Jurnal Bisnis Strategi
Vol. 34, No. 2, 2025, pp. 186-199
Published by Department of Management, Faculty of Economics and Business,
Universitas Diponegoro (p-ISSN: 1410-1246; e-ISSN: 2580-1171)
Published online in https://ejournal.undip.ac.id/index.php/jbs

The Influence of Green Knowledge and Green Transformational Leadership on Environmental Performance Mediated by Green Creativity on MSMEs

Shabrina Putri Ardani and Sabihaini

Faculty of Economics and Business, Universitas Pembangunan Nasional "Veteran" Yogyakarta, Indonesia

Abstract

Environmental damage has become a significant global challenge, encouraging SME actors to adopt environmentally friendly business practices. This study examines the influence of green knowledge and green transformational leadership on environmental performance, mediated by green creativity in SMEs of Grebeg UMKM DIY. Using quantitative methods, data was collected from 43 SMEs through questionnaires and analyzed using Partial Least Square (PLS). Results show that green knowledge and green transformational leadership positively affect both environmental performance and green creativity. Green creativity positively influences environmental performance and mediates the effect of green transformational leadership on environmental performance. However, it does not mediate the relationship between green knowledge and environmental performance. This research highlights the importance of green transformational leadership and creativity in enhancing SMEs' environmental performance. Future studies should expand the sample to other SME sectors and explore additional mediating variables.

Keywords

green knowledge, green transformational leadership, environmental performance, green creativity

INTRODUCTION

Environmental damage, including pollution and resource depletion, is a significant global challenge (Chen et al., 2014). This phenomenon threatens the balance of the ecosystem and has a direct impact on business sustainability. In response, the Triple Bottom Line concept introduced by Elkington (2013) emphasizes the importance of environmental aspects in achieving sustainable business, which is in line with economic and social aspects and encourages the emergence of various environmentally friendly innovations in business practices.

In the face of environmental challenges in business, green innovation has emerged as a key solution that connects creativity with environmental sustainability to achieve long-term organizational success (Susilowati & Barinta, 2024). Environmental concerns drive demand for eco-friendly products (Chen et al., 2014). Business people recognize that environmental issues can drive sustainable development (Li et al., 2023). Business people recognize that environmental issues can encourage sustainable development (Li et al., 2023). Innovative green practices encourage businesses to make green investments, green planning decisions, and return on investments that benefit the environment and businesses (He et al., 2022). Awareness of the importance of environmentally friendly practices is becoming increasingly crucial, especially in developing countries such as Indonesia.

In Indonesia, Micro, Small, and Medium Enterprises (MSMEs) significantly contribute to the economy but face challenges in implementing environmental practices due to resource constraints. Implementing environmentally friendly practices is also still limited, especially in the MSME sector (Yuha Auliana & Luthfi Alhazami, 2023). MSME actors dominate Indonesia's business structure, contributing significantly to the Gross Domestic Product (GDP) (Yuha Auliana & Luthfi Alhazami, 2023). However, the development of MSMEs is a problem for the environment because business practices are not environmentally friendly (Yuha Auliana

✉Correspondence to : nana.shabrina@gmail.com

Received : June, 11th 2025
Revised : November, 18th 2025
Accepted : November, 18th 2025

& Luthfi Alhazami, 2023). Steps to realize green business practices as a reaction to environmental changes must be carried out collaboratively, which is the duty and responsibility of the government, large companies, the general public, and MSME actors (Sulistyo et al., 2021). MSMEs must be able to achieve good business performance to survive and develop (Sabihaini et al., 2020).

Although MSMEs collectively have a significant environmental impact, research on environmental performance in this sector is still limited (Singh et al., 2020). One of the previous studies on several MSMEs has proven that green knowledge, green transformational leadership, and green creativity positively impact environmental performance. Research shows that green creativity mediates the relationship between the influence of green knowledge and green transformational leadership on environmental performance. (He et al., 2022). However, research that specifically examines the role of green creativity as a means to overcome resource limitations in the Indonesian MSME sector is still minimal, so research is expected to be able to fill this gap. In addition, the literature on the influence of environmental performance on business tends to be focused on large companies. In contrast, MSMEs in Indonesia, which together generate most of the environmental impacts of commercial activities, are still under-researched in the academic literature. Thus, the research will focus on MSMEs in Indonesia with business goals that are in line with green or environmentally friendly business development.

This research was conducted by conducting field observations to analyze the factors that affect environmental performance. Research questions are answered with a quantitative approach using PLS 4.0 to analyze green knowledge and transformational leadership's influence on environmental performance mediated by green creativity in SMEs, particularly members of Grebeg UMKM DIY. Grebeg UMKM DIY, initiated by Bank Indonesia's Yogyakarta Regional Office in 2017, is a potential platform for implementing environmentally friendly practices at the SME scale. The study contributes to filling the research gap in understanding how green creativity can effectively mediate the implementation of green knowledge and green transformational leadership in achieving environmental performance within Indonesian SMEs. This research is expected to provide new insights into how SMEs can improve their environmental performance by applying green knowledge, green transformational leadership, and green creativity in the context of sustainable business development.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Environmental Theory

Climate change has become a critical global issue, characterized by extreme weather changes, rising temperatures, and resource depletion that threaten human life, economic growth, and ecosystems (Sabihaini et al., 2024; Susilowati & Barinta, 2024). Sabihaini et al. (2024) Identify that global warming, air pollution, and deforestation are consequences of economic expansion that is too rapid at the expense of environmental sustainability. To address these challenges, stakeholders are pressuring companies to adopt sustainable production practices (Das & Rangarajan, 2020; Yu et al., 2017).

