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The Influence of Psychological Capital on Employees' Green Creativity and Green Work Engagement

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I. INTRODUCTION

In today's era of globalization, characterized by rapid and continuous business changes that are volatile, uncertain, complex, and ambiguous, numerous enterprises have emerged offering diverse products and services in the market. This intensifies competition, causing many companies to exit due to their inability to compete and sustain themselves. Consequently, businesses must continually adapt, learn, and innovate to optimize performance and ensure long-term survival. Achieving sustainable competitive advantage through the optimization of internal resources is essential, with human capital representing the most valuable and critical strategic asset.

Psychological capital (PsyCap), as a key component of human capital, provides a competitive edge and refers to a positive psychological mindset that motivates individuals to adapt effectively to their environment, manage stress, enhance well-being, and strengthen their advantage. PsyCap, characterized by hope, self-efficacy, resilience, and optimism, significantly impacts employee attitudes and behaviors including organizational commitment, job satisfaction, psychological well-being, organizational citizenship behavior, and job performance.

Green Human Resource Management (GHRM) strategies are essential to support pro-environmental behaviors, especially green work engagement (GWE) and green creativity (GC), where GWE reflects employees' energy, dedication, and absorption in environmentally responsible tasks, and GC involves generating practical green ideas for sustainable business practices. Studies show that PsyCap enhances creativity, work engagement, and pro-environmental behaviors. While PsyCap focuses on psychological resources, social capital (SC) emphasizes the value of social networks in fostering organizational success. Integrating PsyCap and SC can enhance motivation, collaboration, and adaptability, with frameworks such as the Job Demands-Resources (JD-R) Model and Conservation of Resources (COR) Theory highlighting their role in workplace well-being and performance. Increased SC fosters collaboration, reciprocity, well-being, performance, creativity, and engagement, all of which support GWE and GC. Additionally, demographic factors such as gender and educational attainment significantly influence pro-environmental behavior. Women tend to engage more in green behavior and individuals with higher education demonstrate stronger environmental attitudes and higher levels of PsyCap and SC.

Meanwhile, rapid urbanization and industrialization have intensified environmental problems in Indonesia, particularly in Jakarta and Surabaya, which are among the most polluted cities. Contributing factors include traffic, household emissions, forest fires, and industrial activity, with pollution estimated to cost over USD 220 billion annually, equal to 6.6% of Indonesia's GDP. SMEs play a critical role in Indonesia's economy, contributing 61% to

GDP and 97% of job creation, but are also responsible for 70% of environmental damage due to weak regulation and poor practices. These impacts necessitate sustainable practices and greater environmental awareness among SMEs. The study problem arises as many companies overlook human capital like PsyCap and SC in favor of other forms of capital, despite their potential to foster creativity and work engagement.

Air pollution in Indonesia is further worsened by urbanization and a lack of regulatory standards. Therefore, sustainable SME development is critical to improving environmental and economic outcomes. This study aims to explore how PsyCap, SC, and GHRM contribute to green creativity and work engagement within Indonesian SMEs. It is the first to investigate the direct influence of PsyCap on GC and GWE, and the mediating role of GHRM, as well as SC's moderating role. Demographic variables such as gender and education are also examined. Conducted in Jakarta, this interdisciplinary study addresses gaps in environmental behavior research in Asian contexts.

1.1 Significance of the study

In today's volatile business landscape, human capital has become more critical than physical or financial resources, as it is deeply embedded within an organization's culture, history, and structure, making it difficult to replicate. Recognizing human resources as capital is essential for achieving sustainable competitive advantage, with Psychological Capital (PsyCap) being a key component linked to positive behavior and performance. However, while previous research has examined PsyCap's general influence on pro-environmental behavior (PEB), few have explored its specific role in Green Creativity (GC) and Green Work Engagement (GWE). This study addresses that gap by investigating PsyCap's direct impact on GC and GWE, highlighting how psychological resources contribute to sustainability.

At the organizational level, Green Human Resource Management (GHRM) has been shown to promote PEB, including GC and GWE, yet its role as a mediator between PsyCap and these behaviors remains underexplored. Social Capital (SC) is another critical yet underexamined factor influencing workplace behaviors like creativity and engagement. Although SC has been linked to PEB, its role in GC and GWE remains largely unexplored. This study aims to fill that gap by examining SC as both a moderator and a factor mediated by GHRM in shaping GC and GWE.

Additionally, demographic factors like gender and educational attainment are considered for their potential influence on these behaviors. Given the study's context in Jakarta—one of the most polluted cities in Indonesia—and the lack of similar research in developing Asian countries, this study seeks to contribute meaningful insights into psychology, organizational behavior, and sustainability, particularly within the SME sector as a key driver of Indonesia's economy.

1.2 Research Objectives

The goal of this research is to investigate how psychological, organizational, and environmental factors are interconnected and how they contribute to improving environmental awareness and recognizing the significance of human resources for sustainability in small and medium-sized enterprises (SMEs) in Indonesia's most polluted cities. The study identifies these factors as crucial for promoting sustainability and presents the following objectives:

1. To examine the impact of PsyCap on employees' GC, GWE, and GHRM
2. To examine the impact of GHRM on GC and GWE
3. To examine the impact of SC on GHRM, GC, and GWE
4. To examine the effect of gender (male and female) on the development of PsyCap, SC, GC, and GWE.
5. To examine the impact of educational attainment (bachelor's, master's, and Ph.D.) on the development of PsyCap, SC, GC, and GWE.
6. To analyze the mediating role of GHRM in the relationship between PsyCap and employees' GC`and GWE, as well as in the relationship between SC and employees' GC and GWE.
7. To examine the moderating effect of SC in the relationship between PsyCap and employees' GC and GWE, mediated by GHRM.
8. To examine the moderating impact of gender (male and female), on the moderated mediation relationship between PsyCap, SC, GHRM, and both GC and GWE, as well as to further analyze how different gender categories influence this relationship.
9. To examine the moderating impact of educational attainment (bachelor's, master's, and Ph.D.) on the moderated mediation relationship between PsyCap, SC, GHRM, and both GC and GWE, as well as to further analyze how different educational attainment categories influence this relationship

1.3 Research questions

Based on the study objectives, the following research questions are formulated:

1. How does PsyCap influence employees' GC and GWE, as well as GHRM?
2. What is the impact of GHRM on employees' GC and GWE?
3. What is the impact of SC on GHRM, GC, and GWE?
4. How does gender, including both male and female, influence the development of PsyCap, SC, GC, and GWE?
5. How does educational attainment, including bachelor's, master's, and Ph.D., influence the development of PsyCap, SC, GC, and GWE?
6. How does GHRM mediate the relationship between PsyCap and employees' GC and GWE, as well as the relationship between SC and employees' GC and GWE?

7. How does SC moderate the relationship between PsyCap and employees' GC and GWE, mediated by GHRM?
8. How does gender, including both male and female, moderate the moderated mediation relationship between PsyCap, SC, GHRM, and both GC and GWE? Additionally, how do different gender categories influence this relationship?
9. How does educational attainment, including bachelor's, master's, and Ph.D., moderate the moderated mediation relationship between PsyCap, SC, GHRM, and both GC and GWE? Additionally, how do different educational attainment categories influence this relationship?

1.4 Hypotheses

This study proposes the following hypotheses to examine the direct, mediating, and moderating impacts of variables.

1.4.1 Direct Effects

H1a: PsyCap has a significant impact on employees' GC.
H1b: PsyCap has a significant impact on employees' GWE.
H1c: PsyCap has a significant impact on GHRM.

H2a: GHRM has a significant impact on employees' GC.
H2b: GHRM has a significant impact on employees' GWE.

H3a: SC has a significant impact on GHRM.
H3b: SC has a significant impact on GC.
H3c: SC has a significant impact on GWE.

