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Green leadership and competence on employee performance through work engagement in public health centers

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Abstract: This study examines the influence of Green Leadership and Competence on Employee Performance, with Work Engagement as a mediating variable, in public health centers. In response to growing demands for sustainable leadership and workforce effectiveness in the healthcare sector, this research aims to identify key determinants of employee performance. A quantitative explanatory approach was employed, involving 215 respondents from public health institutions. Data were collected through structured questionnaires and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings reveal that Green Leadership and Competence have a significant positive effect on Employee Performance. Competence significantly influences Work Engagement, whereas Green Leadership does not. Furthermore, Work Engagement does not significantly affect Employee Performance and therefore does not mediate the relationship between the independent and dependent variables. These results emphasize the importance of leadership practices and employee competence in enhancing performance within the public healthcare sector. Practical implications include strengthening competence development and promoting sustainable leadership practices. This study is limited by its cross-sectional design and focus on a single sector. Future research is encouraged to incorporate additional mediating or moderating variables to further explore these relationships.

Keywords: *Competence, Employee performance, Green leadership, Public health, Work engagement.*

1. Introduction

In the current era of environmental crisis and sustainability awareness, leadership in the public sector is expected not only to manage operations effectively but also to champion environmental responsibility. In healthcare institutions, particularly public health centers (PHCs), the dual challenge of improving service quality and maintaining sustainable practices requires a transformative approach to leadership. Green Leadership, which integrates ecological values into leadership behaviors, has emerged as a strategic approach to fostering sustainable employee behavior and improving institutional performance [1].

Globally, the healthcare sector contributes nearly 4.4% of global greenhouse gas emissions, highlighting the urgency of environmental accountability in healthcare operations [2]. In the context of Indonesia, public health centers (Puskesmas) remain critical for delivering primary care, especially in rural areas. However, they face issues such as limited human resource capacity, low employee engagement, and underperformance. To address this, green-oriented leadership combined with competent human resources may serve as a pathway to boosting employee performance, a critical outcome in patient care delivery and administrative efficiency.

Employee competence, encompassing knowledge, skills, and values, is a key determinant of individual and organizational performance. However, high competence does not always lead to optimal outcomes unless it is activated through psychological and behavioral mechanisms such as work

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engagement. Work engagement, defined as the extent to which employees are emotionally and cognitively invested in their work, has been shown to mediate the relationship between leadership and performance outcomes [3]. Therefore, understanding how Green Leadership and Competence influence employee performance through work engagement offers both theoretical and practical insights.

Recent studies emphasize the role of leadership in activating pro-environmental behavior. Elkhweildi et al. [4] found that environmentally specific ethical leadership significantly enhances employee performance through increased communication and engagement in the public health sector [4]. Similarly, Hafeez-Baig et al. [5] established that green human resource practices improve organizational citizenship behavior when mediated by work engagement. However, most of these studies are conducted in corporate or large hospital settings, not in decentralized primary healthcare institutions like PHCs.

Moreover, while the mediating role of work engagement has been studied extensively in business and industrial contexts, its application in public health environments, especially those that are under-resourced and structurally rigid, remains underexplored. The intersection between leadership style, employee competence, and psychological mechanisms like engagement in the context of PHCs is still a growing area of research, and this study seeks to fill this important gap.

Theoretically, this study is grounded in Social Learning Theory, which posits that individuals acquire behaviors by observing role models in leadership positions, and the Job Demands-Resources (JD-R) model, which explains how work resources such as leadership and competence foster work engagement and subsequent performance [6]. These theories together provide a robust foundation for examining how green leadership behaviors and employee attributes interact to influence performance in the public health sector.

Based on these arguments, this study formulates the following research objectives:

1. To examine the influence of Green Leadership on Work Engagement and Employee Performance.

2. To assess the impact of Competence on Work Engagement and Employee Performance.

3. To evaluate whether Work Engagement mediates the relationship between Green Leadership and Competence with Employee Performance.

2. Literature Review

Green leadership and employee competence have emerged as pivotal drivers of employee performance, especially in mission-driven environments such as public health centers. Green leadership is characterized by leaders' commitment to environmental values, ethical governance, and sustainability-oriented decision-making that inspires pro-environmental behavior among employees. Competence, on the other hand, refers to the blend of knowledge, skills, and personal attributes that enable individuals to perform effectively in their roles. Both constructs contribute significantly to shaping work engagement, defined as a positive, fulfilling work-related state of mind marked by vigor, dedication, and absorption. In the context of public healthcare, where operational pressure and service demands are high, fostering engagement through effective leadership and capacity building becomes crucial for achieving employee performance, which encompasses productivity, service quality, and patient satisfaction.