Environmental identity theory emphasizes the role of individual and group identities in shaping pro-environmental behavior and encouraging conservation efforts (Farihin, 2023). Companies are increasingly pressured to adopt eco-friendly programs and sustainable practices, as good environmental performance is key to long- term business success (Wang et al., 2022; Bendig et al., 2023). Sabihaini et al. (2024) added that the primary goal of the environmental movement is to raise public awareness of the dangers caused by human activities and weather patterns to the environment.

RBV Theory

Resource-Based View Theory (RBV) is one of the fundamental approaches in strategic management that emphasizes the crucial role of the company's internal resources as the key to achieving competitive advantage and sustainable performance (Sabihaini et al., 2024). RBV theory posits that sustainable competitive advantage stems from valuable, scarce, inimitable, and irreplaceable resources (Barney, 1991).

Companies face increasingly intensifying internal and external pressure to comply with

environmental regulations in the context of contemporary environmental sustainability. This situation encourages organizations to implement green strategies comprehensively (Asadi et al., 2020; Weng et al., 2015). Muangmee et al. (2021) revealed that based on the RBV framework, green entrepreneurship orientation plays a vital role in driving green innovation that creates a competitive advantage and improves company performance from environmental, social, and economic aspects.

Green knowledge and environmental performance

Knowledge management directly impacts performance improvement (Darroch, 2005). As the green movement expands, organizations increasingly recognize knowledge's strategic role as a driving force in achieving environmental performance (He et al., 2022). Green knowledge is the capacity to develop skills in producing and utilizing environmental business intelligence for strategic decision-making (Sahoo et al., 2023). Structured information management and utilization are an important foundation for creating sustainable innovation, improving resource efficiency, and building deep environmental awareness (Susilowati & Barinta, 2024). Recent research shows that the level of green knowledge possessed by individuals or teams in an organization positively correlates with the organization's ability to produce green innovations (Susilowati & Barinta, 2024).

Green-knowledge employees demonstrate greater environmental understanding and responsibility (Martinez-Martínez et al., 2019). An accurate, thorough, and appropriate understanding of environmental issues and solutions is crucial in improving organizational performance and transforming businesses to be more sustainable and environmentally friendly (Mohiuddin et al., 2018; Chan et al., 2020). Furthermore, green information has a significant influence on manager and customer decision-making (Wang et al., 2018), so the better a company's ability to manage information and knowledge, the higher the probability of achieving optimal environmental performance (Susilowati & Barinta, 2024). By sharing knowledge, MSMEs can foster an environment conducive to continuous experimentation and learning, thereby encouraging the creation of new sustainable products and processes (Susilowati & Barinta, 2024).

H1: Green knowledge has a positive and significant effect on environmental performance

Green transformational leadership and environmental performance

Based on strategic leadership theory, the successful implementation of social and environmental responsibility in an organization depends on the level of transformational leadership (Chen & Chang, 2013). In the context of the environment, green transformational leadership plays a role in motivating employees to achieve organizational environmental goals (Chen et al., 2014). Empirical studies show that green transformational leadership can create inspiring visions, increase environmental awareness, and encourage employee initiatives to reduce negative environmental impacts (Appelbaum et al., 2000; Haddock-Millar et al., 2016).

In its implementation, green transformational leaders play a strategic role in building an organizational environment that supports improved green product development performance and compliance with high environmental standards and inspires their followers to adopt new perspectives in looking at environmental issues (He et al., 2022). Furthermore, green transformational leadership contributes to optimizing the performance of green product development through three approaches: comprehensive environmental perspective articulation, precise environmental standard setting, and follower motivation in achieving environmental standards and goals (He et al., 2022). Cheng (2019) emphasized that the effectiveness of green transformational leadership is reflected in its ability to create an organizational culture that supports environmentally friendly performance practices.

H2: Green transformational leadership has a positive and significant effect on environmental performance

Green knowledge and green creativity

Green creativity is the creation of new concepts that are practical and useful, leading to sustainable procedures, products, services, and practices for the environment (Li et al., 2020). In environmental management systems, creative and innovative approaches are the main components, and any eco-friendly initiative can be seen as a manifestation of green creativity (Ogbeibu et al., 2020). The development of environmentally friendly creativity in organizations is influenced by various factors, both at the macro and micro levels (Jia et al., 2018). At the micro level, factors such as green organizational culture, managerial characteristics, and organizational values play an important role. Meanwhile, at the macro level, regulatory pressures, stakeholder demands, and changing customer preferences are the main drivers (Jia et al., 2018).

Interestingly, management's awareness and interest in environmental issues significantly influence organizational creativity in the context of the environment, which then encourages more proactive environmental practices (Jia et al., 2018; Liao and Chen, 2018). This indicates that green knowledge has a strategic role in developing green creativity. By integrating eco-friendly knowledge into critical reasoning, organizations can increase the potential for more innovative and distinctive concepts in the context of environmental sustainability. Implementing knowledge management in MSMEs enables collaboration between departments and individuals within the company, facilitating the exchange of ideas and experiences to create innovative and environmentally friendly solutions (Susilowati & Barinta, 2024).

H3: Green knowledge has a positive and significant effect on green creativity

Green transformational leadership and green creativity

Green transformational leadership is crucial in encouraging environmentally friendly creativity in the organization. Green transformational leaders are active in driving creative solutions to environmental problems and supporting corporate innovation oriented towards environmental sustainability (He et al., 2022). The effectiveness of transformational leadership in building creativity is underpinned by four key characteristics: intellectual stimulation, charisma, individual consideration, and motivation. These four elements substantially influence the behavior of individuals within a company, particularly in environmental management (Mi et al., 2019). Through these characteristics, transformational leaders play a significant role in influencing the emergence of innovative ideas and innovative results in organizations (Mittal & Dhar, 2016).

