

Fostering green innovation behavior: Integrating green ambidextrous leadership, green human resource management, and green mindfulness

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ABSTRACT

Purpose-Achieving sustainability goals depends not only on organizational efforts but also on employee engagement through green innovative behavior. This study examines the positive influence of green ambidextrous leadership and green human resource management on green innovative behavior, with green mindfulness as a mediating variable, among batik micro, small, and medium enterprises in Yogyakarta, Indonesia.

Methodology-This study employed a quantitative approach using a survey method. The researchers collected data through a questionnaire distributed to 157 respondents selected via purposive sampling based on predetermined criteria. This technique limits the generalizability of the findings to the entire population of batik micro, small, and medium enterprises. The data were analyzed using Smart PLS 4.0 to test validity, reliability, and hypotheses.

Findings-The results indicate that green ambidextrous leadership and green human resource management positively affect green innovative behavior and green mindfulness. Green mindfulness positively affects green innovative behavior and also partially mediates the relationship between the independent variables and the dependent variable.

Research Limitations-This study has several limitations, including the potential for recall bias, differences in respondents' understanding of the questionnaire, and a relatively small sample size. Future research could use supplementary interviews, simpler instruments, and a larger sample to provide a more accurate picture of environmental behavior.

Novelty-This study contributes by integrating social information processing theory and the componential theory of creativity to explain green mindfulness as a mechanism that translates organizational cues into innovative behavior at the individual level. The study's findings also confirm green mindfulness as a partial mediator linking green ambidextrous leadership and green human resource management to green innovative behavior. Previous research has explored this relationship relatively little.

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1. Introduction

Sustainability issues have become strategic challenges across various industrial sectors. Industrial activities generate greenhouse gas emissions, carbon footprints, and waste, straining

the environment's carrying capacity (Panagiotopoulou et al., 2022). These conditions have heightened regulatory pressure, investor concerns, and public expectations regarding corporate accountability for environmental impacts (Taboada et al., 2026). These pressures are driving organizations to integrate sustainability into their operations, including by developing sustainable products and eco-friendly innovations (Negri et al., 2021). However, these efforts require not only organizational changes but also individual engagement to identify and implement solutions to environmental problems (García-Arca et al., 2024). Thus, achieving sustainability goals requires employee involvement in driving change and generating innovative solutions in work activities.

This behavior is known as green innovative behavior: an individual's behavior in generating, promoting, and implementing new ideas for environmental protection within work activities (Song et al., 2023). This behavior encourages employees to actively identify and implement new solutions to environmental problems (Li et al., 2023). However, this aspect has not yet developed optimally among employees because of challenges such as low environmental awareness and limited organizational support (Piwowar-Sulej et al., 2025). In fact, management's sustainability practices do not necessarily translate into innovative employee behavior. How employees understand and respond to environmental demands at work influences such engagement (Zappalà et al., 2023). Therefore, understanding the factors that shape green innovation behavior is important so employees do not merely implement sustainability policies but become a source of green innovation within the organization.

In response, green ambidextrous leadership has emerged as a combination of a leader's ability to balance exploratory (opening leadership) and exploitative (closing leadership) behaviors to achieve sustainability goals (Prasetyo & Risdiana, 2026). This behavior reflects a leader's ability to give employees the freedom to experiment with new ideas and approaches while providing guidance and support to ensure effective implementation of these ideas (Mascareño et al., 2021). Together, these behaviors create a work culture that provides both freedom and clear direction, encouraging employees to view environmental issues as opportunities for innovation (Lu et al., 2025). Thus, the balance between exploratory and exploitative behaviors leaders exhibit fosters employees' green innovative behavior.

Green human resources management has also been shown to influence employees' green innovative behavior. Green human resources management refers to awareness of, adoption of, and implementation of human resources practices related to sustainability (Bahuguna et al., 2021). These practices instill environmental awareness in work activities while providing the skills, knowledge, and organizational support needed to develop innovative ideas. Yunaningsih et al. (2024) also identified this aspect as a factor in enhancing employees' green innovative behavior. Previous studies have tended to position green ambidextrous leadership and green human resources management as factors that directly drive green innovative behavior. However, when the organizational environment already supports sustainability, it is important to understand how that support influences individuals. This highlights the need for additional internal mechanisms to explain this process.

One mechanism that may explain this discrepancy is green mindfulness, that is, the attention and awareness organizational members pay to environmental information, opportunities, and consequences during the performance of their work (Özgül, 2025). Green ambidextrous leadership activates employees' internal processes of thinking, feeling, and considering environmental impacts in decision-making (Lu et al., 2025). In contrast, green human resources management creates a work environment that supports sustainability, so exposed employees develop heightened internal awareness of environmental issues through their central nervous system (Li & Li, 2025). Recent studies also find that green mindfulness can enhance employees' creativity, innovation, and ability to generate new ideas (Zhao et al., 2023; Emilisa et al., 2025). Although researchers have identified relationships among these variables, few studies have specifically tested green mindfulness as a mediator. Few studies have examined green human resources management, green mindfulness, and green innovative behavior as a cohesive mechanism.

