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Fostering Green Café Image in the Culinary Sector: A PLS-SEM and NCA Approach on Employee Achievement Motivation and Green Skills

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ABSTRACT

This research aims to investigate the causal mechanisms and absolute prerequisites of Achievement Motivation and Green Skills on the formulation of Work Environmental Behavior among employees in eco-friendly cafes. The study adopted a quantitative cross-sectional survey design, involving 229 employees from five eco-friendly cafes in Bandung City, Indonesia. Empirical data were evaluated using a complementary dual-analytical approach: Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine sufficient logic and mediation effects, and Necessary Condition Analysis (NCA) to evaluate necessity logic and bottleneck thresholds. The PLS-SEM results confirm that achievement motivation has a positive and significant effect on both green skills and work environmental behavior, with green skills acting as a valid partial mediator. Interestingly, the NCA evaluation unveiled a new dimension: achievement motivation acts as an absolute necessary condition; its absence will immediately obstruct the implementation of pro-environmental behavior. Conversely, green skill serves only as a performance-optimizing catalyst and becomes an essential prerequisite only when the company targets flawless absolute environmental behavior (100%). The originality of this research rests on the methodological integration of PLS-SEM and NCA within the Green Human Resource Management discourse in the sustainable culinary sector. This study offers theoretical novelty by deconstructing previous assumptions; proving that eco-friendly initiatives in the workplace do not merely require technical expertise (green skills) as a facilitator, but are fundamentally bounded (acting as a bottleneck) by the magnitude of the workers' internal achievement motivation. Cafe management is advised to restructure recruitment strategies by prioritizing achievement-oriented candidates, which must be subsequently refined through targeted green skills training.

Keywords: Achievement Motivation; Green Skill; Work Environmental Behavior; PLS-SEM; Necessary Condition Analysis (NCA); Eco-friendly Cafe.

INTRODUCTION

As public awareness regarding ecological sustainability grows, modern consumers increasingly prefer eco-friendly products and services. This shifting preference compels coffee shops to adapt to consumer expectations to survive in a highly competitive market. A cafe's success in executing green practices relies heavily on employee motivation and skills, rather than merely on formal policies. Highly driven and well-equipped staff actively generate sustainable innovations and practices, thereby elevating the cafe's positive public image. For instance, Le et al. (2022) demonstrated that a trendy cafe's green image strongly dictates customers' return intentions, highlighting the employees' crucial role in shaping a positive guest experience. Furthermore, employees' achievement motivation directly fuels innovative sustainable practices. Mastria, Vezzil, and De Cesarei (2023) emphasized that a robust internal drive pushes individuals toward more sustainable actions. Consequently, motivated workers proactively propose novel ideas and eagerly participate in green initiatives (Baloglu, Raab & Malek, 2022).

To realize these goals, Farrukh, Rafiq, Raza, and Ansari (2024) argued that organizations require a cohesive team, prompting cafe management to design effective training and development modules. Targeted training that emphasizes green skills—such as waste management, the utilization of sustainable goods, and effective customer communication—significantly amplifies the staff's capacity to execute ecological practices. Moreover, green human resource management positively impacts employees' green voice behavior, empowering them to confidently articulate sustainability-oriented ideas (Tabrizi et al., 2023). Therefore, comprehensive training programs do more than just upgrade technical proficiencies; they actively cultivate a profound sense of ownership and responsibility among the workforce.

Empowering leadership directly stimulates employees' green creative behavior, as Khattak, Rehman, and Hashmi (2024) revealed. From a broader social perspective, ecological practices in coffee shops benefit the surrounding environment and society, extending beyond mere corporate advantages (TM, Kaur, Ferraris & Dhir, 2021). By minimizing carbon footprints and advocating for local sourcing, cafes actively construct more sustainable communities. Interestingly, eco-anxiety among staff members significantly influences their

green behavior (Joshua, Jin, Ogunmokun & Ikhide, 2023). Consequently, management must cultivate a supportive and positive workplace culture to alleviate this anxiety and encourage employees to passionately engage in sustainability efforts (Liu & Liu, 2023).

Sarwar, Baig, Rahi, and Sattar (2025) stressed that an ethical climate and environmental knowledge serve as foundational elements for fostering workplace green behavior. Similarly, Rayner and Morgan (2018) identified ability, motivation, and opportunity as critical drivers of ecological actions at work. Furthermore, environmentally focused ethical leadership substantially elevates employee performance by enhancing communication and work engagement (Elkhweildi, Vetbuje, Alzubi & Aljuhmani, 2025). Within this communication framework, Arby (2021) proved that vertical communication effectively motivates the workforce. Additionally, scholars noted that consumers' informational capabilities affect green consumption intentions, mediated by green trust and media publicity (Luo, Zheng & Guo, 2023; Amin & Tarun, 2021).