More specifically, transformational leadership creates a work environment with a clear vision, which triggers and fosters a culture of creativity within the organization (Mittal & Dhar, 2016). Leaders who are dedicated to a green vision can inspire employees to participate in sustainability initiatives actively (Li et al., 2020). Team spirit and motivation to achieve green innovation can be optimally built through inspirational leadership. In practice, green transformational leaders are expected to be able to stimulate the intellectual process of employees through a research-based approach that considers the specific needs of each member. Thus, leaders can provide effective coaching and guidance in fostering group creativity, especially in the context of environmentally friendly initiatives (He et al., 2022).

H4: Green transformational leadership has a positive and significant effect on green creativity

Green creativity and environmental performance

Green creativity is the development of new ideas related to green products, services, processes, or practices that are original, innovative, and useful (Chen et al., 2016). This concept plays an important role in improving the efficiency of environmental management systems by implementing environmentally friendly policies and procedures (Cheng, 2019; Song et al., 2020). More broadly, the ability to be creative has been recognized as a key factor in creating competitive advantage, encouraging superior organizational performance, and solving customer problems (Darvishmotevali, 2020).

Green creativity strategically connects various green human resource management practices with environmental management systems (He et al., 2022). In its implementation, solutions and procedures resulting from green creativity contribute to

improving the operational efficiency and competitiveness of companies (Chen et al., 2016). This is in line with the demands of environmental strategic management, which requires organizations to be open to change, respect environmental aspects in the development of new products, processes, and technologies, as well as adaptability in implementing strategies (Darvishmotevali et al., 2020). Thus, creating an environment that supports the development of green creativity is crucial for the company in achieving sustainability goals and increasing its competitive position in the market.

H5: Green creativity has a positive and significant effect on environmental performance

Green knowledge and green transformational leadership support for environmental performance mediated by green creativity

Environmental performance is the focus of the organization in developing environmentally friendly technology to increase the company's profitability (Rahman et al., 2021). To improve environmental performance, green knowledge and green transformational leadership are very important, and green creativity plays a key mediator in this relationship. Darvishmotevali et al. (2020) explained that environmental management expertise and green knowledge encourage the formation of a creative culture, which then affects employee creativity. Green creativity is a mediator that connects green knowledge and leadership into concrete actions in improving environmental performance.

Several research findings further strengthen the mediation role of green creativity. Song et al. (2020) revealed that to improve environmental performance, a proactive attitude toward green creativity needs to be instilled in organizational leadership, knowledge, and skills. Furthermore, Su et al. (2020) found that learning environmental knowledge helps leaders improve green technologies, products, and processes that significantly impact company performance. Employees led by green transformational leaders and with adequate green knowledge tend to be more creative in creating innovative solutions to environmental challenges, ultimately improving overall environmental performance (Shahbaz et al., 2024; Zameer et al., 2020). Mittal and Dhar (2016) also assert that when green transformational leadership is thoroughly implemented in an organization, green innovation significantly impacts green practices.

H6: Green knowledge has a positive and significant effect on environmental performance mediated by green creativity in MSMEs members of Grebeg MSMEs

H7: Green transformational leadership has a positive and significant effect on environmental performance mediated by green creativity

METHODS

This study employed a quantitative approach to investigate green knowledge and transformational leadership's influence on environmental performance, mediated by green creativity, among MSMEs in the Grebeg MSMEs DIY program. The framework used for this research can be seen in Figure 1.

Data collection was conducted using an online survey via Google Forms, distributed to all 43 MSME owners or managers in the program. A census approach was used, including the entire population in the sample. Constructs were measured using a 5-point Likert scale. Data analysis was performed using Partial Least Squares Structural Equation Modeling (PLS- SEM) with SmartPLS software 4.0. The study utilized three types of variables: independent (green knowledge and green transformational leadership), mediating (green creativity), and dependent (environmental performance). Refer to Table 1 below for further information on the variables utilized in this investigation.

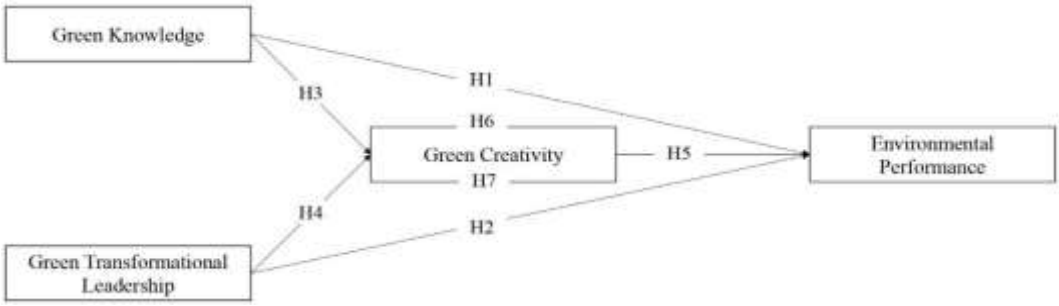


Figure 1. Research Framework

RESULTS

This research used PLS-SEM technique to examine the influence of green knowledge and green transformational leadership on environmental performance, mediated by green creativity in MSMEs of Grebeg DIY. The analysis involved testing both outer and inner models.

Outer Model tests used are validity tests through convergent validity, average variance extracted (AVE), and discriminant validity assessments. Convergent validity is an indicator idea of a correlated construct with a loading factor value of more than 0.7 that is confirmatory. All indicators met the criteria for convergent validity, with loading factor values above 0.7 (Table 2).