Social information processing theory (SIPT) helps explain this gap, as it posits that green ambidextrous leadership and green human resources management serve as sources of information and social cues that shape employees' attention to and interpretation of environmental issues (Salancik & Pfeffer, 1978). Furthermore, the componential theory of creativity (CTC) explains how such attention and awareness can support the cognitive processes involved in exploring and implementing new ideas (Amabile, 1983; Ho et al., 2022). By integrating these two theories, this study positions green mindfulness as an internal process that links organizational environmental cues to green innovative behavior at the individual level.

Batik micro, small, and medium enterprises (MSMEs) are a pillar of the creative industry, contributing to the economy, creating jobs, and preserving national culture. In Yogyakarta, Indonesia, 1.687 batik businesses employ 4.827 workers; thus, the sector's sustainability is crucial not only for the local economy but also for the continuity of its production activities. However, the batik production process poses several environmental challenges, including liquid waste containing synthetic dyes and chemicals (Susanto & Putranto, 2022). Various greening efforts have begun, such as using natural dyes, recycled packaging, and constructing wastewater treatment plants (WWTPs) (Wahab et al., 2025). However, implementation remains focused on production's technical aspects and has not yet achieved optimal results.

Various studies indicate that the implementation of sustainability in batik MSMEs is still constrained by human resource competencies (Agustinah et al., 2025), a lack of worker participation in environmental initiatives (Wijaya et al., 2022), institutional barriers, and internal organizational culture (Gunawan et al., 2022), as well as the suboptimal commitment of MSMEs to sustainability. The characteristics of batik MSMEs, which feature relatively close working relationships and simple management structures, make guidance, habit formation, and support from owners or managers a key way to foster environmental awareness among employees. Zacher et al. (2023) explain that environmental sustainability also depends on employees' behaviors and contributions to eco-friendly practices. However, how such support fosters green mindfulness and subsequently drives green innovative behavior in batik MSMEs requires further understanding. Therefore, this study examines the role of green ambidextrous leadership and green human resource management in green innovative behavior, with green mindfulness as a mediator, in batik MSMEs in Yogyakarta, Indonesia.

2. Literature Review and Hypothesis Development

Social information processing theory (SIPT), proposed by Salancik and Pfeffer (1978), explains how green ambidextrous leadership and green human resource management influence green innovative behavior and green mindfulness. This theory explains that individuals shape their behavior by processing information from the social and organizational environment (Salancik & Pfeffer, 1978). According to Salancik and Pfeffer (1978), individuals use social cues from the organization, leaders' behavior, and workplace interactions to shape their perceptions, thinking, and behavior. Based on SIPT, green ambidextrous leadership serves as a cue that encourages employees to both explore and implement environmentally friendly ideas (Khandiyas & Kustyadji, 2026), while green human resources management serves as a cue regarding the organization's priority values that can guide employee behavior (Yang & Li, 2023), thereby shaping green innovative behavior. SIPT also explains how these two independent variables serve as environmental cues that direct employees' attention and heighten their awareness of environmental issues, thereby fostering green mindfulness (Li & Li, 2025). Processing environmental cues creates cognitive conditions that support individual engagement in the creative process. However, SIPT has not specifically explained how these conditions translate into innovative behavior.

In response, this study also employs Amabile's (1983) componential theory of creativity (CTC) to explain the relationship between green mindfulness and green innovative behavior. The CTC explains that creativity and innovation result from the interaction among an individual's knowledge, creativity-supporting cognitive processes, intrinsic motivation, and a

conducive work environment (Amabile, 1983). Green mindfulness is a cognitive state that enables individuals to process environmental information more deeply, explore innovative solutions, and implement new, more environmentally friendly ideas as a form of green innovative behavior (Emilisa et al., 2025). Thus, CTC complements SIPT by explaining how cognitive states formed through processing environmental cues support the creative process and generate green innovative behavior. Integrating these two theories shows that social information from the organizational environment does not stop at individual perception and attention but can serve as input for the creative process, which can lead to innovative behavior.

Green Ambidextrous Leadership

Green ambidextrous leadership is a leader's ability to balance exploratory and exploitative behaviors to guide followers in supporting environmental goals (Lu et al., 2025). Leaders who practice green ambidextrous leadership can shift from opening behaviors (fostering autonomy, creativity, and risk-taking) to closing behaviors (emphasizing standardization, goal-setting, and performance monitoring) (Nguyen-Van et al., 2025). This approach balances exploring new ideas with optimizing existing processes, encouraging employees to propose and develop environmentally friendly solutions as a form of green innovative behavior (Khandiyas & Kustiyadi, 2026).

Green Human Resources Management

Green human resource management is a set of human resource management practices that integrate an environmental approach into management and work activities to support environmental protection and achieve organizational sustainability goals (Shafaei et al., 2026). These practices encourage employees to participate in environmentally friendly work activities, prevent pollution, and reduce negative environmental impacts (Pham et al., 2019). Through simple, consistently applied practices, green human resources management creates a work environment that encourages employees to implement innovative, environmentally oriented ideas (Kara et al., 2023).

