legitimize the behavior of circular consumption and motivate consumers to engage in activities like selecting recyclable packages, adopting refills, reuse of containers, recycling, and return systems. This link is in line with the S-O-R model, where pressure perception is regarded as an internal psychological and social condition. Consumer engagement is critical for implementing circular economy principles throughout the product life cycle (Shevchenko et al., 2023), especially within the beauty and cosmetics industry, where the use of refillable packaging and take-back programs relies on consumer engagement.

Therefore:

H3: CGP positively influences CCEB.

2.4.2 The Mediating Role of Customer Green Pressure

The above-discussed issues are grounds to view perceived customer green pressure (PCGP) as an intermediary construct between perceived digital platform capability (PDPC) and consumer circular economy behavior (CCEB). Based on the Stimulus-Organism-Response (S-O-R) model, external stimuli may have a behavioral impact via internal psychological processes that can be cognitive, affective, or social (Ma & Liu, 2022; Yetkin Özbük & Oktay Bayhan, 2025). In the current study, PDPC is the stimulus since digital platforms provide consumers with relevant information, interaction with the brand, and sustainability information and expectations. Studies have shown that online environmental platform services can impact green consumption behavior via an internal psychological process of environmental attitude (Ma & Liu, 2022).

Sustainability-oriented information provided using digital platforms can make consumers more environmentally aware and conscious, thus leading to increased perceptions of customer green pressure. It has also been found that digital platforms with transparent information and omnichannel experience can promote circular consumption through consumer awareness and perceptions and through the mechanism of value creation (Zeng et al., 2026). In that way, PCGP is considered the organismic mechanism through which digital platform experience influences circular economy behavior. The proposed mechanism is described as follows:

2.5 Perceived Digital Platform Capabilities → Perceived Customer Green Pressure → Consumer Circular Economy Behavior

The current research builds on the contribution of Sahoo et al. (2026) who have investigated the role of digital platform capabilities and customer green pressure in the manufacturing firms. The critical difference between the two is that customer green pressure was treated as a moderator in Sahoo et al. (2026), while in the current paper, PCGP is considered as an individual mediator.

Accordingly:

H4: CGP mediates the relationship between PDPC and CCEB.

Using the concepts from S-O-R theory and the arguments put forth above, the conceptual model to be used considers perceived digital platform capability as the stimulus, customer green pressure as the organismic process, and circular economy behavior as the behavior, as depicted in Figure 1 below.

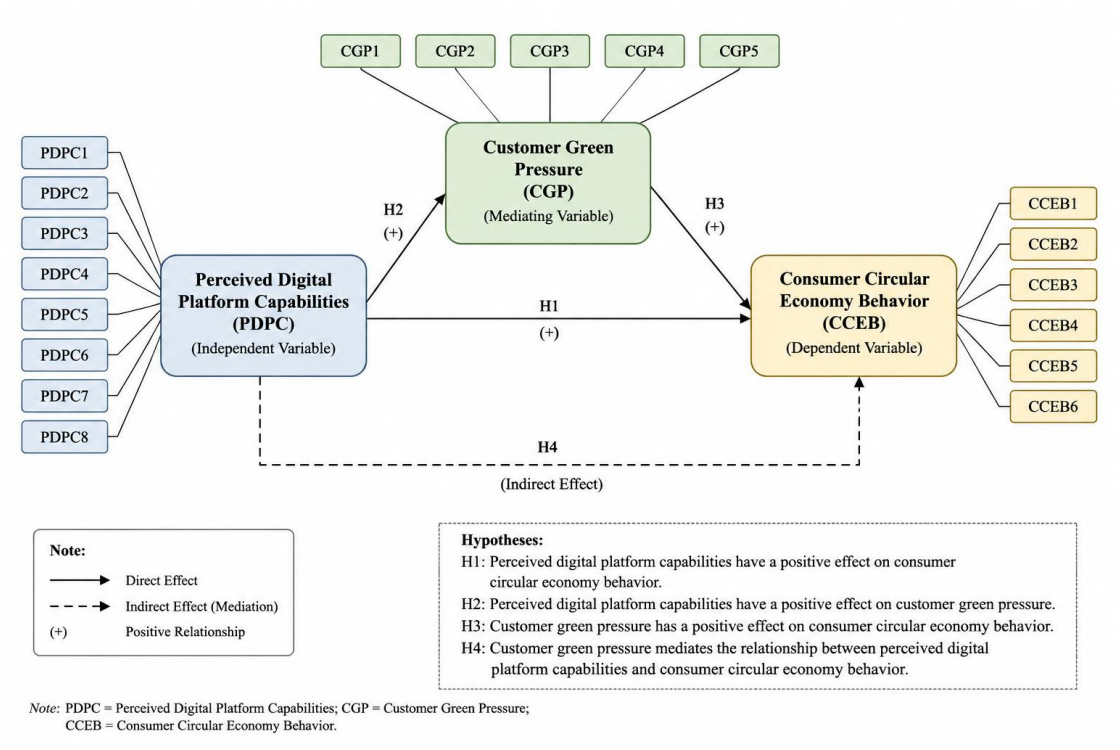


Figure 1: Research Model

3. Methodology

3.1 Research Design

For the purpose of this study, a quantitative research design was used to test the relationships between PDPC, PCGP, and CCEB in the beauty and cosmetics industry. The use of a quantitative approach for testing the theoretical relationships was deemed appropriate in this study since it helps in testing the effect of latent variables.