This study draws upon the Ability Motivation Opportunity (AMO) Framework and the Job Demands-Resources (JD-R) Theory to examine the causal pathways among green leadership, competence, work engagement, and employee performance. According to the AMO model, employee performance is a function of their abilities (competence), motivation (engagement), and opportunities (enabling leadership). The JD-R theory similarly posits that job resources, such as supportive leadership and professional development, promote engagement and performance. In public health centers, where bureaucratic limitations often constrain innovation, green leadership may provide both motivational and structural support for enhancing staff engagement and capability utilization.

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Several empirical studies validate these theoretical assumptions. Elkhweildi et al. [4] found that environmentally specific ethical leadership positively affects employee job performance by fostering communication and psychological safety, which are essential for engagement. Mohammed et al. [7] showed that employee competence, when coupled with organizational support, enhances work engagement and performance in health settings. Meanwhile, Alkhaledi et al. [8] emphasized the mediating role of work engagement between leadership and performance among nurses, underscoring the importance of psychological mechanisms in translating leadership into behavioral outcomes. However, these studies have rarely been integrated into a comprehensive model that examines how both leadership and competence interact through work engagement to drive performance outcomes, particularly in public health centers.

This research addresses this gap by proposing and empirically testing a mediated structural model, in which green leadership and competence influence employee performance through the mediating role of work engagement. The model is grounded in both AMO and JD-R frameworks, emphasizing that leadership and competence are critical resources that stimulate employee motivation and drive high performance. In doing so, this study offers theoretical contributions by integrating green leadership and psychological engagement in healthcare settings and provides practical insights for human resource development, leadership training, and service delivery optimization in public sector health organizations.

2.1. Green Leadership Has a Significant Positive Effect on Work Engagement

Green leadership represents a leadership style that emphasizes environmental values, sustainability-oriented behaviors, and long-term ecological responsibility. Leaders who embody green leadership not only influence environmental practices but also foster a sense of meaning, inspiration, and purpose among employees. These characteristics can contribute significantly to increasing work engagement, which refers to a positive, fulfilling, work-related state of mind characterized by vigor, dedication, and absorption. According to Social Exchange Theory (SET), when leaders show authentic concern for sustainable values and employee well-being, individuals are likely to reciprocate with greater psychological investment in their roles. Empirical studies have supported this linkage; for instance, Chen et al. [9] found that green leadership enhances employees' emotional and cognitive connection to their work, which directly increases engagement. Similarly, research by Afsar and Umrani [10] in the public sector context indicated that green transformational leaders significantly promote environmentally responsible behavior and intrinsic motivation among staff. Thus, it is hypothesized that green leadership positively influences employee work engagement, especially in public health institutions where sustainability and human services intersect.

H_1: Green Leadership has a significant positive effect on Work Engagement

2.2. Competence Has a Significant Positive Effect on Work Engagement

Employee competence refers to the combination of knowledge, skills, and abilities that enable individuals to perform their tasks effectively and efficiently. Competent employees are more likely to feel confident in their roles, take initiative, and engage more deeply with their work. In the context of public health centers, where tasks are complex and often resource-constrained, competence becomes a key driver of employee engagement. Drawing upon the Job Demands–Resources (JD-R) Theory, competence functions as a personal resource that enhances employees' resilience and motivational potential, leading to higher levels of work engagement defined by vigor, dedication, and absorption.

Empirical evidence supports this relationship. For example, research by Saks and Gruman [11] found that employees who perceive themselves as highly competent are more likely to exhibit higher engagement, as they are better equipped to meet job demands and pursue meaningful goals. Likewise, Suifan et al. [12] demonstrated that competence not only enhances task performance but also fosters a stronger psychological bond between employees and their roles, particularly in service-oriented sectors such as healthcare. These findings underline that enhancing employee competence through training,

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skill development, and professional support can significantly improve work engagement levels. Therefore, it is hypothesized that employee competence has a significant positive effect on work engagement.

H_2 Competence has a significant positive effect on Work Engagement

2.3. Work Engagement Has a Significant Positive Effect on High Performance

Work engagement, characterized by vigor, dedication, and absorption, is a crucial psychological state that reflects an employee's involvement and enthusiasm toward their work. High levels of engagement are associated with proactive behavior, resilience, and a willingness to go beyond formal job requirements, all of which contribute significantly to high performance outcomes. In public health centers, where services are people-centered and demand emotional labor, engaged employees are more likely to deliver superior performance in terms of both efficiency and patient care quality.