Green Mindfulness

Green mindfulness is a psychological state that reflects an individual's attention to and awareness of the environmental context, information, and consequences in their work to support sustainability (Rathakrishnan et al., 2024). This concept is characterized by employees' willingness to consider alternative perspectives, attention to current conditions, sensitivity to operational details, and interest in exploring more environmentally friendly solutions (Ho et al., 2022). Green mindfulness helps employees understand the environmental impacts of business practices, identify improvement opportunities, and develop new ideas and solutions that support green innovative behavior (Emilisa et al., 2025).

Green Innovative Behavior

Green innovative behavior refers to employee behavior oriented toward creating and implementing new ideas, methods, or solutions to enhance environmental protection in work activities (Zhu et al., 2022). This behavior encourages employees to explore the relationship between green technology and customers' environmental needs and to address environmental issues through eco-friendly solutions (Xu et al., 2022). Additionally, green innovative behavior helps companies improve environmental performance by saving energy, reducing pollution, and strengthening competitiveness (Ma & Wang, 2024).

Hypothesis Development

Green Ambidextrous Leadership and Green Innovative Behavior

SIPT explains that individual behavior is shaped by interpretations of social cues from the work environment (Salancik & Pfeffer, 1978). Green ambidextrous leadership sends social cues that signal the organization's commitment to sustainability. Employees interpret these cues as support for exploring new ideas about environmental issues (Xu et al., 2022),

motivating them to generate, develop, and implement creative, environmentally friendly ideas as green innovative behavior (Prasetyo & Risdiana, 2026). According to Khandiyas and Kustiyadji (2026), green ambidextrous leadership creates space for innovation and provides clear implementation guidelines for employees, encouraging them to develop and implement environmentally friendly ideas. **H₁: Green Ambidextrous Leadership Has a Positive Effect on Green Innovative Behavior**

Green Human Resource Management and Green Innovative Behavior

In the SIPT model, Salancik and Pfeffer (1978) explain that workplace practices serve as information that shapes employee behavior. Green human resources management provides social cues through employee management practices that instill environmental motivation in work activities (Darvishmotevali & Altinay, 2022). These practices show that the organization values environmentally friendly behavior, shaping green perceptions and values that encourage employees to develop and implement creative ideas as green innovative behavior (Song et al., 2023). According to Piwowar-Sulej and Iqbal (2025), green human resources management practices such as eco-friendly training equip employees with the knowledge, mindset, and skills needed to develop innovative solutions. Thus, green human resources management can influence employees' green innovative behavior (Kara et al., 2023). **H₂: Green Human Resource Management Has a Positive Effect on Green Innovative Behavior**

Green Ambidextrous Leadership and Green Mindfulness

From the SIPT perspective, the work environment provides social cues that help employees form perceptions about important matters that need attention in their work (Salancik & Pfeffer, 1978). Green ambidextrous leadership provides social cues that foster employees' awareness that environmental issues are a priority that must be addressed in work activities (Zhang & Suntrayuth, 2024). This awareness enhances focus, attention to the present moment, and sensitivity to environmental information, as reflected in green mindfulness (Thampanichwat et al., 2023). According to Lu et al. (2025), green ambidextrous leadership serves as a situational cue that can activate employees' internal thought and emotional processes, thereby shaping cognitive states such as green mindfulness. Thus, green ambidextrous leadership can influence the development of employees' green mindfulness. **H₃: Green Ambidextrous Leadership Has a Positive Effect on Green Mindfulness**

Green Human Resource Management and Green Mindfulness

Employee management practices such as green human resource management shape employees' perceptions of what the organization prioritizes (Salancik & Pfeffer, 1978). Practices such as environmental training, performance evaluations, and rewards for eco-friendly behavior then guide employees' thinking and actions in daily work activities (Chen et al., 2021). This interpretation encourages employees to be more environmentally sensitive, increases their environmental awareness, and fosters vigilance regarding environmental issues, all of which are reflected in green mindfulness (Ho et al., 2022). According to Arintowati et al. (2026), green human resource management enhances green mindfulness by consistently providing sustainability information that directs employees' attention to the importance of environmental protection. Environmentally friendly training programs enhance employees' green mindfulness by equipping them with the green skills needed to recognize the environmental impacts of work activities, making them more careful and aware when making sustainability decisions (Li & Li, 2025). **H₄: Green Human Resource Management Has a Positive Effect on Green Mindfulness**

