

GREEN TRANSFORMATIONAL LEADERSHIP AND ORGANIZATIONAL CULTURE ON ENVIRONMENTAL PERFORMANCE

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Abstract

How to cite this paper: Purwanto, F., Riyadi, S., & Ardiana, I. D. K. R. (2024). Green transformational leadership and organizational culture on environmental performance [Special issue]. *Corporate Governance and Organizational Behavior Review*, 8(2), 265–275.
<https://doi.org/10.22495/cgobrv8i2sip2>

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ISSN Online: 2521-1889

ISSN Print: 2521-1870

Received: 07.07.2023

Accepted: 27.05.2024

JEL Classification: M12, M14, Q55, Q56, L25

DOI: 10.22495/cgobrv8i2sip2

This study examines the influence of eco-conscious transformational leadership and organizational culture on environmental outcomes in the context of East Java's small and medium-sized enterprise (SME) industry. It investigates the mediating factors of green human resource management (green HRM) and sustainable innovation. The research methodology employs an explanatory approach to understand the relationships among these variables. The study's target population consists of all registered SMEs in East Java, as recorded by the Provincial Office of Cooperatives and SMEs. These entities include various legal statuses in terms of ownership (PT/CV/UD/Foundation), and there are a total of 862,450 business entities. To determine an appropriate sample size, the study utilizes Slovin's formula, resulting in a sample size of 400 entities. The research adopts a stratified cluster random sampling method for data collection and employs structural equation modeling (SEM) for data analysis. The findings of the study suggest that eco-conscious transformative leadership has a positive impact on green HRM, green innovation, and environmental outcomes. Similarly, organizational culture was found to influence green HRM and green innovation. Additionally, both green HRM and green innovation were positively associated with environmental performance. However, the relationship between organizational culture and environmental performance was found to be insignificant.

Keywords: Green Transformational Leadership, Organizational Culture, Environmental Performance, Green Human Resource Management, Green Innovation, SMEs

Authors' individual contribution: Conceptualization — F.P.; Methodology — F.P.; Software — F.P.; Validation — S.R.; Formal Analysis — S.R.; Investigation — I.D.K.R.A.; Resources — I.D.K.R.A.; Writing — Original Draft — I.D.K.R.A.; Writing — Review & Editing — F.P.; Visualization — F.P.; Supervision — S.R.; Project Administration — I.D.K.R.A.; Funding Acquisition — F.P.

Declaration of conflicting interests: The Authors declare that there is no conflict of interest.

1. INTRODUCTION

Environmental management schemes in organizations or companies depend on developing and maintaining internal competence capabilities (Biscotti et al., 2018).

Small and medium-sized enterprises (SMEs) in the industry are the main contributors to the impact of environmental sustainability changes due to their lack of ability, motivation, and poor management and leadership skills (Boiral et al., 2014). The theory

explains that leadership and human resource management (HRM) play a role in developing human resource competencies and SME capabilities (Leroy et al., 2018). Elsetouhi et al. (2018) and Brettel et al. (2015) described how organizational culture and communication of employees with their psychological nature can improve the performance of SMEs. While Northouse (2021) and Arif et al. (2022) explain that leadership that emphasizes understanding, anticipating, and controlling employees' personalities will influence overall goals.

Therefore, implementing HRM directly related to systems and processes that orderly influence employees on a larger scale can be the best mediator to measure green performance in the SME sector (Almazrouei et al., 2016; Lievens, 2020). Chen and Chang (2013) and Jia et al. (2018) explain that top management in the SME sector must be able to implement green transformational leadership and green HRM practices. Green HRM is based on an environmentally friendly perspective to promote an organizational culture to encourage employees to work in the most environmentally friendly way possible (Darvishmotevali & Altinay, 2022).

Other literature shows that leadership significantly impacts organizational outcomes by influencing attitudes and organizational performance (Saleem et al., 2020).

There was a significant improvement in the management of the Environmental Quality Index (EQI) in Indonesia from 2019-2021. According to Statista Research Department (Statista, 2023) Indonesia's EQI was 71.43 out of 100 in 2021, indicating a slight improvement in the country's environmental quality compared to the previous year. Meanwhile, the Synthetic Water Quality Index (SWQI) score last year was 81.03 points, an increase of 12.09 points compared to 2020 (Hu et al., 2022).

The EQI score last year 2022 also exceeded the Medium-Term National Development Plan (RPJMN) target of 68.96 points (Hu et al., 2022). This is due, in part, to the restrictions on all activities in the public sector due to the pandemic, which resulted in an increased quality of the environment in many regions of Indonesia. However, caution and ongoing evaluation of the management of the SME sector, particularly in terms of resource management and organizational culture, are needed to address the impact on the environment, which will ultimately drive the performance of these industries to become more environmentally.