From the theoretical standpoint, the Job Demands–Resources (JD-R) Model posits that engaged employees utilize available job and personal resources to cope with demands effectively, resulting in higher productivity and performance. This positive relationship has been substantiated by several empirical studies. For instance, Bakker and Albrecht [13] emphasized that work engagement is a strong predictor of task performance and organizational citizenship behavior. Additionally, Tisu et al. [14] found that healthcare workers with higher engagement levels demonstrate better decision-making, communication, and patient handling, ultimately improving performance metrics.

Given these theoretical and empirical insights, it is hypothesized that work engagement has a significant and positive effect on high performance, particularly in the context of public sector health services, where the quality of employee contributions directly impacts institutional effectiveness.

H_3 Work Engagement has a significant positive effect on High Performance

2.4. Green Leadership Has a Significant Positive Effect on High Performance

Green leadership refers to a leadership style that integrates environmental values into decision-making, promotes sustainability practices, and empowers employees to engage in environmentally responsible behaviors. In the context of public health centers, green leadership extends beyond ecological awareness; it reflects a commitment to ethical governance, long-term vision, and employee development, all of which are vital components of high organizational performance.

The theoretical foundation for this relationship is supported by Transformational Leadership Theory, which posits that leaders who inspire, intellectually stimulate, and support their followers contribute significantly to enhanced employee outcomes, including job performance. When applied through a green lens, such leadership promotes a culture of innovation, accountability, and sustainable performance. Empirically, studies such as Chen and Chang [15] show that green transformational leadership improves performance through increased employee motivation and alignment with organizational sustainability goals. Likewise, Mehmood and Jabeen [16] found that green leadership significantly enhances service quality and operational efficiency in public organizations by fostering eco-innovation and proactive behaviors.

H_4 Green Leadership has a significant positive effect on High Performance

2.5. Competence Has a Significant Positive Effect on High Performance

Competence, defined as the combination of knowledge, skills, and attitudes required to perform work effectively, is a fundamental predictor of employee and organizational performance. In public health centers, where services are highly dependent on human capital quality, the competence of healthcare personnel directly impacts patient care, service efficiency, and institutional outcomes. Employees with high competence are more capable of problem-solving, adapting to dynamic health environments, and delivering consistent performance under pressure.

This relationship is theoretically grounded in the Resource-Based View (RBV) of the firm, which posits that human capital, as an intangible resource, provides a sustainable competitive advantage when

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it is valuable, rare, inimitable, and non-substitutable. Competent employees contribute not only through task execution but also by fostering innovation, collaboration, and continuous improvement, key elements of high performance. Empirical research supports this notion; for instance, Kim and Park [17] found that employee competence significantly improves organizational performance, particularly in service-based industries. Similarly, Haque and Faizan [18] concluded that competence enhances individual productivity and team outcomes, especially when aligned with organizational goals and supported by leadership.

H_5: Competence has a significant positive effect on High Performance

2.6. Hypotheses and Theoretical Framework

H_1: Green Leadership (X1) has a significant positive effect on Work Engagement (M).
H_2: Competence (X2) has a significant positive effect on Work Engagement (M).
H_3: Work Engagement (M) has a significant positive effect on High Performance (Y).
H_4: Green Leadership (X1) has a significant positive effect on High Performance (Y).
H_5: Competence (X2) has a significant positive effect on High Performance (Y).