H4a: Gender significantly influences the development of PsyCap
H4b: Gender significantly influences SC.
H4c: Gender significantly influences the development of GC.
H4d: Gender significantly influences the development of GWE
H5a: The educational attainment significantly influences the development of PsyCap
H5b: The educational attainment significantly influences SC.
H5c: The educational attainment significantly influences the development of GC
H5d: The educational attainment significantly influences the development of GWE.

1.4.2 Mediating Effects

H6a: GHRM significantly mediates the relationship between PsyCap and employees' GC.
H6b: GHRM significantly mediates the relationship between PsyCap and employees' GWE.
H6c: GHRM significantly mediates the relationship between SC and employees' GC.

H6d: GHRM significantly mediates the relationship between SC and employees' GWE.

1.4.3 Moderated Mediation Effects

H7a: SC significantly moderates the relationship between PsyCap and Employees' GC, mediated by GHRM.
H7b: SC significantly moderates the relationship between PsyCap and Employees' GWE, mediated by GHRM.

1.4.4 Demographic Factors Moderates Effects

H8a: Gender significantly moderates the moderated mediation relationship between PsyCap, SC, GHRM and both GC and GWE.
H8b: Women plays a substantial role in moderating the moderated mediation relationship between PsyCap, SC, GHRM and both GC and GWE
H9a: The educational attainment significantly moderates the moderated mediation relationship between PsyCap, SC, GHRM, and both GC and GWE.
H9b: The higher degree (Ph.D.) plays a substantial role in moderating the moderated mediation relationship between PsyCap, SC, GHRM and both GC and GWE
Figure 1 illustrates the proposed conceptual research framework based on the hypotheses presented in this study.

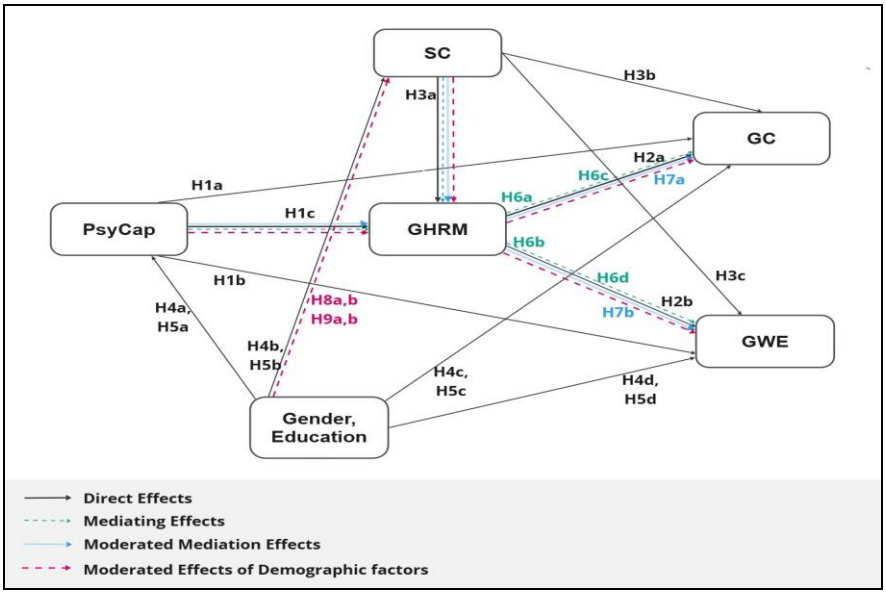

Figure 1. A Proposed Conceptual Framework Based on Literature and Hypotheses
Source: Author's own construction

II. MATERIALS AND METHOD

The methodology chapter serves as a vital part of this research, offering a thorough explanation of the research design, instruments, and procedures employed to gather and analyze data. It outlines the complete process, from formulating research questions to analyzing the collected data.

2.1 Research Process

This chapter describes the research approach, research instrument, sampling method and size, data analysis techniques, and the research flowchart, aiming to offer a clear and comprehensive explanation of the methodology so readers can understand how the study was conducted and how the findings were obtained. The research process involved six phases: first, defining the problem through a thorough literature review; second, developing the research approach and presenting the conceptual model; third, formulating the research design and hypotheses; fourth, creating a structured, closed-ended questionnaire for data collection; fifth, analyzing the data using statistical software; and finally, presenting and interpreting the results and discussion.

2.2 Research Design

According to Crano et al. (2014), research design is a comprehensive plan covering all stages of the research process, from hypothesis development to data analysis and conclusions. It guides investigation structure, variable selection, and study location. This study follows a step-by-step design: defining objectives; conducting a correlational study with sample selection and variable analysis; collecting and processing survey data; performing multivariate analysis using methods like correlation, group comparisons, and SEM; executing these models; and analyzing the results.

2.3 Research Tool

The research used a structured questionnaire with closed-ended questions as the primary data collection tool. This format offers advantages such as faster response times, easier data coding and analysis, and reduced dependence on respondents' communication skills, making it suitable for large samples and time-constrained studies.

2.3.1 Questionnaire Design and Development

Given the study's objectives and limitations, a structured questionnaire was appropriate to examine hypothesized relationships between Psychological Capital (PsyCap), Green Creativity (GC), and Green Work Engagement (GWE), with Green Human Resource Management (GHRM) as a mediator. Social Capital (SC) is explored as a direct, moderating, and mediating factor, while gender and educational attainment are assessed for moderation effects. Constructs include PsyCap, SC, GHRM, GC, GWE, Gender, and Educational Attainment. Ethical standards, as outlined by The University of Sheffield,

guided data collection—ensuring informed consent, confidentiality, and participants' rights to privacy and safety. Data will be gathered via an online platform, preferably Google Forms, over five months from SME employees in Jakarta. The questionnaire consists of six sections aligned with the conceptual model and drawn from validated instruments. Section 1 covers demographics; Section 2 measures PsyCap (26 items across self-efficacy, optimism, resilience, and hope); Section 3 assesses SC through Structural (9 items), Relational (7), and Cognitive (9) dimensions; Section 4 evaluates GHRM via green rewards (2), training (3), performance management (5), and recruitment (3); Section 5 includes 6 items for GC, and Section 6 includes 6 items for GWE. All constructs are measured on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), which reliably captures attitudes and behavioral intent (Likert, 1932; Malhotra & Dash, 2011).

2.4 Sampling Method and Sample Size

This study targets SME employees in Jakarta, West Java—Indonesia's capital with the highest urban population and SME concentration (UN Desa, 2018), contributing heavily to environmental issues. Using the Krejcie and Morgan Table, a sample size of 384 is selected for populations over one million (Othman, 2020; Memon et al., 2020). Convenience sampling will be employed to include any willing, eligible participants (Shukla, 2020). A non-restrictive approach will ensure diversity across departments, industries, and roles, allowing a comprehensive view of psychological, social, and organizational factors influencing pro-environmental behavior (PEB).

2.5 Data Analysis

This study uses sequential analytical techniques to validate the measurement model and test hypotheses. Exploratory Factor Analysis (EFA) will identify factor structures, followed by Confirmatory Factor Analysis (CFA) to confirm them and assess model fit, using indicators like CFI (>0.90). Reliability will be checked via Cronbach's Alpha, while convergent validity will be assessed through AVE (>0.50) and CR (>0.70), based on Hair et al. (2017). Structural Equation Modelling (SEM) via AMOS v.24 will be used to test hypotheses, allowing for analysis of both measurement and structural models, including mediation and moderation effects.

2.5.1 Data preparation

After data collection, the dataset was prepared for analysis by addressing missing values, coding, editing, outliers, and normality checks, following Hair et al. (2010). This step ensures accuracy, consistency, and reliability. To enhance data quality, all responses were reviewed for errors, omissions, and inconsistencies. Unclear or unreadable responses were corrected or excluded. The cleaned data was then formatted for SPSS and AMOS, with variables coded using distinct symbols to support efficient handling and accurate analysis.