The research model was created using the S-O-R framework where PDPC is the stimulus, PCGP is the organismic mechanism, and CCEB is the behavioral response. The empirical analysis was conducted for four hypotheses dealing with direct effect of PDPC on CCEB, direct effect of PDPC on PCGP, direct effect of PCGP on CCEB, and mediation effect of PCGP.

Cross-sectional survey design was chosen for the research since the aim of the study is to determine how consumers perceive certain issues and respond to them during a specified period of time. Cross-sectional surveys are commonly used in marketing research to investigate relationships between psychological perceptions, attitudes, and behavior

3.2 Population and Sampling

The target audience was made up of people who were at least 18 years old and who had bought or used beauty and cosmetics products, engaged with beauty and cosmetics brands via social media, and had come across sustainability or circular information. Purposive sampling was employed to make sure the respondents qualified based on these criteria.

The data were collected using an electronic questionnaire. Voluntary and confidential participation was involved, and only participants whose answers were incomplete or did not pass the screening process were eliminated. The total number of respondents was 400.

The sample size was estimated according to the requirements for PLS-SEM. The conventional 10-times rule is generally applied; however, Kock & Hadaya (2018) argue that it can give rough estimates and suggest using such techniques as inverse square root and gamma-exponential techniques. Consequently, the sample size of 400 respondents was deemed appropriate for conducting PLS-SEM analysis.

3.3 Measurement Development

The constructs were measured through multi-item scales derived from existing literature. All variables were assessed based on a seven-point Likert scale that ranged from 1=strongly disagree to 5=strongly agree. Multi-item measures ensure a holistic description of latent constructs.

Perceived Digital Platform Capabilities (PDPC) was largely borrowed from Cenamor et al. (2019) where the concept of digital platform capability is developed. Given that the study uses an organizational approach, the items have been adapted to measure the consumers' perceived capabilities of access, integration, interaction, and responsiveness to beauty and cosmetics brands.

Customer perceived green pressure (PCGP) was adopted from Lin and Ho (2011) and Sahoo et al. (2026). The original construct which is based on firms' perspective has been modified in light of the perceptions of customers about how the pressure from customers is growing regarding the environment.

Consumer circular economy behavior (CCEB) was adapted from Shevchenko et al. (2023), which highlights consumer participation in circular economy activities. This study will look at behaviors that are pertinent to beauty and cosmetics, which include reusing, refilling, recycling, returning, and packaging recycling.

Since the existing measures have been adapted for use in a new consumer and business environment, the content validity must first be established before actual data collection. Hair et al. (2020) stress the importance of proper evaluation of measurement models that have been adapted for use in PLS-SEM.

Table 1 Measurement items

Variable	Code	Questionnaire item	Source / supporting reference	Status of item
PDPC	PDPC1	Easy access to useful information about beauty products is possible due to digital platforms used by cosmetic brands.	Cenamor et al. (2019); Bhatti et al. (2022); Sahoo et al. (2026)	Adapted to consumer context
PDPC	PDPC2	The digital platform of beauty/cosmetics companies provides me with information about their products.	Cenamor et al. (2019); Bhatti et al. (2022)	Adapted
PDPC	PDPC3	It is possible to communicate with the beauty or cosmetic brand through its digital platforms with ease	Cenamor et al. (2019); Sahoo et al. (2026)	Adapted
PDPC	PDPC4	The digital platforms of beauty/cosmetic firms incorporate information from various sources.	Cenamor et al. (2019); Bhatti et al. (2022)	Adapted
PDPC	PDPC5	The digital channels of the beauty brands can easily offer fresh content or service if there is any change in the requirements of the consumers	Cenamor et al. (2019) – reconfiguration capability	Adapted
PDPC	PDPC6	These beauty and cosmetic brands' digital platforms are flexible enough to allow new uses or functionalities.	Cenamor et al. (2019) – reconfiguration capability	Adapted
PDPC	PDPC7	Digital platforms that belong to the beauty/cosmetics companies allow me to easily gather information regarding product sustainability.	Digital platform capability literature; contextualized to CE	New contextual adaptation

