“Leadership strategy as the driver of achieving sustainable business: A case of endek weaving SMEs in Indonesia”

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LEADERSHIP STRATEGY AS THE DRIVER OF ACHIEVING SUSTAINABLE BUSINESS: A CASE OF ENDEK WEAVING SMES IN INDONESIA

Abstract

The sustainable performance of the endek ikat weaving business is essential for the growth of small and medium enterprises and the local economy of Bali (Indonesia). This study intends to examine the direct effects of green entrepreneurial orientation and sustainable leadership on endek weaving SME performance, as well as their indirect effects through the mediation of green digital innovation. This analysis was conducted on endek ikat weaving SMEs in the province of Bali. The population included 1,391 management personnel. Using the proportional random sampling, the study selected 311 respondents. The research hypotheses were tested using a questionnaire distributed among SME management in Bali. Research data were analyzed using the PLS-SEM method and SmartPLS 3 as the analytical tool. The results revealed that sustainable leadership affects green digital innovation (β = 0.483, *t*-statistic = 5.968). Green entrepreneurial orientation affects sustainable performance and green digital innovation (β = 0.240, 0.445; *t*-statistic = 2.858, 5.457). Moreover, green digital innovation has the potential to mediate the effect of sustainable leadership and green entrepreneurial orientation toward sustainable performance (β = 0.317, 0.292; *t*-statistic = 4.184, 4.645). By integrating leadership strategies with a green entrepreneurial approach, as well as innovating through digital media, Balinese endek weaving SMEs can improve their performance to achieve business sustainability.

Keywords sustainable performance, sustainable leadership, green entrepreneurial orientation, green digital innovation, weaving business

JEL Classification M21, L26, P25

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INTRODUCTION

Bali is one of the provinces in Indonesia that has many small and medium enterprises (SMEs) and is a major destination for foreign and domestic tourists (Ekayani et al., 2023). Endek ikat woven fabric is one of the SME products in Bali that is well-known in the community and is local Balinese wisdom (Wahyono & Hutahayan, 2021). Endek is a typical Balinese ikat woven cloth made from traditional artistic culture and can be used as traditional or everyday clothing (Wahyuni & Sara, 2020). This endek ikat woven cloth is one of the favorite products of domestic and foreign tourists to purchase as Balinese souvenirs (Maksum et al., 2020).

Endek ikat weaving SMEs in the era of globalization face intense competition (Wahyuni & Sara, 2020). Driving the long-term growth of SMEs in a rapidly changing situation continues to be difficult (Farida et al., 2022). A number of facts obtained from initial interviews with endek weaving SME owners in Bali indicate that the productivity of

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endek weaving with the traditional process using non-machine looms is not yet optimal. Many imitation endek cloths are circulating on the market and are produced by machine. The price for such products is lower than that of genuine Balinese woven endek cloth, but in terms of quality, it is not as good.

Empirical investigations have been carried out to identify the elements that underpin the performance of SMEs and help them remain sustainable (Iqbal & Ahmad, 2021; Burawat, 2019; Iqbal et al., 2020; Tian & Wang, 2023). The results revealed that sustainable leadership is positively correlated with firm performance. In contrast, Faulks et al. (2021) and Majali et al. (2022) suggest that leadership had no effect on SME performance.

Muangmee et al. (2021), Fatoki (2019), and Jiang et al. (2018) have examined the relationship between green entrepreneurial orientation and performance. Their findings indicate that green entrepreneurial orientation has a significant effect on sustainable performance. In contrast, Afum et al. (2023) revealed that green entrepreneurial orientation has no effect on performance. The differences and inconsistencies in the research results have created a research gap. To fill this gap and enhance the effectiveness of sustainable leadership on performance, this study highlights the mediating role of green digital innovation in synergizing leadership to drive performance. Many studies have been conducted on how digital innovation affects performance, including Shan (2023), Khin and Ho (2020), Shah et al. (2024), Yasa et al. (2019), Muangmee et al. (2021), and Hanelt et al. (2021). Their findings identified that digital innovation and sustainable performance have a significant correlation.