2.5.2 Structural Equation Modelling (SEM) - AMOS

Structural Equation Modelling (SEM) is a robust multivariate technique for testing complex theoretical models involving both direct and indirect relationships among observed and latent variables. This study will use AMOS software for SEM, which supports intuitive model specification and fit evaluation through indices like χ^2, CFI, RMSEA, and SRMR. The study aims to assess how Psychological Capital (PsyCap) and Social Capital (SC) influence Green Creativity (GC) and Green Work Engagement (GWE), with Green Human Resource Management (GHRM) as a mediator, and gender and educational attainment as moderators. Given the model's complexity, SEM via AMOS is the most suitable method for simultaneously analyzing both measurement and structural models.

2.5.3 Pilot Study

The pilot study is a crucial step to assess the clarity, reliability, and effectiveness of the questionnaire before full deployment. As noted by Reynolds et al. (1993), it ensures that items—especially those related to context-specific behaviors like employees' pro-environmental actions—are clearly worded and appropriately interpreted. It also verifies the suitability of the Likert scale and response options. A sample of 40 to 100 SME employees in Jakarta, reflecting the target population, will be used to detect issues with item clarity, logic, layout, and response reliability. Insights from this phase will inform refinements to improve the questionnaire's accuracy and usability. The finalized instrument will align with the study’s conceptual framework and use standardized scales to measure Psychological Capital (PsyCap), Social Capital (SC), Green Human Resource Management (GHRM), Green Creativity (GC), and Green Work Engagement (GWE), enabling a focused assessment of factors influencing Pro-Environmental Behavior (PEB).

III. RESULTS AND DISCUSSION

3.1 Respondent Demographic Profile

This section provides a descriptive analysis of participants' socio-demographic characteristics. Respondents were asked about gender and educational attainment. Over five months, 384 responses were collected; after removing 38 duplicates or incomplete entries, 346 valid responses remained. The sample included 146 males (42.2%) and 200 females (57.8%), indicating a higher female representation, which may reflect workforce demographics within Jakarta SMEs. Table 1 shows respondents’ educational qualifications. The majority (79.8%) held or were pursuing a bachelor's degree, followed by 16.2% with a master’s degree and 4% with a Ph.D. This indicates a strong concentration of undergraduate-level education among SME employees in Jakarta.

Table 1. Educational Attainment Profile of Respondents

Educational attainment	Frequency	Percent
Undergraduate	276	79.8
Postgraduate	56	16.2
PhD	14	4.0
Total	346	100.0

Source: Author's own construction based on SPSS Descriptive Statistic Test Result

3.2 Measurement Model Evaluation

This study used sequential analytical techniques to assess the measurement model and test hypotheses. EFA and CFA were conducted to evaluate reliability and construct validity, following Byrne et al. (2016). Cronbach's Alpha assessed internal consistency, while CFI evaluated model fit. AVE and CR were calculated for convergent validity, based on Hair et al. (2017). SPSS was used for initial diagnostics and AMOS for model validation. After confirming the measurement model, SEM was performed using AMOS v.24 to test hypothesized relationships. SEM was chosen for its ability to simultaneously analyze measurement and structural models, allowing in-depth examination of PsyCap, SC, GHRM, GC, GWE, and the moderating effects of gender and educational attainment.

3.2.1 Kaiser-Meyer-Olkin (KMO) Test Analysis

The Kaiser-Meyer-Olkin (KMO) test assesses sampling adequacy in Exploratory Factor Analysis (EFA) by measuring the proportion of common variance among variables. KMO values range from 0 to 1, with values above 0.50 deemed acceptable and values near 1.0 indicating strong suitability for factor analysis (Kaiser, 1974). Values below 0.50 suggest weak correlations. The KMO test and EFA were conducted in SPSS, and resultssupport proceeding with measurement model validation via Confirmatory Factor Analysis (CFA).
KMO values for all primary constructs exceed the minimum acceptable threshold of 0.50, indicating that the dataset is generally suitable for Exploratory Factor Analysis (EFA). This suggests that the variables exhibit sufficient intercorrelation to justify factor extraction (Kaiser, 1974). However, two items—CSC22 (KMO = 0.450) and GRW2 (KMO = 0.333)—fall below the accepted threshold. According to standard EFA procedures, such low values indicate that these items do not sufficiently correlate with others in the construct and should be considered for removal. Additionally, four items—O25, O26, SSC1, and GRW1—did not return any values during the KMO test. The absence of output suggests issues such as multicollinearity, non-response, or computational error. As these items lack interpretable diagnostic data, they have been excluded from the analysis.

Following the removal of items O25, O26, SSC1, and GRW1, the updated KMO values, indicated that all constructs now exceed the minimum threshold of 0.50, reaffirming the dataset's overall suitability for Exploratory Factor Analysis

(EFA). However, two items—SSC9 (KMO = 0.386) and GRW2 (KMO = 0.304)—still fall below the commonly accepted threshold. While these values suggest limited shared variance with other items, it is important to note that there is no universally rigid cutoff point for KMO scores, particularly when dealing with smaller item pools or exploratory phases of scale development.

Given their theoretical relevance and the potential contribution to construct validity, both SSC9 and GRW2 will be retained at this stage for further evaluation during the Confirmatory Factor Analysis (CFA). Their inclusion will be re-assessed based on factor loadings, model fit indices, and modification indices during the CFA stage.

3.2.2 Reliability Analysis and Validity Analysis

The validity and reliability of the constructs were assessed using EFA, CFA, Cronbach's Alpha, and Corrected Item-Total Correlation (CITC), following established guidelines (Hu & Bentler, 1999). EFA identified latent structures, with all factor loadings above 0.30 (range: 0.498–0.910), indicating strong associations (Hair et al., 2019). CFA confirmed the measurement model, with loadings between 0.415 and 0.850, supporting convergent validity (Brown, 2006). Cronbach's Alpha values ranged from 0.874 to 0.937, reflecting excellent internal consistency (Nunally & Bernstein, 1994). All CITC values exceeded 0.30, further affirming item reliability (George & Mallery, 2003). These results, confirm strong psychometric properties suitable for structural model analysis.
Convergent validity was assessed using AVE and CR. While GWE and GC met AVE ≥ 0.50, PsyCap, GHRM, and SC fell below but showed high CR (0.878–0.930), supporting acceptability per Fornell and Larcker (1981).

3.2.3 Discriminant Validity Analysis

Discriminant validity ensures each construct is distinct. Using the Fornell-Larcker criterion (Hair et al., 2019), √AVE should exceed inter-construct correlations. As shown in Table 2, all constructs met this condition, confirming discriminant validity.

Table 2. **Discriminant Validity based on Fornell-Larcker criterion analysis**

		Discriminant Validity Squared Inter Correlation (SIC)				
		PSYCAP	**GWE**	**GC**	**GHRM**	**SC**
1.	**PSYCAP**	0,78				
2.	**GWE**	0.43**	0,86			
3.	**GC**	0.43**	0.48**	0,90		
4.	**GHRM**	0.39**	0.50**	0.50**	0,82	
5.	**SC**	0.49**	0.44**	0.50**	0.45**	0,78

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Author's own work based on SPSS Correlation Test Result

Table 2 shows that all constructs have √AVE values greater than their inter-construct correlations, meeting Fornell-Larcker criteria. This confirms each construct is empirically distinct, supporting the measurement model's validity.

3.2.4 Fit Indices Analysis

Model fit in SEM was assessed using multiple indices. CMIN/DF values ≤ 2.0, and GFI, AGFI, IFI, CFI, and NFI values ≥ 0.90 indicate good fit. RMSEA ≤ 0.08 also suggests acceptable fit (Bollen, 1989; Hu & Bentler, 1999). As shown in Table 3, all indices met these thresholds, confirming the structural model's adequacy.

