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Green Transformational Leadership, Creativity, and Organizational Culture: A Structural Model of Pro-Environmental Behavior in an Emerging Cosmetics Market

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ABSTRACT

Understanding the behavioral foundations of green transformation within firms requires attention to both leadership processes and the motivational mechanisms that shape employee action. Drawing on transformational leadership theory, the resource-based view, and self-determination theory, this study investigates how green transformational leadership (GTL) relates to pro-environmental behavior (PEB) through the creative and contextual conditions that support intrinsic motivation. Survey data from 1063 employees in the Turkish cosmetics industry were analyzed using structural equation modeling. The results indicate that green creativity (GC) transmits the influence of GTL on PEB, whereas green organizational culture (GOC) strengthens the conditions under which this influence is expressed. These findings clarify how leadership, creativity, and cultural support jointly underpin employees' environmental engagement. The study contributes to research on organizational greening by highlighting the motivational and contextual pathways through which leadership encourages sustainable behavior in emerging market settings.

1 | Introduction

The accelerating ecological crisis has transformed sustainability from a normative aspiration into a strategic necessity for contemporary business. Across industries, firms are increasingly expected to integrate environmental considerations into their core production and management systems. The cosmetics industry represents a particularly critical case, producing more than 120 billion packaging units annually, most of which remain nonrecyclable (De et al. 2023). Continued sectoral expansion contributes to rising plastic accumulation, with global projections indicating the annual addition of 11 billion tons of plastic waste and a long-term trajectory in which plastic mass may exceed that of all marine fish (Center for Biological Diversity 2022). A similar pattern is evident in the developing Turkish cosmetics sector, which has reached an estimated market size of $2.8 billion (Turkish Ministry of Commerce 2023). Recent governmental initiatives aimed at greener production and consumption underscore the growing environmental pressure (Republic of Turkey Ministry of Environment, Urbanization and Climate Change 2025). These developments illustrate the broader context within which

firms operate; however, the central challenge examined in this study lies at the micro level—specifically, how employees' values, competencies, and everyday practices shape the behavioral foundations of sustainability within organizations.

Reducing the environmental footprint of the cosmetics sector requires internal behavioral commitment rather than relying solely on eco-friendly technologies or consumer awareness campaigns. Product innovation and public consciousness remain important, yet organizational sustainability ultimately depends on the actions of employees who implement environmental practices in daily operations (Ahmed et al. 2024). Recent research shows that internal drivers—particularly leadership, creativity, and organizational culture—play pivotal roles in enabling employees to act on sustainability intentions (Lathabhavan and Kaur 2023; Tao 2025). Green transformational leaders cultivate trust, model environmental responsibility, and create psychologically safe climates that encourage innovative green actions (Singh et al. 2020). This approach positions employees as active contributors to ecological change, making green transformation both an organizational and behavioral process (Farrukh et al. 2022; Lathabhavan and Kaur 2023; Li, Bhutto, et al. 2020).

Within this micro-level focus, the interplay among green transformational leadership (GTL), green creativity (GC), and green organizational culture (GOC) becomes particularly relevant. Scholars argue that the success of sustainability initiatives depends on their translation into actionable leadership behavior and employee engagement (Ahmed et al. 2024). GTL offers a value-driven and motivational foundation, GC captures employees' cognitive and innovative responses to environmental goals, and GOC reflects the shared norms that embed sustainability within organizational routines (Chen and Chang 2013; Begum et al. 2022). Although previous studies have examined these constructs separately, their combined influence—particularly in emerging markets—remains insufficiently understood. This gap is notable given that institutional infrastructures and behavioral readiness differ between developing and advanced economies, making it critical to understand how leadership and culture jointly shape pro-environmental behavior (PEB) in dynamic contexts such as the Turkish cosmetics industry.

Ongoing discussions on circular economy innovations highlight the importance of system-level stakeholder engagement in fostering sustainability-oriented change. KaoDui and Kongkuah (2025) demonstrate that such engagement enables firms to align technological innovation with environmental objectives. Yet these studies largely adopt a macro-strategic lens, focusing on cross-sectoral collaboration and governance structures. In contrast, the present research examines the micro-level behavioral and cultural mechanisms through which environmental goals are internalized by employees. Specifically, the focus lies on how GTL nurtures GC and how a supportive GOC strengthens this process to promote PEB. This distinction underscores the study's contribution: extending sustainability discourse beyond institutional coordination toward the behavioral dynamics that shape organizational greening in emerging market settings.

The primary aim of this study is to analyze how leadership, creativity, and culture jointly shape employees' PEB within Türkiye's developing cosmetics industry. The study investigates (1) the direct and indirect effects of GTL on PEB, (2) the mediating role of GC in translating leadership influence into behavioral outcomes, and (3) the moderating role of GOC in strengthening this relationship. The guiding research question is: How do leadership, creativity, and organizational culture interact to foster PEB in emerging market organizations? To address this question, the study develops and empirically tests a moderated mediation model grounded in transformational leadership theory (TLT) and the resource-based view (RBV).

This research contributes to sustainability and organizational behavior scholarship in three key ways. First, it introduces an integrated behavioral model that connects micro-level cognitive mechanisms with contextual cultural factors, addressing a gap in studies that typically examine these variables separately. Second, it expands the empirical base by focusing on the cosmetics industry in an emerging market economy—an underexplored yet environmentally significant context. Third, it provides practical insights for leadership development and culture-building initiatives that support organizational sustainability by demonstrating that behavioral transformation depends on the combined influence of leadership, creativity, and culture. Within this framework, GC emerges as a central mechanism linking leadership to PEB, whereas GOC enhances the strength of this pathway.

The remainder of this paper is structured as follows. The next section reviews the theoretical foundations and formulates the hypotheses. Section 3 details the research methodology and data analysis procedures. Section 4 presents the empirical findings, followed by Section 5, which discusses theoretical, managerial, and policy implications. The study concludes with limitations and directions for future research.

2 | Theoretical Background

TLT (Bass and Bass Bernard 1985; Burns 1978), self-determination theory (SDT), and the RBV (Barney 1991) offer complementary but theoretically distinct lenses for explaining how leadership, creativity, and organizational culture jointly foster PEB. These approaches are often presented in parallel strands of the literature, yet their explanatory domains overlap in ways that invite a more integrative interpretation. TLT describes *how* leaders communicate priorities and shape meaning; SDT explains *why* employees internalize these signals; RBV clarifies *when* these micro-level processes accumulate into strategic, environmentally oriented capabilities. Bringing these theories together therefore requires addressing not only complementarities but also conceptual boundaries—an issue that has received limited attention in previous work.

According to TLT, transformational leaders influence followers through idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Bass 1990). GTL adapts these behaviors to environmental goals, linking leadership to sustainability-oriented actions such as rethinking work routines or reducing ecological footprint (Chen and Chang 2013; Mittal and Dhar 2016; Ren et al. 2024; Soni 2023). Although the transformational–transactional

distinction is well established, sustainability research frequently assumes the superiority of transformational styles without fully addressing transactional components—such as contingent rewards—that can also stimulate environmental compliance. This conceptual contrast is important because it reinforces the unique positioning of GTL as a behavior-shaping mechanism grounded not in external regulation but in value-driven influence. Empirically, prior studies report positive links between GTL and green participation (Lathabhavan and Kaur 2023; Tao 2025), yet many treat GTL as a "black box" driver. SDT-based research helps unpack this mechanism by demonstrating that transformational leaders enhance PEB by fulfilling employees' needs for autonomy, competence, and relatedness (Kovjanic et al. 2012; Chua and Ayoko 2021). In environmentally specific contexts, leadership strengthens intrinsic green motivation and environmental passion, which subsequently shape sustainable behavior (Li, Xue, et al. 2020; Patwary et al. 2024; Saini et al. 2025). These theoretical contrasts—value-driven vs. compliance-driven leadership, autonomous vs. controlled motivation—clarify why GTL effects are expected to operate through psychological internalization rather than direct behavioral pressure.