Green digital innovation as a mediator is still new in research. The United Nations recognizes the importance of digitalization in aspects of life through the 2030 Sustainable Development Agenda and emphasizes the use of technical partnerships to advance sustainable development goals in all countries (Zavatin et al., 2023). It becomes a research novelty by integrating sustainable leadership and green entrepreneurial orientation with digital innovation to achieve the sustainability of endek weaving business.

1. LITERATURE REVIEW AND HYPOTHESES

This study is based on Barney's (1991) resource-based view (RBV) paradigm. Digital innovation, entrepreneurial spirit, and research and development are factors that correlate with sustainable performance. Innovation is essential for the sustainable performance of SMEs. Innovation is closely related to social, ecological, and economic performance to achieve sustainable development (Zhang et al., 2022).

The whole purpose of life for individuals who choose to live their lives and lead organizations by maintaining a balance between the ecology, society, and economy is reflected in sustainable leadership (McCann & Holt, 2010a). Burawat (2019) researched SMEs in Thailand's manufacturing sector and revealed a positive correlation of sustainable leadership with SME performance. The level of sustainable leadership has a direct correlation with improvements in sustainable performance. Iqbal et al. (2020) and Iqbal and Piwowar-Sulej (2022) discovered that sustainable performance was significantly impacted by the outcomes of sustainable leadership.

Tian and Wang (2023) discovered that sustainable leadership significantly and favorably impacted digital innovation in China's manufacturing sectors. Leaders need to understand the relationship between digitalization and sustainability. They can leverage digitalization to build, deliver, facilitate, enforce, and mobilize support for their sustainability goals. These ideas form the basis of sustainable leadership, and it is recommended that leaders use digitalization to benefit the company (Zavatin et al., 2023).

A company is considered to have a green entrepreneurial attitude when it looks for opportunities to create environmentally friendly goods and services that benefit the environment and the business (Fatoki, 2019). Jiang et al. (2018) found that a green entrepreneurial mindset greatly enhances finan-

cial and environmental performance in Chinese managers and company executives. Additionally, Makhloufi et al. (2024) and Fatoki (2019) revealed that an entrepreneurial approach toward sustainability has a noteworthy impact on sustainable performance.

Muangmee et al. (2021) indicate that green innovation benefits greatly from a green entrepreneurial approach of SMEs in the Thai automotive industry. A vital component that influences environmentally friendly strategies and drives toward green digital innovation is green entrepreneurial orientation. Majali et al. (2022), Makhloufi et al. (2022), and Guo et al. (2020) additionally demonstrate the strong correlation between green digital innovation and green entrepreneurial orientation.

Digital innovation refers to creative information technology solutions that use new and emerging digital technologies to facilitate the digital transformation of non-technology industries, including manufacturing, retail, healthcare, and banking. The increasing importance of digitalization makes digital innovation an important field of study due to the increasing demand for new digital solutions (Khin & Ho, 2020). Hanelt et al. (2021) showed a significant positive impact of green digital innovation on sustainable performance within German automotive manufacturers. These findings imply that operational and capital market performance for manufacturers is greatly improved through green digital innovation. Khin and Ho (2020), Shah et al. (2024), Shan (2023), and Surahman et al. (2023) also discovered that green digital innovation significantly improved business performance.

Iqbal and Piwowar-Sulej's (2022) research on higher education institutions in China and Pakistan revealed that innovation had a major beneficial impact on sustainable performance and was significantly influenced by sustainable leadership. Furthermore, according to Yasa et al. (2019), digital innovation has an indirect impact on the company's sustainable performance. Digital innovation plays a mediating role in the relationship between leadership and firm performance.

Muangmee et al.'s (2021) study on Thai SMEs revealed that green innovation was significantly influenced by a green entrepreneurial approach, as were characteristics of sustainable performance (economic, environmental, and social). Majali et al. (2022) discovered a significant correlation between green innovation and performance of manufacturing sector companies in Jordan, as well as a significant association between green innovation and green entrepreneurial approach. Alshebami (2023) discovered the correlation between green entrepreneurial orientation and performance mediated by green innovation.