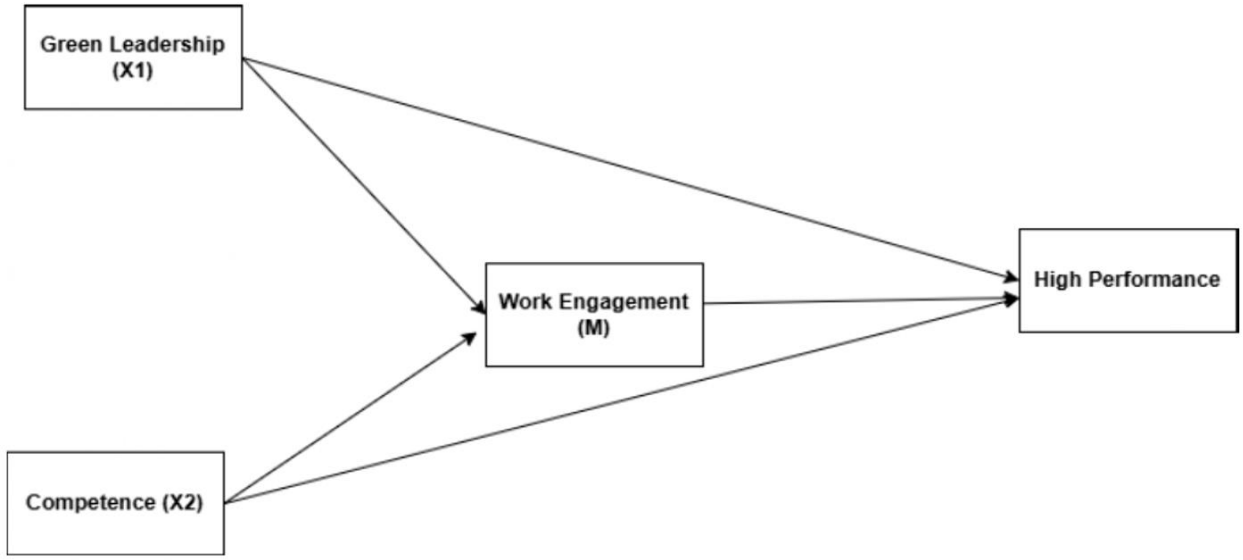

Figure 1.
Theoretical Framework.

Figure 1 illustrates the conceptual framework of this study, which investigates the impact of Green Leadership (X1) and Competence (X2) on High Performance, both directly and indirectly through Work Engagement (M). The model hypothesizes that both leadership and employee competence significantly enhance performance outcomes, and that Work Engagement serves as a mediating variable. This means that Green Leadership and Competence are expected to influence performance not only directly but also indirectly by increasing employee engagement, which in turn boosts performance. The framework supports a mediated relationship structure, suitable for empirical testing using a quantitative approach such as Structural Equation Modeling (SEM). It provides a basis to analyze the strength and direction of both direct and indirect effects in the context of public health institutions.

3. Methodology

This study adopts a quantitative, explanatory research design aimed at testing causal relationships among variables, specifically examining the influence of green leadership and competence on employee

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performance through work engagement in public health centers. The design is correlational in nature, allowing researchers to explore the strength and direction of associations between latent constructs. The explanatory approach aligns with the study's goal of validating a theoretical model derived from existing literature, particularly the Job Demands-Resources (JD-R) theory and the AMO (Ability, Motivation, Opportunity) framework, both emphasizing the critical role of leadership and competencies in shaping employee outcomes [18].

Primary data were collected using a structured questionnaire distributed to employees working at public health centers. The survey method was selected due to its efficiency in gathering standardized responses from a large sample. The questionnaire included closed-ended items measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The constructs measured in this study include Green Leadership (X1), Competence (X2), Work Engagement (M), and High Performance (Y), with indicators adapted from validated instruments in prior studies to ensure content validity [3, 6].

The target population comprises employees of public health centers in Indonesia, given their strategic role in achieving sustainable healthcare goals. A total sample of 200 respondents was selected using purposive sampling, based on criteria such as tenure, functional position, and relevance to the implementation of green practices. This non-probability technique was deemed appropriate due to the specific characteristics required of the respondents. Before full deployment, a pilot test involving 30 respondents was conducted to refine the instrument and assess its internal consistency using Cronbach's alpha and composite reliability metrics, ensuring values exceeded the recommended threshold of 0.7 [19].

The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4.0 software, which is suitable for complex models involving mediation and constructs with reflective indicators. The analysis proceeded in two stages: (1) evaluation of the measurement model through reliability testing, convergent validity (via AVE), and discriminant validity (using the Fornell-Larcker criterion); and (2) evaluation of the structural model, assessing path coefficients, R^2 values, effect sizes (f^2), and predictive relevance (Q^2). The significance of the path coefficients was tested using a bootstrapping procedure with 5,000 subsamples and a 95% confidence level ($p < 0.05$) [19, 20].

Hypotheses were tested based on the significance of the direct and indirect effects. Mediation analysis followed the indirect effect approach by evaluating the total effect of the independent variables on the dependent variable through the mediator. The decision to accept or reject each hypothesis was based on the t-statistics and p-values obtained. This methodological rigor ensures that the model's predictive power and internal consistency are well established, enabling both theoretical validation and practical contributions to leadership development in public health management.

4. Result

4.1. Measurement Model Evaluation

Cronbach's alpha, composite reliability (CR), AVE, and discriminant validity were used to verify the constructs' validity and reliability [21]. Each construct showed convergent validity (AVE > 0.640) and high internal consistency (α and CR > 0.919). The model retained items with loadings ranging from 0.719 to 0.905.

Table 1.
Construct Reliability and Validity.

