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The Impact of Green Innovation and Entrepreneurial Orientation on Business Performance in the Herbal Medicine Industry

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Abstract
The herbal medicine industry has experienced significant growth due to increasing consumer awareness of natural and sustainable health products. However, many businesses in this sector have yet to fully adopt Green Innovation and Entrepreneurial Orientation to improve their business performance. This study aims to analyze the impact of these two factors on business performance in the herbal medicine industry. This research utilizes a quantitative approach with multiple regression analysis to investigate the influence of Green Innovation and Entrepreneurial Orientation on Business Performance. To gather empirical data, a cross-sectional survey was conducted among businesses operating in the herbal medicine industry. Data were collected through a cross-sectional survey of businesses in the herbal medicine sector, including small and medium enterprises (SMEs), herbal product manufacturers, and retailers. These findings highlight the importance of integrating sustainable innovation and an entrepreneurial mindset to enhance business competitiveness in the herbal medicine sector. Businesses should focus on adopting eco-friendly practices and proactive entrepreneurial strategies to ensure long-term success.

Keywords: *Business Performance, Entrepreneurial Orientation, Green Innovation, Herbal Medicine Industry*

Introduction

In recent years, the herbal medicine industry has witnessed significant growth, driven by an increasing awareness among consumers regarding health and the benefits of natural products. The herbal medicine sector is a key component of the national economy, particularly in Indonesia, which boasts a rich biodiversity and a long-standing tradition of herbal medicine use [1]. However, despite this potential, many herbal companies in Indonesia have yet to fully leverage green innovation and entrepreneurial orientation to enhance their business performance [2].

Green innovation, which encompasses the development of environmentally friendly products and processes, has emerged as a critical factor in improving a company's competitive edge. Research by Zhang et al. (2024) indicates that a strong entrepreneurial orientation can drive firms to adopt green innovation practices, ultimately leading to improved economic performance [3]. This is further supported by findings from [4], which highlight the positive influence of entrepreneurial orientation and innovation on business performance within the small and medium-sized enterprises (SMEs)

sector [5]. Additionally, studies have shown that the interaction between entrepreneurial orientation and industry forces can significantly enhance business performance, suggesting that firms that adapt to these external pressures are more likely to succeed [6]. Therefore, it is essential to explore how these factors interact and affect business performance in the herbal medicine industry.

Moreover, government regulations and policies play a vital role in supporting the development of the herbal medicine sector. The interplay between technological capabilities and regulatory frameworks in Indonesia's herbal medicine industry can significantly influence its growth trajectory [7]. Consequently, this study aims to analyze how green innovation and entrepreneurial orientation can be harnessed by herbal companies to enhance their business performance, while also considering the impact of external factors such as regulations and market dynamics. For instance, the role of social capital and networking ties has been shown to significantly impact business performance in dynamic environments, particularly in the hospitality sector, which shares similarities with the herbal medicine industry [8]. By doing so, this study seeks to provide deeper insights into how firms in the herbal medicine industry can adapt and innovate to achieve better performance in an increasingly competitive market.

Literature Review

Green innovation refers to the development and implementation of environmentally friendly practices and products. In the context of the herbal medicine industry, green innovation can encompass sustainable sourcing of raw materials, eco-friendly packaging, and the adoption of production processes that minimize environmental impact [9]. Research indicates that companies that embrace green innovation can achieve a competitive advantage by meeting consumer demand for sustainable products [10]. For instance, the importance of eco-innovation in the traditional herbal agroindustry, suggesting that organizations should focus on educating staff and enhancing product branding to improve market competitiveness [11]. Furthermore, the growing use of herbal medicines and the need for regulatory measures to ensure safety and quality, which aligns with the principles of green innovation [12].

Entrepreneurial orientation (EO) is characterized by a firm's willingness to innovate, take risks, and proactively seek opportunities. In the herbal medicine sector, a strong EO can drive the adoption of green practices and enhance overall business performance. Studies have shown that firms with a high level of EO are more likely to engage in innovative practices that align with environmental sustainability [13], [14]. For example, Musfar et al. argue that integrating green entrepreneurial orientation into business strategies can lead to sustainable performance, enabling firms to differentiate themselves in a competitive market [15]. Additionally, the role of strategic management accounting in supporting startups in achieving sustainable development goals further underscores the significance of EO in enhancing business performance [16].