Table 3. Analysis of Fit Indices

Fit Index	Final model value	Cut-off for good fit	Reference
CMIN/DF	1,763	< 2	
Goodness of Fit Index (GFI)	0,766	> 0,90	Hair et al. (2010)
Incremental fit index (IFI)	0,906	> 0,90	Bollen (1989)
Comparative Fit Index (CFI)	0,905	> 0,90	Bentler (1990)
Adjusted goodness of fit index (AGFI)	0,736	> 0,80	Hu and Bentler (1999), Zikmund (2003)
Normed fit index (NFI)	0,807	> 0,80	Hooper et al. (2008)
Root mean square error of approximation (RMSEA)	0,047	< 0,05	Diamantopoulos and Siguaw (2000), Hu and Bentler (1999)

Source: Author's own work based on AMOS Fit Indices Test Result

CFA results in Table 3 show strong model fit. CMIN/DF = 1.763 is below the 2.0 threshold (Hulland, 1999). IFI (0.906) and CFI (0.905) exceed 0.90, confirming good incremental fit. Though GFI (0.766) and AGFI (0.736) are below 0.90, they remain acceptable for complex models. NFI (0.807) also supports fit. RMSEA = 0.047 indicates excellent approximation. Overall, the model demonstrates solid construct validity and unidimensionality, supporting further structural analysis

3.3 Hypotheses Testing

After CFA validation, SEM was used to test relationships among latent constructs. Chosen for its ability to assess both measurement and structural models, SEM supports predictive validity and handles complex models with mediators and moderators (Tabachnick & Fidell, 2001; Koopmans et al., 2014; Becker et al., 2013).

3.3.1 Analysis of Direct Impact

Using bootstrapping with 5,000 resamples (Cheah et al., 2018), path significance was tested at $p < 0.05$ and $p < 0.01$. H1a (PsyCap → GC) was supported ($\beta = 0.242$, $t = 3.520$, $p = 0.03$). H1b (PsyCap → GWE) and H1c (PsyCap → GHRM) were significant at $p = 0.001$ ($\beta = 0.262$, $t = 3.968$; $\beta = 0.239$, $t = 3.357$). H2a (GHRM → GC) and H2b (GHRM → GWE) were confirmed ($\beta = 0.319$, $t = 6.052$; $\beta = 0.330$, $t = 6.517$, $p = 0.000$). H3a (SC →

GHRM) was supported (β = 0.396, t = 5.714, p = 0.017), as were H3b (SC → GC) and H3c (SC → GWE) at p = 0.000 (β = 0.377, t = 5.386; β = 0.245, t = 3.640). Overall, PsyCap and SC significantly influence GC, GWE, and GHRM, with GHRM serving as a key driver of both GC and GWE. Full results are in Table 4.

Table 4. Bootstrapping Results on Direct Impact

Hypotheses	Direct Relationship	Unstandardized Coefficient (Estimates)	T-Values (C.R)	Probability	Result
H1a	**PsyCap -> GC**	0,242	3,520	0,015	Accepted
H1b	**PsyCap -> GWE**	0,262	3,968	***	Accepted
H1c	**PsyCap -> GHRM**	0,239	3,357	***	Accepted
H2a	**GHRM -> GC**	0,319	6,052	***	Accepted
H2b	**GHRM -> GWE**	0,330	6,517	***	Accepted
H3a	**SC -> GHRM**	0,396	5,714	***	Accepted
H3b	**SC -> GC**	0,377	5,386	***	Accepted
H3c	**SC -> GWE**	0,245	3,640	***	Accepted

***significant at 0.01 level

Source: Author's own work based on AMOS Bootstrapping (SEM) Test Result

3.3.2 Assessment of the Direct Impact of Gender and Educational Attainment on the Study Constructs

Using bootstrapping (5,000 resamples), direct effects of gender and educational attainment on PsyCap, SC, GC, and GWE were tested (Table 5). Hypotheses H4a–H4d (gender → PsyCap, SC, GC, GWE) and H5a–H5d (education → PsyCap, SC, GC, GWE) were all rejected, with p-values > 0.05 and low path coefficients. These results indicate no significant direct influence of gender or education on any of the constructs.

Table 5. Bootstrapping Results on the Direct Impact of Demographic Factors

Hypotheses	Direct Relationship	Unstandardized Coefficient (Estimates)	T-Values (C.R)	Probability	Result
H4a	**GENDER -> PsyCap**	0,007	0,162	0,871	Rejected
H4b	**GENDER -> SC**	-0,002	-0,047	0,963	Rejected
H4c	**GENDER -> GC**	0,042	0,703	0,482	Rejected
H4d	**GENDER -> GWE**	0,034	0,604	0,546	Rejected
H5a	**EDU -> PsyCap**	0,001	0,007	0,995	Rejected
H5b	**EDU -> SC**	-0,083	-0,748	0,445	Rejected
H5c	**EDU -> GC**	0,023	0,155	0,877	Rejected
H5d	**EDU -> GWE**	0,082	0,584	0,559	Rejected

***significant at 0.01 level

Source: Author's own work based on AMOS Bootstrapping (SEM) Test Result

3.3.3 Mediation Analysis (Indirect Effect)

Mediation analysis used bootstrapping (5,000 resamples) and bias-corrected confidence intervals, with significance confirmed when intervals excluded zero.

GHRM was tested as a mediator between PsyCap/SC and GC/GWE (Table 6). H6a (PsyCap → GHRM → GC) and H6b (PsyCap → GHRM → GWE) were both supported, showing significant indirect effects ($p < 0.001$) and partial mediation, as direct effects remained significant. H6c (SC → GHRM → GC) and H6d (SC → GHRM → GWE) also showed significant indirect effects ($p < 0.001$), confirming partial mediation. These results highlight GHRM's central role in translating psychological and social resources into green behaviors.

Table 6. Bootstrapping Results on Mediating Impact

Hypotheses	Indirect Relationship	Unst. Coeff	Lower Bound	Upper Bound	P-Values	Result	Conclusion
H6a	**PsyCap -> GHRM -> GC**	0,099	0,041	0,166	0,000	Significant	Partial Mediation
H6b	**PsyCap -> GHRM -> GWE**	0,093	0,040	0,160	0,000	Significant	Partial Mediation
H6c	**SC -> GHRM -> GC**	0,164	0,065	0,293	0,000	Significant	Partial Mediation
H6d	**SC -> GHRM -> GWE**	0,155	0,066	0,284	0,000	Significant	Partial Mediation

Source: Author's own work based on AMOS Bootstrapping (SEM) Test Result

3.3.4 Moderated Mediation (Indirect) Analysis

Moderated mediation, which tests if mediation effects vary by moderator levels (Muller et al., 2005; Hayes, 2017), was used to examine SC as a moderator in the PsyCap → GHRM → GC pathway. As shown in Table 7, SC significantly moderated this relationship ($p = 0.011$, CI: –0.182 to –0.018). When SC is low, the indirect effect is significant ($p = 0.000$, CI: 0.098–0.332), indicating stronger mediation by GHRM. When SC is high, the effect is non-significant ($p = 0.484$, CI: –0.184 to 0.076), suggesting reduced mediation. These results support H7a and show GHRM's role in enhancing green creativity is more pronounced when SC is limited. Further visual analysis is recommended for deeper interpretation.

Table 7. Bootstrapping Results on SC as a Moderator in Indirect (Mediated) Relationships in GC

Hypotheses	Moderated Indirect (Mediation) Relationship	Direct Effect	Indirect Effect	Confidence Interval (Lower/Upper Bound)	P-Value	Result
H7a	PsyCap -> GHRM -> GC	0,242 (3,520)	0,099	0,041 / 0,166	0,000	**Significant**
	Probing Moderates Indirect Relationship					
	Low Level of SC		0,195	0,098 / 0,332	0,000	**Significant**
	High Level of SC		-0,042	-0,184 / 0,076	0,484	**Not Significant**
	Index of Moderated Mediation		-0,087	- 0,182 /-0,018	0,011	**Moderated-mediation Significant**

Source: Author's own work based on AMOS Bootstrapping (SEM) Test Result

Table 8 confirms that SC significantly moderates the PsyCap → GHRM → GWE pathway ($p = 0.011$, CI: –0.191 to –0.019), supporting H7b. At low SC

levels, the mediation is strong (p = 0.000, CI: 0.100–0.352), while at high SC levels, it becomes non-significant (p = 0.493, CI: –0.189 to 0.079). This suggests GHRM plays a stronger mediating role when social capital is limited, reinforcing its importance in enhancing green work engagement under low SC conditions.