Variable	Code	Questionnaire item	Source / supporting reference	Status of item
PDPC	PDPC8	Digital platforms from the brands for cosmetics make it quite easy for me to get information on reusing packages or refilling them..	Digital platform/CE literature; contextualized to cosmetics	New contextual adaptation
CGP	CGP1	According to me, consumers are now expecting that cosmetic/beauty products be environmentally friendly.	Lin & Ho (2011); Sahoo et al. (2026)	Adapted
CGP	CGP2	I In my view, consumers demand that cosmetic brands have less effect on the environment.	Lin & Ho (2011); Sahoo et al. (2026)	Adapted
CGP	CGP3	Consumers have come to expect eco-friendly packaging from cosmetics companies in my view	Lin & Ho (2011); Sahoo et al. (2026)	Contextual adaptation
CGP	CGP4	Consumers are now more likely to demand circular solutions like refillable and/or recyclable products from beauty/cosmetics companies.	Sahoo et al. (2026); circular economy consumer literature	Contextual adaptation
CGP	CGP5	From my perspective, there is more and more pressure on cosmetic/beauty companies from customers regarding environmental issues.	Lin & Ho (2011); Sahoo et al. (2026)	Adapted
CCEP	CCEP1	I Prefer beauty products or cosmetic products with recycling containers.	Shevchenko et al. (2023); circular packaging/consumer literature	Adapted
CCEP	CCEP2	If there is an opportunity for refills, then I would rather go for the refills than buy a brand new pack.	Shevchenko et al. (2023); circular consumption literature	Contextual adaptation
CCEP	CCEP3	When the beauty/cosmetic containers are reusable, I reuse them.	Shevchenko et al. (2023); Bashir et al. (2026)	Adapted

Variable	Code	Questionnaire item	Source / supporting reference	Status of item
CCEP	CCEP4	I correctly dispose of beauty product containers after their use.	Shevchenko et al. (2023); Bashir et al. (2026)	Adapted
CCEP	CCEP5	I will recycle my empty cosmetics bottles using the take-back scheme of the brand.	Circular packaging and consumer participation literature; Shevchenko et al. (2023)	Contextual adaptation
CCEP	CCEP6	I am ready to support the initiatives of beauty/cosmetic brands regarding the circular economy, for example refill, return, reuse or recycling.	Shevchenko et al. (2023); Bashir et al. (2026); circular consumption literature	Contextual adaptation

3.4 Content Validation and Pilot Study

Prior to the survey, the survey questionnaire was evaluated by academic specialists who have expertise in digital marketing, consumer behavior, and the circular economy. After that, the pilot test was run on 30 consumers, who satisfied the screening requirements for the main test. The following issues were evaluated in the pilot test: clearness of questionnaire items, time taken to fill out the form, and preliminary internal consistency of the constructs.

Table 2. Pilot Study Results

Construct	No. of Items	Cronbach's Alpha	Mean	SD	Minimum Item Loading/Correlation	Result
PDPC	8	0.903	4.18	0.61	0.642	Acceptable
PCGP	5	0.861	4.02	0.65	0.618	Acceptable
CCEB	6	0.874	4.09	0.63	0.601	Acceptable

Before the main survey, the questionnaire was examined by scholars with expertise in digital marketing, consumer behavior, and circular economy literature to verify its validity and understandability. A pre-test was then performed on 30 customers that satisfied the requirements for participation in the study. As presented in Table 3, the Cronbach's alpha coefficient values varied between 0.861 and 0.903 and were thus considered sufficiently high for preliminary internal consistency of the questionnaire. The mean duration of completing the questionnaire was 8.4 minutes, and very few participants had problems with understanding it. In consequence, three items were clarified but none were deleted. This process was especially important given that both the PDPC and PCGP measures were translated from organizational to consumer settings. Measurement assessment should be performed in case of translation of well-known measures into a different research setting (Hair et al., 2020).

Table 3. Respondent Feedback and Questionnaire Administration

Pilot-Test Indicator	Result	Interpretation
Pilot respondents	30	Sufficient for preliminary testing
Items tested	19	All items evaluated
Average completion time	8.4 minutes	Acceptable
Respondents reporting unclear items	2 (6.7%)	Minor wording revision
Respondents reporting difficulty understanding instructions	1 (3.3%)	Minor revision
Respondents reporting questionnaire too long	1 (3.3%)	No major concern
Items removed	0	All items retained
Items revised	3	Minor wording improvements

3.5 Data Collection Procedure

Data was gathered via an online survey consisting of three sections. In the first section, there were screening questions to identify the eligibility of participants. The second section gathered information on demographics and behavior, such as age, gender, level of education, frequency of buying beauty and cosmetic products, and frequency of engagement with beauty/cosmetic brands via digital media. The third section had the questions that measured PDPC, PCGP and CCEB.

The inclusion of these screening questions was to ensure that the respondents had enough experience using both beauty/cosmetics and digital platforms for the purposes of giving evaluations. All respondents who have never purchased or used beauty/cosmetics and those who do not use any digital platform were eliminated.

In order to minimize common method bias, some of the procedural solutions were used in questionnaire design. Respondent anonymity and confidentiality were ensured, neutral language was used, measurement was separated from each other, and it was made clear that there were no correct or incorrect answers. According to Podsakoff et al. (2003), some of the procedural solutions for common method bias include respondent anonymity protection, evaluation apprehension reduction, and measurement procedures design.

It is especially important due to the fact that the study receives the measurements of the independent variable, mediator, and dependent variable from the same respondents. Therefore, common method bias needs to be taken into account in questionnaire design and data analysis.