The results of the convergent validity test can also be seen from the AVE value, which must be greater than 0.5 (valid). Table 2 shows that the AVE value in the environmental performance variable is 0.668, green knowledge is 0.679, green transformational leadership is 0.623, and green creativity is 0.654. This shows that the AVE value meets the validity prerequisite, namely, the AVE value is more significant than 0.5 for confirmatory research.

Then, reliability was measured by looking at Cronbach's alpha values and composite reliability. Based on Table 2, Cronbach's alpha value on the environmental performance variables was 0.944, green knowledge was 0.905, green transformational leadership was 0.933, and green creativity was 0.923. Meanwhile, the composite reliability value on the environmental performance variable was 0.953, green knowledge was 0.927, green transformational leadership was 0.943, and green creativity was 0.938. The values of Cronbach's alpha and composite reliability have a value greater than 0.70, so it can be said that the variables of this study are reliable. This is declared reliable because each variable must have a value for each of Cronbach's alpha and composite reliability > 0.70.

Table 1. Operational Definition of Research

Variables	Definition	Indicator
Environmental Performance (Muafi, 2024, Mangenda Tshiaba et al., 2021; Qurniawati & Nurohman, 2021; Sabihaini & Januar., 2020; Sabihaini 2024; and Ratulian et al., 2024)	Environmental performance is the level of achievement or the result of the implementation of a series of business activities carried out by all elements of MSMEs as a process of achieving goals compared to other companies in the same industry or market on a sustainable basis (for example in the last 1 year).	1. MSME productivity level 2. Environmental performance level 3. Sales growth 4. Market share growth 5. Competitiveness level
Green Knowledge	Green knowledge is the ability	1. Green knowledge

(Tseng, 2010; Sahoo et al., 2023; Lee et al., 2005; and J. Li et al., 2019)	of MSMEs to acquire, maintain, transfer, create, and apply knowledge related to environmental sustainability.	acquisition 2. Green knowledge sharing 3. Green knowledge application
Green Transformational Leadership (Majali et al., 2022; Singh et al., 2020; Mao et al., 2016; and Bass, 1985)	Leadership that can motivate individuals and organizations to achieve environmental goals and perform beyond expectations in terms of environmental sustainability.	1. Vision for the environment 2. Green motivation 3. Intellectual stimulation 4. Green organizational commitment 5. Pro-environmental leadership
Green Creativity (Chen et al., 2016; He et al., 2022; Setyaningrum et al., 2023; Jinag et al., 2021; Chen & Chang, 2013; and Ratulian et al., 2024)	Green creativity is the ability to generate new ideas related to environmentally friendly and sustainable products, processes, or practices in a company.	1. Green product innovation 2. Green creativity application 3. Green creativity management 4. Environmental problem solving

Source: own elaboration (2025)

Table 2. Validity and Reliability Analysis

Construct	Items	Factor Loading	Cronbach	CR	AVE
Environment Performance	EP 1	0.844	0.944	0.953	0.668
	EP 2	0.813			
	EP 3	0.758			
	EP 4	0.851			
	EP 5	0.758			
	EP 6	0.817			
	EP 7	0.831			
	EP 8	0.885			
	EP 9	0.841			
	EP 10	0.765			
Green Knowledge	GK 1	0.875	0.905	0.927	0.679
	GK 2	0.809			
	GK 3	0.875			
	GK 4	0.776			
	GK 5	0.777			
	GK 6	0.827			
Green Transformational Leadership	GTL 1	0.805	0.933	0.943	0.623
	GTL 2	0.771			
	GTL 3	0.728			
	GTL 4	0.835			
	GTL 5	0.738			
	GTL 6	0.771			
	GTL 7	0.810			
	GTL 8	0.772			
	GTL 9	0.824			
	GTL 10	0.833			

Green Creativity	GC 1	0.882	0.923	0.938	0.654
	GC 2	0.851			
	GC 3	0.844			
	GC 4	0.794			
	GC 5	0.728			
	GC 6	0.712			
	GC 7	0.864			
	GC 8	0.774			

Source: own elaboration in SmartPLS (2025)

Table 3. R Square Analysis

Exogenous Variables	Endogenous Variables	R Square	R Square Adjusted
Green Knowledge Green Transformational Leadership Green Creativity	Environment Performance	0.975	0.973
Green Knowledge Green Transformational Leadership	Green Creativity	0.920	0.916

Source: own elaboration in SmartPLS (2025)

Table 4. Hypothesis Test Result

Hypothesis	Path	Original Sample	Mean	SD	t value	P
H1	GK → EP	0.256	0.263	0.263	2.657	0.008
H2	GTL → EP	0.462	0.475	0.475	3.656	0.000
H3	GK → GC	0.319	0.306	0.306	2.608	0.009
H4	GTL → GC	0.659	0.660	0.660	5.685	0.000
H5	GC → EP	0.293	0.273	0.273	2.498	0.013
H6	GK → GC → EP	(0.093)	0.083	0.052	1.789	0.074
H7	GTL → GC → EP	0.193	0.180	0.085	2.278	0.023

Source: own elaboration in SmartPLS (2025)

R square measures the extent to which exogenous latent variables in this study can explain endogenous nature variables. Based on the test results in Table 3, it can be seen that the R square value of the green knowledge, green transformational leadership, and green creativity variable model is 0.975. This means that the variables of green knowledge, green transformational leadership, and green creativity can explain the environmental performance variable by 97.5%, and other variables can explain the remaining 2.5%. The R Square value obtained from the green knowledge and green transformational leadership variable model is 0.920. This means that the variables of green knowledge and green transformational leadership can explain the competitive advantage variable by 92%, and other variables can explain the remaining 8%.