The triple bottom line is a concept that is widely known for the importance of sustainable performance, taking into account the performance of the natural environment, the social performance of society, and economic performance (Elkington & Rowlands, 1999). Preventing resource extraction and minimizing negative environmental effects are key components of environmental performance. Financial performance is essentially what economic performance is all about. In contrast, social performance pertains to the well-being of all parties involved, such as clients and staff (Yusliza et al., 2020). Metrics like resource conservation and emission reductions, extra environmental initiatives and activities, work-related attributes, occupational health and safety, connections to the community and society, stakeholder involvement, and the organization's economic influence beyond the financial analyses utilized in the report finance are all examples of sustainable performance (Burawat, 2019).

This study aims to examine the influence of sustainable leadership and green entrepreneurial orientation on the performance of endek weaving SMEs to achieve business sustainability. In addition to examining its direct influence, this study also examines its indirect influence through the mediation of green digital innovation.

The following are hypotheses based on the research model depicted in Figure 1:

H1: The impact of sustainable leadership on sustainable performance is significant.

H2: The impact of sustainable leadership on green digital innovation is significant.

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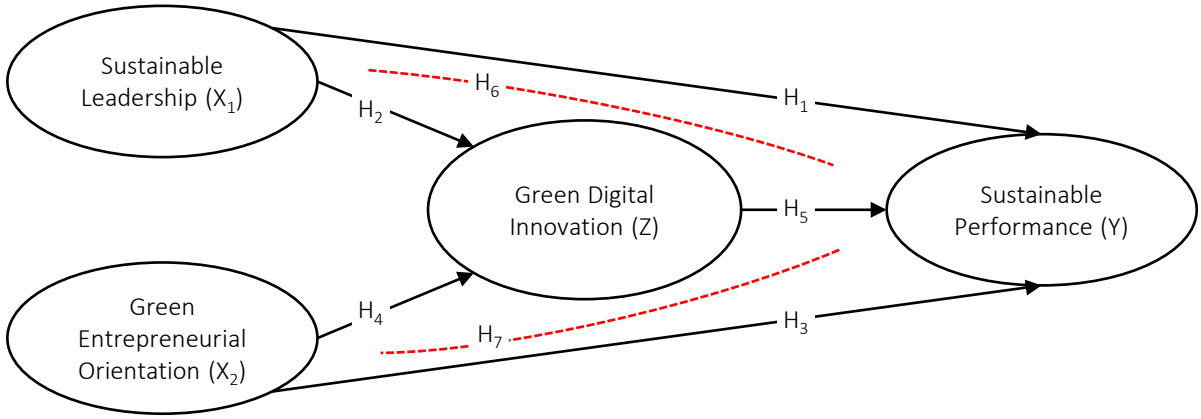

Figure 1. Research model

H3: The impact of green entrepreneurial orientation on sustainable performance is significant.

H4: The impact of green entrepreneurial orientation on green digital innovation is significant.

H5: The impact of green digital innovation on sustainable performance is significant.

H6: Green digital innovation mediates the correlation between sustainable leadership and sustainable performance.

H7: Green digital innovation mediates the correlation between green entrepreneurial orientation and sustainable performance.

2. METHODS

This study was conducted in the Bali province at endek ikat weaving SMEs. The population in this study was management at endek ikat weaving SMEs in Bali province with a total number of 1,391. A proportional random sampling technique was used to select respondents to represent each district in Bali. With a 5% margin of error from the Slovin formula, a total of 311 samples were found from the nine regencies in Bali, including Denpasar, Badung, Gianyar, Klungkung, Bangli, Karangasem, Jembrana, Buleleng, and Tabanan (Akter et al., 2011). Respondents consisted of owners, directors, managers, and supervisors of endek weaving SMEs spread across the districts, the number of which is listed in Table 1.

$$n=\frac{N}{1+N(e)^2}=\frac{1391}{1+1391(0.05)^2}=311 \quad (1)$$

where n = sample size, N = size of population, e = level of error.

Table 1. Sample characteristics

No.	Regency in Bali Province	Number of Respondents
1	Denpasar	63
2	Badung	22
3	Gianyar	53
4	Klungkung	55
5	Bangli	12
6	Karangasem	47
7	Jembrana	26
8	Buleleng	22
9	Tabanan	11
Total Respondents		311

The research instrument was a questionnaire with closed statements; for each statement, the answers were arranged on a 5-point Likert scale where 1 represents the most negative opinion (strongly disagree) to 5 represents the most positive opinion (strongly agree). The sustainable leadership measure adapted five items from McCann and Holt (2010b) (e.g., "Organizational leadership engages in an environmentally responsible manner"). The green entrepreneurial orientation measure consisted of four items based on indicators from Guo et al. (2020) (e.g., "Our company is proactive about green projects in times of uncertainty"). Green digital innovation was measured based on indicators from Paladino (2007) consisting of five items (e.g., "We are always looking for opportunities to innovate using digital technologies"). Sustainable

performance consisted of five items based on indicators from Khan and Quaddus (2015) (e.g., "Our company uses utilities such as water and electricity in an environmentally friendly manner").