While Yafi, Tehseen, and Haider (2021) explored how green training impacts environmental performance via competence and motivation, and Qalati, Barbosa, and Ibrahim (2025) highlighted factors driving employees' eco-innovation capabilities, existing literature lacks a specific examination linking achievement motivation with skills development in eco-friendly cafes. Previous works, such as those by Miah et al. (2024) and Liaquat et al. (2024), investigated motivational drivers of green behavior but failed to connect achievement motivation directly to a cafe's green image. Tang et al. (2023) recommended incorporating employee skill variables in future studies to fully understand how proficiencies support motivation and enhance workplace ecological actions. Yet, empirical investigations detailing the specific impact of skill enhancement on a cafe's green reputation remain absent. Although earlier scholars discussed green human resource management broadly, they rarely applied a holistic approach centering on achievement motivation and skill development within the specific context of green cafes in Bandung. Most prior studies focused on entirely different geographical or industrial settings, such as Bangladesh (Mamun, 2023) or the broader hospitality sector (Sibian & Ispas, 2021).

Organizations must not overlook the critical role of achievement motivation and employee proficiency in driving pro-environmental behavior within coffee shops. This study

paves the way for further exploration into the interplay between motivation, skills, and sustainability practices in the cafe industry, offering actionable insights for real-world application. By adopting this holistic strategy, cafes can position themselves as pioneers in establishing a socially responsible and sustainable business sector.

Therefore, this research formulates the following core problem: To what extent do achievement motivation and green skills influence the enhancement of work environmental behavior among cafe employees in Bandung City.

METHOD

This study employs a quantitative cross-sectional survey design. The investigation specifically targets the sustainable culinary sector, observing five cafes in Bandung City that explicitly operate under eco-friendly concepts. The target population encompasses the entire workforce operating within these five establishments. To gather the sample, the study utilized voluntary purposive sampling, distributing questionnaires to employees who willingly participated and provided objective feedback. This collection procedure successfully yielded a final analytical sample of 229 respondents. A seven-point Likert scale—ranging from strongly disagree to strongly agree—served as the primary data collection tool, effectively translating respondent perceptions into measurable metric data.

To ensure measurement precision, this study operationalizes the three core constructs as follows: Achievement Motivation: Within the context of this study, this variable represents an individual's internal determination and drive to attain objectives strictly aligned with ecological sustainability principles. The construct integrates motivational elements that focus on producing positive environmental outcomes and generating constructive social impacts through consistent sustainable work behaviors (Smith, Karaman, Balkin & Talwar, 2020; Rizvi & Garg, 2021).

Green Skill: This construct defines the comprehensive expertise, capabilities, and capacities employees possess to execute tasks precisely and efficiently. It holistically covers both technical (hard skills) and non-technical (soft skills) proficiencies crucial for realizing individual targets and macro-level organizational visions (Yafi, Tehseen & Haider, 2021; Gull & Idrees, 2022).

Work Environmental Behavior: As the endogenous variable, this construct embodies the conscious, tangible actions individuals take to protect ecosystems and champion sustainable practices. These proactive behaviors include autonomous initiatives such as cutting down energy consumption, actively joining recycling systems, choosing low-emission transport modes, and supporting pro-environmental workplace policies (Sharpe, Perlaviciute & Steg, 2021; Lange, 2024).

To comprehensively address the hypotheses and analyze the underlying phenomena, this research integrates two advanced statistical frameworks. First, the study applies Partial Least Squares Structural Equation Modeling (PLS-SEM) to test model feasibility and traditional causality (sufficient logic). This methodology involves two main evaluation phases: outer model validation to confirm the instrument's reliability and validity, and inner model evaluation to determine the significance of direct effects, mediation paths, and the predictive relevance (PLSpredict) of the hypothesized relationships.

Second, to overcome the inherent limitations of standard causal testing, the investigation incorporates Necessary Condition Analysis (NCA). This analytical approach evaluates necessity logic to determine whether the independent variables (Achievement Motivation and Green Skills) act as absolute, uncompromising prerequisites for achieving specific levels of Work Environmental Behavior. Furthermore, the strategic integration of PLS-SEM and NCA allows the study to successfully pinpoint critical bottlenecks that may obstruct companies from reaching their environmental sustainability targets.

RESULTS AND DISCUSSION

Respondent Characteristics and Demographic Profile, this study employed descriptive statistical analysis to map the demographic profiles of the 229 participating eco-friendly cafe employees in Bandung City. The researchers categorized respondent characteristics based on three primary indicators: gender, age group, and tenure (length of employment). Questionnaire data revealed that male participants constituted 43.7% of the total sample population. Consequently, female workers slightly dominated the workforce within these establishments, accounting for an estimated proportion of 56.3%. This demographic configuration accurately reflects standard trends in the hospitality and Food & Beverage (F&B) industries. Historically, this sector absorbs a large number of female employees, as

they often possess comparative advantages in hospitality, customer service, and operational meticulousness—qualities that strongly support the execution of a cafe's sustainability practices.