The relationship between green innovation and entrepreneurial orientation is crucial for understanding how businesses in the herbal medicine industry can thrive. Research by and Koumaravelou indicates that regulatory compliance is essential for herbal medicinal products, as it ensures quality and safety, which are vital for consumer trust and business success [17][18]. Moreover, the synergy between green innovation and EO can lead to improved operational efficiency and market responsiveness, ultimately enhancing business performance [19]. This is particularly relevant in the herbal medicine industry, where consumer preferences are shifting towards sustainable and ethically produced products[20].

Research Methods

This study employs a quantitative research approach using multiple regression analysis to examine the impact of Green Innovation and Entrepreneurial Orientation on Business Performance. A cross-sectional survey method was chosen to collect empirical data from businesses in the herbal medicine industry. This approach is suitable as it allows for the quantification of relationships between variables and provides statistical evidence to support the research hypotheses. The population of this study consists of businesses operating in the herbal medicine industry, including small and medium enterprises (SMEs), herbal product manufacturers, and herbal medicine retailers. The collected data were analyzed using SPSS 24.0, employing multiple regression analysis as the primary analytical tool to examine the relationship between Used to measure the combined effect of Green Innovation (X1) and Entrepreneurial Orientation (X2) on Business Performance (Y). The R^2 value was examined to determine the explanatory power of the independent variables on business performance. Beta coefficients were analyzed to identify the relative strength of each predictor variable.Green Innovation (X1), Entrepreneurial Orientation (X2), and Business Performance (Y).

Results and Discussion

1. Simultaneous Effect of Green Innovation and Entrepreneurial Orientation on Business Performance

The simultaneous effect of Green Innovation (X1) and Entrepreneurial Orientation (X2) on Business Performance (Y) can be observed in Table 1 below:

Table 1: Coefficient of Determination (R^2) Summary

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.768[a]	.589	.579	7.706

a. Predictors: (Constant), Entrepreneurial Orientation (X2), Green Innovation (X1)
b. Dependent Variable: Business Performance (Y)

The R Square (R^2) value is 0.589 or 58.9%, indicating that Green Innovation and Entrepreneurial Orientation have a simultaneous influence of 58.9% on Business Performance, while the remaining 41.1% is influenced by other factors not included in this study.

2. Partial Effect of Green Innovation and Entrepreneurial Orientation on Business Performance (t-Test)

To determine the individual influence of Green Innovation on Business Performance and Entrepreneurial Orientation on Business Performance, an analysis was conducted using SPSS 24.0 for Windows. The results are presented in Table 2:

Table 2: t-Test Significance Values

Coefficients[a]						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	19.455	6.229		3.123	.002
	Green Innovation (X1)	.353	.090	.365	3.934	.000
	Entrepreneurial Orientation (X2)	.594	.114	.484	5.229	.000

a. Dependent Variable: Business Performance (Y)

Based on Table 2, the t-test result for the effect of Green Innovation on Business Performance shows a t-value of 3.934 with a significance level of 0.000. Since the significance level is below 0.05 and t-value (3.934) > t-table (1.990, df=79, α=5%), Green Innovation has a positive and significant effect on Business Performance. The contribution of Green Innovation to Business Performance is 36.5% (Beta = 0.365).

The t-test result for Entrepreneurial Orientation on Business Performance shows a t-value of 5.229 with a significance level of 0.000. Since t-value (5.229) > t-table (1.990, df=79, α=5%), Entrepreneurial Orientation also has a positive and significant effect on Business Performance. The contribution of Entrepreneurial Orientation to Business Performance is 48.4% (Beta = 0.484). Thus, both Green Innovation and Entrepreneurial Orientation significantly contribute to improving Business Performance.

3. Simultaneous Effect Analysis (F-Test / ANOVA)

To test the combined significance of Green Innovation and Entrepreneurial Orientation on Business Performance, an F-test (ANOVA) was conducted, as shown in Table 3.

Table 3: F-Test Significance Values (ANOVA)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6732.548	2	3366.274	56.691	.000[b]
	Residual	4690.964	79	59.379		
	Total	11423.512	81			

a. Dependent Variable: Business Performance (Y)

b. Predictors: (Constant), Entrepreneurial Orientation (X2), Green Innovation (X1)

H_a : $\rho > 0$, meaning there is a positive effect of Green Innovation and Entrepreneurial Orientation on Business Performance.

H_o : $\rho \leq 0$, meaning there is no significant positive effect

Based on Table 3, the statistical calculation shows:

F-calculated = 56.691 > F-table = 3.111 (df1=2, df2=80, α=5%).

Significance value = 0.000 < 0.05, confirming that the hypothesis (H_a) is accepted, meaning Green Innovation and Entrepreneurial Orientation jointly influence Business Performance.