Green Mindfulness and Green Innovative Behavior

According to the CTC, creativity arises from an individual's ability to identify problems, process information, and generate solutions that are valuable to the organization (Amabile, 1983). Green mindfulness makes employees more aware of the environmental impacts of work processes, enabling them to evaluate existing practices and consider more

environmentally friendly alternatives (Chen & Wu, 2022). This cognitive process enhances employees' ability to generate and use original ideas to solve environmental problems, as reflected in green innovative behavior (Zhao et al., 2023). According to Henriksen et al. (2020), green mindfulness enhances individuals' ability to view problems from multiple perspectives through increased empathy and openness to experience, helping them generate creative ideas in the workplace. When organizational members recognize the negative impacts of business practices, motivation arises to seek and implement more environmentally friendly solutions in their work activities as a form of green innovative behavior (Van et al., 2023). **H₅: Green Mindfulness Has a Positive Effect on Green Innovative Behavior**

Green Ambidextrous Leadership and Green Innovative Behavior: The Mediating Role of Green Mindfulness

Green ambidextrous leadership signals the importance of sustainability issues by developing assets and optimizing existing environmentally friendly work systems (Zhang & Suntrayuth, 2024). Based on the SIPT framework, employees interpret these signals as guidelines for thinking and acting, increasing their attention and awareness, which green mindfulness reflects (Salancik & Pfeffer, 1978; Zhou, 2024). Furthermore, CTC explains that this awareness enhances employees' ability to recognize environmental issues and process that information into innovative solutions (Amabile, 1983). This cognitive process underpins employees' creativity and innovation, which manifests as green innovative behavior (Van et al., 2023). Although green ambidextrous leadership can directly influence green innovative behavior, green mindfulness may mediate this influence. Lu et al. (2025) found that green mindfulness mediates the positive relationship between green ambidextrous leadership and green innovative behavior. Thus, green mindfulness serves as the psychological mechanism bridging green ambidextrous leadership and green innovative behavior. **H₆: Green Ambidextrous Leadership Has a Positive Effect on Green Innovative Behavior with Green Mindfulness as a Mediator**

Green Human Resource Management and Green Innovative Behavior: The Mediating Role of Green Mindfulness

Green human resource management serves as a workplace signal through human resource management oriented toward environmental protection (Miah et al., 2024). Based on the SIPT, employees interpret this signal as guidance on how to act and think in all environmental activities at work (Salancik & Pfeffer, 1978), which in turn fosters employees' green mindfulness. Subsequently, employees' green mindfulness heightens their awareness of environmental issues while keeping them open to new information, forming the basis for developing innovative solutions as a form of green innovative behavior (Mei-Jiao, 2025). In line with this, CTC explains that individuals who are sensitive to environmental issues are more likely to explore alternatives and implement new solutions as part of their creativity (Amabile, 1983). Conceptually, pro-environmental behavior may serve as the psychological mechanism linking green human resource management and green innovative behavior. **H₇: Green Human Resource Management Has a Positive Effect on Green Innovative Behavior with Green Mindfulness as a Mediator**

Based on the hypotheses outlined above, this study proposes a conceptual model that positions green human resource management and green ambidextrous leadership as independent variables, green mindfulness as a mediating variable, and green innovative behavior as the dependent variable. Figure 1 presents the study's conceptual model.