The Regarding age distribution, the vast majority of respondents (77.3%) fell into the under-30 category. Meanwhile, mid-level adults (aged 31–40) represented 16.2% of the sample. In contrast, senior employees over the age of 40 accounted for a highly marginal portion of merely 6.6%. This dense concentration of workers under 30—predominantly representing Generation Z and late millennials—holds profound theoretical relevance to the study's core focus. Empirical evidence consistently acknowledges that younger generations exhibit significantly higher ecological literacy, climate crisis awareness, and environmental consciousness than their predecessors.

Analyzing the length of employment (tenure) demonstrated that employees working between 2 and 4 years formed the largest group, contributing 46.3% to the total population. Workers with 4 to 5 years of service followed this position, representing 28.4% of the sample. Additionally, newly hired staff with less than one year of experience comprised 22.7%. On the other hand, the segment of senior workers demonstrating long-term loyalty (exceeding 5 years) recorded the smallest fraction at just 2.6%.

By combining these mid-level tenure groups (2 to 5 years), the data reveals a substantial accumulation of 74.7%. This high proportion strongly indicates that nearly three-quarters of the respondents have successfully surpassed the initial adaptation phase, thoroughly internalizing both the company's operational rhythm and its corporate culture.

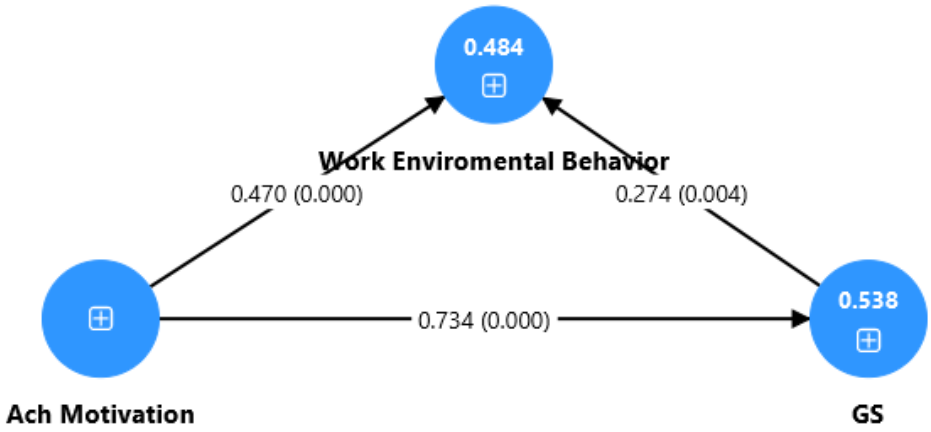


Figure 1. Path Result

Table 1. Validity and Reliability

	Ach Motivation	Work Environmental Behavior	GS	VIF	Cronbach's alpha	(AVE)
AB1	0.720			1.960		
AB2	0.689			1.979		
AB3	0.553			2.071		
AB4	0.713			2.505		
AB5	0.532			1.956	0.940	0.940
AT1	0.799			2.613		
AT2	0.813			3.284		
AT3	0.776			2.390		
AT4	0.752			2.152		
AT5	0.838			3.198		
AT6	0.834			3.166		
AT7	0.755			2.624		
AT8	0.855			3.947		
AT9	0.839			3.745		
F1.1		0.855		3.214		
F1.2		0.741		1.982		
F1.3		0.845		3.244		
F1.4		0.844		3.061		
F1.5		0.837		2.937	0.941	0.654
F2.1		0.859		3.149		
F2.2		0.792		2.681		
F2.3		0.781		2.631		
F2.4		0.770		2.340		
F2.5		0.751		2.396		
GS1			0.706	2.584		
GS2			0.828	3.412		
GS3			0.740	1.975		
GS4			0.840	3.032		
GS5			0.846	3.032	0.947	0.678
GS6			0.817	2.722		
GS7			0.859	3.637		
GS8			0.872	3.956		
GS9			0.844	2.936		
GS10			0.864	3.877		

Measurement Model Evaluation (Outer Model), researchers evaluated the suitability of the indicators in representing their respective constructs by examining the outer loading parameters and the Average Variance Extracted (AVE). Data analysis results revealed that the majority of the statement items exhibited robust factor loadings, safely surpassing the recommended 0.70 threshold. Although a few indicators within the Achievement Motivation construct demonstrated values below 0.70 (specifically AB3 = 0.553 and AB5 = 0.532), the researchers consciously chose to retain them. This decision aligns perfectly with established statistical measurement guidelines proposed by Hair et al. (2019). These guidelines assert that researchers may keep indicators with loadings between 0.40 and 0.70, provided that removing them does not significantly boost the AVE and reliability scores beyond the required baseline.