The HRM plays a major competitive advantage because it can directly affect organizational performance (Hou et al., 2017). When organizations use HRM policies to encourage green performance by increasing their morale and satisfaction with environmental preservation, which is described as green HRM (Al-Hawari et al., 2021), and at this time, employees have the desire and satisfaction with organizations that are proactive in supporting the preservation of a green environment (Ahmad, 2015).

Therefore, to reduce environmental degradation and waste, international organizations, academics, and governments focus on the importance of green HRM initiatives in exploring several instruments, such as organizational culture, to develop green performance (Anwar et al., 2020). Kumar et al. (2020)

also explained that organizational culture is the main behavioral factor in influencing performance.

According to data from the Ministry of Environment and Forestry, medical waste has increased by 30% to 50% during the pandemic (Mihai, 2020). If the increase in medical waste is not addressed and managed seriously, it will cause massive environmental degradation, especially in East Java. Therefore, the provincial government needs to manage B3 and non-B3 waste caused by the COVID-19 pandemic according to procedures so that it does not cause environmental degradation. It is recorded that the biggest contributor to medical waste is disposable masks used by the public.

Of the thousands of companies in East Java, five industries are the largest producers of B3 waste: the chemical industry, metallurgical industry, paper industry, electric power industry, and the sugar industry. However, these industries are included in the large companies that already have adequate wastewater treatment plants, so it is not difficult to supervise them. While the industry is increasing in the micro, small and medium enterprise (MSME) sector, most of which do not yet have legality, it isn't easy to carry out supervision related to the environment. The use of B3 waste not by the provisions/regulations tends to increase in MSMEs due to a lack of knowledge in waste management. Very few businesses are still applying for permits to produce/manage B3 waste.

For this reason, this research focuses on the MSME sector in East Java, which is seen from the point of view of several variables that have a large impact on environmental performance. With environmentally sound green construction management, it is hoped that exploitation and environmental pollution waste can be minimized. The manufacturing industry is very vulnerable to environmental exploitation related to land, water, and air management. For example, the chicken farming industry must be managed properly to avoid odors and land use for planting vegetables or fruit is managed by considering good soil conditions. Therefore, this research focuses on looking at the environmental impacts that occur from a management perspective by building a research model that influences environmental performance in SMEs in East Java.

This research is centered on scrutinizing the intricate relationship between green transformational leadership, organizational culture, green HRM, green innovation, and environmental performance within the scope of SMEs located in East Java, Indonesia. Although prior studies have looked into the individual impacts of these elements on environmental performance, this study endeavors to unravel the multifaceted associations among them. It also seeks to identify how green HRM and green innovation serve as intermediaries, aiding in the conversion of green transformational leadership and organizational culture into enhanced environmental performance. Furthermore, this investigation addresses a gap in the existing literature by focusing on the specific context of SMEs in Indonesia. As a developing nation with its unique set of environmental and socio-economic obstacles, Indonesia presents a distinct backdrop that may influence the efficacy of green initiatives.

The structure of this paper is as follows. Section 2 reviews relevant literature, outlines the conceptual framework underpinning this research and details key findings from prior studies. Section 3 provides research methodology, including data collection methods, data analysis, and the measurement of key variables of focus in this study. Sections 4 and 5 details the results, elucidating findings emerging from data analysis and their relation to the proposed conceptual framework. Section 6 delves into the implications of these findings in practical, managerial, and policy contexts, as well as provides pertinent recommendations. Following the structure of this article, the authors aim to explore and analyze the impacts and interaction of various elements holistically in the unique context of East Java, Indonesia.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Green transformational leadership

2.1.1. The impact of green transformational leadership on green HRM

Visionary leaders accurately identify and articulate their organization's present actions and potential future strategies within a changing market scenario (Avolio et al., 1999). These leaders must develop an innovative vision, express deep conviction in it, and communicate it effectively to their workforce. As a result, the employees start believing in and becoming passionate about this vision (Zhu et al., 2005). Zhu et al.'s (2005) study found that such transformational leadership leads to increased motivation, trust, unity, commitment, and overall performance. Further research has evidenced that the intellectually stimulating aspect of transformational leadership can positively impact performance management, talent management, and employee productivity (Jia et al., 2018). As a result, the following hypothesis can be formulated:

H1: Eco-friendly transformational leadership significantly impacts green human resource management.

2.1.2. The impact of green transformational leadership on green innovation

Prior research has indicated the critical role transformational leadership holds in stimulating innovation within an organization (Zuraik et al., 2020; Zuraik & Kelly, 2018). García-Morales et al. (2012) affirmed the impact of transformational leadership on fostering innovation by cultivating key competencies and abilities via personal decision-making processes, to accomplish common objectives. The second hypothesis proposes that:

H2: Eco-friendly transformational leadership significantly impacts sustainable innovation.