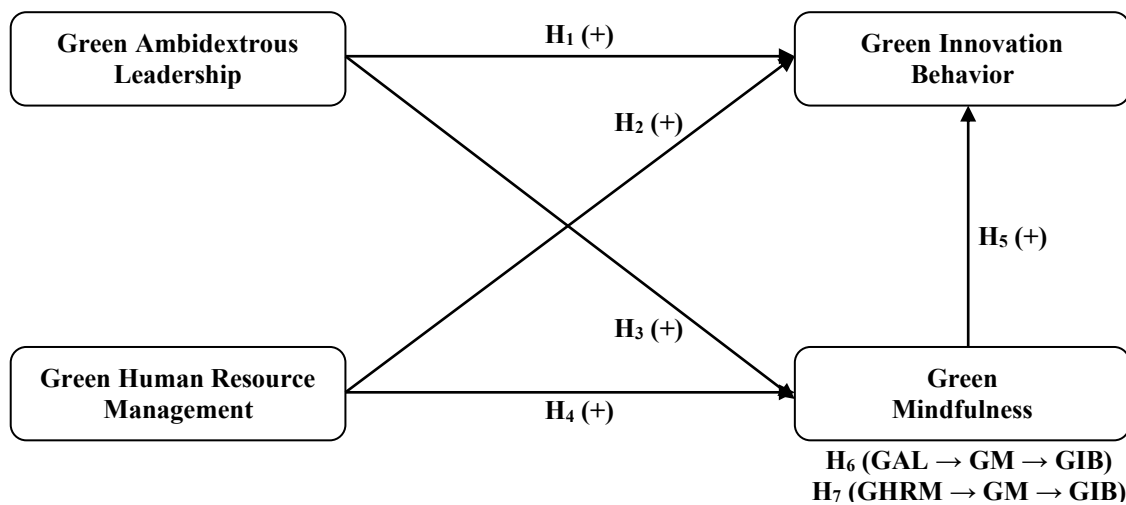


Figure 1. Conceptual Framework

3. Research Methodology

This study uses a quantitative survey approach focused on employees of Batik MSMEs in Yogyakarta, Indonesia. The study covers five administrative regions in Yogyakarta, namely Sleman, Bantul, Kulon Progo, Gunungkidul, and Yogyakarta City. The study used purposive sampling, requiring respondents to meet certain criteria before completing the questionnaire. The criteria were: respondents must be at least 18 years old; must have worked at a batik MSME for at least one year; must be involved in day-to-day operational activities; and must still be actively employed at the time of data collection. These criteria ensured respondents had sufficient work experience and could provide information relevant to the organization's conditions at the time of the study. A total of 157 participants were successfully recruited through the distribution of questionnaires. This sample size met the requirements for partial least squares structural equation modeling (PLS-SEM) research of moderate complexity, which requires at least 100 respondents to produce stable estimates (Hair et al., 2021).

The questionnaire used indicator items from previous studies to ensure validity and reliability. All items were measured using a 1–5 Likert scale. Before completing the questionnaire, respondents underwent a screening process to ensure the study's objectives were met. Respondents completed several questions and fields to provide their personal information. Respondents were informed that all answers and personal data would be kept confidential and used solely for research purposes. To minimize bias during questionnaire completion, statements were organized by independent variable, mediating variable, and dependent variable. Each section included a brief explanation of the variables and instructions for completion. The green ambidextrous leadership variable has two indicators: green opening leadership and green closing leadership, each with seven statement items, for a total of 14 statement items adopted from Rosing et al. (2011); the green human resource management variable has five statement items from Rubel et al. (2020); the green mindfulness variable has 4 statement items from Li and Li (2025); and the green innovative behavior variable has 5 statement items from Piwowar-Sulej and Iqbal (2025). Table 1 presents all indicator items.

The data were then analyzed using SmartPLS 4.0 with the PLS-SEM approach. In the initial stage, validity was assessed by examining outer loadings (>0.7) and average variance extracted (AVE) (>0.5), in accordance with Ghazali's (2021) criteria. Subsequently, reliability testing was performed by examining Cronbach's alpha and composite reliability, with a requirement of >0.7 (Ghozali, 2021). This study also examined the variance inflation factor (VIF) values for each variable indicator. VIF values must not exceed 5 to avoid multicollinearity issues among the variables (Hair et al., 2021). Finally, hypothesis testing was conducted by examining the P-value (>0.05) and t-statistics (>1.96) (Ghozali, 2021).

Table 1. Measurement Items and Indicators

Variable	Definition	Item Indicator
Green Ambidextrous Leadership (GAL) (Rosing et al., 2011)	A supervisor's ability to balance freedom to innovate with guidance and oversight to foster a supportive environment.	Opening Leadership GAL1: My supervisor gives me the freedom to use different approaches to get the job done. GAL2: My supervisor encourages me to try out various new ideas at work. GAL3: My supervisor motivates me to take risks when trying new approaches. GAL4: My supervisor allows me to think and act independently. GAL5: My supervisor gives me the space to express and develop my own ideas. GAL6: My supervisor is tolerant when mistakes occur while trying new methods or ideas. GAL7: My supervisor encourages me to learn from my mistakes. Closing Leadership GAL8: My supervisor monitors and controls the achievement of work goals. GAL9: My supervisor establishes routines or work procedures that must be followed. GAL10: My supervisor takes corrective action when mistakes occur at work. GAL11: My supervisor ensures that work is performed in accordance with established rules. GAL12: My supervisor ensures that work is performed consistently in accordance with established standards. GAL13: Supervisors impose disciplinary action when mistakes are made that violate regulations. GAL14: Supervisors ensure that work continues to be carried out as planned.
Green Human Resources Management (GHRM) (Rubel et al., 2020)	Employee management practices that integrate environmental considerations into work activities and management to support sustainability.	GHRM1: My workplace sets environmental sustainability goals for employees. GHRM2: My workplace provides environmental training to develop the knowledge and skills needed for environmental management. GHRM3: My workplace takes employees' environmentally friendly behavior into account in performance evaluations. GHRM4: My workplace takes employees' environmentally friendly behavior into account when offering promotion opportunities. GHRM5: My workplace takes employees' environmentally friendly behavior into account when awarding recognition and compensation.
Green Mindfulness (GM) (Li & Li, 2025)	A psychological state that reflects an individual's attention to and awareness of environmental information, conditions, and consequences in the workplace.	GM1: I have the freedom to discuss various environmental issues and problems, including environmentally friendly activities, services, and products. GM2: I can express differing opinions on environmental issues at my workplace. GM3: Sharing and disseminating new knowledge and information about the environment is valued at my workplace. GM4: I know my coworkers well and can discuss or consult with them when faced with unexpected environmental problems.
Green Innovative Behavior (GIB) (Piwowar-Sulej & Iqbal, 2025)	Employee behavior in creating, promoting, and implementing new ideas, methods, or solutions to improve environmental protection in the workplace.	GIB1: I look for new ideas regarding environmentally friendly technologies, processes, and products. GIB2: I generate new ideas for environmental protection. GIB3: I promote new environmental ideas to my coworkers. GIB4: I obtain and manage the resources needed to implement new environmental ideas. GIB5: I develop a schedule for implementing new environmental ideas.