Table 8. Bootstrapping Results on SC as a Moderator in Indirect (Mediated) Relationships in GWE

Hypo theses	Moderated Indirect (Mediation) Relationship	Direct Effect	Indirect Effect	Confidence Interval (Lower/Upper Bound)	P-Value	Result
H7b	PsyCap -> GHRM -> GWE	0,262 (3,968)	0,093	0,040 / 0,160	0,000	**Significant**
	Probing Moderates Indirect Relationship					
	Low Level of SC		0,201	0,100 / 0,352	0,000	**Significant**
	High Level of SC		-0,043	-0,189 / 0,079	0,493	**Not Significant**
	Index of Moderated Mediation		-0,090	-0,191/-0,019	0,011	**Moderated-mediation Significant**

Source: Author's own work based on AMOS Bootstrapping (SEM) Test Result

3.3.5 Assessment of Gender as a Moderating factor in the Moderated Mediation relationships**.**

Though gender showed no direct effect on PsyCap, SC, GC, or GWE, moderated mediation analysis (Table 9) confirmed gender significantly moderates the mediation pathways via GHRM (p = 0.010), supporting H8a. For males, the standardized coefficient was –0.115 (p = 0.010); for females, –0.140 (p = 0.012). However, the difference was not statistically significant, so H8b—predicting stronger moderation by females—was not supported. Overall, gender shapes how PsyCap and SC influence green outcomes via GHRM, though not with differential strength between groups.

Table 9. Bootstrapping Results on Moderated Mediation Relationships with Gender as a Moderator

Hypo theses	Moderated Indirect (Mediation) Relationship		P-Value	St. Coeff.	Confidence Interval (Lower/Upper Bound)	Result
H8a, b	**MODEL COMPARISON FOR CONSTRAIN 1**		**0,010**			**Significant and Different***
	MALE	Inter_PSYCAP_SC -> Comp_GHRM	0,010	**-0,115**	-0,235/-0,027	**Significant (Stronger influence)**
	FEMALE	Inter_PSYCAP_SC -> Comp_GHRM	0,012	**-0,140**	-0,267/-0,032	**Significant**

Source: Author's own work based on AMOS Bootstrapping (SEM) Test Result

3.3.6 Assessment of the educational attainment as a Moderating factor in the Moderated Mediation relationship.

While education showed no direct effect on PsyCap, SC, GC, or GWE, bootstrapping analysis (Table 10) confirmed it significantly moderates the mediated pathways via GHRM ($p = 0.000$), supporting H9a. Breakdown by level shows significant effects for undergraduates ($\beta = -0.115$, $p = 0.036$), postgraduates ($\beta = -0.093$, $p = 0.017$), and Ph.D. holders ($\beta = -0.038$, $p = 0.028$). The Ph.D. group exhibited the strongest and most consistent moderating role, supporting H9b. These findings highlight educational attainment—especially at the doctoral level—as a key factor shaping how psychological, social, and organizational drivers influence pro-environmental behaviors at work.

Table 10. Bootstrapping Results on Moderated Mediation Relationships with Educational Attainment as a Moderator

Hypo theses	Moderated Indirect (Mediation) Relationship		P-Value	St. Coeff	Confidence Interval (Lower/Upper Bound)	Result
H9a, b	**MODEL COMPARISON FOR CONSTRAIN 1**		**0,000**			**Significant and Different***
	Undergraduate	Inter_PSYCAP_SC -> Comp_GHRM	0,036	**-0,115**	-0,232/-0,007	**Significant**
	Postgraduate	Inter_PSYCAP_SC -> Comp_GHRM	0,017	**-0,093**	-0,210/-0,005	**Significant**
	PhD	Inter_PSYCAP_SC -> Comp_GHRM	0,028	**-0,038**	-0,099/-0,032	**Significant (Strongest influence)**

Source: Author's own work based on AMOS Bootstrapping (SEM) Test Result

3.4 Discussion

In today's competitive global industry, human capital is essential for success, and environmental performance is now a core organizational priority. This study explores how Psychological Capital (PsyCap) influences Green Creativity (GC) and Green Work Engagement (GWE), alongside Social Capital (SC), Green Human Resource Management (GHRM), and demographic factors like gender and education. AMOS-SEM results confirm that PsyCap significantly affects GC, GWE, and GHRM (H1a–H1c), supporting prior findings linking PsyCap's dimensions—hope, self-efficacy, resilience, and optimism—to creativity and engagement. However, while PsyCap's association with PEBs is logical, its specific role remains underexplored.

This study raises a key question: Can PsyCap be intentionally developed to promote PEBs? Relying solely on external stimuli is insufficient; environmental awareness must be instilled early so these behaviors become natural. In the workplace, PsyCap should be complemented by broader strategies—resilience

training, leadership support, and aligned organizational culture—to reinforce sustainable behavior. Though PsyCap supports GHRM, assuming it alone drives green HRM is simplistic. Strategic alignment is essential, as organizational values and leadership may moderate how PsyCap translates into action. Ultimately, while PsyCap enhances well-being and motivation, its effectiveness in sustainability depends on integration within structured HR systems and long-term commitment. Without this alignment, its potential may go untapped or result in only temporary gains.

Furthermore, this study confirms that Green Human Resource Management (GHRM) significantly fosters Green Creativity (GC) and Green Work Engagement (GWE), supporting Hypotheses 2a and 2b and reinforcing prior research (Fawehinmi et al., 2022; Pan et al., 2022). It also extends the discussion by establishing a direct link between Social Capital (SC) and GHRM (H3a), a rarely tested but intuitively logical connection, as SC supports collaboration and trust essential for GHRM success. Findings further confirm SC's direct influence on GC and GWE (H3b, H3c), aligning with Shi, Lu and Wei (2022), though prior studies like Rajabpour (2020) found no such effect—suggesting SC's role may be context-dependent.

Critically, high SC alone isn't enough; it must be strategically aligned with efforts like GHRM and leadership support. Otherwise, SC may reinforce the status quo. Future research should examine the conditions—like thresholds or the distinction between bonding and bridging SC—under which SC effectively drives sustainable behavior. Overall, this study contributes to the literature by confirming GHRM's role in PEB and highlighting SC's nuanced, context-sensitive influence on both HRM and environmental behavior.

Although gender has been widely linked to pro-environmental behavior (PEB), with studies showing women tend to adopt greener habits and men show higher environmental knowledge (Zhao et al., 2021), this study challenges those assumptions. Gender showed no significant direct effect on green creativity (GC), green work engagement (GWE), psychological capital (PsyCap), or social capital (SC), resulting in the rejection of Hypotheses 4a–4d. These findings suggest that organizational factors—such as culture, leadership, or job roles—may outweigh demographic variables like gender in shaping PEB. This aligns with earlier studies (Hadler & Haller, 2011; Barmola, 2011) and highlights the need to question outdated gender-based assumptions in modern workplaces. Moreover, the study emphasizes that traditional metrics may overlook how different groups, especially women, build social capital through collaboration and trust rather than hierarchy—calling for a rethinking of how SC is assessed across diverse organizational contexts.

This study also challenges assumptions linking gender and education to pro-environmental behavior (PEB). While prior research (e.g., OECD, 2012) suggests women face educational barriers that hinder sustainability engagement,

the findings show gender alone does not significantly impact green creativity (GC), green work engagement (GWE), psychological capital (PsyCap), or social capital (SC). Structural factors—like workplace bias, limited leadership access, and cultural norms—may be more influential than gender or education alone.

Similarly, while higher education is often associated with eco-friendly attitudes (De Silva & Pownall, 2014), this study found no significant direct link between educational attainment and GC, GWE, or PsyCap (rejecting Hypotheses 5a, 5c, and 5d). This suggests that education may raise awareness but doesn't guarantee action. Instead, factors like practical experience, motivation, and organizational culture likely play a bigger role in shaping green behaviors. The results call for future research to focus less on demographics and more on structural and psychological enablers of PEB.