Green Innovation has a positive and significant impact on Business Performance, with a Beta coefficient of 0.365 (36.5%). Entrepreneurial Orientation also has a positive and significant impact on Business Performance, with a Beta coefficient of 0.484 (48.4%). Together, Green Innovation and Entrepreneurial Orientation explain 58.9% of the variation in Business Performance, with the remaining 41.1% influenced by other factors. The F-test confirms that these two independent variables significantly influence Business Performance.

The results of this study confirm that Green Innovation and Entrepreneurial Orientation play a crucial role in shaping Business Performance in the herbal medicine industry. The findings provide important insights into how sustainable innovation and entrepreneurial mindset contribute to improving business success.

1. The Impact of Green Innovation on Business Performance

The analysis shows that Green Innovation (X1) has a significant positive effect on Business Performance (Y), as indicated by a t-value of 3.934 (p = 0.000) and a beta coefficient of 0.365

(36.5%). This means that the more a company engages in environmentally friendly innovation—such as using sustainable raw materials, implementing eco-friendly production processes, and offering certified green products—the better its business performance will be.

These findings align with previous studies, such as those by Porter & Kramer (2011), which suggest that businesses that integrate sustainability into their innovation strategies gain a competitive advantage. In the herbal medicine industry, green innovation helps companies meet the growing demand for organic and natural health products, while also enhancing their market positioning and customer loyalty.

2. The Impact of Entrepreneurial Orientation on Business Performance

The results also indicate that Entrepreneurial Orientation (X2) has a stronger influence on Business Performance, with a t-value of 5.229 (p = 0.000) and a beta coefficient of 0.484 (48.4%). This suggests that companies with a high level of entrepreneurial orientation—characterized by proactiveness, risk-taking, and innovation—tend to perform better in the marketplace. This finding is consistent with research by Lumpkin & Dess (1996), which highlights that entrepreneurial-oriented firms are more likely to capitalize on emerging opportunities, adapt to market changes, and sustain long-term growth. In the context of the herbal medicine industry, companies that continuously innovate their business models, embrace digital transformation, and proactively respond to consumer needs can achieve higher financial and market performance.

3. Joint Influence of Green Innovation and Entrepreneurial Orientation on Business Performance

The F-test results (F = 56.691, p = 0.000) indicate that Green Innovation and Entrepreneurial Orientation collectively explain 58.9% of the variation in Business Performance, meaning that these two factors significantly contribute to business success. The remaining 41.1% is influenced by other factors that were not examined in this study, such as market competition, regulatory policies, customer preferences, and financial resources. These results suggest that businesses need to integrate both sustainability-driven innovation and entrepreneurial agility to maximize their performance. While green innovation enhances brand reputation and compliance with environmental regulations, entrepreneurial orientation ensures that firms remain adaptive and competitive in a rapidly evolving market.

Conclusion

This study examined the impact of Green Innovation and Entrepreneurial Orientation on Business Performance in the herbal medicine industry. The findings demonstrate that both variables play a crucial role in enhancing business success. The results indicate that Green Innovation (X1) has a positive and significant effect on Business Performance (Y), with a beta coefficient of 0.365 (36.5%) and a t-value of 3.934 (p = 0.000). This suggests that businesses that adopt environmentally friendly innovations—such as sustainable sourcing of raw materials, eco-friendly production processes, and green product certifications—tend to perform better in the market. Similarly, Entrepreneurial Orientation (X2) has a stronger positive effect on Business Performance, with a beta coefficient of 0.484 (48.4%) and a t-value of 5.229 (p = 0.000). This implies that companies with a high level of entrepreneurial orientation—characterized by proactiveness, innovation, and risk-taking—are more likely to achieve higher performance levels by adapting to market dynamics and seizing business opportunities. The F-test results (F = 56.691, p = 0.000) confirm that Green Innovation and Entrepreneurial Orientation jointly explain 58.9% of the variation in Business Performance (R^2 = 0.589), while the remaining 41.1% is influenced by other factors not examined in this study. These findings emphasize the importance of integrating sustainability-driven innovation and an

entrepreneurial mindset to maintain competitiveness in the herbal medicine sector. Future research should explore additional moderating factors, such as market orientation, government support, and digital transformation, to provide a more comprehensive understanding of how businesses can maximize their performance in an evolving industry. This study reinforces the idea that businesses that balance sustainability and entrepreneurship are better positioned for long-term growth and success in the herbal medicine market.

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