The data obtained were then analyzed using SmartPLS 3 software. Data analysis was carried out in three stages: outer model testing, inner model testing, and hypothesis testing. Validity and reliability tests were carried out during the outer model testing. Convergent validity uses the criteria for the outer loading indicator value > 0.7 and significance (p-value < 0.05) and the AVE value > 0.5 to be declared valid. While discriminant validity uses the criteria for the square root value of AVE on a variable must be greater than the correlation value of the construct on other latent variables (Hair et al., 2021). In the inner model testing, the R-Square (R^2), predictive relevance (Q^2), and goodness of fit (GoF) tests were carried out to determine whether the research model is accurate and robust. The good R^2 criterion is a value above 0.5, while the Q^2 and GoF values should be close to 1; the model then is considered to have high accuracy and robustness (Akter et al., 2011). The criteria for hypothesis testing are: if the t-statistic value > t-table 1.96 (alpha 0.05) and p-value < 0.05, the hypothesis is accepted, and vice versa.

3. RESULTS

The results of the SmartPLS 3 analysis provide a comprehensive explanation of the outer model or research instrument measurement that can be seen from the validity and reliability. The measurement of the structural model involves the results of R-square, predictive relevance, and goodness of fit. Finally, the hypothesis testing stage determines whether to accept or reject the research hypothesis.

3.1. Outer model testing

The outer model was evaluated using discriminant and convergent validity. Meanwhile, the reliability test was conducted using Cronbach's Alpha and composite reliability.

Table 2 shows that all indicators meet the valid criteria indicated by the outer loading coefficient > 0.7 and p-value < 0.05 so that the data are convergently valid. Likewise, the AVE values in Table 3 show that all variables have met the valid criteria, where all AVE values are > 0.5.

Table 4 shows that all variables have square root value of AVE greater than the correlation value of the construct on other latent variables, thus meeting the valid discriminant criteria. Table 5 ex-

Table 2. Convergent validity

Variable	Indicator	Validity		
		Outer loading	t-statistic	p-values
Sustainable Leadership (X_1)	X1.1	0.904	52.506	0.000
	X1.2	0.836	20.758	0.000
	X1.3	0.891	38.427	0.000
	X1.4	0.830	19.127	0.000
	X1.5	0.823	29.083	0.000
Green Entrepreneurial Orientation (X_2)	X2.1	0.806	12.832	0.000
	X2.2	0.932	69.458	0.000
	X2.3	0.946	98.909	0.000
	X2.4	0.915	40.069	0.000
Green Digital Innovation (Z)	Z.1	0.913	45.620	0.000
	Z.2	0.860	34.509	0.000
	Z.3	0.839	19.777	0.000
	Z.4	0.858	27.898	0.000
	Z.5	0.792	17.256	0.000
Sustainable Performance (Y)	Y.1	0.840	29.892	0.000
	Y.2	0.698	11.561	0.000
	Y.3	0.778	20.348	0.000
	Y.4	0.739	17.295	0.000
	Y.5	0.811	23.819	0.000

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Table 3. Average variance extracted

Variable	Average Variance Extracted (AVE)
Sustainable Leadership (X_1)	0.735
Green Entrepreneurial Orientation (X_2)	0.813
Green Digital Innovation (Z)	0.728
Sustainable Performance (Y)	0.599

Table 4. Discriminant validity

Variable	Green Digital Innovation	Green Entrepreneurial Orientation	Sustainable Leadership	Sustainable Performance
Green Digital Innovation (Z)	0.853			
Green Entrepreneurial Orientation (X_2)	0.680	0.901		
Sustainable Leadership (X_1)	0.699	0.485	0.858	
Sustainable Performance (Y)	0.749	0.637	0.475	0.774

plains that all variables meet the reliability criteria based on Cronbach's Alpha value and composite reliability > 0.70. Because the data had met the validity and reliability requirements, the study further tested the research model's accuracy (inner model measurement).