3.6 Data Analysis

The data collected were analyzed through Partial Least Squares Structural Equation Modeling (PLS-SEM). The choice of PLS-SEM technique stems from the need to establish relationships between the latent variables in order to make predictions about consumers' circular economy behavior and test a mediation mechanism.

The analysis process involved the use of SmartPLS software and was carried out in two main phases; the first one being an evaluation of the measurement model and the second one, an evaluation of the structural model.

3.6.1 Measurement Model Assessment

The measurement model was analyzed to test for reliability of indicators, reliability of internal consistency, convergence and discriminant validity.

Reliability of indicators was tested through outer loadings. Reliability of internal consistency was measured by Cronbach's alpha and composite reliability (CR). Convergent validity was measured by average variance extracted (AVE). Discriminant validity was measured by heterotrait-monotrait (HTMT) ratio.

The choice of HTMT for discriminant validity test is especially suitable due to the fact that HTMT offers a more sophisticated approach to discriminant validity assessment than traditional methods that only rely on the Fornell-Larcker criterion. Measurement model assessment also meets up-to-date guidelines of PLS-SEM related to reflective constructs assessment (Hair et al., 2020).

Since the constructs under consideration are adjusted for a new context, the assessment process will involve not only the verification of the statistical thresholds but also the theoretical relevance of each construct and its proper contribution to its construct.

3.6.2 Structural Model Assessment

After the measurement model confirmation process, structural model assessment was done. The test analyzed collinearity between predictor constructs, path coefficient (β), coefficient of determination (R^2), effect size (f^2) and predictive relevance (Q^2) where applicable.

The statistical significance of the relationships between the variables was tested using bootstrapping with 5,000 samples. The use of bootstrapping was considered appropriate for the estimation of the sampling distribution of path coefficients and indirect effects, especially since normality assumptions were not needed.

The direct relationships were tested using the estimated path coefficients, t-values, p-values and confidence intervals. If there was a predicted significant relationship in the expected direction, then the hypotheses were supported.

3.6.3 Mediation Analysis

Mediating Hypothesis of Central Mediation looks into whether customer green pressure is perceived to mediate the relationship between digital platform capability and consumer circular economy behavior.

The indirect effect was calculated as the product of the path from PDPC to PCGP and PCGP to CCEB. Statistical significance of the indirect effect was determined using bootstrap confidence intervals, where statistical mediation is significant if the confidence interval does not contain zero.

An assessment of the impact of PDPC on CCEB through its direct effect, as well as an indirect effect, was conducted. This is necessary in order to find out if the PCGP stands for complementary mediation, indirect-only mediation, or no mediation, based on the significance and direction of the direct and indirect effects.

This mediation analysis is very crucial to the theoretical contribution made by the research because the model being proposed does not only look at whether the digital platform capabilities affect the circular behavior, but how this is done.

4. Results

4.1 Respondent Profile and Descriptive Statistics

The total number of people who participated was 400 out of which 300 gave a valid response, thus giving a response rate of 75%. The participants had bought or used beauty and cosmetics products and have interacted with the beauty or cosmetics brands

using the digital platform. The participants were selected based on their eligibility for the research based on the set criteria. Table 2 shows the demographics and behavior of the participants.

Table 4. Respondent Profile

Variable	Category	Frequency	Percentage (%)
Gender	Male	112	37.3
Gender	Female	188	62.7
Total		300	100.0
Age	18–24 years	72	24.0
Age	25–34 years	126	42.0
Age	35–44 years	69	23.0
Age	≥45 years	33	11.0
Total		300	100.0
Education	High school/equivalent	83	27.7
Education	Diploma	48	16.0
Education	Bachelor's degree	131	43.7
Education	Master's degree or above	38	12.7
Total		300	100.0
Beauty/cosmetics purchase frequency	Less than once a month	43	14.3
Beauty/cosmetics purchase frequency	1–2 times a month	139	46.3
Beauty/cosmetics purchase frequency	3–4 times a month	82	27.3
Beauty/cosmetics purchase frequency	More than 4 times a month	36	12.0
Total		300	100.0
Digital-platform interaction	Less than once a week	25	8.3
Digital-platform interaction	1–2 times a week	77	25.7
Digital-platform interaction	3–4 times a week	91	30.3
Digital-platform interaction	More than 4 times a week	107	35.7
Total		300	100.0

From Table 4, the majority of respondents were females (62.7%), with males representing 37.3%. The largest age bracket was between 25-34 years (42.0%), while those having Bachelor degrees represented the largest group of respondents (43.7%). Over half the respondents bought beauty and cosmetics products once or twice a month (46.3%) whereas 35.7% communicated with beauty and cosmetics products brands on digital platforms more than four times a week. The respondents thus had experience with beauty and cosmetics products and digital platforms.

Descriptive statistics were analysed after to get an overview of the respondent's perception regarding the three constructs. Mean and standard deviation values are provided in table 3 below.