Table 1 illustrates that indicators AB3 (0.553) and AB5 (0.532) yielded outer loadings below the optimal 0.708 threshold. In variance-based structural equation modeling, these lower coefficients typically signal a variance imbalance. Specifically, more dominant items within the block—namely, AT1 through AT9, which exhibit factor loadings greater than 0.80—capture the bulk of the latent construct's variance. Despite this internal variance skew, we purposefully kept AB3 and AB5 in the measurement model. Eliminating these items would drastically undermine the content validity of the 'Achievement Motivation' construct, as they measure essential psychological elements of intrinsic pro-environmental motivation specific to Bandung's sustainable culinary workforce. Methodologically, retaining these indicators remains structurally sound. The overarching construct yields an outstanding Average Variance Extracted (AVE) of 0.940, easily surpassing the mandatory 0.50 benchmark. This result confirms that the latent variable accounts for over 94% of the shared variance among its indicators without triggering measurement misspecification errors.

Furthermore, all constructs achieved highly satisfactory AVE scores, easily exceeding the minimum criterion of 0.50. Specifically, Achievement Motivation recorded an AVE of 0.940, Work Environmental Behavior scored 0.654, and Green Skill reached 0.678. These empirical figures confirm that, on average, each construct successfully explains more than half of the variance present in its indicators. Consequently, the measurement model absolutely satisfies the strict requirements for convergent validity.

Regarding instrument reliability, the study tested internal consistency by utilizing the Cronbach's alpha metric. The testing outcomes demonstrated remarkably high reliability scores across all observed variables (Achievement Motivation = 0.940; Work Environmental Behavior = 0.941; Green Skill = 0.947). Because every single score lands well above the 0.70 tolerance limit, one can firmly conclude that the distributed questionnaire possesses prime dependability and remains free from random bias.

Finally, to ensure the absence of measurement redundancy or indicator overlap within a single construct, this research examined the Variance Inflation Factor (VIF) values. Based on the data summary, the VIF scores for all indicators ranged from a minimum of 1.956 (AB5) to a maximum peak of 3.956 (GS8). All of these calculated figures fall significantly below the critical threshold of 5.00. This empirical evidence clearly indicates that the measurement model completely avoids severe multicollinearity issues, proving that each measurement item functions uniquely without excessively replicating the others.

Table 2. HTMT

	Ach Motivation	**GS**	**Work Environmental Behavior**
Ach Motivation			
GS	0.767		
Work Environmental Behavior	0.709	0.648	

Based on the HTMT correlation matrix, the highest ratio value emerged in the relationship between Achievement Motivation and Green Skill, recording a score of 0.767. Meanwhile, the ratio linking Achievement Motivation to Work Environmental Behavior displayed a value of 0.709, and the cross-correlation between Green Skill and Work Environmental Behavior yielded 0.648. Since none of these inter-construct correlations approached or exceeded the critical 0.85 threshold, this study confidently asserts that every variable empirically stands as a distinct, separate entity that measures fundamentally different phenomena.

Table 3. Path Coefficients, Indirect Effect, Specific indirect effect and Total Effect

	Coefficients	**Bias**	**5.0%**	**95.0%**	**P values**
Ach Motivation -> GS	0.734	0.004	0.615	0.807	0.000

Ach Motivation -> Work Environmental Behavior	0.470	0.003	0.275	0.632	0.000
GS -> Work Environmental Behavior	0.274	0.002	0.122	0.464	0.004
Indirect Effect	**Coefficients**	**Bias**	**5.0%**	**95.0%**	**P values**
Ach Motivation -> Work Environmental Behavior	0.201	0.004	0.086	0.356	0.007
Specific indirect effect	**Coefficients**	**Bias**	**5.0%**	**95.0%**	**P values**
Ach Motivation -> GS -> Work Environmental Behavior	0.201	0.004	0.086	0.356	0.007
Total Effect	**Coefficients**	**Bias**	**5.0%**	**95.0%**	**P values**
Ach Motivation -> Green Skill	0.734	0.738	0.056	13.200	0.000
Ach Motivation -> Work Environmental Behavior	0.671	0.678	0.068	9.931	0.000
Green Skill -> Work Environmental Behavior	0.274	0.276	0.103	2.662	0.004

Direct Effects Analysis, the parameter estimation results prove that the data fully support all three hypotheses testing direct effects. The researchers detail the testing outcomes as follows: The Impact of Achievement Motivation on Green Skills: Achievement Motivation exerts a highly significant and positive influence on Green Skills, demonstrated by the highest path coefficient of 0.734 (p-value = 0.000). This finding indicates that an employee's internal drive to achieve excellent work performance acts as a primary catalyst in shaping and enhancing their mastery of environmental-based skills.

The Impact of Achievement Motivation on Work Environmental Behavior: Achievement Motivation visibly delivers a positive direct contribution to Work Environmental Behavior, yielding a coefficient of 0.470 (p-value = 0.000). Consequently, cafe employees possessing high achievement motivation tend to proactively execute eco-friendly operational behaviors, completely independent of any mediating variables.