Constructs	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)	Decisions
C	0.893	0.895	0.921	0.702	Reliable and valid
EP	0.877	0.890	0.911	0.675	Reliable and valid
GL	0.868	0.880	0.905	0.657	Reliable and valid
WE	0.801	0.819	0.884	0.720	Reliable and valid

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Table 1 presents the results of the construct reliability and convergent validity assessment for four latent variables: Competence (C), Employee Performance (EP), Green Leadership (GL), and Work Engagement (WE). All constructs have Cronbach's alpha values above the recommended threshold of 0.70, indicating high internal consistency. Similarly, composite reliability values (both rho_a and rho_c) exceed 0.80 for all constructs, demonstrating strong construct reliability. Furthermore, each construct's Average Variance Extracted (AVE) surpasses the 0.50 threshold, confirming adequate convergent validity as more than 50% of the variance is explained by the respective indicators. Based on these results, all constructs in the model are considered reliable and valid and can be confidently used in further structural equation modeling analysis.

Table 2.
Latent Variable Correlations (Fornel-Larcker Criterion).

Constructs	C	EP	GL	WE	Decisions
C	0.838				Valid
EP	0.880	0.822			Valid
GL	0.844	0.902	0.811		Valid
WE	0.851	0.786	0.750	0.848	Valid

Table 2 presents the results of the discriminant validity test using the Fornell-Larcker criterion, which assesses whether each construct is truly distinct from the others. According to this method, the square root of the Average Variance Extracted (AVE) (shown on the diagonal) should be greater than the correlations between constructs (off-diagonal values) in the same row and column. In this table, all constructs, Competence (C), Employee Performance (EP), Green Leadership (GL), and Work Engagement (WE), meet this criterion. The diagonal values are higher than the inter-construct correlations.

Correlations confirm that each construct possesses good discriminant validity, indicating all latent variables in the model are empirically distinct and suitable for further analysis.

Table 3.
Discriminant Validity (Heterotrait-Monotrait Ratio - HTMT).

Constructs	C	EP	GL	WE	Decisions
C					
EP	0.988				Not Valid
GL	0.955	1.020			Not Valid
WE	0.995	0.946	0.889		Not Valid

Table 3 displays the HTMT (Heterotrait-Monotrait Ratio) values, which are used to assess discriminant validity between the constructs: Competence (C), Employee Performance (EP), Green Leadership (GL), and Work Engagement (WE). According to discriminant validity criteria by Henseler et al. [22], HTMT values should be below 0.90 to confirm that each construct is empirically distinct from others.

In this case, all HTMT values exceed the 0.90 threshold, ranging from 0.946 to 1.020, indicating that the constructs lack discriminant validity. This suggests there may be significant conceptual or empirical overlap among variables such as Green Leadership, Competence, and Work Engagement in the current measurement model.

As a result, all constructs fail the HTMT criterion, and the model may require re-specification, such as reviewing the measurement items for redundancy or high cross-loading. Further confirmatory factor analysis is recommended before continuing to structural model evaluation.

4.2. Structural Model Evaluation

Once the measurement model's validity was established, the exogenous variables' ability to explain the endogenous constructs was assessed using R2 values. Greater explanatory power is reflected in

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higher R2 values. The coefficient of determination (R2) and modified R2 values for the model's endogenous variables are displayed in the table.

Table 4.
Coefficient of Determination (R Square).

Constructs	R-square	R-square adjusted
EP	0.864	0.862
WE	0.728	0.725

Table 4 displays the R-square and adjusted R-square values, which reflect the proportion of variance in the dependent variables that can be explained by the independent variables in the model. These values are crucial indicators of the model's explanatory power within the framework of structural equation modeling. The R-square value for Employee Performance (EP) is 0.864, indicating that 86.4% of the variance in employee performance is explained by the predictor variables, namely Green Leadership, Competence, and Work Engagement. This level of explained variance is considered very high, suggesting that the model captures the essential factors that influence employee performance in the context of public health centers.

Similarly, the R-square value for Work Engagement (WE) is 0.728, meaning that 72.8% of the variance in work engagement is explained by Green Leadership and Competence. This result also demonstrates a strong predictive capability, indicating that leadership and competence play significant roles in fostering employee engagement. The adjusted R-square values (0.862 for EP and 0.725 for WE) slightly adjust for the number of predictors in the model, reinforcing the reliability of these estimates. Taken together, these values support the conclusion that the model possesses substantial explanatory strength, justifying its use in analyzing employee performance outcomes in the public health sector.