2.1.3. The impact of green transformational leadership on environmental performance

Coff and Kryscynski (2011) argued that unique resources and capabilities — those that are valuable, rare, hard to imitate, and irreplaceable — form the basis for firms to achieve a competitive edge and enhance performance. Leadership is one such

unique resource that can guide organizations towards accomplishing their objectives and securing a competitive advantage (Srivastava et al., 2013). The natural resource-based view (NRBV) puts forward the idea that while historically overlooked, elements of the natural environment must now be recognized and prioritized within strategic planning (Hart, 1995). Environmentally conscious leadership can motivate employees and organizations towards adopting green practices and decreasing pollution mitigation costs, consequently improving a company's environmental performance (Țăpurică & Ispășoiu, 2013). As a result, the third hypothesis stipulates that:

H3: Environmentally focused transformational leadership significantly affects environmental performance.

2.2. Organizational culture

2.2.1. The impact of organizational culture on green HRM

Organizational culture encapsulates the values, beliefs, and behaviours of its employees (Schein, 2010). Values are aligned with what individuals believe they should uphold and are tied to moral and ethical codes (Awad et al., 2018). Beliefs denote personal perceptions deemed to be true or false. Behaviour, on the other hand, denotes a consistent series of actions undertaken by individuals, guided by their values and beliefs (Schein, 2010). These values, beliefs, and behaviours become an integral part of an organization's philosophy, aiding in navigating ambiguous or complex circumstances encountered in corporate life (Schein, 2010). The organizational philosophy is mirrored in the behaviour of its employees, and over time, these behaviours form ingrained habits that shape the day-to-day operations of the company, and thus the organizational culture (Schein, 2010). As a result, the fourth hypothesis provides that:

H4: Organizational culture significantly influences green human resource management.

2.2.2. The impact of organizational culture on green innovation

The exact terminology for green innovation tends to be somewhat unclear. Scholars frequently use terms like "eco-innovation" (Xavier et al., 2017; Hojnik & Ruzzier, 2016), "green innovation" (Albort-Morant et al., 2017; Wang, 2019) and "environmental innovation" (Hojnik & Ruzzier, 2016) interchangeably in their research. Green innovation is defined as innovations in products and processes that offer value to customers and businesses while drastically lowering their environmental footprint (Bocken et al., 2014). The fifth hypothesis proposes that:

H5: Organizational culture significantly influences green innovation.

2.2.3. The impact of organizational culture on environmental performance

Our hypothesis posits that a company's organizational culture can boost its environmental performance. More specifically, we propose that factors such as the focus on leadership, credibility of messages, empowerment of employees, and peer involvement

can positively shape the organizational culture, thereby enhancing environmental performance (Chu et al., 2019). For instance, a forward-thinking approach to environmental issues (emphasis on leadership) can aid employees in understanding environmental matters better and enable them to put into action positive environmental solutions like recycling and stakeholder engagement programs (Liu et al., 2021). As a result, the sixth hypothesis is formulated:

H6: Organizational culture significantly impacts environmental performance.

2.3. Green innovation to environmental performance

Environmental performance relates to organizational initiatives to meet and exceed the expectations of society and the natural environment in a way that goes beyond compliance with rules and regulations. This includes the environmental effects of organizational processes, products, and resource consumption in a manner that best meets legal environmental requirements. Previous studies show that environmental performance depends on environmentally friendly product quality, green process and product innovation, and the incorporation of ecological sustainability into business operations and product development. Green innovation is associated with a firm environmental management agenda and stimulates environmental performance.

$$n = \frac{N}{1 + N \cdot e^2} = \frac{862.450}{1 + 862.450 \times 0,05^2} = 399,8 \approx 400 \quad (1)$$

where, n — sample size; N — population size; e — sampling error 5%.

Thus, the number of samples to be used in this study is 400 units of SMEs. The sampling technique to be used is stratified cluster random sampling.

The selected sampling technique for this research is stratified cluster random sampling. This method is chosen because it allows for a systematic and efficient way to obtain a representative sample of MSMEs in the East Java province.

In stratified cluster random sampling, the population is divided into strata, or subgroups, based on certain characteristics that are relevant to the research objectives. In this case, strata could be created based on factors such as business size, industry type, or geographical location. From each stratum, clusters of MSMEs are randomly selected. This approach ensures that a diverse and representative sample is obtained, which can provide insights into various aspects of the MSME sector in the region.

While the selected methodology suits the research objectives, it's essential to acknowledge alternative methods that could be considered for future studies:

- *Qualitative research:* Qualitative research methods, such as in-depth interviews or focus groups, can complement quantitative findings by providing a deeper understanding of the experiences, perceptions, and motivations of MSME owners and stakeholders.