The Impact of Green Skills on Work Environmental Behavior: The Green Skill construct empirically affects Work Environmental Behavior in a positive and significant manner (coefficient = 0.274; p-value = 0.004). This empirical evidence confirms that the eco-friendly knowledge and technical capacities human resources possess will materialize directly into tangible daily actions within the cafe's working environment.

Specific Indirect Effect and Mediation Analysis, beyond direct impacts, the researchers evaluated the role of Green Skills as a mediating variable connecting Achievement Motivation to Work Environmental Behavior. Based on the Specific Indirect Effect output, this mediation path generates a coefficient of 0.201 with an adequate significance level (p-value = 0.007). The confidence interval range (from 5.0% to 95.0%), which spans from 0.086 to 0.356, further reinforces the validity of this mediation effect. Because both the lower and upper bounds show positive values (neither crossing nor touching zero), statistics firmly validate this mediating role. Since Achievement Motivation simultaneously maintains a significant direct influence on Work Environmental Behavior, scholars classify the intervening mechanism in this model as partial mediation. This classification implies that Green Skills successfully bridge the effects of Achievement Motivation, even though the motivation itself can independently drive workplace environmental behaviors.

Total Effect Evaluation, the Total Effect results illustrate the cumulative leverage operating between the variables. The total impact of Achievement Motivation on Work Environmental Behavior surges to 0.671 (accumulating the 0.470 direct effect and the 0.201 indirect effect) with a p-value of 0.000. Ultimately, to optimally cultivate eco-friendly work habits (Work Environmental Behavior), management teams must do more than just stimulate employees' achievement motivation; they must proactively equip their workforce with robust Green Skills.

Table 4. R2, F2, PLSpredict, CVPAT and Model Fit

	R-square	**R-square adjusted**
Green Skill	0.538	0.536
Work Environmental Behavior	0.484	0.480
		f-square
Ach Motivation -> Green Skill		1.165
Ach Motivation -> Work Environmental Behavior		0.198
Green Skill -> Work Environmental Behavior		0.067
PLSpredict	**Q^2predict**	**RMSE** **MAE**

GS			0.526	0.697	0.481
Work Environmental Behavior			0.431	0.765	0.522
CVPAT	**PLS loss**	**IA loss**	**Average loss difference**	**t value**	**p value**
Green Skill	1.288	1.953	-0.665	4.795	0.000
Work Environmental Behavior	1.282	1.787	-0.505	4.488	0.000
Overall	1.285	1.870	-0.585	5.197	0.000
Model Fit		**Saturated model**		**Estimated model**	
SRMR		0.066		0.066	
d_ULS		2.571		2.571	
d_G		1.236		1.236	
Chi-square		1480.970		1480.970	
NFI		0.787		0.787	

Structural Model Viability and Predictive Relevance, assessing the quality of a structural model requires researchers to go beyond merely examining the significance of directional relationships. It demands rigorous testing to determine how effectively the research architecture explains the targeted phenomena and predicts data outside the observed sample. The researchers evaluated this structural viability by examining explanatory power (R^2), effect size (f^2), forecasting accuracy (PLSpredict and CVPAT), and global model fit (Hair, Sarstedt, Ringle & Gudergan, 2024).

Explanatory Power (R^2) and Effect Size (f^2), researchers utilized the coefficient of determination (R-square) to measure the model's capacity to elucidate variations within the endogenous variables. The Green Skill construct registered an R^2 value of 0.538 (or 53.8%). This metric indicates that achievement motivation holds a solid, moderate explanatory power in shaping employees' pro-environmental proficiencies. Meanwhile, the integration of achievement motivation and green skills successfully explained 48.4% ($R^2 = 0.484$) of the variance in Work Environmental Behavior. External factors operating outside the scope of this research model account for the remaining percentage.

In terms of practical significance or effect size (f^2), the path connecting Achievement Motivation to Green Skill demonstrated a massive structural contribution, yielding a value of 1.165 (large effect category). Furthermore, the motivational drive impacting work environmental behavior produced a medium-scale effect ($f^2 = 0.198$). Conversely, the role of green skills in influencing actual behavior yielded a relatively small impact size ($f^2 = 0.067$) (Henseler, Ringle & Sarstedt, 2015). These calculations affirm that while skills certainly

influence actions, the internal motivational drive remains the primary engine, exerting the strongest practical effect within the structural model.

Predictive Accuracy (PLSpredict and CVPAT), a robust structural equation model distinguishes itself through its ability to project new data accurately (out-of-sample prediction). Following the PLSpredict procedure, the Q^2 predict values for all endogenous variables—specifically Green Skill (0.526) and Work Environmental Behavior (0.431)—stood absolutely above zero (> 0). This achievement provides concrete evidence that the proposed model possesses high predictive relevance. The researchers further validated this finding using the Cross-Validated Predictive Ability Test (CVPAT). Comparative analysis results revealed that the empirical model's loss (PLS loss) fell significantly below the average indicator benchmark (IA loss). This condition produced a negative average loss difference (overall = -0.585) paired with an absolute p-value of 0.000. This statistical significance ensures that the proposed research architecture performs far more precisely and effectively in forecasting outcomes compared to a basic theoretical model.