Table 5. Descriptive Statistics of the Constructs

Construct	Mean	Standard Deviation
PDPC	4.12	0.63
PCGP	3.98	0.67
CCEB	4.05	0.65

Table 5 depicts a relatively high mean score for each of the three constructs. The highest mean was recorded for PDPC (M = 4.12, SD = 0.63), then for CCEB (M = 4.05, SD = 0.65), and finally for PCGP (M = 3.98, SD = 0.67). In general, respondents viewed the digital platform capabilities, environmental expectations, and their involvement in the circular economy positively.

4.2 Measurement Model Assessment

Measurement model was conducted to determine the reliability and convergent validity of the constructs utilized in the study. The analysis was conducted according to the appropriate steps of PLS-SEM approach by examining the outer loadings of indicators, Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE). It was assumed that the reliability of indicators is adequate if outer loadings were above 0.70, and adequate internal consistency was found if Cronbach's alpha and composite reliability were greater than 0.70. Convergent validity was confirmed if AVE was higher than 0.50 (Hair et al., 2020).

The results of the measurement model analysis are provided in Table 6. As can be seen, the outer loadings of all selected indicators vary from 0.724 to 0.892, which exceeds the suggested criterion of 0.70. The values of Cronbach's alpha vary from 0.873 to 0.921, while composite reliability varies from 0.910 to 0.938. These findings indicate that the level of reliability is satisfactory for all three variables. Moreover, the values of AVE vary from 0.616 to 0.684, which is higher than the minimum value of 0.50.

Table 6. Measurement Model Assessment

Construct	Indicator	Outer Loading	Cronbach's Alpha	Composite Reliability (CR)	AVE
PDPC	PDPC1	0.824	0.921	0.938	0.650
PDPC	PDPC2	0.851	0.921	0.938	0.650
PDPC	PDPC3	0.873	0.921	0.938	0.650
PDPC	PDPC4	0.842	0.921	0.938	0.650
PDPC	PDPC5	0.811	0.921	0.938	0.650
PDPC	PDPC6	0.786	0.921	0.938	0.650
PDPC	PDPC7	0.765	0.921	0.938	0.650
PDPC	PDPC8	0.724	0.921	0.938	0.650
PCGP	PCGP1	0.824	0.873	0.910	0.669
PCGP	PCGP2	0.856	0.873	0.910	0.669
PCGP	PCGP3	0.841	0.873	0.910	0.669
PCGP	PCGP4	0.793	0.873	0.910	0.669
PCGP	PCGP5	0.781	0.873	0.910	0.669
CCEB	CCEB1	0.812	0.884	0.914	0.640
CCEB	CCEB2	0.846	0.884	0.914	0.640
CCEB	CCEB3	0.821	0.884	0.914	0.640
CCEB	CCEB4	0.779	0.884	0.914	0.640
CCEB	CCEB5	0.753	0.884	0.914	0.640
CCEB	CCEB6	0.805	0.884	0.914	0.640

4.3 Discriminant Validity

The HTMT Ratio Approach was employed in this study to test the discriminant validity of the three research constructs. The HTMT approach is an appropriate way to measure discriminant validity in the case of PLS-SEM because it measures the similarity among the constructs (Hair et al., 2020). When HTMT values fall below the threshold value, the constructs can be considered sufficiently discriminable.

Table 7 shows the findings of HTMT for PDPC, PCGP, and CCEB constructs. The HTMT values lie between 0.421 to 0.687, which are less than the conservative threshold value of 0.85. These findings demonstrate that the constructs are distinct in their concept and are empirically different from each other. Hence, discriminant validity is achieved for the model.

Table 7. Heterotrait–Monotrait (HTMT) Ratio

Constructs	PDPC	PCGP	CCEB
PDPC	—	0.621	0.687
PCGP	0.621	—	0.421
CCEB	0.687	0.421	—

4.4 Structural Model Assessment

Upon validating the reliability, convergent validity, and discriminant validity of the measurement model, the structural model was tested to analyze the relationship between Perceived Digital Platform Capabilities (PDPC), Perceived Customer Green Pressure (PCGP), and Consumer Circular Economy Behavior (CCEB). These analyses involved testing for collinearity, path coefficients, R^2, f^2, and Q^2. Statistical significance of the hypothesized relationships was evaluated using the bootstrap technique involving 5,000 samples.

First of all, the variance inflation factors (VIFs) were assessed to assess whether there was any possibility of multicollinearity that would influence the structural estimation results. As shown in Table 8, the VIFs varied between 1.000 and 1.627, which is far lower than the threshold value of 5.00. This shows that there is no major problem of collinearity.

Table 8. Collinearity and Structural Model Results

Hypothesized Relationship	VIF	β	t-value	p-value	f^2	Decision
PDPC → CCEB (H1)	1.627	0.286	4.214	<0.001	0.092	Supported

Hypothesized Relationship	VIF	β	t-value	p-value	f^2	Decision
PDPC → PCGP (H2)	1.000	0.451	7.386	<0.001	0.255	Supported
PCGP → CCEB (H3)	1.627	0.394	6.028	<0.001	0.174	Supported

PDPC's effect on CCEB is positive and statistically significant (β = 0.286, t = 4.214, p < 0.001). Therefore, H1 is supported. PDPC's influence on PCGP is positive and statistically significant (β = 0.451, t = 7.386, p < 0.001). Thus, H2 is supported as well, which means that better digital platform capabilities of a company contribute to greater consumer exposure to sustainability information and environment-related expectations. PCGP's effect on CCEB is positive and statistically significant (β = 0.394, t = 6.028, p < 0.001). This confirms H3.