Within this motivational architecture, GC represents a behavioral expression of self-determined motivation. GC entails generating novel and useful ideas that improve environmental performance (Chen and Chang 2013; Begum et al. 2022). Although creativity research often distinguishes "process creativity" (idea generation) from "outcome creativity" (implemented solutions), sustainability studies rarely explore this distinction. GTL influences both: Leaders stimulate creative thinking (Riva et al. 2021; Hameed et al. 2022) while also shaping conditions that support the implementation of environmentally beneficial ideas. SDT-based work reinforces this by showing that autonomous, passion-driven employees engage more deeply in GC than those acting under external controls (Li, Xue, et al. 2020; Li, Bhutto, et al. 2020; Aviste and Niemiec 2023). From an RBV standpoint, GC forms a knowledge-based asset that can evolve into rare, valuable, and difficult-to-imitate capabilities when embedded in organizational routines (Barney 1991). Thus, GC operates as a behavioral bridge between leadership signals and capability development—a point seldom theorized explicitly in earlier research.

GOC captures shared norms, values, and behavioral expectations concerning environmental issues (De Witte and Van Muijen 1999; Zientara and Zamojska 2018; Khan and Terason 2022; Shahzad et al. 2023). In organizations where sustainability is embedded into HR practices and communication systems, employees receive consistent cues that green behavior is expected and rewarded (Srivastava et al. 2024). However, culture and climate research identify an important theoretical distinction: Culture reflects deep normative structures, whereas climate reflects surface-level perceptions. Much of the green management literature treats GOC interchangeably with green climate, yet this conflation masks critical meso-level processes that shape employees' capacity for creativity. Recent studies (Srivastava et al. 2024; Liu et al. 2024) show that leadership, HRM, and contextual factors jointly strengthen GC, but they rarely discuss how culture evolves through value internalization—a core SDT mechanism.

Strong empirical correlations are often observed between GOC and GC, reflecting their shared motivational underpinnings within environmentally supportive workplaces. SDT-oriented research helps explain this pattern by showing that supportive social environments facilitate the internalization of environmental values, which in turn reinforces autonomous motivation and creative engagement (Li, Bhutto, et al. 2020; Aviste and Niemiec 2023; Patwary et al. 2024; Saini et al. 2025). This close association does not indicate that GC and GOC represent the same construct. GOC denotes a shared, normative meso-level system through which green expectations are communicated and legitimized, whereas GC captures micro-level cognitive and behavioral efforts to generate novel environmental solutions. The constructs are therefore theoretically distinct yet empirically interconnected, as both arise from related motivational and value-internalization processes.

The literature on GTL, SDT, GC, and GOC has evolved along parallel pathways. Leadership studies highlight direct or mediated effects on green behavior (Chen and Chang 2013; Mittal and Dhar 2016; Lathabhavan and Kaur 2023; Tao 2025; Soni 2023), whereas SDT research emphasizes autonomous motivation and environmental passion (Kovjanic et al. 2012; Chua and Ayoko 2021; Li, Xue, et al. 2020; Patwary et al. 2024; Aviste and Niemiec 2023; Saini et al. 2025). GOC and related contextual constructs are treated as antecedents to creativity and environmental behavior (Zientara and Zamojska 2018; Khan and Terason 2022; Shahzad et al. 2023; Srivastava et al. 2024; Liu et al. 2024), whereas RBV-oriented work frames GC and GOC as capabilities with strategic implications (Barney 1991). These strands are rarely synthesized into an integrated model, and they seldom address conceptual tensions such as leadership-driven vs. culture-driven change or autonomous vs. structurally induced green behavior.

Two gaps therefore shape the present study. First, few studies integrate TLT, SDT, and RBV into a unified explanatory framework that links GTL to PEB via GC while conceptualizing GOC as a contextual amplifier. Existing studies examine leadership–motivation–engagement chains (Kovjanic et al. 2012; Chua and Ayoko 2021), leadership–PEB links (Li, Bhutto, et al. 2020; Soni 2023), or culture–creativity associations (Srivastava et al. 2024; Liu et al. 2024) in isolation. Second, although high empirical correlations between GOC and GC are widely observed, the field rarely clarifies why these constructs remain distinct or how their motivational foundations differ. By positioning GC as a self-determination–driven behavioral mechanism and GOC as a normative context that supports and amplifies this pathway, the present study offers a theoretically grounded justification for their joint inclusion.

Finally, macro-level sustainability pressures highlighted in recent circular economy discussions (Saglam et al. 2025; KaoDui and Kongkuah 2025) influence employee expectations only insofar as they are translated into micro-level cultural signals and leadership behaviors—reinforcing the study's emphasis on individual and organizational dynamics in the emerging Turkish cosmetics industry. This sectoral context, characterized by rapid growth and heightened environmental scrutiny, provides a compelling setting to examine how leadership, creativity, and culture jointly foster PEB.

2.1 | Hypothesis Development

2.1.1 | GTL and PEB

GTL represents an environmentally specific adaptation of transformational leadership, emphasizing ecological values and sustainability-oriented vision (Chen and Chang 2013; Ren et al. 2024). Guided by TLT (Bass 1990; Burns 1978), GTL encourages followers to transcend self-interest, internalize collective environmental goals, and act consistently with organizational sustainability aspirations. Leaders exhibiting green transformational behaviors communicate environmental purpose, model eco-conscious conduct, and intellectually stimulate employees to question conventional routines and devise environmentally sound alternatives (Mittal and Dhar 2016; Soni 2023).

Within the RBV (Barney 1991), GTL functions as an intangible strategic asset—valuable, rare, and difficult to imitate—capable of generating sustained competitive advantage through human capital transformation. By embedding environmental values into leadership practices, organizations build a reservoir of trust, shared meaning, and intrinsic motivation that translates into PEB. Empirical evidence across sectors supports this linkage: Environmentally oriented leaders have been found to increase employees' voluntary green behaviors, reduce resource waste, and promote eco-innovation (Lathabhavan and Kaur 2023; Tao 2025).

However, some studies report inconsistent direct effects between GTL and PEB when contextual factors are weak or cultural alignment is absent (Farooq et al. 2022; Omarova and Jo 2022). These mixed findings suggest that leadership influence may depend on intervening mechanisms such as creativity or organizational culture. Nevertheless, a positive baseline relationship between perceived GTL and PEB remains theoretically justified.

Hypothesis 1. *Employees' perceptions of green transformational leadership positively influence their pro-environmental behavior.*

2.1.2 | GTL and GC

GC, defined as the generation of novel and useful ideas that enhance environmental sustainability, has become central to understanding how organizations innovate within the green domain (Chen and Chang 2013; Begum et al. 2022). GTL serves as a key driver of such creativity by fostering a psychologically safe environment where employees feel supported to propose and implement green solutions (Riva et al. 2021). The influence of GTL on GC arises through the leader's ability to inspire, intellectually stimulate, and cultivate conditions that encourage green innovation.

From a psychological perspective, this process aligns with the principles of SDT: GTL fulfills employees' basic needs for autonomy (freedom to act), competence (belief in one's capabilities), and relatedness (feeling valued and connected). When these needs are satisfied, employees become intrinsically motivated to generate innovative, sustainability-oriented ideas that advance the organization's environmental goals (Ryan and Deci 2000).

Hypothesis 2. *Employees' perceptions of green transformational leadership positively affect their green creativity levels.*

2.1.3 | GC and PEB

PEB refers to deliberate actions that support environmental sustainability. Increasingly, research shows that such behaviors are shaped by individual creativity. Employees with high GC are more likely to engage in environmentally responsible practices because they can identify novel ways to reduce waste, save energy, and enhance sustainability at work (Al-Ghazali and Afsar 2020; Arslan et al. 2022). Creativity also fosters a sense of agency, empowering employees to act proactively rather than reactively.

This relationship is explained by SDT, which proposes that when individuals experience autonomy, competence, and relatedness, they become intrinsically motivated to develop creative solutions and engage in value-consistent behaviors (Ryan and Deci 2000). It can also be interpreted through the Theory of Planned Behavior, which identifies intention and perceived behavioral control as key predictors of behavior, and through the creativity-in-action perspective, which views ideation and behavior as co-evolving in context-specific problem-solving.

2.1.4 | Relationship Between GC, Transformational Leadership, and PEB (Mediating Role)

GC refers to the development of novel and useful ideas aimed at reducing environmental harm and enhancing sustainability performance (Chen and Chang 2013). According to TLT, leaders stimulate followers' intellectual curiosity and intrinsic motivation—psychological conditions that foster creative thinking (Bass 1990; Ren et al. 2024). Green transformational leaders provide vision and psychological safety, legitimizing risk-taking and experimentation (Riva et al. 2021). This environment encourages employees to generate innovative green solutions that bridge aspirational sustainability goals with practical action (Begum et al. 2022).