Global Model Fit, the researchers evaluated the alignment between the empirical correlation matrix and the model's implicit correlation matrix by utilizing the Standardized Root Mean Square Residual (SRMR) indicator. The computations generated an SRMR value of 0.066. Referring to econometric validation standards that require an SRMR below 0.08 (or a maximum tolerance of 0.10), one can confidently assert that the research model demonstrates a highly ideal structural fit (good fit). Even though the Normed Fit Index (NFI) settled in a moderate range (0.787), successfully fulfilling the strict SRMR threshold provides more than enough evidence to indicate that the overall structural model remains completely free from specification errors (misspecification). Consequently, it serves as a highly reliable foundation for drawing causal conclusions.

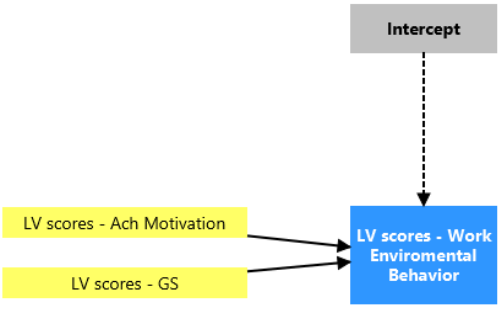


Figure 2. NCA Analysis

Prerequisite Condition Evaluation (Necessary Condition Analysis) and Critical Bottleneck Analysis. To complement the traditional causality testing (sufficiency logic) inherent in the PLS-SEM algorithm, this research applies Necessary Condition Analysis (NCA) to strictly evaluate necessity logic. This advanced analytical approach aims to determine whether a specific independent variable functions as an absolute prerequisite that employees must fulfill to achieve a targeted level of Work Environmental Behavior within eco-friendly cafe operations.

Necessity Effect Size Analysis, the researchers evaluated the prerequisite strength of each construct by calculating the effect size metric (d). To achieve this, the study utilized two distinct upper-bound parameters: Ceiling Envelopment - Free Disposal Hull (CE-FDH) to accommodate stepped data assumptions, and Ceiling Regression - Free Disposal Hull (CR-FDH) for linear continuous data assumptions. According to established NCA literature consensus, an effect size demonstrates meaningful significance only when it successfully surpasses the minimum threshold of 0.10 (Dul, 2024).

Achievement Motivation: This construct recorded a highly significant necessity effect, yielding a CE-FDH score of 0.274 and a CR-FDH score of 0.295. These empirical figures, which firmly reside within the moderate range, confirm that an employee's internal drive to achieve does not merely act as a contributing push factor. Instead, it operates as an absolute, non-negotiable prerequisite that staff members must possess to successfully demonstrate eco-friendly workplace behaviors.

Green Skills: Conversely, the green skill variable registered a highly marginal necessity effect size, scoring only 0.060 for CE-FDH and 0.030 for CR-FDH (both falling far below the 0.10 boundary). Analytically, this evidence indicates that even though green skills statistically enhance environmental behavior (as the prior inner model evaluation previously proved), this specific technical mastery does not function as an absolute essential condition for reaching general environmental performance targets.

Table 5. Ceiling Size

	CE-FDH	**CR-FDH**
LV scores - Ach Motivation	0.274	0.295
LV scores - Green Skill	0.060	0.030

Table 6. Bottleneck CE and CR

CE	LV scores - Work Environmental Behavior	LV scores - Ach Motivation	LV scores - GS
0%	1.110	NN	NN
10%	1.699	2.451	NN
20%	2.288	2.451	NN
30%	2.877	2.451	NN
40%	3.466	2.487	NN
50%	4.055	2.789	NN
60%	4.644	2.789	NN
70%	5.233	2.789	NN
80%	5.822	2.789	NN
90%	6.411	4.686	NN
100%	7.000	6.318	4.732
CR	**LV scores - Work Environmental Behavior**	**LV scores - Ach Motivation**	**LV scores - GS**
0%	1.110	NN	NN
10%	1.699	NN	NN
20%	2.288	NN	NN
30%	2.877	1.647	NN
40%	3.466	2.234	NN
50%	4.055	2.820	NN
60%	4.644	3.407	NN
70%	5.233	3.994	NN
80%	5.822	4.580	NN
90%	6.411	5.167	NN
100%	7.000	5.754	4.732

To scrutinize the specific performance levels where a variable transforms into a critical bottleneck if left unfulfilled, researchers examined the Bottleneck CE and Bottleneck CR matrices. These tables accurately project the targeted outcomes for Work Environmental Behavior (ranging from 0% to 100%) alongside the mandatory threshold scores that the predictor constructs must satisfy. The 'NN' (Not Necessary) designation clearly indicates that, at that specific performance tier, the corresponding variable does not yet function as an absolute prerequisite.