Hypothesis testing aims to determine the relationship of each hypothesized variable through the results of the significance level and path parameters between latent variables. The results of the hypothesis test using bootstrapping with a sample of 43 yielded significant results for most hypotheses. They were supported and accepted with a p-value < 0.05 or a significant level of 5% (Figure 2). Based on the results of the hypothesis test in Table 4, H1 confirmed in this case that green knowledge has a positive and significant influence on environmental performance with a p-value of 0.008 < 0.05, a t-statistic of 2.657

> 1.96, and a p-value of 0.256 (positive). H2 is also confirmed in this case that green transformational leadership positively and significantly influences environmental performance with a p-value of 0.000 < 0.05, a statistical t-value of 3.656 > 1.96, and a p-value of 0.462 (positive). The same thing is also shown by H3, where the hypothesis confirmed in this case that green knowledge has a positive and significant influence on green creativity with a p-value of 0.009 < 0.05, a statistical t-value of 2.608 > 1.96, and a p-value of 0.319 (positive). In contrast to H4, which confirmed in this case that green transformational leadership has a positive and significant influence on green creativity with a p-value of 0.000 < 0.05, a statistical t- value of 5.685 > 1.96, and a p-value of 0.659 (positive). H5 confirmed in this case that green creativity has a positive and significant influence on environmental performance with a p-value of 0.013 < 0.05, a statistical t-value of 2.498 > 1.96, and a p- value of 0.293 (positive). However, H6 rejected that green knowledge has no effect and is not significant on environmental performance through green creativity with a p-value of 0.074 > 0.05, a statistical t-value of 1.789 < 1.96, and a p-value of -0.193 (negative). H7 confirmed in this case that green transformational leadership has a positive and significant effect on environmental performance through green creativity with a p-value of 0.023 < 0.05, a statistical t-value of 2.278 > 1.96, and a p-value of 0.193 (positive).

Among all the influencing factors, green creativity appears to have the greatest influence on environmental performance, followed by green knowledge, and green transformational leadership has the least impact, as depicted in Figure 2.

DISCUSSION

Green knowledge on environmental performance

Green knowledge positively and significantly impacts environmental performance in the studied MSMEs. Greater application of green knowledge improves MSME environmental performance. High green knowledge supports environmental performance, reflected in MSME productivity, sales, competitiveness, and practical knowledge acquisition and sharing. MSMEs need to invest in increasing green knowledge among employees as a strategy to improve environmental performance. Green or environmentally friendly knowledge allows individuals to make better decisions in the context of the environment, which in turn can improve environmental performance (He et al., 2022). Previous research that supports this hypothesis includes Chen et al. (2014), Su et al. (2020), Majali et al. (2022), and Sahoo et al. (2023).

Green transformational leadership on environmental performance

The green transformational leadership variable positively and significantly affects environmental performance in MSMEs members of Grebeg MSMEs of DIY MSMEs. This means that the more guided by the green transformational leadership that is implemented, it can improve the environmental performance of MSMEs. High-green transformational leadership can support the creation of environmental performance reflected in a vision for the environment, green motivation, intellectual stimulation, green organizational commitment, and pro-environmental leadership. Meanwhile, environmental performance is reflected by the acquisition of green knowledge, the sharing of green knowledge, and the application of green knowledge. MSMEs need to focus on developing leadership competencies in environmental sustainability because environmentally oriented transformational leadership styles have proven effective in encouraging green innovation and improving environmental performance. Jabbour et al. (2013) emphasized that leaders with an environmental orientation can direct organizational resources to achieve sustainability goals. This positive mechanism of influence can occur because green transformational leaders provide moral and emotional support to employees, which creates an organizational climate that supports innovation and collaboration in addressing environmental challenges. Previous research that supports this hypothesis includes Singh et al. (2020), He et al. (2022), Majali et al. (2022), and Su Xiaofeng et al. (2020).

Green knowledge on green creativity

The green knowledge variable positively and significantly affected green creativity in MSMEs members of Grebeg MSMEs of DIY. This means that the more guided by the green knowledge that is applied, it can increase the green creativity of MSMEs. High green knowledge can support the creation of green creativity, which is reflected in the level of productivity of MSMEs, environmental performance, sales growth, market share growth, and competitiveness. Meanwhile, green creativity is reflected in green product innovation, green creativity applications, green creativity management, and environmental problem-solving. This study shows that some owners and managers have successfully implemented green knowledge by acquiring, maintaining, transferring, creating, and applying knowledge related to environmental sustainability to increase green creativity and meet environmental performance levels. Strategic resources such as green knowledge can provide a competitive advantage for organizations due to their unique and difficult-to-replicate nature (Barney & Wright, 1998). Previous research that supports this hypothesis includes Susilowati & Barinta (2024), Chen et al. (2016), He et al. (2022), Majali et al. (2022), and Sahoo et al. (2023).

Green transformational leadership on green creativity

The green transformational leadership variable positively and significantly affects green creativity in MSMEs members of Grebeg MSMEs of DIY MSMEs. This means that the more guided by the green transformational leadership that is applied, it can increase the green creativity of MSMEs. High green transformational leadership can support the creation of green creativity, which is reflected in a vision for the environment, green motivation, intellectual stimulation, green organizational commitment, and pro-environmental leadership. Meanwhile, green creativity is reflected in green product innovation, green creativity applications, green creativity management, and environmental problem- solving. This research shows that green transformational leaders have partially succeeded in motivating individuals and organizations to achieve environmental goals and exceed expectations in terms of environmental sustainability. Through a transformational approach, leaders play a role in shaping a clear sustainability vision and inspiring organization members to think creatively in achieving environmental goals. Previous research that supports this hypothesis includes He et al. (2022) and Majali et al. (2022).