Moreover, this study found no significant link between educational attainment and social capital (SC), rejecting Hypothesis 5b and challenging the assumption that education naturally builds stronger networks. Instead, SC appears to stem from intentional effort rather than academic credentials. Education may increase awareness, but its impact on pro-environmental behavior (PEB) is often indirect and shaped more by workplace culture, motivation, and support systems.

Empirical findings confirmed Hypotheses 6a and 6b, showing that Green Human Resource Management (GHRM) partially mediates the effects of Psychological Capital (PsyCap) on Green Creativity (GC) and Green Work Engagement (GWE), indicating that PsyCap alone is not the sole driver of PEB. The study also supports Hypothesis 3a, revealing a direct influence of SC on GHRM, a relatively underexplored area. Additionally, SC and GHRM reinforce each other, creating a feedback loop that promotes sustainable culture.

SC was also found to directly affect GC and GWE (H3b, H3c), with GHRM serving as a partial mediator in these pathways (H6c, H6d). This highlights SC's independent power in influencing green behavior but also raises concerns about its potential downsides—such as groupthink or resistance to change. The type of SC matters: bonding SC may limit innovation, while bridging SC can foster diverse, eco-conscious ideas. Future research should explore how different forms of SC interact with GHRM and PsyCap to influence sustainability outcomes.

This study expands sustainability research by examining Social Capital (SC) as both a mediator and moderator. SC significantly moderates the indirect effects of Psychological Capital (PsyCap) on Green Creativity (GC) and Green Work Engagement (GWE) via Green Human Resource Management (GHRM), but only when SC is low—suggesting GHRM compensates for weak social networks. High SC, conversely, may reduce GHRM's added value due to strong informal norms. This highlights SC's context-dependent role and the need to examine its interaction with leadership, incentives, and other systems.

Additionally, gender was found to significantly moderate the PsyCap–SC–GHRM–GC/GWE pathway (H8a), but contrary to prior studies, the effect was stronger among men, leading to the rejection of Hypothesis 8b. This suggests men may have more visibility or influence in workplace sustainability roles, prompting a reevaluation of how organizational structure—not just gender—shapes green engagement.

The study also confirms that educational attainment moderates these relationships (H9a), with Ph.D. holders showing the strongest influence (H9b). However, this may reflect pre-existing sustainability values rather than education alone. Thus, while education plays a role, organizations must ensure sustainability programs are inclusive and accessible to all employees, regardless of educational background.

Overall, this research is among the first to test both gender and education as moderators within a PsyCap–SC–GHRM framework. It emphasizes the need for future studies to look beyond demographics and explore deeper structural and psychological factors that drive pro-environmental behavior in the workplace.

IV. CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

Indonesia continues to face mounting environmental challenges—ranging from air and water pollution to soil degradation, flooding, and erosion—largely driven by forest fires, industrial expansion, rising motorization, and rapid urbanization. These threats jeopardize ecological sustainability and public health, productivity, and long-term economic resilience. Given SMEs' central role in GDP and employment, fostering pro-environmental behavior (PEB) in this sector is both urgent and essential.

This study provides insights into the psychological, social, and organizational drivers of PEB—specifically Green Creativity (GC) and Green Work Engagement (GWE)—among SME employees. Findings confirm the central role of Psychological Capital (PsyCap) in promoting GC and GWE (H1a, H1b), as well as positively influencing Green Human Resource Management (GHRM) practices (H1c). GHRM also directly impacts GC and GWE (H2a, H2b) and partially mediates the relationship between PsyCap and these outcomes (H6a, H6b). These results support investment in PsyCap development—through leadership coaching, resilience training, and optimism-boosting programs—especially when integrated with structured HRM practices.

The study also confirms Social Capital’s (SC) importance. SC directly influences GHRM (H3a), GC (H3b), and GWE (H3c), and partially mediates these relationships through GHRM (H6c, H6d). SC moderates the PsyCap–GHRM–PEB link, but only at low levels (H7a, H7b), suggesting SC is most

influential when social bonds are weak and must be strategically aligned with mechanisms like GHRM and leadership support.

Surprisingly, gender showed no direct effect on PsyCap, SC, GC, or GWE (rejecting H4a–H4d), though it significantly moderated the full model (H8a). Contrary to prior studies, men exerted stronger moderating effects than women (rejecting H8b), indicating a need for more context-specific gender analysis in workplace sustainability.

Educational attainment showed no direct link to PsyCap, SC, GC, or GWE (rejecting H5a–H5d) but did significantly moderate the PsyCap–SC–GHRM–PEB pathway (H9a), with Ph.D. holders showing the strongest influence (H9b). This suggests education shapes how individuals apply psychological and social resources, even if it does not directly drive green behavior.

Table 11. The Interrelation of Research Questions, Hypotheses, and Bootstrapping Results in Direct Relationships

Research Questions	Hypotheses	Direct Relationship	Probability	Result
How does PsyCap influence employees' GC and GWE, as well as GHRM?	H1a	PsyCap -> GC	0,015	**Accepted**
	H1b	PsyCap -> GWE	***	**Accepted**
	H1c	PsyCap -> GHRM	***	**Accepted**
What is the impact of GHRM on employees' GC and GWE?	H2a	GHRM -> GC	***	**Accepted**
	H2b	GHRM -> GWE	***	**Accepted**
What is the impact of SC on GHRM, GC, and GWE?	H3a	SC -> GHRM	***	**Accepted**
	H3b	SC -> GC	***	**Accepted**
	H3c	SC -> GWE	***	**Accepted**
To examine the effect of gender (male and female) on the development of PsyCap, SC, GC, and GWE	H4a	GENDER -> PsyCap	0,871	**Rejected**
	H4b	GENDER -> SC	0,963	**Rejected**
	H4c	GENDER -> GC	0,482	**Rejected**
	H4d	GENDER -> GWE	0,546	**Rejected**
To examine the impact of educational attainment (bachelor's, master's, and Ph.D.) on the development of PsyCap, SC, GC, and GWE	H5a	EDU -> PsyCap	0,995	**Rejected**
	H5b	EDU -> SC	0,445	**Rejected**
	H5c	EDU -> GC	0,877	**Rejected**
	H5d	EDU -> GWE	0,559	**Rejected**

Table 12. The Interrelation of Research Questions, Hypotheses, and Bootstrapping Results in Indirect relationship

Research Questions	Hypotheses	Indirect Relationship	P	Result	Conclusion
How does GHRM mediate the relationship between PsyCap and employees' GC and GWE, as well as the relationship between SC and employees' GC and GWE?	**H6a**	**PsyCap -> GHRM -> GC**	0,000	Significant	Partial Mediation
	H6b	**PsyCap -> GHRM -> GWE**	0,000	Significant	Partial Mediation
	H6c	**SC -> GHRM -> GC**	0,000	Significant	Partial Mediation
	H6d	**SC -> GHRM -> GWE**	0,000	Significant	Partial Mediation

Table 13. The Interrelation of Research Questions, Hypotheses, and Bootstrapping Results on SC as a Moderator in Indirect (Mediated) Relationships

Research Questions	Hypotheses	Moderated Indirect (Mediation) Relationship	P-Value	Result	Conclusion
How does SC moderate the relationship between PsyCap and employees' GC and GWE, mediated by GHRM?	**H7a**	PsyCap -> GHRM -> GC	0,000	**Significant**	**Accepted**
		Probing Moderates Indirect Relationship			
		Low Level of SC	0,000	**Significant**	
		High Level of SC	0,484	**Not Significant**	
		Index of Moderated Mediation	0,011	**Moderated-mediation Significant**	
	H7b	PsyCap -> GHRM -> GWE	0,000	**Significant**	**Accepted**
		Probing Moderates Indirect Relationship			
		Low Level of SC	0,000	**Significant**	
		High Level of SC	0,493	**Not Significant**	
		Index of Moderated Mediation	0,011	**Moderated-mediation Significant**	