Furthermore, product innovation and green processes reduce the negative environmental impact of business and improve the company's financial and social performance by reducing waste and costs. Previous studies show that green innovation should not be considered as a company's reactive action against stakeholder pressure through proactive organizational intentions and practices to improve environmental performance to gain a competitive advantage (Liu et al., 2021). Using the NRBV, we predict that green process and product innovation are significant organizational resources firms use to improve their environmental performance and gain goodwill among critical stakeholders.

3. RESEARCH METHODOLOGY

This research was structured as a quantitative study. Quantitative research is recognized by its deductive approach to research processing, aiming to confirm, refute, or support existing theories. This form of quantitative study includes the measurement of variables and the exploration of interrelationships among these variables to uncover patterns, associations, or cause-effect connections (Leavy, 2017).

The population of this study is the total number of MSMEs registered in the regional government of East Java province, with a total of 862,450 business units. With a very large population, researchers can't study everything in the population, so can use samples.

- *Mixed-methods approach:* Combining quantitative and qualitative methods can offer a more comprehensive view of the research topic, allowing for a deeper exploration of the relationships between variables while also capturing rich, contextual information.

- *Case studies:* Conducting in-depth case studies of a smaller subset of MSMEs can provide detailed insights into specific businesses or situations within the broader population.

4. RESULTS

This research begins by testing the tool because whether the data taken from the data source using a tool is good or not, the tool must be tested first to ensure the accuracy of the measurements. For tools whose measurements are physical (for example rulers, thermometers and scales), then testing the tools use calibration techniques. For tools whose measurements are non-physical (latent variables) using questionnaires, the testing uses validity and reliability techniques. Validity and reliability testing uses data from at least 30 respondents. In this research, the questionnaire was tested on 50 MSME entrepreneurs in East Java who were registered with the East Java Province Cooperative and SME Service in 2021 (Sari et al., 2023).

Table 1. Unidimensionality validity test results

Variable	Validity of unidimensionality			Information
	Kaiser-Meyer-Olkin (KMO) measure	Bartlett's test	Eigenvalue	
Green transformational leadership (X1)	0.759	0.000	6.573	Valid
Organizational culture (X2)	0.760	0.000	6.355	Valid
Green HRM (Z1)	0.800	0.000	4.603	Valid
Green innovation (Z2)	0.751	0.000	3.094	Valid
Environmental performance (Y)	0.834	0.000	3.013	Valid
Rule of thumb	≥ 0.50	≤ 0.05	≥ 1	

As such, it was concluded that all statement items evaluating green transformational leadership, organizational culture, green HRM, green innovation, and environmental performance have satisfied

the unidimensionality condition, implying they “represent a single concept” within each of the constructs they measure.

Table 2. Uji reliability

Variable	Number of items	Cronbach's alpha	Information
Green transformational leadership (X1)	16	0.901	Reliable
Organizational culture (X2)	15	0.894	Reliable
Green HRM (Z1)	11	0.860	Reliable
Green innovation (Z2)	6	0.811	Reliable
Environmental performance (Y)	6	0.796	Reliable
Rule of thumb		≥ 0.60	

The outcomes of the reliability test on all variables yielded Cronbach's alpha values that exceeded 0.60. Therefore, it can be affirmed that the questionnaire statement items utilized to measure the variables of green transformational

leadership, organizational culture, green HRM, green innovation, and environmental performance are reliable. They can be trusted as consistent and dependable measurement tools.

Table 3. Uji multivariate normality

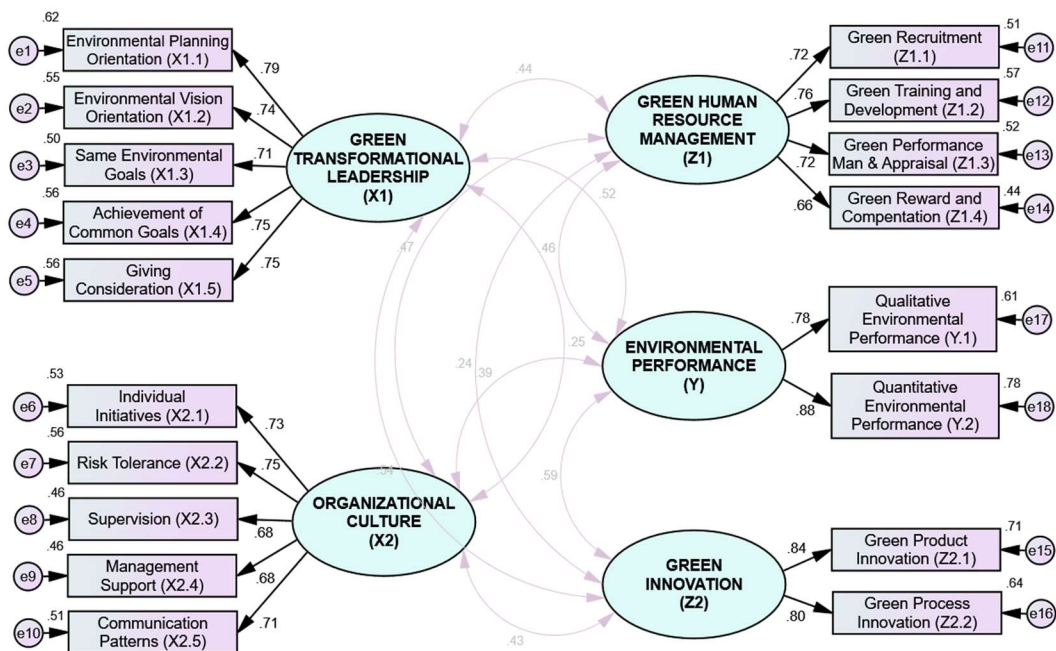
Test	Kurtosis	C.R. multivariate	Conclusion
Multivariate normality	-4.252	-1.585	C.R. is within the range of ±1.96 so that the multivariate data is normally distributed