SDT (Ryan and Deci 2000) further explains this process: When leaders satisfy employees' basic psychological needs for autonomy, competence, and relatedness, individuals become intrinsically motivated to engage in creative PEBs. Empirical research supports this motivational pathway. For instance, Li, Bhutto, et al. (2020) found that GTL enhances creative self-efficacy, which subsequently predicts PEB. Similarly, Hameed et al. (2022) reported that leadership-driven creativity initiatives translate into measurable environmental performance improvements.

Nonetheless, alternative findings indicate that leadership alone may not automatically stimulate creativity unless organizational conditions—such as support, feedback, and recognition—are present (Srivastava et al. 2024). This underscores the

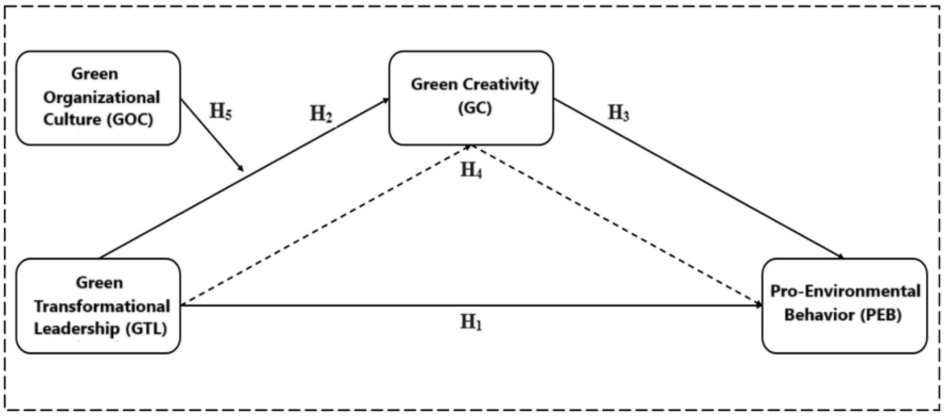

FIGURE 1 | Theoretical model of the research and hypotheses.

necessity of examining creativity as an intermediate mechanism rather than a guaranteed outcome of leadership influence. In the present framework, GC captures how leadership inspiration becomes enacted through innovative environmental problem-solving, thereby converting values into behaviors.

Hypothesis 3. *Employees' green creativity positively affect their level of pro-environmental behavior.*

2.1.5 | Moderating Role of GOC

GOC embodies shared ecological norms, symbols, and behavioral expectations that shape how sustainability is practiced within firms (Zientara and Zamojska 2018). From the RBV, such culture constitutes a collective intangible asset—socially complex and path-dependent—that enhances the effectiveness of other strategic resources like leadership and creativity (Barney 1991). A strong GOC legitimizes environmental behavior by rewarding innovation, embedding ecological values in daily routines, and signaling management's genuine commitment to sustainability (Khan and Terason 2022; Shahzad et al. 2023).

In transformational leadership contexts, culture acts as both an amplifier and a boundary condition. When the organizational culture reinforces environmental priorities, leaders' messages resonate more deeply, and employees perceive greater alignment between vision and practice. Conversely, in weak cultures where sustainability norms are inconsistent or symbolic, leadership efforts may fail to convert into behavioral outcomes (Al-Hakimi et al. 2022; Abualigah et al. 2023). By fostering a climate of trust, open communication, and shared purpose, GOC strengthens the indirect effect of GTL on PEB through creativity. It transforms creative ideas into legitimate, actionable practices, bridging the micro (individual creativity) and meso (organizational systems) levels of sustainability behavior. Empirical studies across sectors confirm that green culture moderates the relationship between leadership and behavioral outcomes by embedding sustainability into organizational identity (Srivastava et al. 2024; Singh et al. 2020).

Hypothesis 4. *Green organizational culture positively moderates the indirect relationship between green transformational leadership and pro-environmental behavior* via *green creativity.*

The concept model representing the research hypotheses is presented in Figure 1.

3 | Methodology

This study adopted a quantitative, deductive research design, progressing from theoretical foundations to hypothesis formulation and empirical testing. The objective was to examine the structural relationships between GTL, GC, GOC, and PEB, paying particular attention to mediating and moderating mechanisms. Hayes' (2013) PROCESS Model 7 was selected as it allows for the simultaneous estimation of indirect and conditional effects, making it ideal for evaluating complex moderated mediation structures and complementing structural equation modeling (SEM) procedures.

To achieve analytical consistency, the methodological sequence followed a theory-driven logic: The measurement model was first validated with confirmatory factor analysis (CFA) to determine latent construct reliability and validity before estimating structural relationships, and PROCESS was included because SEM exhibited low statistical power in modeling latent interaction effects. Thus, this combined approach reflects a methodological necessity derived from the study's theoretical model rather than a procedural choice.

3.1 | Research Context

This research was conducted in the cosmetics industry, an environmentally sensitive sector characterized by high consumption levels, significant packaging waste, and increasing scrutiny of sustainability practices. With annual consumption estimated at 355 million tons, the cosmetics sector is one of the fastest-growing sectors globally, with continued growth projected to exceed US$550 billion by 2030 (Cubas et al. 2022; Mali 2024). Because of its intensive use of chemical ingredients, continuous plastic waste generation (increasing at approximately 2.5% per year; Cubas et al. 2022), and widespread daily product use, the cosmetics sector is a suitable context for examining corporate environmental behavior (Aguiar et al. 2022; Nawalage and Bellanthudawa 2022). Turkey was selected as the research area because of its rapid adoption of global green transformation

policies and the growing environmental expectations of the local cosmetics market.

3.2 | Sampling Strategy and Data Collection

A convenience sampling approach was used to recruit employees from different firms. Although probability sampling is theoretically ideal, it is often impractical in organizational behavior research because of limited access to employee sampling frames, confidentiality restrictions, and inter-firm heterogeneity. These access barriers are widely recognized in methodological studies, particularly in emerging markets where centralized workforce databases are lacking (Highhouse 2009; Aguinis and Edwards 2014; Scandura and Williams 2000). Therefore, convenience sampling is a common and appropriate strategy for studying environmental behavior, leadership, and creativity in organizational settings.

3.2.1 | Convenience Sampling Rationale

In the current study, convenience sampling emerged as the most applicable strategy not due to access limitations but because the Turkish cosmetics industry lacks a unified or publicly accessible sampling frame. Organizational behavior research commonly faces similar constraints, as employee lists are not centrally maintained and firms rarely allow probability-based recruitment. Within this structural context, convenience sampling provided a feasible and methodologically appropriate approach for reaching employees across a diverse set of firms. The final dataset spans 24 cosmetics brands and includes employees from multiple functional areas, increasing heterogeneity and representativeness within the industry.

3.2.2 | Sample and Data Collection Procedure

Participants were recruited from 24 cosmetics brands operating in Türkiye, all of which voluntarily agreed to participate. Data were collected online using Google Forms to ensure anonymity and facilitate access across regions, departments, and job roles. Respondents first reviewed an informed consent statement explaining the study's purpose, confidentiality, and voluntary participation rights. Only those who consented proceeded to the questionnaire. A total of 1063 complete and usable responses were obtained. Because the survey was distributed through open channels, a precise response rate could not be calculated; however, the large sample size contributes substantially to the statistical robustness of the analysis.

3.3 | Measurements

Validated and widely used scales were used to operationalize the study variables. GTL was measured using a six-item scale developed by Chen and Chang (2013) and originally adapted by Podsakoff et al. (1996). GC was assessed using a seven-item scale developed by Chen and Chang (2013). GOC was measured using a six-item scale adapted by Shahriari et al. to reflect shared environmental norms and values. PEB was assessed using a nine-item scale commonly used in green behavior research (Bissing-Olson et al. 2013). All items used a 5-point Likert format ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Scale adaptation followed a multistage process to ensure semantic and conceptual equivalence. All items were translated into Turkish and back-translated into English by independent bilingual experts. Four field experts (two organizational behavior scholars and two sustainability practitioners) reviewed the translated items for conceptual clarity, sectoral relevance, and linguistic accuracy. Before full data collection, a preliminary pilot test was conducted with 50 cosmetics professionals to assess the items' understandability and cultural relevance. Minor wording adjustments were made based on pilot feedback. Final CFA results confirmed that the translated scales retained their intended latent structures, supporting the adequacy of the adaptation process.