Green creativity on environmental performance

The green creativity variable positively and significantly affects environmental performance in MSMEs members of Grebeg MSMEs of DIY MSMEs. This means that the more guided by green creativity that is applied, it can improve the environmental performance of MSMEs. High green creativity can support the creation of environmental performance, which is reflected in green product innovation, green creativity applications, green creativity management, and environmental problem-solving. Meanwhile, environmental performance is reflected by the acquisition of green knowledge, the sharing of green knowledge, and the application of green knowledge. This research shows that creativity in developing environmentally friendly solutions allows MSMEs to achieve better environmental performance even with limited resources. Green creativity is important in creating innovative solutions to address environmental challenges and improve organizational competitiveness (Cheng et al., 2023). When organizations have a high level of green creativity, they can develop innovative solutions that can be implemented to improve operational efficiency and reduce environmental impact. Previous research that supports this hypothesis includes Cheng et al. (2023), He et al. (2022), Majali et al. (2022), and Singh Sanjay et al. (2020).

Green knowledge on environmental performance mediated by green creativity

The green knowledge variable indirectly has no effect and is not significant on environmental performance through green creativity in MSMEs members of Grebeg MSMEs of DIY MSMEs. This means that the high and low implementation of green knowledge does not affect green creativity, so it does not have an impact on improving the environmental performance of MSMEs. These

results support hypothesis 6, which states that although green creativity is often considered a key factor in improving environmental performance, in the context of mediation between green knowledge and environmental performance, this relationship is not statistically significant. This study shows that, for now, green creativity is not a solution because it has not been fully encouraged to increase the influence of the hypothesis. The relationship between green knowledge, green creativity, and environmental performance is not always linear, and it is necessary to consider contextual factors that can affect the effectiveness of mediation. Several factors may explain these findings. First, even if green knowledge is available, organizations may not have the capacity or resources to implement those creative ideas effectively. The creative ideas produced may also not be based on the needs or priorities of the organization so they do not significantly impact environmental performance. Limited resources and expertise are still relevant for MSMEs in Indonesia (Harymawan et al., 2021). The study's results stated that green He et al. (2022) knowledge did not significantly affect environmental performance. However, the results of this study show a difference from previous research by He et al. (2022).

Green transformational leadership on environmental performance mediated by green creativity

The green transformational leadership variable indirectly has a positive and significant effect on environmental performance through green creativity in MSMEs members of Grebeg MSMEs of DIY MSMEs. This means that the more guided by green transformational leadership, the more green creativity will increase, so the environmental performance of MSMEs will also increase. This research shows that to improve environmental performance, MSMEs need to pay attention to the aspects of green transformational leadership directly, and how such leadership can facilitate and encourage green creativity in organizations. Simultaneously developing of these two aspects can be an effective strategy for achieving organizational sustainability goals. Strategic resources such as green transformational leadership can provide a competitive advantage for organizations, especially when leaders can harness and develop green creativity to create innovative solutions that support environmental sustainability (Barney & Wright, 1998). In the context of MSMEs members of Grebeg MSMEs in DIY, the mediation role of green creativity has proven to be effective in strengthening the relationship between green transformational leadership and environmental performance. The results of this study are consistent with the findings of previous research by He et al. (2022).

DISCUSSION

This research investigated the influence of green knowledge and green transformational leadership on environmental performance, with green creativity as a mediating variable, within the context of MSMEs members of the Grebeg MSMEs DIY program. The findings reveal several key insights. First, both green knowledge and green transformational leadership demonstrate a positive and significant direct impact on environmental performance within these MSMEs. This highlights the importance of environmental knowledge and leadership. Furthermore, the study found that both green knowledge and green transformational leadership positively and significantly influence green creativity within the MSMEs. Green creativity, in turn, also exhibits a positive and significant effect on environmental performance.

Interestingly, the mediating effect of green creativity was significant only in the relationship between green transformational leadership and environmental performance. While green knowledge positively influenced both green creativity and environmental performance independently, green creativity did not significantly mediate the relationship between green knowledge and environmental performance. This suggests that the benefits of green knowledge for environmental performance may be realized more directly or through other mediating mechanisms not explored in this study. The positive indirect effect of green transformational leadership on environmental performance through green creativity highlights the significance of leaders in fostering a creative environment for the MSMEs to be innovative and ultimately perform better environmentally.