Table 5. Reliability testing

Variable	Reliability	
	Composite Reliability	Cronbach's Alpha
Sustainable Leadership (X_1)	0.933	0.912
Green Entrepreneurial Orientation (X_2)	0.945	0.925
Green Digital Innovation (Z)	0.930	0.907
Sustainable Performance (Y)	0.882	0.833

3.2. Inner model testing

R^2, Q^2, and GoF assess the model's accuracy. The research model has strong accuracy overall, according to the R^2 coefficient (Table 6). This is demonstrated by the sustainable performance's R^2 value of 0.596; 59.6% of sustainable performance is impacted by green entrepreneurial orientation, sustainable leadership, and green digital innovation. Factors not included in the research model influenced the remaining 40.4%.

Table 6. *R*-square testing

Variable	Coefficient R-Square	Result
Green Digital Innovation (Z)	0.641	Strong
Sustainable Performance (Y)	0.596	Strong

The accuracy of the study model with predictive relevance is calculated using the following formula:

$$Q^2 = 1 - \left(1 - R_1^2\right)\left(1 - R_2^2\right), \quad (2)$$

where Q^2 = Predictive relevance, R^2_1 = *R*-square of green digital innovation, R^2_2 = *R*-square of sustainable performance.

As can be seen from the computations, testing predictive relevance yields a result of 0.855, which means it is close to 1, so the research model is said to have high accuracy. Next, the following goodness of fit formula is used to test the structural model:

$$GoF = \sqrt{averageR^2 \cdot average\ AVE}, \quad (3)$$

where *GoF* = Goodness of Fit, *averageR²* = average *R*-square, *averageAVE* = Average Variance Extracted.

At a value of 0.667, the research model's accuracy falls into the high category of models examined by GoF. Assessment of the research model accuracy has been carried out through R^2, Q^2, and GoF, which have proven this research model is robust.

3.3. Hypotheses testing

The PLS analysis results are displayed in Figure 2 and Table 7.

Table 7 presents the direct influence findings, demonstrating that sustainable leadership has no