3.4 | Analytical Procedures

SEM was performed using AMOS v24 to assess the relationships between the measurement and structural models. PROCESS v4.2 in SPSS v25 was then used to test mediation and moderation effects based on Hayes' Model 7. Using PROCESS in conjunction with SEM allows for more precise estimation of conditional indirect effects via bootstrapping. Mediation effects were assessed using bias-corrected bootstrapping with 5000 resamples, as per standard recommendations.

Alternative structural specifications (e.g., direct-only models, mediation-only models, and moderation-only models) were evaluated but did not demonstrate superior theoretical fit or statistical performance. Therefore, the integrated moderation model was retained because it corresponds to the theoretical proposition that GTL influences PEB via GC while remaining dependent on GOC as a contextual amplifier.

3.5 | Common Method Bias (CMB) and Research Design Issues

Because the data were collected from a single source, potential CMB was addressed using procedural and statistical solutions. Procedurally, anonymity was maintained to reduce assessment anxiety; item wording was modified to minimize response patterns; and the order of constructs in the questionnaire was randomized to avoid consistency patterns (Podsakoff et al. 2003). Statistically, Harman's single-factor test and the common latent factor (CMB) procedure were conducted within the framework of CFA. CMB accounted for less than 20% of the total variance, which is below the commonly referenced threshold indicating significant CMB. Furthermore, comparing the measurement model with and without the latent method factor resulted in a negligible change in fit ($\Delta CFI < 0.01$), indicating that CMB did not significantly distort the observed relationships. These combined procedures increase confidence in the robustness of the findings.

3.6 | Reliability, Validity, and Measurement Diagnostics

Internal consistency thresholds were met for all constructs, and Cronbach's alpha values ranged from 0.816 to 0.965. CFA demonstrated satisfactory convergent validity, with average variance extracted (AVE) values exceeding 0.50 and composite reliability (CR) values exceeding 0.70. Model fit indices were within acceptable ranges (root mean square approximation [RMSEA] ≤ 0.08, comparative fit index [CFI] ≥ 0.90), supporting the adequacy of the measurement model. Discriminant validity was confirmed using the Fornell-Larcker criterion, where the square root of the AVE for each construct was greater than the inter-construct correlations. Multicollinearity was examined using variance inflation factors (VIF < 5) and tolerance statistics (> 0.20), demonstrating that there was no problematic nonlinearity among the predictors.

4 | Findings

This section presents the empirical results of the study in alignment with the hypothesized model. A combination of descriptive statistics, CFA, and structural modeling techniques was employed to evaluate the relationships among the study variables.

4.1 | Sociodemographic Characteristics of the Participants

Table 1 presents the sociodemographic characteristics of the participants. The sample consists of 60.3% female and 39.7% male respondents. A majority of participants are single (55.1%) and hold a bachelor's degree or higher (63.4%). Most participants fall within the 23–27 (27.3%) and 28–32 (22.9%) age ranges. In terms of sector experience, 37.8% have 1–5 years of experience, followed by 16.9% with 6–10 years, and 25.3% with more than 11 years. Regarding tenure at their current workplace, the largest group (40.5%) has worked for 1–5 years.

4.2 | Validity, Reliability, and Normality Analyses

The 5-point Likert-type measurement tools used in the research and included in the survey form were first subjected to a

TABLE 1 | Sociodemographic profiles of employees.

Gender	*n*	%	Marital status	*n*	%
Female	641	60.3	Married	477	44.9
Male	422	39.7	Single	586	55.1
Educational level	*n*	%	Age	*n*	%
Primary school	28	2.6	18–22	106	10
High school	192	18.1	23–27	290	27.3
Associate degree	169	15.9	28–32	243	22.9
Undergraduate	554	52.1	33–37	171	16.1
Postgraduate	120	11.3	38–42	90	8.5
Industry experience	*n*	%	43 ve üzeri	163	15.3
Less than 1 year	212	19.9	Working time at current workplace	*n*	%
1–5 years	402	37.8	Less than 1 year	313	29.4
6–10 years	180	16.9	1–5 years	431	40.5
11 years and above	269	25.3	6–10 years	152	14.3
Department	*n*	%	11 years and above	167	15.7
Operations	151	14.2	Role at work	*n*	%
R&D	152	14.3	Employee	810	76.2
Human resources	22	2.1	Manager	253	23.8
Sales and marketing	504	47.4	Status at work	*n*	%
Accounting & finance	61	5.7	Senior manager	42	4
Education	71	6.7	Middle manager	102	9.6
Customer relations	41	3.9	Lower manager	108	10.2
IT & media	33	3.1	Employee/technical staff	811	76.3
Technical & support staff	28	2.6			

TABLE 2 | Reliability coefficients for scales.

Scale	Items	α
Green transformational leadership (GTL) scale	6	0.942
Green organizational culture (GOC) scale	6	0.931
Green creativity (GC) scale	7	0.965
Pro-environmental behavior (PEB) scale	9	0.816

reliability test. All of the coefficients are above the $\alpha = 0.70$ level, and the scales meet the reliability condition (Karasar 2010) (see Table 2). Although several scales exhibited high reliability coefficients, item–total correlations for all items were above 0.50, and Cronbach's alpha did not increase when any single item was removed. This indicates that the high internal consistency reflects construct homogeneity rather than item redundancy. In order to test whether the items forming the scales used in the study were in line with the normal distribution, the skewness and kurtosis values were checked. Skewness and kurtosis values for all items fell within the acceptable ±2 range, supporting the adequacy of distributional assumptions for SEM (George and Mallery 2010; Tabachnick and Fidell 2013) (see Table 3).

According to the CFA results, a single dimension was detected in all measurement tools. It was observed that the *t*-values of the paths related to the items met the condition of $t \geq 2.576$ and were significant. The expected coefficient range for AVE and CR coefficients (AVE ≥ 0.50; CR ≥ 0.70) was reached. The confirmatory model created according to the fit indices shows high fit (see Table 3).

4.3 | Interfactor Relations and Discriminant Validity

The relationships between the factor structures confirmed in the study were revealed by correlation analysis. The results obtained are presented in Table 4. Accordingly, there is a positive and significant relationship between the participants' perceptions of GTL and their perceptions of GOC ($r = 0.673$; $p \leq 0.001$), GC levels ($r = 0.695$; $p \leq 0.001$), and PEBs ($r = 0.386$; $p \leq 0.001$). There is a positive and significant relationship between the participants' perceptions of GOC and their GC levels ($r = 0.798$; $p \leq 0.001$) and PEBs ($r = 0.479$; $p \leq 0.001$). There is a positive and statistically significant relationship between the participants' GC levels and their PEBs ($r = 0.500$; $p \leq 0.001$). Discriminant validity was further evaluated using the HTMT ratio. All HTMT values were below the recommended 0.85 threshold, confirming discriminant validity beyond the Fornell–Larcker criterion. In addition, a nested model comparison showed that constraining the correlations between latent constructs to unity significantly worsened model fit ($\Delta\chi^2$, $p < 0.001$), indicating that the factors are not statistically interchangeable. However, the AVE > *r* condition was met for all factors. Although the correlation between GOC and GC was relatively high, the two constructs operate at different psychological levels—GOC as a meso-level cultural climate and GC as a micro-level creative behavior. Their empirical association is therefore theoretically expected but does not indicate conceptual redundancy.

4.4 | Multicollinearity Problem Test

It was tested whether there was a multicollinearity problem among the variables used in the study. Because if the independent variables of the study are linearly related to each other, the estimated results of the study will not be the desired results. The VIF, tolerance, and condition index values obtained as a result of the test are reported in Table 5. Accordingly, it was seen that there was no multicollinearity problem among the independent variables GTL (VIF = 2.088 ≤ 10; TV = 0.479 ≥ 0.10; C = 10.070 ≤ 30), GOC (VIF = 3.006 ≤ 0.10; TV = 0.333 ≥ 0.10; C = 13.154 ≤ 0.30), and GC (VIF = 3.186 ≤ 0.10; TV = 0.314 ≥ 0.10; C = 18.691 ≤ 0.30). Thus, it was decided to proceed to structural tests related to mediation and moderation.