Note: C.R. — critical ratios.

The normality test shows a multivariate C.R. of -1.585 which is in the range of -1.96 to +1.96 at

a significance level of 5%, so it can be concluded that the multivariate data is normally distributed.

Figure 1. Evaluation of measurement models

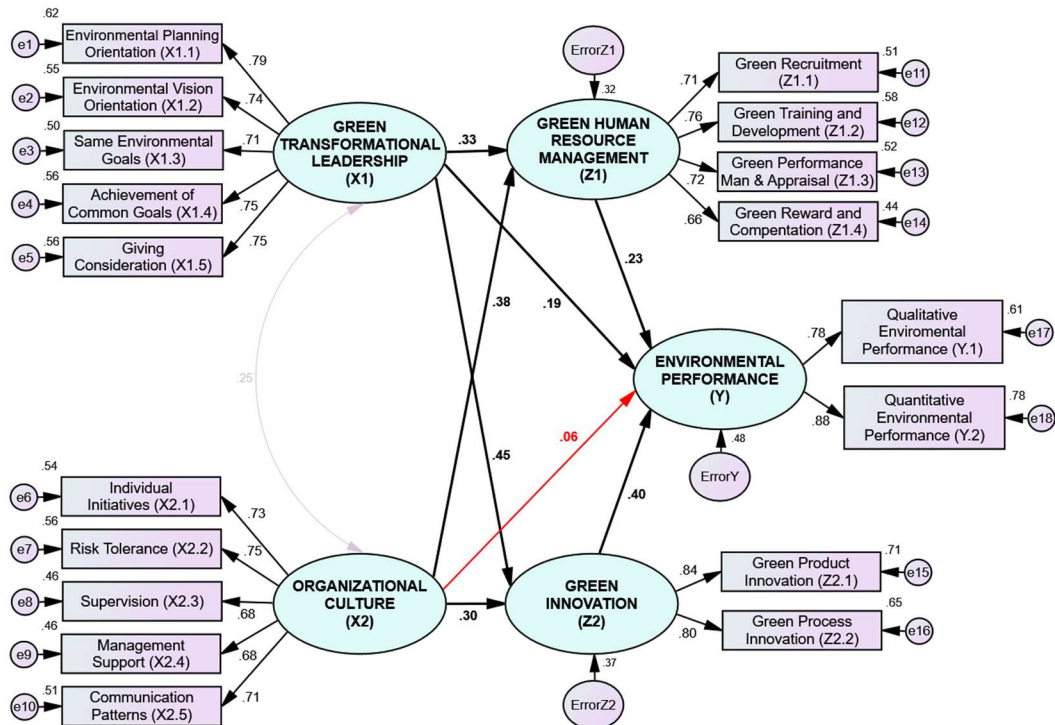


Note: Chi-square = 128.944, Prob. = 0.386, Cmin/df = 1.032, Goodness of fit index (GFI) = 0.966, Root mean square error of approximation (RMSEA) = 0.009, Comparative fit index (CFI) = 0.999, Tucker-Lewis index (TLI) = 0.998, Normed fit index (NFI) = 0.948, Relative fit index (RFI) = 0.948, Adjusted goodness-of-fit (AGFI) = 0.953. Source: Authors' elaboration.

The results of the suitability test on the measurement model have produced appropriate criteria: both absolute fit indices, incremental fit indices, and parsimony fit indices have fulfilled

the requirements so that the measurement model can be accepted because the suitability of the model is good (good fit).

Figure 2. Structural Model Estimation Results



Note: Chi-square = 133.699, Prob. = 0.302, Cmin/df = 1.061, GFI = 0.964, RMSEA = 0.012, CFI = 0.997, TLI = 0.997, NFI = 0.956, RFI = 0.947, AGFI = 0.952.
Source: Authors' elaboration.