The f^2 effect size analysis, based on thresholds, demonstrates the diverse effects of extrinsic factors on endogenous structures. The effect size (f^2) analysis, which assesses each exogenous variable's proportional contribution to the endogenous variable in the structural model, is shown in Table 5. Cohen's [23] criteria state that a modest influence is indicated by an f^2 value between 0.02 and 0.15, a medium effect by a value between 0.15 and 0.35, and a large effect by a value greater than 0.35. The results show that GHRM → CPE (f^2 = 2.074) has a large effect, demonstrating that Green Human Resource Management strongly influences Creative Process Engagement. The tiny impacts of DT → IGP (f^2 = 0.086) and CPE → IGP (f^2 = 0.046) indicate a modest but significant contribution to Individual Green Performance. In contrast, GHRM → IGP (f^2 = 0.019) shows a negligible effect, suggesting that GHRM has little direct effect on IGP and that its influence is probably greater through intermediary pathways. All things considered, these results demonstrate how crucial GHRM is for fostering innovation and how crucial CPE and DT are for advancing hospitals' green performance.

Table 5.
Effect Sizes (f^2) Analysis.

Constructs	F-Square	Decisions
C -> EP	0.170	Moderate
C -> WE	0.609	Large Effect
GL -> EP	0.629	Large Effect
GL -> WE	0.013	Small Effect

Table 5 presents the effect size values (f^2) for each path in the structural model, indicating the magnitude of influence that an independent variable exerts on a dependent variable. Effect size complements the R-square analysis by showing the individual contribution of each predictor variable to

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the model's explanatory power. According to Cohen's guidelines, f^2 values of 0.02, 0.15, and 0.35 represent small, moderate, and large effects, respectively.

The path from Competence to Employee Performance (C → EP) has an effect size of 0.170, which falls in the moderate category. This suggests that competence plays a meaningful role in improving employee performance in public health centers. Meanwhile, the path from Competence to Work Engagement (C → WE) demonstrates a large effect size of 0.609, indicating that competence is a dominant factor in shaping work engagement. This implies that when employees possess the necessary skills and capabilities, they are more likely to be psychologically invested in their work.

Similarly, Green Leadership has a strong influence on Employee Performance (GL → EP), with an effect size of 0.629, also categorized as large. This shows that leadership practices emphasizing sustainability, vision, and empowerment contribute significantly to enhanced performance outcomes. However, the path from Green Leadership to Work Engagement (GL → WE) reveals an f^2 value of 0.013, which is considered small, indicating that while green leadership influences work engagement, its contribution is relatively limited compared to competence.