4.5 | Hypotheses Testing (Structural Model Testing)

Hypotheses created to measure direct relationships and mediation roles between variables within the scope of the research were tested through SEM (see Figure 2). In order to test the mediation model, direct relationships between variables were determined first. In the second stage, indirect relationships with mediation variables were analyzed. The structural model established to test the research Hypotheses 1, 2, 3, and 4 was statistically accepted ($p = 0.000 \leq 0.05$) (see Table 6). The obtained fit indices showed that the model showed good fit ($x^2/df = 4.931 \leq 5$; RMSEA = 0.057 ≤ 0.08; CFI = 0.963 ≥ 0.90; NFI = 0.953 ≥ 0.90) (Şimşek 2007).

According to the mediation test result, the GC variable mediates the effect of GTL on PEB. Namely, the coefficient of $\beta = 0.370$ obtained regarding the direct effect of GTL on PEB is statistically significant ($p \leq 0.05$; $t = 10.716 \geq 1.96$). When the effect of GC on the model is taken into consideration, the coefficient decreases to $\beta = 0.074$ and becomes statistically insignificant ($p = 0.103 > 0.05$; $t = 1.632 < 1.96$). According to the mediation test result, GC mediates the effect of GTL on PEB, and the direct path becomes nonsignificant when GC is included; thus, Hypothesis 4 is accepted. However, high intercorrelations among predictors can sometimes produce suppressor-like patterns (MacKinnon et al. 2000), and this possibility is acknowledged as a measurement limitation. In addition, because the data are cross-sectional, the analyses do not establish temporal or causal direction. The findings therefore represent associations consistent with, but not definitive evidence of, a mediated process. The nonsignificance of the direct path, alongside the significant indirect effect, indicates a full mediation mechanism in which GTL influences PEB primarily through GC rather than directly. This suggests that the transformational process operates through creativity rather than direct behavioral modeling.

4.6 | Analysis of the Mediator Role

In the analysis phase, the interaction between the dependent variable (GC) and the independent variable (GTL) was first checked without including the PEB variable in the model. Then, the effect of the independent variable (GTL)

TABLE 3 | CFA results.

		t	AVE	CR	Skewness	Kurtosis	Goodness of fit index
Green transformational leadership (GTL) scale							
GTL1	0.79	20.22	0.722	0.836	1224	−1685	GFI = 0.994 ≥ 0.90 CFI = 0.998 ≥ 0.90 x^2/df = 2509 ≤ 5 RMSEA = 0.038 ≤ 0.08 p = 0.000 ≤ 0.05
GTL2	0.78	20.35			1178	−1041	
GTL3	0.89	16.71			1498	0.952	
GTL4	0.88	17.31			1412	−1367	
GTL5	0.89	16.63			0.984	1475	
GTL6	0.86	17.67			1385	0.993	
Green organizational culture (GOC) scale							
GOC1	0.84	18.06	0.705	0.834	−1741	1025	GFI = 0.991 ≥ 0.90 CFI = 0.996 ≥ 0.90 x^2/df = 4204 ≤ 5 RMSEA = 0.055 ≤ 0.08 p = 0.000 ≤ 0.05
GOC2	0.86	17.36			1113	−1381	
GOC3	0.87	17.44			1286	−0.953	
GOC4	0.85	18.38			1660	1334	
GOC5	0.87	17.39			0.912	1162	
GOC6	0.74	21.00			1031	−1247	
Green creativity (GC)							
GC1	0.85	20.65	0.792	0.862	0.825	−1043	GFI = 0.987 ≥ 0.90 CFI = 0.996 ≥ 0.90 x^2/df = 4177 ≤ 5 RMSEA = 0.055 ≤ 0.08 p = 0.000 ≤ 0.05
GC2	0.88	19.79			1245	1554	
GC3	0.91	18.49			1351	−1874	
GC4	0.90	19.00			1774	1204	
GC5	0.92	17.97			−1368	−1547	
GC6	0.90	18.91			1333	1093	
GC7	0.87	20.21			−0.949	1859	
Pro-environmental behavior (PEB) scale							
PEB1	0.70	19.84	0.587	0.873	−0.121	1457	GFI = 0.979 ≥ 0.90 CFI = 0.978 ≥ 0.90 x^2/df = 3997 ≤ 5 RMSEA = 0.053 ≤ 0.08 p = 0.000 ≤ 0.05
PEB2	0.71	19.53			−0.565	1554	
PEB3	0.82	21.82			1086	1349	
PEB4	0.74	18.66			0.245	1962	
PEB5	0.73	18.74			0.647	−0.224	
PEB6	0.67	20.31			0.985	0.651	
PEB7	0.80	19.83			1457	1374	
PEB8	0.89	23.01			1547	−0.771	
PEB9	0.81	19.68			1243	−0.891	

and the moderator (GOC) variable on the dependent variable (GC) was checked at the same time (Model 1). Finally, the Z scores for the independent variable (GTL) and the moderator (GOC) were calculated, and an interaction term including the two variables was created. The effects of all variables (GTL, GOC, and GC) on the dependent variable (PEB) within a model were analyzed (Model 2). The obtained results are presented in Tables 7 and 8. The graphical summary of the results is presented in Figure 3. Model 1 shows whether GOC plays a moderator role in the relationship between GTL and GC without including the PEB variable in the calculation. According to the analysis results (see Table 7), the regression model created for the mediation role is statistically significant ($R^2 = 0.555$; $p \leq 0.05$). The GTL variable alone has a significant effect on GC ($\beta = 0.616$; $p \leq 0.05$). The GOC variable alone has a significant effect on GC ($\beta = 0.840$; $p \leq 0.05$). However, GTL and GOC variables together have a significant effect on GC ($\beta = 0.308$; $p \leq 0.05$). The GOC variable plays a moderating

TABLE 4 | Interfactor correlations and discriminant validity.

Faktörler	GTL	GOC	GC	PEB
Green transformational leadership	1			
Green organizational culture	0.673**	1		
Green creativity	0.695**	0.798**	1	
Pro-environmental behavior	0.386**	0.479**	0.500**	1
√AVE	0.850	0.839	0.890	0.766

Note: r = Pearson correlation.
**$p \leq 0.01$.

TABLE 5 | Findings on multicollinearity.

Independent variables	VIF	Tolerance value (TD)	Condition index (C)
Green transformational leadership	2088	0.479	10,070
Green organizational culture	3006	0.333	13,154
Green creativity	3186	0.314	18,691

Note: Dependent variable: Pro-environmental behavior.

role in the relationship between GTL and YY. When LLCI and ULCI coefficients are taken into consideration, it is seen that all coefficients are positive and the coefficient intervals do not include zero.

According to the results of Model 2, where PEB is considered as the dependent variable and GC plays a mediating role, the regression equation obtained is statistically significant ($R^2 = 0.253$; $p \leq 0.05$) (see Table 8). According to the model formed, the GTL variable significantly affects PEB ($\beta = 0.186$; $p \leq 0.05$). The GC variable significantly affects PEB ($\beta = 0.308$; $p \leq 0.05$). All LLCI and ULCI variables related to the model are positive, and there is no interval containing zero between the variables.

The effect of the GOC variable, which assumes a moderating role in Model 2, on the model is presented in Table 8. The coefficients related to the significance of the obtained effect coefficients are given in Table 9. Accordingly, the LLCI and ULCI values related to the moderating role assumed by the GOC variable are positive, and both coefficient intervals do not include the value zero. Thus, it has been statistically proven that the GOC variable plays a moderating role in the multiple relationships between GTL, GC, and PEB, and Hypothesis 4 has been accepted.