The size of the effects is as follows: PDPC has a small-to-moderate effect on CCEB (f^2 = 0.092), a moderate effect on PCGP (f^2 = 0.255), and PCGP

Table 9. Coefficient of Determination and Predictive Relevance

Endogenous Construct	R^2	R^2 Adjusted	Q^2	Interpretation
PCGP	0.203	0.201	0.128	Weak-to-moderate explanatory power
CCEB	0.387	0.383	0.241	Moderate explanatory and predictive power

As indicated in Table 9, the explanatory power of PDPC on PCGP accounts for about 20.3% of the variance (R^2 = 0.203). On the other hand, the joint effect of PDPC and PCGP accounts for 38.7% of the variance in CCEB (R^2 = 0.387). The values of Q^2 for the two endogenous constructs are all greater than zero, hence the structural model is indicative of predictive relevance for PCGP and CCEB.

4.4 Mediation Analysis

A mediation analysis was carried out to see if Perceived Customer Green Pressure (PCGP) serves as the mediating variable of the relationship between Perceived Digital Platform Capabilities (PDPC) and Consumer Circular Economy Behavior (CCEB). Bootstrapping technique with 5,000 resamples was used in the mediation analysis for the assessment of the indirect effect. The direct effect of PDPC on CCEB was also investigated to identify the mediation type.

Table 10. Direct, Indirect, and Total Effects

Effect	β	t-value	p-value	95% Confidence Interval	Decision
Direct effect: PDPC → CCEB	0.286	4.214	<0.001	[0.151, 0.419]	Significant
Indirect effect: PDPC → PCGP → CCEB	0.178	4.812	<0.001	[0.111, 0.257]	Significant
Total effect: PDPC → CCEB	0.464	8.137	<0.001	[0.351, 0.573]	Significant

Based on the results presented in Table 11, the indirect effect of PDPC on CCEB via PCGP is positive and significant (β = 0.178, t = 4.812, p < 0.001), with a 95% bootstrapped confidence interval of 0.111 to 0.257 that does not contain zero. This shows that PCGP partially mediates the effect of PDPC on CCEB.

Furthermore, the direct effect of PDPC on CCEB is also positive and significant (β = 0.286, t = 4.214, p < 0.001), which supports partial complementary mediation. In addition, the total effect is positive and significant (β = 0.464, t = 8.137, p < 0.001). Thus, H4 is confirmed, demonstrating that digital platform capabilities affect CCEB both directly and indirectly via PCGP.

Table 11. Mediation Hypothesis Testing

Hypothesis	Mediation Path	Indirect β	t-value	p-value	95% CI	Mediation Type	Decision
H4	PDPC → PCGP → CCEB	0.178	4.812	<0.001	[0.111, 0.257]	Partial mediation	Supported

4.5 Hypothesis Testing Summary

Table 12 presents the results of the hypothesis testing process. It is evident from the above results that all the four hypotheses hold true. More specifically, Perceived Digital Platform Capabilities (PDPC) have a positive and significant impact on Consumer Circular Economy Behavior (CCEB). This finding proves the validity of Hypothesis 1 (H1). PDPC further have a positive and significant effect on Perceived Customer Green Pressure (PCGP). This shows that H2 holds true. Lastly, PCGP has a positive and significant influence on CCEB, thus proving H3 and H4.

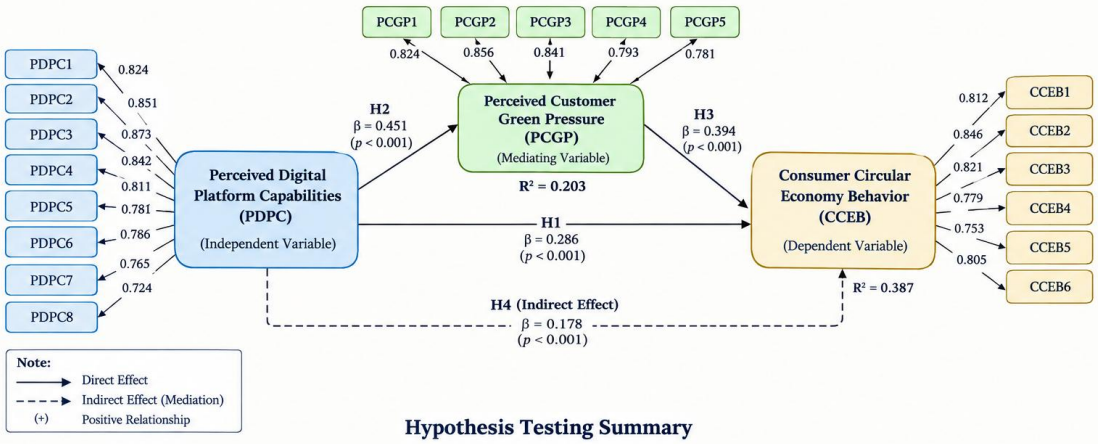
Table 12. Hypothesis Testing Summary

Hypothesis	Hypothesized Relationship	β	t-value	p-value	Decision
H1	PDPC → CCEB	0.286	4.214	<0.001	Supported
H2	PDPC → PCGP	0.451	7.386	<0.001	Supported
H3	PCGP → CCEB	0.394	6.028	<0.001	Supported
H4	PDPC → PCGP → CCEB	0.178	4.812	<0.001	Supported