4. Result and Discussion

Table 2 shows that most respondents were women, totaling 83 participants. Sixty-seven respondents were aged 36–45. By educational level, most respondents were high school graduates (65 participants). Most employees at batik MSMEs in Yogyakarta had worked for more than 6 years (73 respondents). The largest number of respondents lived in Yogyakarta city (58 people). This distribution reflects the data collection location, which centered on batik trading hubs, specifically the Beringharjo area and its surroundings, resulting in a higher concentration of respondents in Yogyakarta city and nearby areas. No respondents were from Kulon Progo or Gunungkidul because those regions were outside the primary data-collection scope.

Table 2. Respondent Demographics

Characteristics	Frequency	Percentage
Gender		
Man	74	47.1
Woman	83	52.9
Age (years)		
26-35	14	8.9
36-45	67	42.7
46-55	58	36.9
>55	18	11.5
Education Level		
Junior High School Graduate	43	27.4
High School Graduate	65	41.4
Bachelor's Degree	49	31.2
Years of Experience		
1–3 years	41	26.1
4–6 years	43	27.4
>6 years	73	46.5
Domicile		
Yogyakarta City	58	36.9
Sleman	51	32.5
Bantul	48	30.6
Kulon Progo	0	0
Gunungkidul	0	0

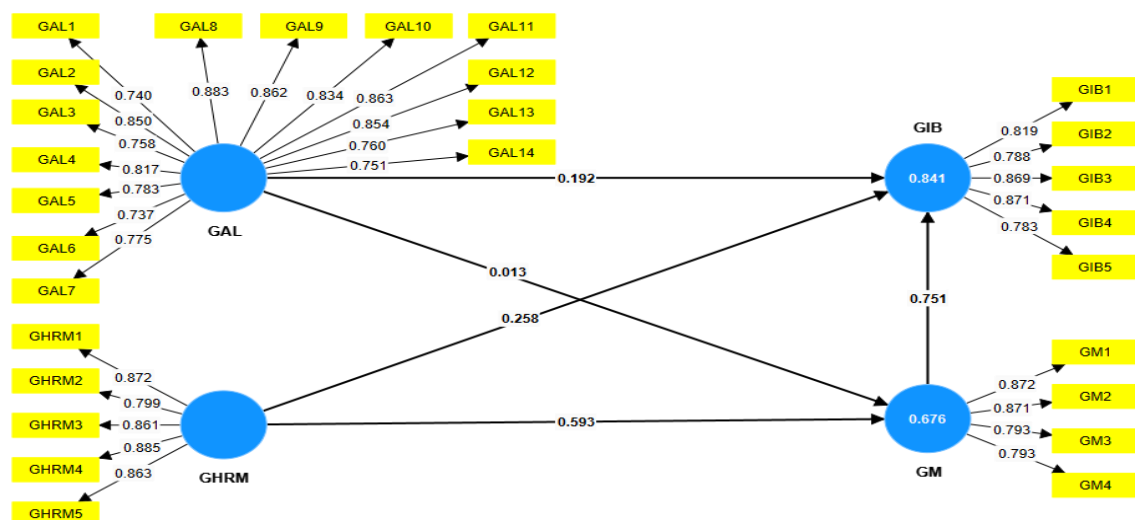


Figure 2. Measurement Model

Figure 2 shows the outer-loading values of the measurement model using PLS-SEM. The results indicate that all indicators meet the validity criteria, with outer loadings (>0.7) and AVE values (>0.5) (Ghozali, 2021). These results are consistent with the values presented in Table 3. Furthermore, the reliability test results also indicate that all indicators are reliable, with Cronbach's alpha and composite reliability values >0.7 (Ghozali, 2021). The test results also showed that several indicators had VIF values >5 . Hair et al. (2021) noted that this evaluation primarily applies to formative research models, whereas this study used a reflective research model; therefore, VIF values were not a primary criterion in the model evaluation. Consequently, this research model showed no multicollinearity issues.