When the GOC variable is perceived as low, its contribution to the relationship between GTL and GC is weak (blue line). When GOC is perceived as moderate, the contribution strengthens moderately (red line). When GOC is perceived as high, its contribution becomes strong (green line). Accordingly (see Figure 3),

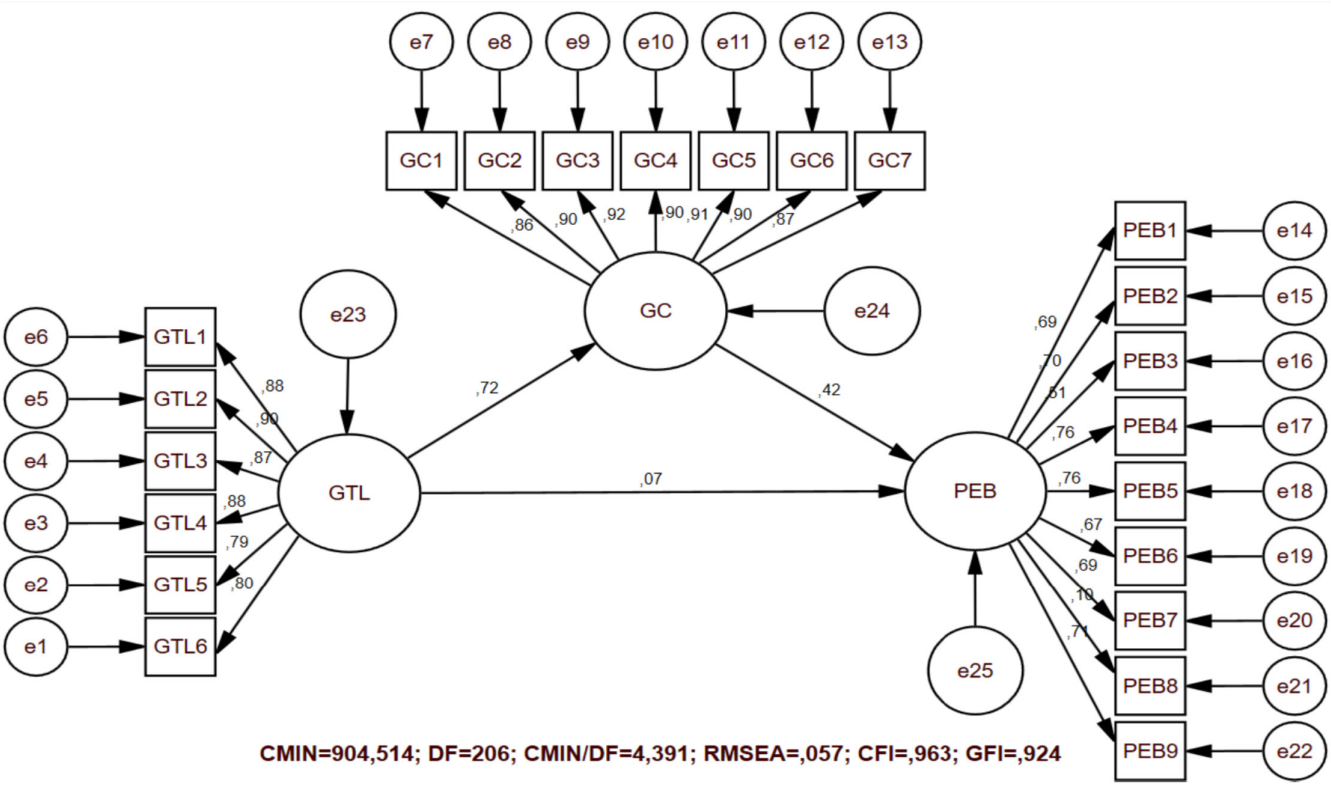

FIGURE 2 | Structural equation model.

TABLE 6 | Hypotheses regarding direct effect and mediating effect.

Type of effect	Hypothesis	Dependent variable	Independent variable	β	t	Situation
Direct effect	Hypothesis 1	PEB	GTL	0.370	10,716	Supported
	Hypothesis 2	GC	GTL	0.723	22,860	Supported
	Hypothesis 3	PEB	GC	0.492	14,271	Supported
Mediating effect	Hypothesis 4	PEB	GC	0.074	1632	Supported
			GTL	0.420	8905	

TABLE 7 | Regression models for moderation analysis (Model 1).

Independent variables	Dependent variables	β	R^2	R^2 change	t	p	LLCI	ULCI
Green transformational leadership	Green creativity	0.616	0.555	0.016	15,416	0.000	0.5381	0.6950
Green organizational culture	Green creativity	0.840			19,002	0.000	0.7534	0.9269
Green transformational leadership*Green organizational culture	Green creativity	0.308			6269	0.000	0.4049	0.2119

TABLE 8 | Regression models for moderation analysis (Model 2).

Independent variables	Dependent variables	β	R^2	t	p	LLCI	ULCI
Green transformational leadership	Pro-environmental behavior	0.186	0.253	3380	0.012	0.0120	0.160
Green creativity	Pro-environmental behavior	0.308		13,299	0.000	0.2631	0.3541

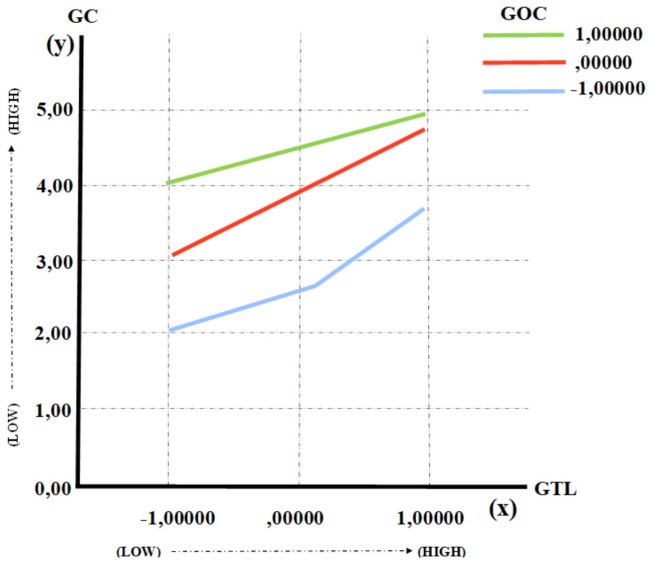

FIGURE 3 | Moderating effect.

- Employees with low perceptions of both GOC and GTL demonstrate lower levels of GC.
- Employees with moderate perceptions of GOC and GTL demonstrate moderate levels of GC.
- Employees with high perceptions of GOC and GTL demonstrate substantially higher levels of GC.
- A strong perception of GOC in organizations amplifies the effect of GTL behaviors on employees' GC levels.

This interaction pattern demonstrates that GOC moderates the link between GTL and GC, such that the positive relationship between GTL and GC becomes stronger under high levels of GOC. In other words, the presence of a supportive and environmentally oriented culture enhances the leader's ability to stimulate creativity among employees. This pattern supports Hypothesis 4 and confirms the presence of a significant moderating effect, as also reflected in the PROCESS analysis (index of moderated mediation = 0.072, 95% CI [0.015, 0.145]) (Hayes 2013).

5 | Discussion

The results show that employees' perceptions of GTL were generally positive yet not firmly consolidated. Average scores clustered around partial agreement, a pattern consistent with the early-stage adoption of environmental leadership practices in settings where sustainability norms are still forming (Mittal and Dhar 2016; Li, Bhutto, et al. 2020; Singh et al. 2020; Maitlo

TABLE 9 | Reliability results regarding the moderating role.

Moderating variable	Index	SE	BootSE	BootLLCI	BootULCI	Sig.
GTL → GC → PEB (moderated by GOC)	0.072	0.033	0.0188	0.0601	0.1335	Yes

et al. 2022). This suggests that GTL may not yet constitute a stable or deeply internalized influence mechanism in the cosmetics sector, where environmental expectations and organizational routines continue to evolve.

The modest association between GTL and PEB aligns with research showing that environmentally oriented behavior rarely results from leadership cues alone (Begum et al. 2022; Zhou et al. 2018). PEB typically reflects the combined influence of motivational readiness, contextual affordances, and organizational support structures (Al-Ghazali and Afsar 2020). In this context, GC emerges as a consequential pathway. The observed mediation is consistent with earlier findings highlighting that creativity can translate environmental vision into concrete action by stimulating problem-solving, innovation, and psychological engagement (Farooq et al. 2022; Krishnan and Arora 2008; Maitlo et al. 2022).

The finding of full mediation indicates that leadership affects PEB primarily through the activation of creative processes rather than direct behavioral modeling. However, this interpretation must be considered cautiously. Cross-sectional data cannot differentiate temporal ordering, and the strong intercorrelations among GTL, GOC, and GC raise the possibility of suppressor-like dynamics in mediation estimates. Thus, although creativity appears to be a plausible behavioral mechanism, the results should be viewed as consistent with—rather than definitive evidence of—a motivational pathway. The presence of a significant moderated mediation index further clarifies the mechanism: The strength of the GTL → GC → PEB chain varies meaningfully across levels of GOC, demonstrating that contextual reinforcement shapes how creative engagement converts leadership signals into environmentally oriented actions.