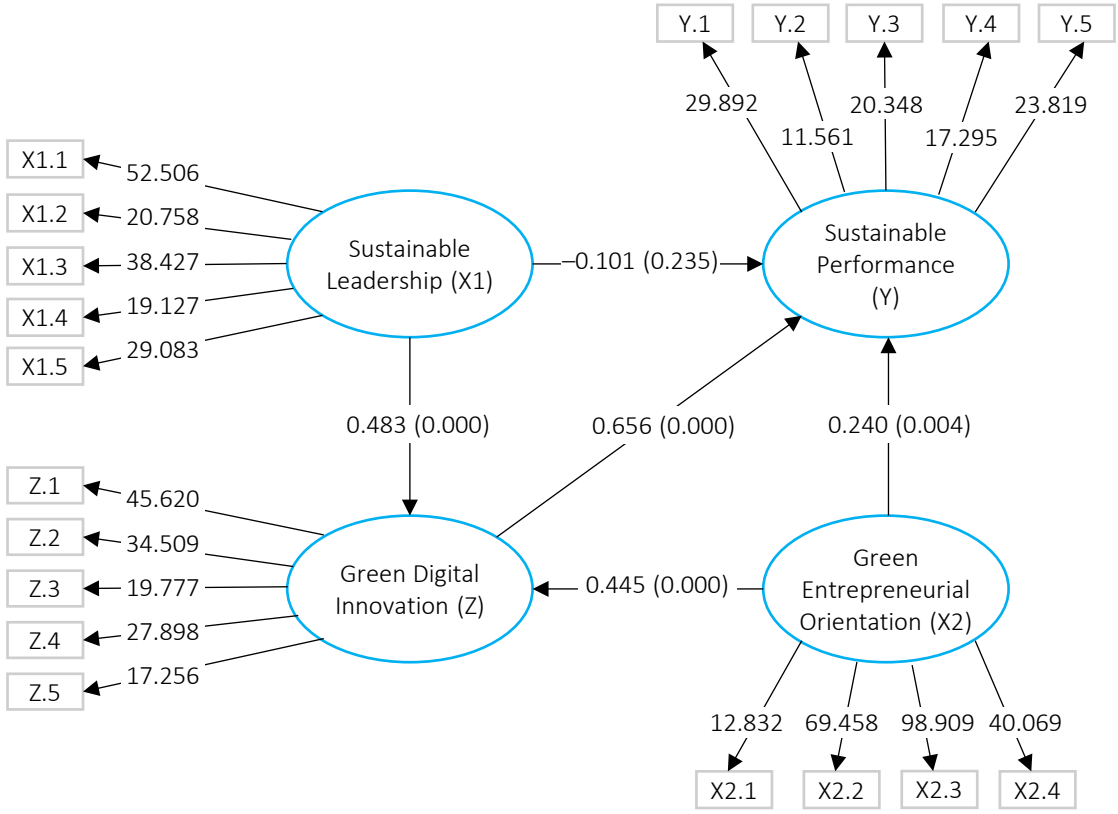

Figure 2. PLS analysis results

Table 7. Hypotheses testing

Hypothesis	Path Coefficient	t-statistic	p-value	Result
Sustainable Leadership → Sustainable Performance	–0.101	1.189	0.235	H1 is rejected
Sustainable Leadership → Green Digital Innovation	0.483	5.968	0.000	H2 is accepted
Green Entrepreneurial Orientation → Sustainable Performance	0.240	2.858	0.004	H3 is accepted
Green Entrepreneurial Orientation → Green Digital Innovation	0.445	5.457	0.000	H4 is accepted
Green Digital Innovation → Sustainable Performance	0.656	6.620	0.000	H5 is accepted
Sustainable Leadership → Green Digital Innovation → Sustainable Performance	0.317	4.184	0.000	H6 is accepted
Green Entrepreneurial Orientation → Green Digital Innovation → Sustainable Performance	0.292	4.645	0.000	H7 is accepted

effect on sustainable performance (beta –0.101, *t*-statistic 1.189, *p*-value 0.235). Because the *t*-statistic < 1.96 and *p*-value > 0.05 (significance level), *H1* is rejected. On the other hand, it was found that sustainable leadership affects green digital innovation (beta 0.483, *t*-statistic 5.968, *p*-value 0.000), so *H2* is accepted. Furthermore, green entrepreneurial orientation has a favorable and significant influence on sustainable performance (beta 0.240, *t*-statistic 2.858, *p*-value 0.004) and also green digital innovation (beta 0.445, *t*-statistic 5.457, *p*-value 0.000). Because the *p*-value < 0.05, *H3* and *H4* are accepted. Lastly, green digital innovation has a substantial direct impact on sustainable performance (beta 0.656, *t*-statistic 6.620, *p*-value 0.000), so *H5* is accepted.

The examination of the indirect effects, as mediated by green digital innovation, shows the existence of a mediating role. Green digital innovation is found to mediate the relationship between sustainable leadership and sustainable performance (beta 0.317, *t*-statistic 4.184, *p*-value 0.000), as well as green entrepreneurial orientation and sustainable performance (beta 0.292, *t*-statistic 4.645, *p*-value 0.000); *H6* and *H7* can be accepted.

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4. DISCUSSION

According to the data analysis results in Table 7, sustainable leadership cannot improve sustainable performance. The efforts of the leaders of Balinese endek weaving SMEs have not been able to encourage an increase in sustainable performance. One of the reasons is that the majority of SME employees consist of homemakers in Bali who spend most of their time not only weaving endek but also being involved in *ngayah*, which is a Balinese term for working voluntarily and cooperatively among villagers in Bali. The divided focus between working on weaving endek and traditional obligations reduces their productivity. These results are different from those of Burawat (2019), Iqbal et al. (2020), and Iqbal and Piwowar-Sulej (2022), who discovered that sustainable leadership is positively correlated with sustainable performance.

However, sustainable leadership contributes to driving the pace of green digital innovation. These results mean that the quality of sustainable leadership is getting better in endek ikat woven SMEs, which can encourage increased green digital innovation that companies desire. This is in line with research results from Tian and Wang (2023), which means that if the leaders of endek ikat weaving SMEs have high levels of sustainable leadership, then the results will be directly proportional to green digital innovation, which will increase as well.