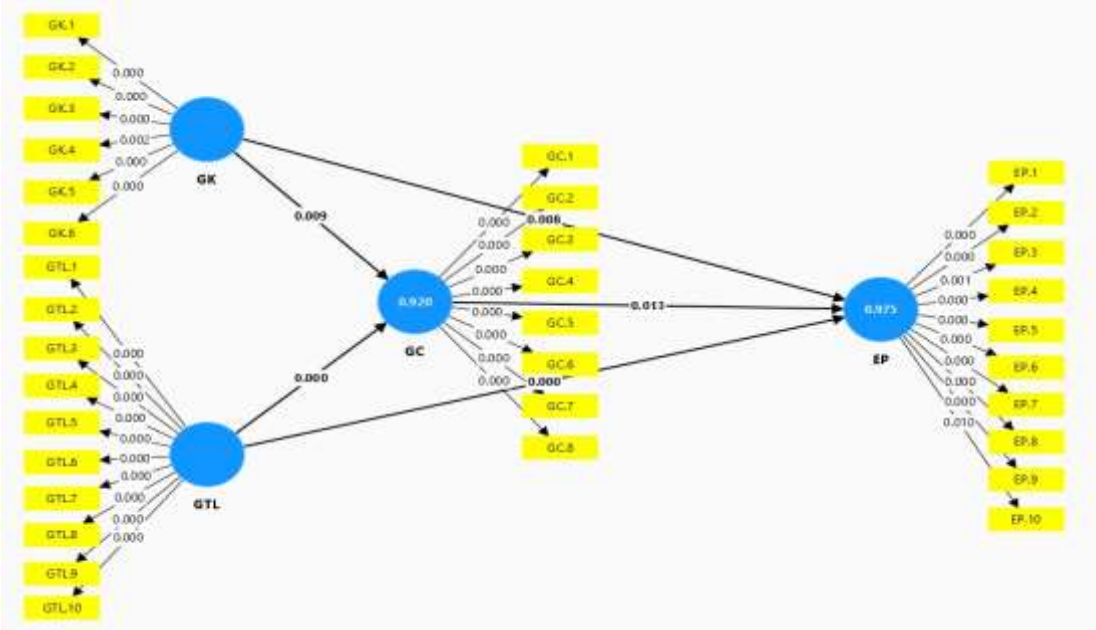


Figure 2. Model path and significance level

Theoretical Implications

These findings contribute to the growing literature on environmental management and sustainability within the SME context. Specifically, they highlight the importance of considering direct and indirect pathways through which green knowledge and green transformational leadership can impact environmental performance. The research suggests that it is not enough for organizations to possess environmental knowledge simply; leaders must also actively foster a creative environment to translate that knowledge into practical action. Furthermore, this study contributes to a deeper understanding of green performance within the setting of the Indonesian economy, a developing country where more sustainable practices in the MSME sector are needed.

Practical Implications

This research offers actionable insights for MSME practitioners, especially those participating in programs like Grebeg MSMEs DIY. The study suggests that while efforts to increase green knowledge are valuable, they should be coupled with initiatives to cultivate green creativity and support green transformational leadership. Organizations are encouraged to focus on strategies that empower leaders to inspire and motivate their employees to develop innovative environmental solutions. Fostering a culture that values creativity and provides employees with the resources and support to experiment with new ideas can be crucial for realizing the full benefits of green knowledge and transformational leadership. The research suggests a need for workshops, training, or mentorship programs that are focused on providing organizations with the resources and knowledge to implement the environmental innovation that green knowledge and green transformational leadership are trying to instill.

Future research could explore other potential mediators or moderators that might influence the relationship between green knowledge, green transformational leadership, green creativity, and environmental performance. Longitudinal studies could also be valuable in understanding the long-term impact of these factors on MSME sustainability. Furthermore, comparing and contrasting these relationships across different industries or regions could provide additional insights into the contextual factors that shape environmental performance.

REFERENCES

Aisyah, H., & Puspita, S. (2022). RESOURCE-BASED VIEW: STRATEGI UMKM DI

SUMATERA BARAT UNTUK MENCAPAI KEUNGGULAN KOMPETITIF. *Jurnal Riset Manajemen & Bisnis Dewantara*, 5(2), 109–120. https://ejournal.stiedewantara.ac.id/index.php/JMD/article/view/1029

Burhany, D. I., Novianty, I., Suwondo, S., Akuntansi, J., & Bandung, N. (2021). Pengukuran Kinerja Lingkungan dengan Sustainability Balanced Scorecard: Seimbang, Komprehensif, dan Strategis. *Jurnal Riset Akuntansi Dan Keuangan*, 9(1), 149–164. https://doi.org/10.17509/jrak.v9i1.26296

Chen, Y. S., Chang, C. H., & Lin, Y. H. (2014). Green transformational leadership and green performance: The mediation effects of green mindfulness and green self-efficacy. *Sustainability (Switzerland)*, 6(10), 6604–6621. https://doi.org/10.3390/su6106604

Chen, Y. S., Chang, T. W., Lin, C. Y., Lai, P. Y., & Wang, K. H. (2016). The influence of proactive green innovation and reactive green innovation on green product development performance: The mediation role of green creativity. *Sustainability (Switzerland)*, 8(10). https://doi.org/10.3390/su8100966

Cheng, C., Ahmad, S. F., Irshad, M., Alsanie, G., Khan, Y., Ahmad, A. Y. A. B., & Aleemi, A. R. (2023). Impact of Green Process Innovation and Productivity on Sustainability: The Moderating Role of Environmental Awareness. *Sustainability (Switzerland)*, 15(17). https://doi.org/10.3390/su151712945

Dabić, M., Lažnjak, J., Smallbone, D., & Švarc, J. (2019). Intellectual capital, organisational climate, innovation culture, and SME performance. *Journal of Small Business and Enterprise Development*, 26(4), 522–544. https://doi.org/10.1108/JSBED-04-2018-0117

Farihin, A. U. (2023). MUJAHADA: Jurnal Pengabdian Masyarakat Meningkatkan Kesadaran Lingkungan melalui Edukasi dan Partisipasi Masyarakat. MUJAHADA: *Jurnal Pengabdian Masyarakat*, 01(1). https://doi.org/10.54396/mjd.v1iI.967

Ghozali, I., & Latan, H. (2015). *Structural Equation Modeling, Metode Alternatif Dengan Partial Least Square* (PLS). Universitas Diponegoro.

Hair J. (2021). *Partial Least Squares Structural Equation Modeling in Handbook of Market Research* (C. Homburg, M. Klarmann, & A. Vomberg, Eds.). Springer International Publishing.