GOC emerged as a central contextual facilitator. Rooted in shared norms and supported by HR practices (Sackmann 2012), green culture creates psychological and structural conditions that encourage participation in sustainability initiatives, enhance perceived organizational support, and strengthen links between leadership and creative engagement (Hameed et al. 2022; Malik et al. 2021). In this study, GOC amplified the indirect effect of leadership, suggesting that the degree to which creativity translates into PEB is contingent on cultural support. This aligns with evidence that culture fosters innovation and environmental participation, particularly when leadership and knowledge-sharing practices operate synergistically (Bhatti 2022; Simmou et al. 2025; Abualigah et al. 2023; Srivastava et al. 2024). Nonetheless, cultural influence observed here should be interpreted within industry-specific boundaries, as cosmetics firms may exhibit distinct normative pressures related to branding, consumer expectations, and environmental scrutiny.

From an SDT perspective, the mediating role of GC reflects the psychological processes through which leadership influence is internalized. GTL behaviors—such as articulating environmental purpose, expressing confidence in employees, and fostering autonomy—support basic psychological needs for autonomy, competence, and relatedness (Ryan and Deci 2000). When these needs are met, employees are more likely to internalize environmental values and express them through creative, self-initiated behavior. This SDT-based interpretation helps explain why the direct GTL → PEB link weakens once creativity enters the model: Intrinsic motivation becomes the operative mechanism driving environmentally responsible action.

The positive relationship between GTL and GOC reinforces the idea that leadership and culture function as interconnected mechanisms. Although leadership behaviors may shape cultural perceptions, they do not singularly account for them; broader HR practices, communication structures, and organizational routines contribute to the formation of environmental culture (De Witte and Van Muijen 1999; Hameed et al. 2022). This interdependence underscores the importance of examining leadership and culture jointly rather than as isolated antecedents.

Comparative analysis with previous studies reveals that earlier research tended to identify partial mediation between transformational leadership and environmental outcomes (Chen and Chang 2013; Mittal and Dhar 2016; Jia et al. 2018). The stronger reliance on creative mechanisms observed here may reflect contextual features of the emerging-market setting and the developmental stage of environmental practices in the cosmetics industry. Similar contextualized findings showing creativity as a dominant behavioral mechanism have been documented in settings emphasizing collective values and adaptive learning (Li, Bhutto, et al. 2020; Bhatti 2022; Srivastava et al. 2024). These parallels suggest that leadership effectiveness is tied not only to leader behavior but also to how creativity and cultural norms converge to institutionalize sustainability-oriented practices within specific organizational environments.

6 | Conclusion

The study analyzed how GTL, GC, and GOC jointly relate to employees' PEB within the cosmetics sector. The model incorporated mediating and moderating mechanisms that clarified how leadership signals are interpreted and enacted in organizational settings. The results showed that GC statistically mediated the relationship between GTL and PEB, indicating that leadership influence is expressed primarily through employees' creative and cognitive engagement rather than direct behavioral modeling. The moderation effect of GOC indicated that cultural reinforcement shapes the strength of this indirect relationship, pointing to a multi-layered structure in which leadership, creativity, and culture operate together within environmental workplace dynamics.

The findings contribute to sustainability and organizational behavior literature by positioning creativity as a behavioral mechanism through which leadership-supportive cues may be transformed into environmentally oriented actions. The presence of a significant moderation effect further demonstrates that leadership influence does not operate uniformly across organizational contexts; instead, the clarity and strength of environmental norms appear to condition how effectively employees translate leadership inspiration into creative engagement. This pattern aligns with SDT (Ryan and Deci 2000), which proposes that autonomy-supportive behaviors increase psychological need satisfaction and foster internalization processes that facilitate self-directed environmental action. The results therefore underscore the value of examining motivational and contextual factors together when assessing sustainability-oriented leadership processes.

Organizational actors can draw on these findings to support the development of sustainability practices in the workplace. Leadership behaviors that encourage autonomy, competence, and meaningful purpose may stimulate employees' capacity to generate eco-focused ideas, particularly when combined with cultural norms that reinforce environmental expectations. The standardized coefficients observed in the model show that even modest improvements in leadership behavior or cultural reinforcement may produce discernible gains in creative engagement and environmental actions. These patterns suggest that organizations can strengthen their environmental performance by integrating leadership development with practices that institutionalize green values and support innovative problem-solving. Such implications should, however, be interpreted within the boundaries of the study's design and sampling frame.

The research context and method introduce several limitations. The focus on a single industry and national setting means that the observed relationships may reflect features specific to Türkiye's cosmetics sector, such as innovation-driven competition and high visibility of environmental issues. The cross-sectional and self-reported design limits claims about temporal ordering and causal direction, and high correlations among predictors raise the possibility that suppressor-like effects may have influenced the mediation estimates. Additional data sources and longitudinal approaches would enhance future examinations by reducing potential method bias and providing clearer insight into the temporal dynamics of leadership, creativity, and culture. Broader cross-industry and cross-national replication would further clarify how institutional maturity, cultural norms, and sector-specific pressures interact with leadership processes to shape PEB.

The overall pattern of results highlights that environmental behavior in organizations emerges through the alignment of leadership cues, creative engagement, and cultural support rather than through leadership action alone. This configuration offers a clearer theoretical specification of how behavioral mechanisms emerge within sustainability-oriented organizations. The evidence indicates that leadership does not exert influence in isolation but depends on employees' cognitive engagement and the cultural reinforcement of environmental norms. This framework extends existing research by demonstrating that creativity functions as a generative mechanism rather than a downstream outcome, and that cultural support operates as a contingency that shapes the efficiency of motivational processes. These analytical insights refine the explanatory boundaries of sustainability-focused leadership models and advance a more integrated understanding of how micro-level motivation and meso-level cultural structures jointly shape PEB. The interaction among these elements illustrates the complexity of sustainability transformation in organizational environments, where individual motivation, shared norms, and contextual reinforcement must operate together to produce consistent environmental outcomes. GC appears to play a central role in this process by linking leaders' environmental vision with employees' capacity to enact sustainability-oriented behaviors. This perspective offers a foundation for both theoretical refinement and practical implementation in organizations aiming to advance their environmental goals.

7 | Recommendations

7.1 | Recommendations for Literature

Sustainability research increasingly requires models that clarify how individual-level mechanisms operate within organizational contexts. The present study contributes to this need by identifying an indirect pathway in which GTL influences PEB primarily through GC. The evidence indicates that the GTL–PEB association is not linear but channeled through cognitive and creative processes. GOC strengthens this pathway, functioning as a boundary condition that shapes the degree to which leadership-induced creativity translates into behavior. By examining this multi-layered model within the cosmetics sector in Türkiye, the study adds contextual depth to sustainability scholarship and highlights a setting that remains underrepresented in the literature.

A single-industry sample offers the advantage of contextual focus but also restricts generalizability. Comparative studies across manufacturing, tourism, and healthcare could test whether the indirect and moderated relationships observed here are sector-specific or broadly applicable across institutional environments. Such designs would help determine whether the GTL → GC → PEB mechanism is contingent on the competitive dynamics and innovation pressures characteristic of cosmetics firms or whether it generalizes to industries with different operational logics.

Sociodemographic variables—although controlled statistically—may exert theoretically meaningful effects on sustainability engagement. Age, gender, tenure, and hierarchical position may moderate or mediate how employees interpret leadership cues and cultural signals. Treating these factors as substantive constructs rather than peripheral controls would enhance the explanatory power of future models. Additional constructs such as organizational climate (Zientara and Zamojska 2018), green innovation (Awan et al. 2023), green HRM practices (Chen and Yan 2022), environmental commitment (Cop et al. 2020), green learning (Cui et al. 2023), team-level resistance (Cop et al. 2020), and environmental knowledge (Farrukh et al. 2022) could extend the conceptual

model by enabling more complex moderated–mediated designs.

Theoretical development would also benefit from deeper engagement with environmental psychology (Russell and Ward 1982; Gifford 2014) and motivation-based frameworks such as SDT (Ryan and Deci 2000). These perspectives can illuminate the psychological conditions—autonomy, competence, and relatedness—through which leadership prompts creativity and, in turn, environmentally oriented behavior. A more explicit integration of these mechanisms would support the transition from outcome-based models to frameworks that explain the perceptual and motivational foundations of individual participation in sustainability initiatives.