Both sustainable performance and green digital innovation are positively and significantly impacted by green entrepreneurial orientation. Jiang et al. (2018), Fatoki (2019), and Makhloufi et al. (2024) support these results, where it has been proven that green entrepreneurial orientation and avoiding natural pollution increases sustainable performance leading to the goal of achieving a sustainable endek ikat weaving SME business. According to Guo et al. (2020), Muangmee et al. (2021), and Majali et al. (2022), an entrepreneurial orientation that promotes environmental preservation will boost green digital innovation or the endeavor to take innovative digital actions targeted at protecting the environment. This correlation between green entrepreneurial orientation and green digital innovation is noteworthy.

Sustainable performance is positively and significantly impacted by green digital innovation, therefore indicating that if digital innovation is based on the intention to preserve the natural environment, it will certainly increase sustainable performance, ultimately leading to the achievement of sustainable business goals for endek ikat woven SMEs. These findings are consistent with Khin and Ho (2020), Hanelt et al. (2021), and Shah et al. (2024), who demonstrate a substantial relationship between green digital innovation and sustainable performance.

The examination of indirect consequences through green digital innovation is presented in Table 7. This study offers concrete evidence that green digital innovation can mediate the relationship between sustainable leadership and performance. This means that if management pays special attention to environmentally friendly digital innovation, it is hoped that there will be an increase in the role of green digital innovation and an impact on good sustainable leadership relationships that will increase sustainable performance in the endek ikat woven SMEs. The mediating role of green digital innovation is classified as full mediation because the result of the direct influence of sustainable leadership on sustainable performance is not significant. The study's findings are consistent with those of Iqbal and Piwowar-Sulej (2022) and Yasa et al. (2019), who found that digital innovation contributes to the development of sustainable performance.

Green digital innovation serves as a bridge between green entrepreneurial orientation and sustainable performance. To achieve the sustainable performance of endek ikat woven SMEs, management should focus on environmentally friendly digital innovation that will positively affect the performance of these SMEs. This is because such innovation will increase the entrepreneurial orientation of endek ikat woven SMEs. The mediating role of green digital innovation is partial mediation because the result of the direct influence between green entrepreneurial orientation and sustainable performance is positive and significant. The present study's results align with the findings of Muangmee et al. (2021), Majali et al. (2022), and Alshebami (2023), which suggest that green digital innovation contributes to the positive correlation between green entrepreneurial orientation and performance, which will result in the sustainability of the endek ikat weaving business.

CONCLUSION

This study has examined how sustainable leadership and green entrepreneurship approaches can influence the performance of endek weaving SMEs to achieve long-term success. Empirical evidence underlines that leadership with sustainable ideas can embrace digital innovations in functional areas of the organization, ultimately improving the endek weaving performance. A green entrepreneurial approach can also help improve long-term performance. In addition, green digital innovation has the potential to be a bridge connecting the influence of green entrepreneurial approach to sustainable performance. Endek weaving SME leaders must prioritize green digital innovation to ensure that the relationship between green entrepreneurship approaches and business performance leading to corporate sustainability continues to strengthen. In addition, leadership strategies must also be strengthened because, based on research data analysis, leadership does not have a significant impact on performance. Leaders must be better at making decisions that have a significant impact on resource allocation strategies, marketing strategies, and corporate operational efficiency.

The findings contribute to the endek weaving SMEs that it is crucial to implement a sustainable leadership strategy by always innovating through environmentally friendly digital methods to improve SME performance so that business sustainability will be achieved.

This study focuses on Balinese endek ikat weaving SMEs, and for this research model to be generalized, further research needs to be carried out on SMEs in wider industries or other types of companies.

AUTHOR CONTRIBUTIONS

Conceptualization: Made Ermawan Yoga Antara.
Data curation: Made Ermawan Yoga Antara, Ida Ayu Putu Widani Sugianingrat.
Formal analysis: Made Ermawan Yoga Antara.
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Validation: Ida Ayu Putu Widani Sugianingrat, Ida Ayu Oka Martini.
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Writing – original draft: Made Ermawan Yoga Antara.
Writing – review & editing: Made Ermawan Yoga Antara, Ida Ayu Oka Martini.

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