Table 3. Validity, Reliability, And VIF Tests

Indicator	Outer Loading	VIF	AVE	Cronbach's alpha	Composite Reliability
Green Ambidextrous Leadership			0.651	0.958	0.963
GAL1	0.740	2.643			
GAL2	0.850	4.166			
GAL3	0.758	2.344			
GAL4	0.817	3.463			
GAL5	0.783	3.145			
GAL6	0.737	2.317			
GAL7	0.775	2.933			
GAL8	0.883	4.334			
GAL9	0.862	4.692			
GAL10	0.834	3.508			
GAL11	0.863	4.019			
GAL12	0.854	5.481			
GAL13	0.760	11.986			
GAL14	0.751	11.450			
Green Human Resource Management			0.733	0.909	0.932
GHRM1	0.872	2.746			
GHRM2	0.799	1.950			
GHRM3	0.861	2.552			
GHRM4	0.885	3.050			
GHRM5	0.863	2.570			
Green Mindfulness			0.694	0.852	0.901
GM1	0.872	2.488			
GM2	0.871	2.433			
GM3	0.793	1.745			
GM4	0.793	1.705			
Green Innovative Behavior			0.683	0.884	0.915
GIB1	0.819	2.090			
GIB2	0.799	1.895			
GIB3	0.861	2.848			
GIB4	0.885	2.818			
GIB5	0.863	1.793			

Table 4 shows the bootstrapping results for hypothesis testing in Smart PLS 4.0. All hypotheses were accepted because the p-values were < 0.05 and the t-statistics were > 1.96 , as required by Ghozali (2021).

Table 4. Hypothesis Test Results

Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Green Ambidextrous Leadership → Green Innovative Behavior	0.386	0.392	0.083	4.619	0.000
Green Human Resource Management → Green Innovative Behavior	0.459	0.451	0.104	4.409	0.000
Green Ambidextrous Leadership → Green Mindfulness	0.258	0.264	0.079	3.261	0.001
Green Human Resource Management → Green Mindfulness	0.593	0.585	0.094	6.311	0.000
Green Mindfulness → Green Innovative Behavior	0.751	0.738	0.074	10.122	0.000
Green Ambidextrous Leadership → Green Mindfulness → Green Innovative Behavior	0.194	0.195	0.062	3.127	0.002
Green Human Resource Management → Green Mindfulness → Green Innovative Behavior	0.445	0.429	0.066	6.737	0.000

Discussion

Green Ambidextrous Leadership and Green Innovative Behavior

The findings suggest that green ambidextrous leadership signals to employees that the organization provides flexibility to explore environmentally friendly ideas while also implementing sustainable practices (Farooq, 2025). From the SIPT perspective, these signals shape the perception that sustainability is a priority within the organization (Salancik & Pfeffer, 1978), thereby encouraging proactive employee behavior to seek out and adopt new solutions to environmental problems through green innovative behavior (Jabeen et al., 2024). Kabir et al. (2026) explain that green ambidextrous leadership fosters open-mindedness, experimentation, and independent thinking, which help generate innovative ideas as a form of green innovative behavior. In the context of batik MSMEs, these findings highlight the importance of giving workers the freedom to try new, more environmentally friendly production methods.

Green Human Resource Management and Green Innovative Behavior

Green human resource management significantly influences green innovative behavior, suggesting that integrating sustainability principles into human resource management can foster work behaviors that support environmental innovation (Chen et al., 2021). In batik MSMEs, these practices can be reflected in communicating sustainability values, developing knowledge, and encouraging employees to participate in improving production processes to make them more environmentally friendly. Salancik and Pfeffer (1978) explain that employees interpret information repeatedly conveyed through organizational policies and practices as guidelines for expected behavior within the organization. This interpretation encourages employees to generate and implement creative ideas related to environmental issues as green innovative behavior (Aboramadan, 2026). Previous studies have also confirmed that green human resource management equips employees with the knowledge and skills needed to identify green innovation opportunities (Khan et al., 2025; Mensah et al., 2026).

Green Ambidextrous Leadership and Green Mindfulness

Leadership that encourages employees to try new, more environmentally friendly approaches will increase employees' sensitivity to environmental issues (Malik et al., 2024). For batik MSMEs, leaders can foster green mindfulness by directly guiding workers to be more sensitive to the environmental impacts of the production process. From the SIPT perspective, green mindfulness cues employees' perceptions and workplace behaviors (Salancik & Pfeffer, 1978), which can be reflected in increased awareness, sensitivity, and full attention to

environmental issues. Amit et al. (2024) also argue that environmentally friendly leadership practices are crucial for developing self-awareness in green mindfulness.

Green Human Resource Management and Green Mindfulness

In the context of batik MSMEs, green human resource management practices do not always take the form of formal human resource policies; such practices can also be realized through guidance, modeling, and communicating environmental values in work activities. These practices serve as social cues that help workers understand the need to consider environmental impacts in their work (Salancik & Pfeffer, 1978). This understanding encourages employees to enhance their attention capacity, internal awareness, and higher-order nervous system functions, a state referred to as “green mindfulness” (Li & Li, 2025). According to Murillo-Ramos et al. (2024), green human resource management can enhance green mindfulness by increasing individuals’ awareness of the workplace context and available environmentally friendly information.

Green Mindfulness and Green Innovative Behavior

Employees who are highly attentive to environmental issues tend to be more sensitive to problems and more cautious when making environmentally friendly decisions (Sun & Xi, 2024). Attention to various environmental stimuli helps them discover new things and identify opportunities for improvement (Mulligan et al., 2021). In line with Amabile's (1983) perspective, the ability to identify problems and turn information into solutions underpins creativity and innovative behavior. Research on green mindfulness shows that it increases employees’ awareness of the environmental behaviors and impacts of their work activities, encouraging them to change harmful habits into more environmentally friendly ones, including green innovative behavior (Apaolaza et al., 2022). The more employees understand and pay attention to the environmental impacts of daily production processes, the more likely it becomes to identify parts of the process that can be improved using more environmentally friendly methods, including in the context of batik MSMEs.