The structural model suitability test results showed that all model suitability criteria met the requirements (good fit). Additional detection to determine the model's suitability is the standardized residual covariances. The value of the standardized residual covariances generated from the structural model gives the lowest value (min) of -1.74 and the largest value (max) of 1.48, so that all the values of the standardized residual covariances are within the range of ±2,58, which shows that the suitability of the structural model is acceptable. There is no need to modify the model.

Table 4. Coefficient of determination

Influence between variables	R ²
X1, X2 → Z1	R ² _{Z1} = 0.320
X1, X2 → Z2	R ² _{Z2} = 0.367
X1, X2, Z1, Z2 → Y	R ² _Y = 0.477

The R²_{Z1} value is 0.320, meaning that the percentage effect of green transformational leadership (X1) and organizational culture (X2) on green HRM (Z1) in the MSME industry in East Java is 32%. In comparison, other variables influence the remaining 68%. The R²_{Z2} value is 0.367, meaning that the percentage effect of green transformational leadership (X1) and organizational culture (X2) on green innovation (Z2) in the MSME industry in East Java is 36.7%. In comparison, other variables influence the remaining 63.3%. Furthermore, the R²_Y value is 0.477, meaning that the percentage effect of green transformational leadership (X1), organizational culture (X2), green HRM (Z1), and green innovation (Z2) on environmental performance (Y) in the MSME industry in East Java is 47.7%. In comparison, other variables influence the remaining 52.3%.

Table 5. Testing of structural relationships of direct effect

Structural relationships	Std. dev.	C.R.	p-value	Information
H1 Green transformational leadership (X1) → Green HRM (Z1)	0.335	5.618	0.000*	H1 accepted
H2 Green transformational leadership (X1) → Green innovation (Z2)	0.453	7.880	0.000*	H2 accepted
H3 Green transformational leadership (X1) → Environmental performance (Y)	0.192	2.825	0.005*	H3 accepted
H4 Organizational culture (X2) → Green HRM (Z1)	0.378	6.133	0.000*	H4 accepted
H5 Organizational culture (X2) → Green innovation (Z2)	0.303	5.170	0.000*	H5 accepted
H6 Organizational culture (X2) → Environmental performance (Y)	0.064	1.011	0.312 n.s.	H6 not accepted

Note: * Significant at the 0.05 level; n.s. — not significant.

Table 5 presents the results of a structural equation model (SEM) analysis, outlining various

hypotheses (H1 to H6) that investigate the relationships between different variables or constructs. Each idea

is assessed using standard estimates, critical ratios (C.R.), and p-values, and its acceptance status is determined based on the significance level (0.05).

Table 5 provides the statistical results that show whether the hypothesized relationships are

significant. Most hypotheses are accepted, indicating substantial associations between the constructs in the model, except for *H6*, which is not taken as it did not demonstrate a significant relationship.

Table 6. Indirect effect

No.	Indirect path	Specific indirect effect test (Bias-corrected percentile method)			
		Estimate	p-value	Decision	Mediation type
1	Green transformational leadership (X1) → Green HRM (Z1) → Environmental performance (Y)	0.078	0.002*	Significant mediation	Partially mediation
2	Organizational culture (X2) → Green HRM (Z1) → Environmental performance (Y)	0.088	0.015*	Significant mediation	Fully mediation
3	Green transformational leadership (X1) → Green innovation (Z2) → Environmental performance (Y)	0.180	0.003*	Significant mediation	Partially mediation
4	Organizational culture (X2) → Green innovation (Z2) → Environmental performance (Y)	0.121	0.003*	Significant mediation	Fully mediation

Note: * Significant at the 0.05 level.

These results indicate that SMEs with high green transformational leadership will be able to improve their environmental performance directly. If green human resources are also managed better, then the environmental performance of these SMEs will be even better.

It turns out that organizational culture can only affect environmental performance by mediating green HRM. These results indicate that to improve the environmental performance of SMEs, it is not enough to strengthen the organizational culture, but it must also be accompanied by good green HRM, so that the environmental performance of SMEs can increase.

These results indicate that SMEs with high green transformational leadership will be able to improve their environmental performance directly. If green innovation is also strengthened, then the environmental performance of these SMEs will be even better.

It turns out that organizational culture can only influence environmental performance by meditating on green innovation. These results indicate that to improve the environmental performance of SMEs, it is not enough to strengthen the organizational culture but must also be accompanied by strong green innovations so that the environmental performance of SMEs can increase.

Table 7. Total effect

No.	Total impact path	Total effect	p-value	Rank
1	Green transformational leadership (X1) → Environmental performance (Y)	0.450	0.015*	1
2	Organizational culture (X2) → Environmental performance (Y)	0.273	0.013*	3
3	Green HRM (Z1) → Environmental performance (Y)	0.234	0.006*	4
4	Green Innovation (Z2) → Environmental performance (Y)	0.398	0.002*	2

Note: * Significant at the 0.05 level.