The results of the hypothesis test show the evidence to support the proposed research framework. The direct and significant influence of PDPC on CCEB reveals the potential of digital platform capabilities to induce circular economy behavior among consumers. Furthermore, the significance of the relationship between PDPC and PCGP proves that digital platform capabilities can enhance customers' perceptions of environmental expectation and pressure. Additionally, the significant influence of PCGP on CCEB reveals the role of customer green pressure in encouraging circular economy behavior among consumers. Lastly, the significant indirect effect confirms the mediation role of PCGP.

The model represents the relationship between Perceived Digital Platform Capabilities (PDPC), Perceived Customer Green Pressure (PCGP), and Consumer Circular Economy Behavior (CCEB). The path coefficients, loadings, and R^2 of the endogenous constructs are presented in Figure 2 below. The findings reveal that all the hypothesized relationships have proven to be positive and statistically significant, thus validating H1–H4.

Figure 2. Structural Model and Hypothesis Testing Results



Hypothesis Testing Summary

Hypothesis	Hypothesized Relationship	β	t-value	*p*-value	Decision
H1	PDPC → CCEB	0.286	4.214	<0.001	Supported
H2	PDPC → PCGP	0.451	7.386	<0.001	Supported
H3	PCGP → CCEB	0.394	6.028	<0.001	Supported
H4	PDPC → PCGP → CCEB (Indirect Effect)	0.178	4.812	<0.001	Supported

Note: Standardized path coefficients (β) are shown. Values in parentheses for indicators are outer loadings (from Table 4). R^2 values are shown for endogenous constructs. All paths are significant at $p < 0.001$.

5. Discussion

The results confirm all the four hypotheses and show that PDPC positively affects CCEB directly as well as indirectly through PCGP. The direct effect of PDPC on CCEB was found to be positive and significant (β = 0.286, t = 4.214, p < 0.001), suggesting that consumers who perceive digital platforms to be easily accessible, interactive, integrated, and flexible have greater tendency to practice reuse, refill, recycling, and packaging-return activities. Digital platforms have the potential to help in overcoming informational barriers and gaining access to sustainable products and circular actions. This is in accordance with Sahoo et al. (2026). In the case of cosmetics, packaging reuse, recycling, and refill are important practices (da Silva et al., 2024; Shevchenko et al., 2023).

Furthermore, PDPC has a positive and significant influence on PCGP (β = 0.451, t = 7.386, p < 0.001) and is the most powerful direct effect between all of the constructs in the model. This result implies that digital platforms play a role in increasing consumers' awareness of sustainability information and environmental expectations as well as their engagement in conversations about brand environmental practices. Whereas Sahoo et al. (2026) have investigated customer green pressure from an organizational point of view, the results of the present paper highlight the importance of this construct from the point of view of consumers.

In addition, PCGP has a positive and significant impact on CCEB (β = 0.394, t = 6.028, p < 0.001). Consumers who believe in higher environmental expectations tend to take part in circular activities. In the case of beauty and cosmetics industry, these expectations can result in increased focus on reusability, refilling, recycling, and returns (da Silva et al., 2024). This finding aligns with the research related to circular economy as it stresses the need for the consumer engagement in acquisition, usage, reuse, recycling, and disposing of products and materials (Shevchenko et al., 2023).

Further evidence for H4 emerges from the results of the mediation analysis. The indirect effect of PDPC on CCEB via PCGP is positive and significant (β = 0.178, t = 4.812, p < 0.001), whereas the direct effect of PDPC on CCEB stays significant (β = 0.286, t = 4.214, p < 0.001), which means that there is partial mediation. Hence, digital platform capabilities affect the engagement in circular behavior not only directly through the access to information and circular opportunities but also indirectly via improving environmental expectations of customers. This result expands the contribution of Sahoo et al. (2026).

6. Theoretical Implications

This research makes a contribution to the existing studies on digital platforms, consumer behavior, and circular economy by developing the Stimulus–Organism–Response (S-O-R) approach to understand the behavior of consumers in relation to circular economy. It is evident from the results obtained that there exists the proposed process, where the stimulus is represented by PDPC, the organism is PCGP, and the response is CCEB. The statistically significant relations and mediation effect indicate that digital platform capabilities have an impact on circular behavior both directly and through consumers' perception of environmental pressures.