7.2 | Recommendations for Practice

Organizations in environmentally salient industries such as cosmetics can use the empirical patterns observed in this study to prioritize interventions with the strongest behavioral leverage. The path coefficient linking GTL to GC ($\beta = 0.723$) indicates that leadership behaviors oriented toward intellectual stimulation, vision articulation, and empowerment have a substantial impact on employees' creative engagement. Interventions that strengthen these competencies—such as training in autonomy-supportive communication or structured feedback designed to enhance competence—are likely to produce the largest behavioral return.

Human resource systems can reinforce this effect. Recruitment processes can incorporate assessments of environmental values, onboarding programs can introduce green role expectations, and performance evaluations can include creativity-based sustainability indicators (Zafar and Suseno 2024). These practices are consistent with the empirical finding that GC predicts PEB with moderate strength ($\beta = 0.492$), suggesting that employees' creative engagement functions as a pivotal behavioral gateway. Reward mechanisms recognizing eco-innovation and problem-solving further reinforce this pathway by legitimizing creativity as a valued organizational output.

A supportive GOC enhances the translation of creativity into PEB. Internal communication that consistently frames environmental goals, ongoing training, and cross-functional collaboration platforms can strengthen perceptions of cultural alignment. The moderated mediation detected in the study shows that the influence of leadership becomes more behaviorally consequential under strong cultural conditions. This implies that leadership development alone is insufficient; cultural reinforcement is necessary for the observed indirect effects to materialize.

Structures that enable bottom-up participation—such as open idea systems or sustainability-focused innovation labs—can further support employee ownership. These formats align with evidence that green cultures enhance creativity by encouraging participation in environmentally oriented work practices (Bhatti 2022; Simmou et al. 2025). Leadership behavior interacts with these structures by providing direction and psychological safety (Abualigah et al. 2023; Srivastava et al. 2024), reinforcing the complementary relationship between leader practices and cultural mechanisms.

The findings apply specifically to the cosmetics sector in Türkiye and reflect the sustainability expectations, competitive pressures, and consumer dynamics characteristic of this context. Organizations in other industries should therefore adapt these recommendations cautiously, considering whether their operational structures and cultural norms align with the mechanisms observed here. Cross-sectoral replication will be needed before broader managerial prescriptions can be made with confidence.

7.3 | Organizational Change Perspective

From an organizational change perspective, the findings indicate that green transformation is not a top-down directive but a multilevel cultural and behavioral process that depends on sustained participation and internalization. Change unfolds through shared meaning and daily practice, where formal roles, informal norms, and individual creativity intersect. GTL may initiate this process, yet its long-term impact relies on cultivating a climate that supports creative engagement and on building a shared green identity embedded in organizational routines.

This interpretation resonates with the approach of the *Journal of Organizational Change Management*, which views change not only as structural adaptation but also as a symbolic, discursive, and behavioral reconstruction of meaning within organizations. Within this framework, leadership functions as a facilitator of collective sense-making rather than a top-down enforcer.

The combined influence of GC and GOC on PEB also reflects the central logic of the Theory of Planned Behavior. GC represents employees' cognitive and attitudinal readiness for sustainable action, whereas GOC provides normative and behavioral support. When these elements align, intentions are more easily converted into action, reinforcing planned behavioral change at the micro-level.

Overall, the interaction of leadership, culture, and creativity demonstrates that sustainability transformation extends beyond strategic plans or formal structures. It emerges through deeper psychological, cultural, and symbolic reconfigurations embedded in everyday organizational life.

7.4 | Unexpected Findings and Interpretations

An interesting and somewhat unexpected finding was that the direct effect of GTL on PEB became statistically insignificant once GC was introduced as a mediator. Although prior studies (e.g., Begum et al. 2022) have identified both direct and indirect effects, the present results indicate that, in this context, the behavioral influence of leadership depends entirely on the activation of creative processes. Leadership alone may therefore be insufficient to foster environmentally responsible behavior unless it stimulates employees' cognitive and imaginative capacities.

This finding strengthens a key principle of behavioral sustainability research: Values must be matched with capabilities. Leadership can articulate vision, but creativity translates that vision into action. The absence of a direct effect also opens space for further theoretical reflection. In emerging market contexts, where sustainability norms are still forming, employees may require stronger psychological enablers—such as confidence, autonomy, and perceived agency—to transform leadership messages into consistent behavior.

Practically, organizations should reconsider how leadership initiatives are embedded within their internal systems. Without a climate that encourages experimentation, divergent thinking, and open expression, even the most committed green leadership efforts risk remaining symbolic rather than behavioral. Psychological safety, innovation support, and creative legitimacy are therefore essential preconditions for meaningful sustainability transformation.

7.5 | Limitations and Future Research Directions

This study provides meaningful theoretical and practical contributions, yet several limitations deserve consideration as opportunities for further conceptual and methodological development.

First, the research was conducted within a single industry and national context—Türkiye's cosmetics sector. The findings therefore reflect sector-specific dynamics such as high consumer visibility, product innovation pressures, and brand-oriented environmental sensitivity, which may not characterize other industries or institutional environments. This contextual concentration limits generalizability more than the original text implied. Future studies should examine whether the identified leadership–creativity–culture mechanisms hold in sectors such as manufacturing, tourism, or healthcare, and across countries with different sustainability norms and managerial traditions.

Second, the reliance on self-reported survey data introduces the possibility of CMB and social desirability effects. Although diagnostic procedures such as Harman's one-factor test were applied, single-source responses may still inflate correlations through percept–percept consistency. More robust designs—multi-source ratings, peer or supervisor evaluations, or behavioral observations—would help reduce this risk. Longitudinal or experimental designs would also strengthen internal validity by separating measurement timing and improving construct representation.

Third, the cross-sectional design prevents establishing causal direction. The mediated and moderated relationships identified statistically are consistent with theory but do not confirm temporal sequencing or causal pathways. The possibility that the observed patterns reflect reciprocal influence or unmeasured variables cannot be excluded. Experimental manipulation of GC or time-lagged measurement of leadership and behavioral outcomes would provide stronger evidence for the proposed mechanisms.

Fourth, the model remains theoretically bounded, incorporating a limited set of antecedents and contextual factors. PEB is a multidimensional construct shaped by psychological, organizational, and environmental contingencies. Including factors such as green HRM practices, organizational climate, environmental mindfulness, or perceived behavioral control could increase explanatory depth and enhance policy relevance.

Fifth, rapid developments in digital transformation and technological innovation present additional avenues for research. As green technologies become integrated into organizational decision-making and operations, future studies should examine how digital tools interact with behavioral enablers such as creativity and organizational culture.

Finally, although the methodological approach is appropriate for the study's objectives, certain constraints must be acknowledged. Convenience sampling may limit representativeness, and firms that elected to participate may differ systematically from those that did not. Probability-based sampling or stratified designs, where feasible, would enhance external validity. The combination of convenience sampling, self-reported data, and cross-sectional measurement suggests that the findings should be interpreted cautiously and viewed as associative rather than causal. To further strengthen validity, future studies could incorporate multi-source or time-lagged data collection strategies.

Advancing sustainability research ultimately requires interdisciplinary models, causal research designs, and integrative frameworks that reflect the complex realities of organizational life under ecological strain. Future work may also integrate scientometric insights to trace how CSR and green innovation evolve across emerging markets (Sameer et al. 2023).

Author Contributions

In this study, the International Committee of Medical Journal Editors (ICMJE) principles of authorship were strictly followed and applied.

- All authors listed met the following criteria:
- Made a significant contribution to the conception, design, acquisition, analysis, or interpretation of data
- Wrote the article or revised it critically for important intellectual content
- Approved the final version of the article for publication.

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The authors have nothing to report.

Ethics Statement

This study was approved by the Hasan Kalyoncu University Research Ethics Committee (approval no. E-97105791-050.04-53629/2024-9) on March 6, 2024. There are no issues regarding the authors and/or their

institutions, funders, approval committees, and so forth that might compromise anonymity.

Consent

At the beginning of the digital survey form, participants were greeted with an informed consent letter. The survey process began for participants who voluntarily accepted written informed consent. The survey process ended for participants who did not wish to consent.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

For research data, please sincerely contact the corresponding author via duygubaltaci@gumushane.edu.tr.

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