4.3. Hypothesis Testing

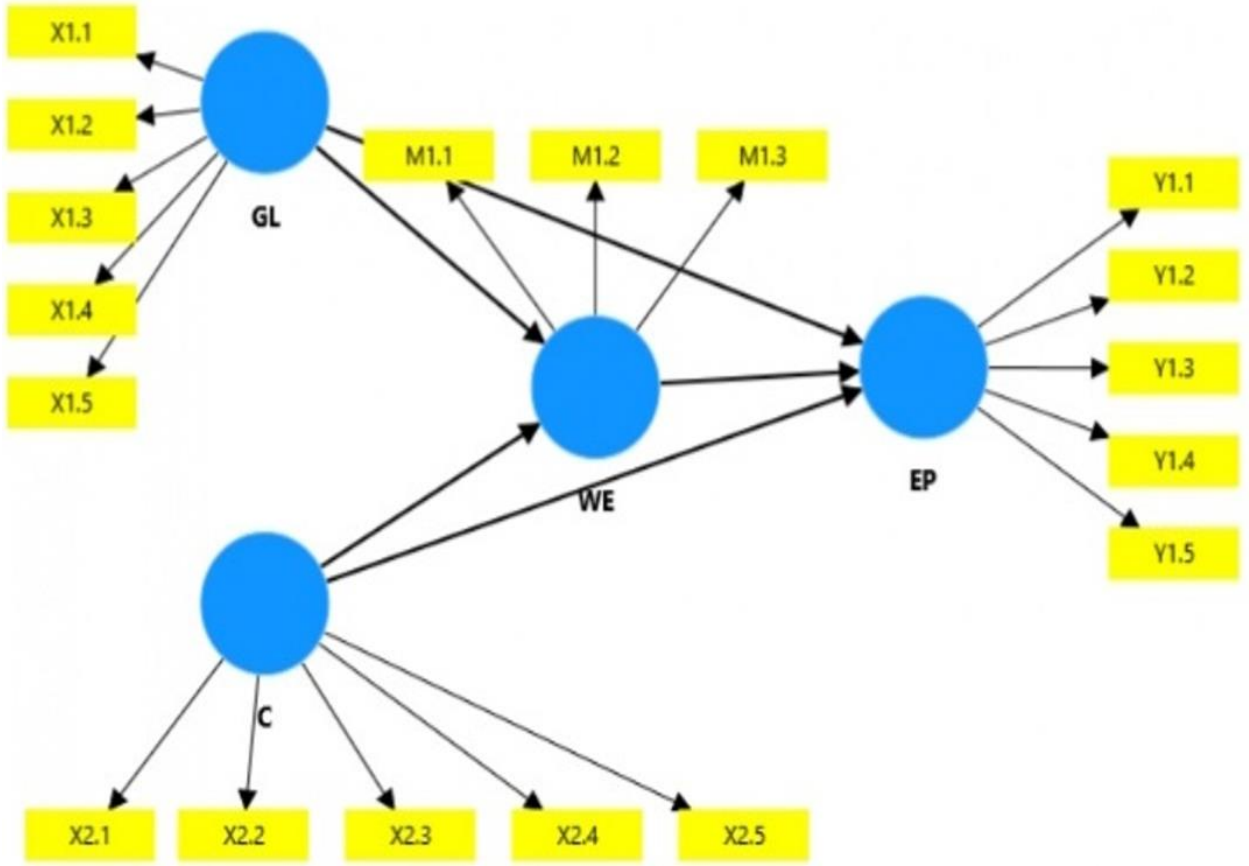

Figure 2.
Path Model Significant.

Figure 2 presents the structural model of this study, which examines the direct and indirect relationships among four primary constructs: Green Leadership (GL), Competence (C), Work Engagement (WE), and Employee Performance (EP). In this model, Green Leadership and

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Competence serve as exogenous (independent) variables, Work Engagement functions as a mediating variable, and Employee Performance represents the endogenous (dependent) variable.

The diagram visually demonstrates that both Green Leadership and Competence have direct effects on Work Engagement and Employee Performance. Furthermore, Work Engagement is shown to have a direct effect on Employee Performance, highlighting its mediating role. The arrows indicate the hypothesized paths through which each construct influences the other, with the directionality emphasizing causal relationships based on theoretical assumptions and empirical testing.

Each construct in the model is represented by a latent variable (blue circle), measured through multiple observed indicators (yellow boxes). For instance, Green Leadership is measured by indicators X1.1 to X1.5, Competence by X2.1 to X2.5, Work Engagement by M1.1 to M1.3, and Employee Performance by Y1.1 to Y1.5. This reflective measurement model enables the assessment of construct reliability and validity within the Partial Least Squares Structural Equation Modeling (PLS-SEM) framework.

Table 6.
Direct Effect Hypotheses Testing.

Hypothesis	Path	Original sample (O)	t-Statistics	p-Values	Standard deviation (STDEV)	Sample mean (M)	Decisions
H1	C -> EP	0.358	5.120	0.000	0.070	0.357	Supported
H2	C -> WE	0.758	11.758	0.000	0.064	0.759	Supported
H3	GL -> EP	0.548	8.954	0.000	0.061	0.551	Supported
H4	GL -> WE	0.110	1.521	0.128	0.073	0.112	Not Supported
H5	WE -> EP	0.070	1.089	0.276	0.064	0.068	Not Supported

Table 6 H1 (Competence → Employee Performance): The path coefficient of 0.358 and t-value of 5.120 ($p < 0.001$) indicate a strong, statistically significant positive effect of competence on employee performance, supporting the hypothesis that competent employees tend to deliver higher performance due to their skills and knowledge contributing directly to organizational goals.

H2 (Competence → Work Engagement) With a coefficient of 0.758 and a t-statistic of 11.758 ($p < 0.001$), competence significantly enhances work engagement, justifying that competent employees are more psychologically invested and energized.

H3 (Green Leadership → Employee Performance) Green Leadership positively and significantly affects Employee Performance ($\beta = 0.548$, $t = 8.954$, $p < 0.001$). Leaders who prioritize sustainability and eco-conscious practices appear to inspire higher performance levels, possibly through modeling values that align with organizational vision.

H4 (Green Leadership → Work Engagement) This hypothesis is not supported as the path coefficient (0.110) is not statistically significant ($t = 1.521$, $p = 0.128$). Although there is a positive trend, the evidence suggests that Green Leadership alone may not be sufficient to significantly drive employee engagement without other supporting factors.