The paper further expands the theoretical definition of digital platform capabilities from a capability at the organizational level to a stimulus at the consumer level. Previous literature on the topic has focused on analyzing the relationship between digital platform capabilities and organizational innovation and circular economy performance (Sahoo et al., 2026), but in this research, it is revealed that consumers feel these capabilities in terms of accessibility, interactivity, information provision, integration, and flexibility.

In addition to this, another contribution made by this study is the role of PCGP as an individual-level mechanism, instead of being merely a moderation factor at the organizational level. Sahoo et al. (2026) studied the customer green pressure as a moderator in the organizational circular economy process, while the current study identifies that consumers' perception of environmental expectations can be mediating the relationship between digital platform capability and circular behaviours.

The results also serve to close an important gap in digital platform and circular economy literature by redirecting focus from performance and innovation in organizations to consumer engagement. The recent research stresses the importance of gaining a more thorough understanding of consumer behavior and digital platforms' ability to facilitate circularity practices (Blackburn et al., 2026). Through an analysis of CCEB, the present research acknowledges the consumer as an active agent in the implementation of the circular economy through practices such as reuse, refill, recycling, and return.

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7. Managerial and Practical Implications

There are a number of important implications of the results for beauty and cosmetic companies that want to enhance consumer involvement in the process of the circular economy. In light of the direct and indirect impact of PDPC on CCEB through PCGP, digital platforms must be regarded by managers as an important interface for communicating sustainability and engaging consumers in circularity.

The first measure involves improving digital platforms with relevant information related to the opportunities for being circular. Product websites, social media, and online shopping platforms can indicate if the packaging is recyclable, reusable, refillable, or returnable, and include clear directions on how to participate. Such functionalities as "How to Recycle," "Refill," or "Return your packaging" can lower the information barrier (da Silva et al., 2024).

Secondly, the organizations should take advantage of digital platforms to make consumer environmental expectations visible. Considering that there is a very strong correlation between PDPC and PCGP (β = 0.451), then the firms may be able to capture the consumer expectations through interactive campaigns, surveys, feedbacks, and environmental issues discussed on such platforms, which would make it easier for them to incorporate these expectations into circular innovations. This view is reinforced by Sahoo et al. (2026).

Third, circular action-specific efforts should be prioritized within digital campaigns. The list of such circular actions includes returning containers, refill, reuse, recycling, and take-back schemes. It is also important to incorporate circular options during the entire consumer journey, including pre-purchase and post-purchase activities. For instance, QR codes can help consumers learn how to recycle or get refills, and e-commerce websites can remind users of such possibilities. This approach helps maintain consumer engagement continuously through the entire lifecycle of the product (Blackburn et al., 2026).

Fourthly, businesses need to view customer green pressure as a means of gathering market intelligence and communicating sustainability in a clear, focused, and transparent manner by tying it with verifiable circular processes. Customer feedback about packaging waste, the ability to refill and recycle, as well as return mechanisms, may be used to enhance product and packaging innovation. In conclusion, the findings reveal the necessity of adopting a consumer-oriented approach that starts with Digital capability → Green expectation → Circular action, whereby organizations enhance their digital capabilities, recognize environmental expectations, and transform them into convenient means of reuse, refill, recycle, and return.

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8. Conclusion

The study sought to test the influence of perceived capabilities of digital platforms (PDPC) on consumer circular economy behaviors (CCEB), with the mediating role of perceived green pressure from customers (PCGP). Using S-O-R theory, PDPC is the stimulus, PCGP is the psychological mechanism, and CCEB is the behavioural response.

The results confirm that PDPC has a positive impact on CCEB and PCGP, while PCGP has a positive impact on CCEB. Furthermore, PCGP mediates the link between PDPC and CCEB to some degree, suggesting that digital platforms facilitate circular actions both through direct and indirect effects via enhanced consumers' expectations toward the environment (Blackburn et al., 2026; Sahoo et al., 2026; da Silva et al., 2024). In that regard, this research adds value to the work of Sahoo et al. (2026) through the introduction of customer green pressure as a mediator.

In practice, beauty and cosmetics companies must take advantage of digital platforms not just to promote their products but also to serve as circular economy infrastructure by informing consumers about how to refill, reuse, recycle, and return the packaging of their products. The findings of the study show that the approach from PDPC to PCGP and finally to CCEB works.

8.1 Limitations and Future Research

While this study makes important contributions, there are several limitations associated with this study. The first limitation is that it utilizes a cross-sectional study design, which hinders the establishment of a time relationship or causality. Future studies can consider using longitudinal or experimental research designs.

Secondly, the research is concerned with the beauty and cosmetic industry in terms of packaging, refilling, reusing, and recycling. Hence, the results cannot be generalized for other industries. Other future researches can test the model in the fashion, food, electronics, and home goods industries.

Third, this paper examines the effect of customer green pressure as one mediator. Further studies could focus on other potential mediators, for example, environmental concern, perception of consumer effectiveness, environmental self-identity, sustainability claims' credibility, and perceived behavioural control.

Fourth, further research could focus on examining the individual digital platform capabilities independently. The capabilities would include interaction via social media, e-commerce capabilities, personalized recommendations, information on products provided digitally, QR-coded traceability, and participation in online communities.

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