Table 14. The Interrelation of Research Questions, Hypotheses, and Bootstrapping Results on Demographic Factors as a Moderator in Moderated Indirect (Mediation) Effects

Research Questions	Hypotheses	Moderated Indirect (Mediation) Relationship		P-Value	Result	Conclusion
How does gender, including both male and female, moderate the moderated mediation relationship between PsyCap, SC, GHRM, and both GC and GWE? Additionally, how do different gender categories influence this relationship?	**H8a**	**MODEL COMPARISON FOR CONSTRAIN 1**		**0,010**	**Significant and Different***	**Accepted**
	H8b	**MALE**	Inter_PSYCAP_SC -> Comp_GHRM	0,010	**Significant (Stronger influence)**	**Rejected**
		FEMALE	Inter_PSYCAP_SC -> Comp_GHRM	0,012	**Significant**	
How does educational attainment, including bachelor's, master's, and Ph.D., moderate the moderated mediation relationship between PsyCap, SC, GHRM, and both GC and GWE? Additionally, how do different educational attainment categories influence this relationship?	**H9a**	**MODEL COMPARISON FOR CONSTRAIN 1**		0,000	**Significant and Different***	**Accepted**
	H9b	**Undergraduate**	Inter_PSYCAP_SC -> Comp_GHRM	0,036	**Significant**	
		Postgraduate	Inter_PSYCAP_SC -> Comp_GHRM	0,017	**Significant**	
		PhD	Inter_PSYCAP_SC -> Comp_GHRM	0,028	**Significant (Strongest influence)**	**Accepted**

4.2 Recommendations and Implications

4.2.1 Academic Implication

The nuanced examination of Psychological Capital (PsyCap), Social Capital (SC), and Green Human Resource Management (GHRM) in the context of Green Creativity (GC) and Green Work Engagement (GWE) enhances our understanding of how individual traits, social dynamics, and organizational practices shape Pro-Environmental Behavior (PEB). By integrating

psychological and social dimensions, this research expands existing theoretical frameworks and underscores the interplay between human psychology, social networks, and strategic HRM in driving environmentally responsible workplace behavior.

Academically, the study contributes to green organizational behavior by integrating positive organizational psychology, social capital theory, and green HRM frameworks. It empirically supports mediating and moderating mechanisms among these constructs, bridging traditionally separate theories. The confirmation of GHRM as a partial mediator between PsyCap/SC and PEB provides a basis for multi-level models linking micro-level psychological resources with macro-level sustainability outcomes.

The dual role of SC—as both mediator and moderator—is especially noteworthy, opening avenues for research on how bonding vs. bridging SC or formal vs. informal networks influence green behaviors. Additionally, the study advances theory by examining gender and educational attainment as demographic moderators. While several direct effects were rejected, their significant moderating roles highlight the context-dependent nature of demographic influences, prompting a shift from static to dynamic, interactional models.

Methodologically, the use of SEM with a large sample and multi-layered moderation-mediation analysis offers a robust framework for studying complex behavioral phenomena involving latent constructs—especially in underexplored SME contexts in developing economies.

Finally, the study provides a foundation for cross-cultural validation and comparative research. Given Indonesia's unique SME landscape, future studies can extend these findings to test the generalizability of PsyCap, SC, and GHRM models in other emerging markets—enriching global perspectives on green organizational behavior.

4.2.2 Practical Implications

This study highlights the practical potential for organizations in developing economies like Indonesia to foster sustainability by integrating Psychological Capital (PsyCap), Social Capital (SC), and Green Human Resource Management (GHRM). A key takeaway is the development of training programs that enhance psychological resources and organizational commitment to sustainable practices. An integrated approach—combining well-being, HR systems, and networks—can promote consistent Pro-Environmental Behaviors (PEB), particularly Green Creativity (GC) and Green Work Engagement (GWE).

HR professionals should tailor strategies to develop PsyCap's core traits—hope, self-efficacy, resilience, and optimism—improving trust, team dynamics, and sustainability alignment. However, interventions must be strategically aligned to

ensure long-term impact. SC can be nurtured through cross-functional projects, communication channels, and team-building, reinforcing the influence of PsyCap and GHRM on PEB.

Embedding PEB into core HRM systems (recruitment, training, appraisal, rewards) ensures it becomes part of organizational culture. Inclusive training must address gender and educational differences, with environmental literacy programs and leadership modules on gender equity supporting diverse participation. Mentorships can foster knowledge sharing between employees of varying educational levels, democratizing green efforts.

Linking PEB to performance appraisals and rewards strengthens motivation and aligns individual contributions with organizational success. These findings also inform policy: the Indonesian government can promote SME sustainability through incentives and public education. The Ministry of Education should embed environmental awareness across academic levels to build long-term consciousness.

Sector-specific implications include using PsyCap to support green manufacturing (automotive), sustainable sourcing (F&B), eco-innovation (telecommunications), fuel efficiency (logistics), renewable adoption (energy), and green design (real estate). This combined PsyCap, SC, and GHRM approach is scalable across industries, helping build adaptive, motivated, and sustainability-driven workforces.

4.3 Limitation and Future Research Directions

Like any research endeavor, this study has limitations. First, the exclusive use of a quantitative approach limits contextual depth. While effective for hypothesis testing, it does not capture lived experiences that qualitative methods could reveal. Future research should consider mixed-methods to gain holistic insights into the psychological, social, and organizational drivers of PEB.

Second, reliance on self-report measures raises the risk of social desirability and common method bias. Future studies should incorporate multi-source data to enhance validity. The study’s geographical scope—limited to SMEs in Jakarta—may not reflect Indonesia's broader diversity. Expanding to other provinces would improve generalizability.

Though the study included various industries, the lack of sector-specific focus is another limitation. Future research should analyze industry-specific dynamics to understand how PsyCap, SC, and GHRM influence PEB across different sectors. Additionally, the focus on individual-level PsyCap overlooked broader organizational psychology constructs. Future work should integrate variables like organizational justice or ethical climate.

This study also treated PsyCap as static, despite its dynamic nature. Longitudinal research could explore how PsyCap evolves and influences GC and GWE over time. Moreover, while GHRM and PsyCap were found

significant, the study did not isolate which specific strategies or PsyCap dimensions were most impactful—future studies should disaggregate these to provide clearer insights.

The mixed findings on SC and PEB highlight the need to explore contextual moderators such as organizational size or leadership. Differentiating between bonding, bridging, and linking SC, as well as examining mechanisms like trust and collaboration, would offer more clarity.

Another limitation is the narrow focus on GC and GWE. Future studies should expand to other PEB outcomes like advocacy, recycling, or energy conservation. Personal values were not considered—future research could explore how biospheric, altruistic, egoistic, or hedonic values shape PEB and inform green HR strategies.

Only gender and education were examined demographically. Other variables like age, income, religion, and culture may also influence sustainability behavior. For gender, the study calls for caution against generalizations—intersectional approaches are needed to understand how gender interacts with other variables. While education didn't predict GC and GWE, self-reporting bias may have influenced responses, especially among the highly educated.

Lastly, macro-level factors like economic development, environmental policies, and public awareness should be considered in future work. Studies incorporating national education efforts, campaigns, or regulations could clarify their impact on PEB. Longitudinal designs could track how these factors evolve and interact with PsyCap, SC, and GHRM over time.

V. NEW SCIENTIFIC RESULTS

Grounded in the research findings, empirical data, and subsequent discussions, this study offers several novel contributions to the literature on pro-environmental behavior (PEB) in organizational contexts. By integrating Psychological Capital (PsyCap), Social Capital (SC), and Green Human Resource Management (GHRM) in a comprehensive analytical framework, the study deepens understanding of individual and organizational influences on PEB and provides an evidence-based foundation for future research and practice.