The results of the comprehensive effect analysis conclude that to improve environmental performance in the SME sector in East Java, the highest to lowest priority is strengthening transformational leadership, enriching oneself with green innovations, strengthening organizational culture, and improving HRM.

Green transformational leadership is the priority because it can directly impact mental performance or indirectly through the mediation of green HRM and innovation. With a relatively simple bureaucracy in MSMEs, leaders can exert direct and quick influence on the organization.

Green innovation is the second priority to improve the MSME sector's environmental performance. Innovation in products and processes is needed to support business innovation so that business productivity goes hand in hand with better environmental performance.

Organizational culture gets the third priority because it can only indirectly impact environmental performance through the mediation of green HRM and innovation. This means that organizational culture must be built by considering a culture that can strengthen green HRM and innovation to increase environmental performance.

Green HRM is the last priority because even though it significantly affects environmental performance, the coefficient value is still not too big/strong. This is in line with the statement of Rakin et al. (2020), Ahakwa et al. (2021), Hussain et al. (2021), and Rehman and Yaqub (2021) who, in their research, stated that the effect of green HRM on environmental performance is stronger through mediation, especially green innovation, and green creativity.

5. DISCUSSION

Green transformational leadership is a leadership style that aims to provide employees with a clear vision, inspiration, motivation and support their development in achieving organizational environmental goals. Assessment of MSME entrepreneurs in East Java shows a high level of approval of green transformational leadership, with a main focus on environmental goals and achieving shared goals. However, considering employees' participation in environmental ideas still needs to be improved. Factor analysis shows that planning orientation is the most important indicator in reflecting green transformational leadership. MSME actors need to increase their green planning

orientation and take concrete steps to reduce emissions and the negative environmental impacts of their businesses. Strong collaboration and focus on environmentally friendly business practices will be the key to increasing the economic sustainability of MSMEs and facing the challenges of global climate change in the future.

An assessment of MSME entrepreneurs in East Java indicated a strong green organizational culture, with a focus on environmental initiatives, good supervision, management support, and good communication between employers and employees. The highest indicator is supervision, showing the implementation of clear and fair rules within the organization. However, risk tolerance still needs to be improved, with encouragement to take risks, be more aggressive in environmental innovation, and encourage continued work related to the environment. Factor analysis shows that risk tolerance is the most important indicator in reflecting organizational culture, which needs to be considered to build a green environment-oriented culture. MSME actors must encourage employees to take risks, innovate aggressively, and continue to innovate in work related to the environment.

The assessment of MSME entrepreneurs in East Java registered with the Cooperative and MSME Agency of East Java Province [Department of Cooperatives and SMEs East Java Province (*Indonesian*: Dinas Koperasi dan UKM Provinsi Jawa Timur)] on the green innovation variable indicates a high rating. This means that MSME industries in East Java have embraced effective green innovation practices, showing proactive efforts to enhance environmental performance for competitive advantage. The indicator with the highest level of agreement is green process innovation, demonstrated by energy-efficient production processes, reduced emissions of hazardous substances and waste, and optimized use of raw materials. However, the perception of green product innovation received a slightly lower rating, indicating that MSME has been able to produce environmentally friendly goods, utilize resources with minimal environmental impact, and create products that are easily recyclable, reusable, or biodegradable. The factor loading analysis confirms the significant contribution of both indicators (Z2.1 and Z2.2) in reflecting green innovation. The most significant indicator in reflecting green innovation in MSME in East Java is green product innovation, highlighting the importance of innovative green processes in producing environmentally friendly goods. However, attention should be given to the lower utilization of resources with minimal environmental impact regarding green product innovation. The assessment results and factor loading analysis of green innovation indicate that the indicator receiving the most attention from MSME entrepreneurs in East Java is green product innovation, deemed more crucial than green process innovation, which currently has a lower implementation level. To enhance green innovation, MSME entrepreneurs must commit to producing environmentally friendly goods, utilizing resources with minimal environmental impact, and ensuring their products' ease of recycling, reusability, or biodegradability.

The assessment of MSME entrepreneurs in East Java who are registered with the Office of

Cooperatives and MSME of East Java Province on environmental performance variables also shows a high rating. This means that the MSME industry in East Java has demonstrated good environmental performance, meeting societal expectations by complying with environmental regulations and legal requirements regarding organizational processes, products and resources. The indicator with the highest level of approval is qualitative environmental performance, which shows that MSMEs have established rules related to environmental protection and preservation, continuous innovation processes, and employees with a high commitment to green environmental policies. Meanwhile, indicators with a relatively lower level of approval are quantitative environmental performance which shows that MSMEs have set limits on reducing waste generation, allocated budgets for waste management and recycling, and provided adequate green open spaces. The factor loading analysis confirms the significant contribution of both indicators (Y1 and Y2) in reflecting environmental performance. The most significant indicator in reflecting the environmental performance of MSMEs in East Java is quantitative performance because it allows measurable assessments and faster control.