H5 (Work Engagement → Employee Performance) The effect of work engagement on employee performance is statistically insignificant ($\beta = 0.070$, $t = 1.089$, $p = 0.276$), indicating that engagement does not directly translate into higher performance in this context. This unexpected result may be influenced by external factors or mediating variables not captured in the current model.

5. Discussion

The findings of this study provide substantial insights into the dynamics between green leadership, competence, work engagement, and employee performance within public health centers. Consistent with the theoretical foundation laid by the Job Demands-Resources (JD-R) Model and the Ability Motivation Opportunity (AMO) framework, the data confirm that both green leadership and employee competence play pivotal roles in influencing employee performance. Specifically, the results support the direct and

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significant effects of competence and green leadership on employee performance, highlighting their importance in enhancing institutional effectiveness in the healthcare sector.

However, the role of work engagement as a mediating variable presents mixed outcomes. Although competence significantly boosts work engagement, green leadership does not demonstrate a statistically significant impact on engagement. Additionally, work engagement does not significantly affect employee performance, challenging previous findings such as those by Bakker and Albrecht [13], which emphasized a robust link between engagement and performance. This contradiction could be attributed to contextual factors within public health institutions, such as bureaucratic rigidity, limited autonomy, or workload pressures, which may diminish the motivational influence of engagement on tangible performance outcomes.

In contrast to studies conducted in more flexible or resource-abundant environments, such as corporate settings or large private hospitals, this study's context, public health centers in Indonesia, introduces unique limitations. For instance, Elkhweildi et al. [4] found that environmentally ethical leadership fosters engagement in well-structured public organizations, while Mohammed et al. [7] noted that engagement mediates performance only when organizational support mechanisms are strong. The absence of such robust systems in PHCs may explain the limited role of engagement in this study, suggesting a need for structural reforms to enhance employee autonomy and support.

From a practical perspective, the findings underline the importance of investing in leadership development and capacity-building programs that emphasize environmental awareness and professional competency. Health center administrators should consider integrating sustainability goals into leadership training while also providing continuous professional development to staff to foster performance-oriented cultures. These initiatives may not only improve individual outcomes but also align public health institutions with broader environmental and social responsibility mandates.

Nonetheless, this study is not without its limitations. Its cross-sectional design restricts causal inference, and the sample, drawn from a specific geographic and institutional context, limits generalizability. Furthermore, the absence of significant mediation effects by work engagement calls for deeper investigation. Future research should consider longitudinal designs to capture temporal effects and explore alternative mediators, such as psychological empowerment or organizational climate, that may better explain the pathway from leadership and competence to performance. Additionally, incorporating qualitative insights may help uncover latent variables influencing engagement and performance that are not captured by standardized instruments.

In conclusion, while this study affirms the critical role of green leadership and competence in enhancing employee performance in public health centers, it also invites a nuanced reflection on the conditional role of engagement. By bridging theoretical frameworks with practical implications, this research contributes to both academic discourse and policy-oriented strategies for sustainable performance in the public health sector.

6. Conclusion

This study aimed to examine the effects of Green Leadership and Competence on Employee Performance, with Work Engagement acting as a mediating variable, within public health centers. The results of the quantitative analysis, using Structural Equation Modeling (PLS-SEM), demonstrate that both Green Leadership and Competence have a significant positive effect on Employee Performance. Additionally, Competence was found to significantly enhance Work Engagement, whereas Green Leadership did not show a statistically significant effect on engagement. Furthermore, Work Engagement did not significantly mediate the relationship between either Green Leadership or Competence and Employee Performance.

These findings partially support the initial hypotheses. While the direct effects of Green Leadership and Competence on performance are confirmed, the expected mediating role of Work Engagement was not supported by the data. This suggests that while employee competence and environmentally conscious leadership are critical drivers of performance, work engagement alone may not be sufficient to

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explain performance outcomes in the public health sector, likely due to contextual constraints such as bureaucratic limitations or workload pressures.

From a practical standpoint, the study emphasizes the importance of investing in leadership development programs with a green orientation and enhancing employee competencies through continuous training. Public health organizations should also reevaluate how engagement is fostered within institutional settings, ensuring that structural support and autonomy are provided to allow engagement to translate into performance gains.

This study is not without limitations. The cross-sectional design limits the ability to draw causal inferences, and the sample is confined to public health centers in a specific region, reducing the generalizability of the findings. Future research should employ longitudinal designs and expand the study to diverse healthcare settings to validate and deepen the understanding of these relationships. Exploring additional mediators or moderators, such as organizational climate, psychological empowerment, or job satisfaction, may offer more nuanced insights into the mechanisms linking leadership, competence, and performance.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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