Harymawan, I., Putra, F. K. G., Fianto, B. A., & Wan Ismail, W. A. (2021). Financially distressed firms: Environmental, social, and governance reporting in indonesia. *Sustainability (Switzerland),* 13(18). https://doi.org/10.3390/su131810156

He, D., Raza, A., Chen, M., Xu, Y., & Morake, O. (2022). Examining the green factors affecting environmental performance in small and medium–sized enterprises: A mediating essence of green creativity. *Frontiers in Psychology*, 13. https://doi.org/10.3389/fpsyg.2022.1078203

Majali, T., Alkaraki, M., Asad, M., Aladwan, N., & Aledeinat, M. (2022). Green Transformational Leadership, Green Entrepreneurial Orientation and Performance of SMEs: The Mediating Role of Green Product Innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(4). https://doi.org/10.3390/joitmc8040191

Muafi. (2024). The Effect of Green Creativity and Green Innovation on Green Competitive Advantage and Performance of Sustainable SMEs: The Moderation Role of Digital Empowerment. *Journal of System and Management Sciences*, 14(4). https://doi.org/10.33168/jsms.2024.0401

Muangmee, C., Dacko-Pikiewicz, Z., Meekaewkunchorn, N., Kassakorn, N., & Khalid, B. (2021). Green entrepreneurial orientation and green innovation in small and medium-sized enterprises (Smes). *Social Sciences*, 10(4). https://doi.org/10.3390/socsci10040136

Oxyopida, F., Sabihaini, & Darpito Hapsoro, S. (2020). KUALITAS STRATEGI BERSAING MEMEDIASI PENGALAMAN, PENGETAHUAN, DAN ADAPTABILITAS LINGKUNGAN TERHADAP KINERJA. *Jurnal Administrasi Bisnis (JABis),* 18, 25–38.

Ratulian, M. C., Sabihaini, S., Salleh, F., & Prasetio, J. E. (2024). Knowledge sharing and sustainable competitive advantage: Mediating role of innovation culture and MSMEs business performance. *Asian Management and Business Review*, 358–375.https://doi.org/10.20885/AMBR.vol4.iss2.art12

Sabihaini, Eko Prasetio, J. (2020). COMPETITIVE STRATEGY AND BUSINESS ENVIRONMENT ON SMEs PERFORMANCE IN YOGYAKARTA, INDONESIA. *International Journal of Management (IJM),* 11(8), 1370–1378. https://doi.org/10.34218/IJM.11.8.2020.125

Sabihaini, Kurniawan, A., Eko Prasetio, J., & Rusdiyanto. (2024). Environmental analysis and impact on green business strategy and performance in SMEs post the Covid-19 pandemic. *Cogent Economics and Finance*, 12(1). https://doi.org/10.1080/23322039.2024.2330428

Sabihaini, Pratomo, A. H., Rustamaji, H. C., & Sudaryatie. (2018). Environmental factors affecting traditional fishermen in maintaining the resilience of marine areas in the context of Indonesian State Defense. *Humanities and Social Sciences Reviews*, 6(3), 46–54. https://doi.org/10.18510/hssr.2018.637

Sabihaini, Pratomo, A. H., Rustamaji, H. C., & Sudaryatie. (2020). The Impact of Climate Change on Pampus Argenteus Fish Production in Depok Village, Indonesia. *Journal of Physics: Conference Series*, 1471(1). https://doi.org/10.1088/1742-6596/1471/1/012065

Sahoo, S., Kumar, A., & Upadhyay, A. (2023). How do green knowledge management and green technology innovation impact corporate environmental performance? Understanding the role of green knowledge acquisition. *Business Strategy and the Environment*, 32(1), 551–569. https://doi.org/10.1002/bse.3160

Saifullah Doloan, E., & Heru Kristanto, R. H. (2024). Green Intellectual Capital on Firm Performance Moderated by Green Business Strategy in Craftsmanship SME's. *In West Science Journal Economic and Entrepreneurship* (Vol. 2, Issue 02).

Sekaran, U., & Bougie, R. (2017). *Metode Penelitian Untuk Bisnis. Dalam Metode Penelitian Untuk Bisnis* (6,B ed.). Salemba Empat.

Setyaningrum, R. P., Kholid, M. N., & Susilo, P. (2023). Sustainable SMEs Performance and Green Competitive Advantage: The Role of Green Creativity, Business Independence and Green IT Empowerment. *Sustainability (Switzerland),* 15(15). https://doi.org/10.3390/su151512096

Singh, S. K., Giudice, M. Del, Chierici, R., & Graziano, D. (2020). Green innovation and environmental performance: The role of green transformational leadership and green human resource management. *Technological Forecasting and Social Change*, 150. https://doi.org/10.1016/j.techfore.2019.119762

Su, X., Xu, A., Lin, W., Chen, Y., Liu, S., & Xu, W. (2020). Environmental Leadership, Green Innovation Practices, Environmental Knowledge Learning, and Firm Performance. *SAGE Open*, 10(2). https://doi.org/10.1177/2158244020922909

Sulistyo, A. (2021). Strategi UMKM Dalam Menciptakan Bisnis Berkelanjutan Di Yogyakarta. *Kapita Selekta Pariwisata* (KSP), a(a), 113–127.

Susilowati, C., & Barinta, D. D. (2024). The Influence of Knowledge Management and Green Innovation on the Environmental Performance of MSMEs in Malang City: A Study of the Laundry Sector. *Jurnal Manajemen Bisnis*, 11(1), 79–93. https://doi.org/10.33096/jmb.v11i1.661

Yuha Auliana, & Luthfi Alhazami. (2023). Pengaruh Environmental Performance dan Green Innovation Terhadap Green Competitive Advantage Pada UMKM di Jakarta. Transformasi: *Journal of Economics and Business Management*, 2(3), 23–34. https://doi.org/10.56444/transformasi.v2i3