The Critical Path of Achievement Motivation: Referring to the CE estimation model, cafe management must guarantee a minimum Achievement Motivation score of 2.451 just to reach a baseline 10% capacity in pro-environmental behavior. The required magnitude of this motivation escalates continuously in tandem with the organization's performance targets. For instance, to successfully attain a 90% green behavior target, employees' motivation scores must not fall below 4.686 (based on the CE model) or 5.167 (based on the CR model). This

empirical phenomenon strongly affirms that without establishing a solid motivational foundation, the cafe's sustainability initiatives will immediately encounter a severe bottleneck right from the initial execution phases.

The Critical Path of Green Skills: Perfectly consistent with the earlier effect size findings, the Bottleneck instrument consistently displays an 'NN' status for Green Skills across performance targets ranging from 0% up to 90%. This specific variable only evolves into an essential prerequisite (demanding a strict threshold score of 4.732) when the organization explicitly targets absolute perfection (100% compliance) in its Work Environmental Behavior performance.

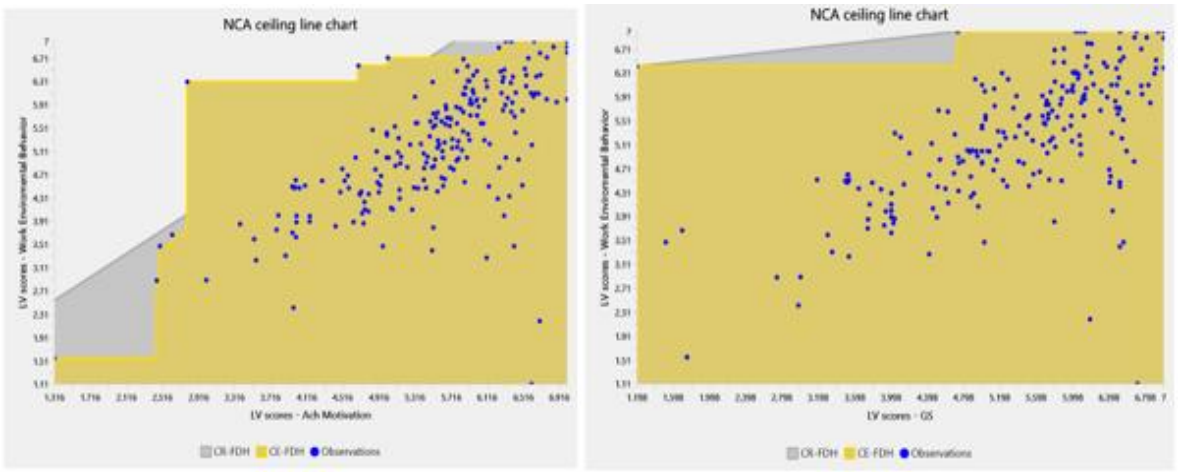


Figure 3. NCA Ceiling Line Chart Analysis

The integration of PLS-SEM and NCA findings offers profound strategic implications for the eco-friendly cafe industry. To cultivate an environmentally conscious workplace ecosystem, human resource management must prioritize recruiting candidates with high Achievement Motivation or implementing interventions to build it, treating this trait as a non-negotiable foundational baseline (a must-have factor). Meanwhile, Green Skill training functions as a value-adding complementary element (a should-have factor). It actively serves to optimize environmental performance; however, its absence will not entirely thwart the execution of pro-environmental behaviors unless the cafe strictly demands an absolute standard of perfection (100% compliance).

This research investigates the formulation of employees' pro-environmental behaviors within the sustainable culinary sector, specifically targeting eco-friendly cafes in Bandung City. By successfully integrating the sufficiency logic approach of PLS-SEM with the

necessity logic of NCA, this study produces novel insights regarding how achievement motivation and green skills actively interact within a dynamic workplace ecosystem.

Achievement Motivation as the Primary Determinant of Green Skills

Empirical testing confirms that Achievement Motivation exerts a massively positive impact on the mastery of Green Skills. The substantial effect size (f-square = 1.165) firmly positions internal motivation as the strongest predictor within this theoretical model. Within the context of eco-friendly cafes, standard operating procedures typically demand strict adherence to sustainability practices, such as zero-waste management, energy efficiency, and organic product preparation. Highly achievement-oriented employees tend to view these technical challenges not as burdensome tasks, but rather as valuable opportunities to demonstrate their competence and achieve workplace excellence. This internal drive to consistently perform optimally actively stimulates them to proactively absorb, learn, and master various environmentally oriented technical skills.