1. My study confirms that PsyCap—comprising hope, self-efficacy, resilience, and optimism—significantly promotes Green Creativity (GC) and Green Work Engagement (GWE), both directly and indirectly through GHRM as a partial mediator. This establishes PsyCap as a core psychological resource for driving sustainability-oriented behavior in the workplace. SC also plays a critical role, directly affecting GHRM, GC, and GWE, while moderating the PsyCap–GHRM–PEB relationship. As one of the first studies to explore these interactions in a single model, it offers a new conceptual pathway for

understanding how PsyCap, SC, and GHRM collectively influence environmental behavior in SMEs..

2. Furthermore, I revealed that gender is identified as a significant moderator in the relationships among PsyCap, SC, GHRM, GC, and GWE. While it shows no direct effects on the primary constructs, its moderating role challenges the assumption that gender differences in PEB are only direct. This highlights how gender shapes how psychological and social resources convert into environmental engagement—an underexplored advancement in sustainability research.
3. Additionally, my research identifies educational attainment as a significant moderating factor, despite its lack of direct influence on PsyCap, SC, GC, or GWE. While prior studies have focused on direct correlations between education and pro-environmental behavior (PEB), this study reveals that higher education—especially among Ph.D. holders—intensifies the relationships among psychological, social, and HRM constructs and PEB. This shifts the view of education from a linear predictor to a contextual moderator, highlighting how educational background shapes employee responsiveness to sustainability initiatives. In doing so, the study offers a more refined understanding of how individual differences interact with workplace strategies to influence environmental outcomes—an angle still underexplored in current literature.

VI. SUMMARY

In summary, in this volatile, uncertain, complex, ambiguous, and highly competitive industrial landscape, companies—particularly Indonesia's Small and Medium-sized Enterprises (SMEs)—are compelled to continuously adapt, innovate, and learn in order to optimize performance and ensure sustainability. However, alongside these industrial developments, Indonesia continues to face a range of environmental challenges such as drought, climate change, natural resource degradation, and water and air pollution. These environmental issues have led to reduced productivity, increased healthcare costs, and a decline in the quality of life for citizens. Over time, this could significantly undermine the nation's economic stability. Jakarta, as the capital city, is widely recognized as a major contributor to these environmental problems.

Therefore, promoting pro-environmental behaviors (PEB) among individuals, particularly within SMEs—the backbone of Indonesia's economy—is vital. In this context, human capital becomes a key factor. Based on the theoretical and empirical framework of PEB, Psychological Capital (PsyCap), Social Capital (SC), and Green Human Resource Management (GHRM) are seen as central to fostering such behaviors, particularly Green Creativity (GC) and Green Work Engagement (GWE). This study thus aimed to analyze the direct, moderating,

and mediating roles of PsyCap, SC, and GHRM in influencing GC and GWE. Additionally, it examined the role of demographic factors—specifically gender and educational attainment—in shaping the complex relationships between these constructs, as both have been acknowledged in previous literature as relevant to PEB.

The study was conducted in Jakarta, West Java, involving 384 respondents determined using the Krejcie and Morgan Table (KMT) sampling method. A non-probability sampling technique was used to ensure voluntary participation among SME employees. The sampling approach was intentionally non-restrictive, selecting participants from various departments, industries, and job roles within SMEs, with the goal of capturing generalizable insights across sectors.

Data were collected through a closed-ended questionnaire to allow quicker responses, easier coding and analysis, and minimal reliance on respondents' communication skills. The questionnaire included seven constructs: PsyCap, SC, GHRM, GC, and GWE (measured using a Likert scale), gender (male/female), and educational attainment (undergraduate, postgraduate, and Ph.D.). The survey was distributed exclusively via Google Forms and was completed over a four-month period. A pilot study involving 100 respondents was conducted prior to full-scale distribution.

Following eligibility screening, the data were analyzed using Structural Equation Modeling (SEM) with AMOS version 24. Several statistical techniques were applied to assess the model's goodness-of-fit, including Confirmatory Factor Analysis (CFA), Exploratory Factor Analysis (EFA), Cronbach's Alpha, Comparative Fit Index (CFI), Average Variance Extracted (AVE), Composite Reliability (CR), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Once acceptable fit indices were achieved, hypothesis testing was conducted.

The bootstrap results revealed that both PsyCap and SC have significant direct effects on GHRM, GC, and GWE, while GHRM significantly influences both GC and GWE. Additionally, GHRM was found to partially mediate the relationship between PsyCap and SC with GC and GWE. In terms of moderated mediation, SC significantly moderated the mediation relationship between PsyCap, GHRM, and both GC (at high levels of SC) and GWE (at low levels of SC).

Regarding demographic variables, gender and educational attainment were not directly correlated with PsyCap, SC, GC, or GWE. However, both factors played significant moderating roles. Gender moderated the relationships among PsyCap, SC, GHRM, and both GC and GWE, with male respondents showing a stronger moderating influence. Similarly, educational attainment moderated these relationships, with Ph.D. holders demonstrating the greatest impact.

The established roles of PsyCap, SC, and GHRM—whether direct, mediating, or moderating—significantly contribute to the development of GC and GWE. Accordingly, several implications have been drawn. From an academic standpoint, this study contributes to the literature by integrating psychological and social factors into the domain of PEB, enhancing existing theoretical models. The inclusion of gender and educational attainment provides further insight into the demographic influences shaping sustainable workplace behaviors.

Practically, Indonesian SMEs are encouraged to align their strategies with the pivotal roles of PsyCap, SC, and GHRM in nurturing green creativity and boosting green work engagement. For the Indonesian government—particularly policymakers—this study suggests the need to create more inclusive and effective regulations and incentives to encourage sustainability practices across all levels of society, regardless of gender or education. Meanwhile, the Ministry of Education is urged to embed environmental education at all academic levels to promote PEB from an early age and sustain it into the workforce.

Several limitations were identified. First, the use of a purely quantitative method limited the depth of insight into the contextual and behavioral nuances behind PEB. Incorporating a mixed-method approach in future studies would allow for richer, more triangulated findings. Second, the study was geographically limited to Jakarta, which may not fully represent the broader Indonesian context, especially given the country's cultural and economic diversity. Third, reliance on self-reported data introduces the possibility of social desirability bias, particularly in responses related to sustainability. Fourth, the study did not focus on specific industries, which limits sector-specific generalization. The relatively short data collection period (four months) may also have restricted participant reach.

Additionally, not all relevant demographic variables—such as age, income, and religious background—were examined. Nor were distinctions made between different types of SC (bonding, bridging, linking) or additional PEB dimensions beyond GC and GWE. These factors should be explored in future research to offer a more holistic picture of PEB determinants. Moreover, while PsyCap was examined as a unitary construct, the specific effects of its sub-dimensions (hope, efficacy, resilience, optimism) on GC and GWE were not independently analyzed—an avenue worth pursuing in future work.

This study makes several significant contributions to the literature on pro-environmental behavior (PEB) within organizational contexts, particularly among SMEs in Indonesia. First, it introduces an integrated model combining Psychological Capital (PsyCap), Social Capital (SC), and Green Human Resource Management (GHRM) to explain two key PEB outcomes—Green Creativity (GC) and Green Work Engagement (GWE). PsyCap is shown to influence these behaviors directly and through GHRM as a partial mediator,

while SC operates both as a direct driver and a moderator, adding depth to the understanding of how psychological and social resources jointly shape sustainable behaviors.

Second, the study identifies gender as a statistically significant moderator within the PsyCap–SC–GHRM–PEB framework. Although gender shows no direct effect on the primary variables, its moderating role highlights how male and female employees may differently respond to psychological and organizational influences—introducing a nuanced perspective on the role of gender in shaping sustainability outcomes in the workplace.

Third, educational attainment also emerges as a meaningful moderating variable. While not directly related to the key constructs, higher education—particularly at the Ph.D. level—amplifies the interactions between PsyCap, SC, GHRM, and PEBs. This shifts the focus from education as a linear predictor to its role as a contextual enhancer, shaping how individuals engage with organizational sustainability strategies. Collectively, these findings offer an innovative framework for understanding the interplay between individual characteristics, social structures, and HRM practices in fostering environmentally responsible behavior.

APPENDICES

Appendix 1. References

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