Green Mindfulness Mediates the Relationship between Green Ambidextrous Leadership and Green Innovative Behavior

This finding indicates that green mindfulness bridges leadership directives and employees’ ability to identify environmental issues and develop more innovative work practices. This aligns with the SIPT framework, which explains that leaders’ behavior provides cues that shape how employees interpret sustainability within an organization (Salancik & Pfeffer, 1978). Owners or managers of batik MSMEs can provide guidance, set an example, and offer flexibility to improve environmentally impactful work practices. These cues foster employees’ intentional awareness of environmental issues, laying the foundation for green mindfulness (Rathakrishnan et al., 2024). From a CTC perspective, green mindfulness underpins the emergence of innovative ideas because employees are motivated to evaluate current practices, explore more environmentally friendly alternatives, and implement new solutions (Amabile, 1983; Cai et al., 2023). Thus, green mindfulness functions as a cognitive mechanism that translates leadership directives into innovative actions (Lu et al., 2025).

Green Mindfulness Mediates the Relationship between Green Human Resource Management and Green Innovative Behavior

This finding suggests that green human resource management practices do not automatically generate innovative behavior in the workplace; instead, these practices first foster attention to and awareness of environmental issues. These results are explained by integrating SIPT and CTC theories. SIPT, developed by Salancik and Pfeffer (1978), explains that various green human resource management practices serve as information sources and signals that employees interpret as valuable and prioritized within the organization. This awareness encourages employees to pay closer attention to sustainability-related information and understand organizational norms around sustainable behavior, helping them develop green

mindfulness (Murillo-Ramos et al., 2024). Furthermore, CTC explains green mindfulness's role in shaping green innovative behavior by encouraging employees to explore alternative solutions and implement innovative approaches to sustainability issues (Amabile, 1983). This study's findings align with previous research showing that green human resource management creates a work climate that fosters green mindfulness (Murillo-Ramos et al., 2024), which ultimately drives green innovative behavior (Sun & Xi, 2024). In the context of batik MSMEs, this mechanism can occur through simple practices such as instructions to reduce waste or pay attention to the impact of the dyeing process, which then encourages employees to seek more environmentally friendly work methods. Thus, the results provide empirical evidence of green mindfulness's mediating role in linking green human resource management and green innovative behavior.

5. Conclusion

This study provides empirical evidence that green ambidextrous leadership and green human resource management positively affect green innovative behavior and green mindfulness. Green mindfulness partially mediated the relationship between the two and green innovative behavior, as both the direct and indirect effects remained significant. This study shows that innovative behavior depends not only on organizational systems and support but also on employees' ability to notice and recognize environmental issues in the workplace. Green mindfulness helps employees identify environmental problems, explore alternatives, and implement environmentally friendly solutions. Thus, strengthening sustainability practices must go hand in hand with increasing environmental awareness and attention at the individual level.

This study was conducted to the best of our ability; however, several limitations remain and can inform improvements in future research. Data collection via questionnaires relies on respondents' perceptions and experiences, so recall bias is possible because most batik MSMEs do not maintain written records of their daily work activities. Furthermore, differences in respondents' backgrounds may affect their understanding of questionnaire terms or questions, which could reduce response consistency. Additionally, this study has a relatively small sample size compared to the overall population. Future studies may consider supplementary interviews, simpler, clearer instruments, and a larger sample to provide a more accurate picture of environmental behavior.

Theoretically, this study contributes by complementarily integrating the SIPT and CTC to explain the formation of green innovative behavior. The SIPT explains how organizational factors shape green mindfulness through environmental cues, while the CTC explains how these cognitive conditions support the creative process that drives green innovative behavior. This study also confirms green mindfulness as a partial mediator linking green ambidextrous leadership and green human resource management to green innovative behavior, thereby clarifying the role of individual internal mechanisms in transforming organizational factors into innovative behavior.

In practice, organizations can foster green innovative behavior through simple management practices that do not require large investments. Leaders can give employees space to share and test ideas for environmental improvements while offering clear guidance to ensure the effective implementation of these ideas in daily work activities. Green human resource management practices can also be implemented through direct coaching, feedback on environmentally friendly behavior, and non-financial rewards for employees who actively propose improvements. This approach is expected to raise employees' awareness of Batik MSMEs' sustainability priorities and encourage them to adopt behavioral and work standards that prioritize sustainability. This environment can also foster employee creativity and innovation, such as reducing hazardous waste, improving production process efficiency, and utilizing eco-friendly materials in batik production. This, in turn, can enhance the sustainability value of batik MSMEs and serve as a competitive advantage in the market.

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