The Effect of Achievement Motivation on Work Environmental Behavior

The research findings do not merely prove a significant direct influence of Achievement Motivation on Work Environmental Behavior; they also expose it as an absolute prerequisite (a necessary condition). The Bottleneck Analysis reveals that an absence of motivation immediately stalls green initiatives right at the foundational stage (the 10% level). This discovery profoundly expands conventional organizational behavior literature by asserting that a cafe's eco-friendly physical infrastructure simply cannot function without the driving psychological force of its workforce. Employees motivated to achieve inherently possess higher moral and professional responsibilities, prompting them to consistently initiate resource-saving actions and adhere strictly to the cafe's environmental protocols without requiring close supervisory oversight.

The Nuanced Role of Green Skills

Analyzing the path from Green Skills to Work Environmental Behavior yields highly rational findings. On one hand, the inner model evaluation proves that Green Skills legitimately heighten the intensity of Work Environmental Behavior. Conversely, the NCA results reject the notion of Green Skills as an absolute prerequisite, demonstrating that this

specific competency only becomes a bottleneck when an organization actively pursues a flawless 100% standard of environmental performance.

Daily operational realities easily explain this phenomenon. Basic environmental conservation actions within a cafe setting—such as switching off unused lights or sorting plastic from organic waste—often rely heavily on common sense and empathetic awareness rather than demanding complex technical expertise. Therefore, workers lacking formal green skill training still manage to exhibit pro-environmental behaviors to a certain degree. Nevertheless, these technical capabilities remain crucial, acting as a powerful catalyst to enhance operational efficiency and maximize the impact of those green actions.

Green Skills as a Partial Mediator

The empirical data proves that Green Skills successfully and partially mediate the relationship connecting Achievement Motivation to Work Environmental Behavior. The presence of this partial mediation provides solid theoretical confirmation that high intentions and internal drives (motivation) actively require a technical conduit (skills) to translate into systematic and measurable environmental conservation actions. When management equips highly enthusiastic cafe employees with targeted green practice training modules (such as coffee grounds composting techniques or energy-saving machine operations), they effectively convert their psychological energy into affirmative actions that directly impact the business's overall sustainability.

Managerial Implications for Bandung's Cafe Industry, the rapidly shifting coffee shop and cafe industry in Bandung City, which increasingly embraces the eco-lifestyle trend, can draw vital strategic prescriptions from these findings. Management teams must proactively reconstruct their human resource recruitment and development paradigms. Considering that Achievement Motivation operates as a must-have factor (an absolute condition), the employee selection process must heavily emphasize uncovering a candidate's track record of initiative, strong work ethic, and intrinsic drive. Subsequently, organizations must design orientation and training programs (functioning as should-have factors) to comprehensively instill Green Skills. This structured approach successfully bridges the employees' high motivation with the realization of the cafe's ultimate vision to operate as a business entity perfectly aligned with global earth conservation efforts.

CONCLUSION

This research successfully maps the absolute prerequisites for establishing sustainable behaviors within the green culinary industry. By synthesizing predictive sufficiency testing (PLS-SEM) and prerequisite condition analysis (NCA), the study concludes that Achievement Motivation serves as both the primary determinant and the absolute foundation (necessary condition) for generating Work Environmental Behavior and Green Skills. Without this intrinsic drive to achieve, environmental conservation initiatives within cafe operations will inevitably encounter roadblocks right from the initial phases. Furthermore, the empirical evidence validates Green Skills as a partial mediator that effectively bridges internal motivation with actual pro-environmental actions. Nevertheless, Green Skills function primarily as a performance-optimizing catalyst (a should-have factor) rather than an absolute prerequisite, unless the organization explicitly targets absolute perfection in its environmental behavior implementation.

These empirical findings yield strong recommendations for business owners and management teams of eco-friendly cafes in Bandung City to adopt a holistic approach to human resource management. During the recruitment process, management must heavily prioritize candidates exhibiting a clear track record or psychological profile of high achievement orientation, as this specific variable remains strictly non-negotiable. Secondly, to properly facilitate and channel this pre-existing motivation, companies need to regularly organize technical Green Skill workshops or training sessions, specifically targeting practical areas like specialized waste management and operational energy efficiency.

The primary limitation of this research lies in its observational scope, which exclusively targeted a survey sample from eco-friendly cafes within the Bandung City area. Additionally, selecting cafes that already explicitly market themselves as eco-friendly inherently introduces potential selection bias. Employees working in these specific establishments most likely possess prior exposure to sustainability values, setting them apart from workers operating in the conventional culinary sector.

To bridge the gaps created by these limitations, the researchers strongly encourage future scholars to expand the investigative landscape. Subsequent studies should conduct comparative analyses by incorporating conventional coffee shops or non-green-labeled restaurants. This specific expansion will rigorously test whether the causal effect of Achievement Motivation on pro-environmental behavior remains consistent within work

environments lacking formal environmental conservation policies. Finally, future investigations should explore organizational-level antecedents or moderating variables—such as Green Transformational Leadership or Green Organizational Culture—to capture a much more comprehensive understanding of the dynamics driving employees' environmental behaviors.

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CONFLICTS OF INTEREST

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