Regarding quantitative performance, attention must be paid to budget allocations for waste management and the adequacy of green open spaces. The results of the mean and factor loading analysis of environmental performance show that the indicator that receives the most attention from MSME entrepreneurs in East Java is quantitative performance because it is considered more measurable than qualitative performance. By focusing on quantitative performance, MSME entrepreneurs must limit waste generation to minimize waste, allocate budgets for waste management and recycling and allocate part of their business premises as green open spaces.

6. CONCLUSION

The research concludes that green transformational leadership positively and significantly influences green HRM in the SME sector in East Java. Leaders with transformational abilities to achieve green organizational goals tend to effectively manage their employees to exhibit green behaviours and create a work environment compatible with resource-saving and socially responsible practices. The findings indicate that green transformational leadership positively and significantly influences green innovation in the SME sector in East Java. Leaders with transformational abilities to achieve green organizational goals tend to be proactive and innovative in improving environmental performance, thereby gaining a competitive advantage. The research establishes that green transformational leadership positively and significantly influences environmental performance in the SME sector in East Java. Leaders with transformational abilities to achieve green organizational goals tend to produce environmentally friendly products and implement eco-friendly production processes, thus integrating ecological sustainability into business operations and product development. The study concludes that organizational culture positively and significantly influences green HRM in the SME sector in East Java.

Organizations with strong values and collective beliefs that foster an ecologically friendly and environmentally responsible production style tend to effectively manage their employees to exhibit green behaviours and create a work environment compatible with resource-saving and socially responsible practices. The findings demonstrate that organizational culture positively and significantly influences green innovation in the SME sector in East Java. Organizations with strong values and collective beliefs that foster an ecologically friendly and environmentally responsible production style tend to be proactive and innovative in improving environmental performance, thereby gaining a competitive advantage. The research suggests that organizational culture does not significantly influence environmental performance in the SME sector in East Java. Although organizations with strong values and collective beliefs that foster an ecologically friendly and environmentally responsible production style are present, their impact on the organization's ability to produce environmentally friendly products and processes is not yet evident. The study reveals that green HRM positively and significantly influences environmental performance in the SME sector in East Java. Organizations that effectively manage their employees to exhibit green behaviours and create a work environment compatible with the environment tend to produce environmentally friendly products and implement eco-friendly production processes, promoting ecological sustainability in their business operations and product development. The research concludes that green innovation positively and significantly influences environmental performance in the SME sector in East Java. Organizations that are proactive and innovative in improving their competitive advantage tend to produce environmentally friendly products and implement eco-friendly production processes, thereby promoting ecological sustainability in their business operations and product development.

The findings of this research make a significant contribution to the understanding of the relationship between green transformational leadership, organizational culture, green HRM, green innovation, and environmental performance in the SME sector in East Java. It is crucial to highlight several key aspects that render this study important for future research:

1. *The significance of green leadership:* This study demonstrates that green transformational leadership positively and significantly influences green HRM, green innovation, and environmental performance. This provides a robust foundation for

future research to delve deeper into the role of leaders in driving sustainable practices within SMEs. Researchers can explore further how green leadership can be developed, strengthened, and applied in different contexts.

2. *The role of organizational culture:* Findings regarding the positive and significant influence of organizational culture on green HRM and green innovation emphasize the importance of shared values and beliefs in promoting sustainable practices. Further studies can investigate how organizations can shape a culture that supports sustainable innovation. Moreover, research can explore the role of organizational culture in overcoming limitations in achieving high environmental performance.

3. *Interactions among the factors:* The findings that green HRM has a positive and significant influence on environmental performance, as well as the similar impact of green innovation, highlight the complexity of the relationships among these factors. Future research can explore how these elements interact and how they can be optimized to achieve the highest level of environmental performance.

It is essential to acknowledge some limitations of this research that may guide future studies:

1. *Generalizability:* The findings are based on data from the SME sector in East Java and may not be fully generalizable to other regions or sectors. Future research can expand the scope to include different geographic areas and industries to validate the conclusions.

2. *Data collection methods:* This study primarily relied on survey data. Future research may benefit from a combination of qualitative and quantitative methods to gain a more comprehensive understanding of the phenomenon under investigation.

3. *Causality:* While this study identifies significant relationships, it does not establish causality. Future research could use experimental or longitudinal designs to explore causal links between the variables.

4. *External factors:* The research did not extensively explore external factors that may influence the relationships studied. Future research can consider external variables such as government policies, market dynamics, and technological advancements.

By addressing these limitations and building on the insights from this research, future studies can further advance our knowledge of sustainability practices in SMEs and offer practical guidance for businesses and policymakers aiming to promote environmental responsibility and innovation.

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