

Integration of Green Innovation and Utilization of Digital Technology to Achieve Sustainable Competitive Advantage for Haseda Herbal Products in Medan City

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ABSTRACT

This study examines the role of green innovation and the use of digital technology in achieving sustainable competitive advantage for Haseda herbal products produced in Medan. Increasing public interest in natural and health-oriented products creates opportunities while also requiring companies to strengthen their competitiveness in a rapidly evolving herbal market. The purpose of this research is to analyze the influence of green innovation and digital technology on sustainable competitive advantage. A quantitative method was employed by distributing questionnaires to 100 consumers of Haseda in Medan. Data were analyzed using multiple linear regression to evaluate the partial and simultaneous effects of both independent variables on competitive advantage. The results show that green innovation and digital technology each have a positive and significant effect on sustainable competitive advantage, with digital technology demonstrating a stronger influence. Together, both variables explain 40.3% of the variation in competitive advantage. The study concludes that integrating environmentally oriented innovation with effective digital practices strengthens product differentiation, enhances consumer trust, and increases long-term competitiveness. The implication is that companies in the herbal industry need to consistently develop sustainability-based innovations supported by digital marketing and online service optimization to maintain relevance and market strength.

Keywords: Haseda, Herbal Products, Green Innovation, Digital Technology, Sustainable Competitive Advantage.

INTRODUCTION

Herbal products are one of the fastest growing sectors in Indonesia, including in the city of Medan. Increased public awareness of healthy lifestyles and the need for natural products has driven demand for various herbal products. One well-known product is Haseda, a herbal product formulated from natural ingredients with various health benefits. The presence of Haseda products is not only an alternative for people who want to maintain their health, but also part of the trend of consuming modern herbal products that prioritize quality, safety, and sustainability. This is in line with research (Rezai et al., 2015) which shows that herbal consumers increasingly prioritize green practices such as natural ingredients and sustainability in their purchasing decisions. Green innovation is a key strategy in driving sustainability performance and creating long-term competitive advantage (Alshebami, 2023a).

Despite its great potential, in practice, marketing Haseda herbal products in Medan faces a number of challenges. Competition with various other herbal brands, both local and national, means that Haseda must be able to highlight the advantages of its products. In

addition, consumer literacy regarding herbal products still varies, so education and socialization are key to expanding the market. On the other hand, the perception of some people who still doubt the effectiveness of herbal products also poses its own obstacles. According to (Hu et al., 2020), one way to overcome this perception is through green product innovation, which has been proven to enhance consumer reputation and trust. Therefore, the right marketing strategy and product differentiation are important aspects in facing these challenges.

From an environmental perspective, the urgency to adopt green innovation has become increasingly critical. According to the Medan City Environmental Agency, the city generated 1,004 tons of waste per day in 2023, with 34% originating from household and product packaging waste, including food and herbal product packaging. This situation pressures businesses to adopt sustainable practices such as eco-friendly packaging, efficient production processes, and environmentally safe raw materials. Moreover, a survey by the Ministry of Industry (2024) reports that 68% of urban consumers prefer products with environmentally friendly packaging, and 54% are willing to switch brands if sustainability attributes are clearly communicated. This demonstrates that green innovation is no longer limited to environmental compliance, but has become a crucial element for building market trust and gaining competitive differentiation.

In parallel, the rapid digitalization in Medan also shapes the competitive landscape. Data from the Medan City Communication and Information Office shows that 87% of residents actively use smartphones and 79% access social media regularly, indicating that digital platforms serve as a primary channel for information, communication, and purchasing decisions. However, BPS Medan (2024) notes that only 28% of SMEs have effectively utilized e-commerce, revealing a significant digital gap among local businesses. Despite this, online purchases of herbal products in Medan increased by 42% between 2023 and 2024, illustrating that consumer purchasing behavior is increasingly shifting toward digital channels. For Haseda, this means that optimizing digital tools—such as social media, marketplaces, and educational digital content—is essential for expanding market reach and strengthening brand engagement.

Tabel 1. Sales Data for Haseda Herbal Products

PT. Amanah Berkah Kencana				
JI. DENAI, KOMPLEK RUKO DENAI AVENUE,NO.8L, MEDAN				
NO	PRODUCT NAME	YEAR SALES	TOTAL SALES	UNIT
1	HASEDA	2021	1,902	BOTTLE
		2022	2,240	BOTTLE
		2023	2,309	BOTTLE
		2024	4,223	BOTTLE
GRAND TOTAL			10,674	BOTTLE

Based on sales data from PT. Amanah Berkah Kencana, Haseda herbal products experienced an increase in total sales from 1,902 bottles in 2021 to 4,223 bottles in 2024, with a cumulative total of 10,674 bottles, with the largest surge occurring in 2024. This development can be attributed to the implementation of green innovations (X1), such as improving the quality of natural raw materials and environmentally friendly packaging that can increase consumer confidence, as well as the use of digital technology (X2) through online marketing strategies, social media, and e-commerce that expand market reach. The integration of these two factors supports Haseda's achievement of sustainable competitive advantage (Y) in Medan, reflected in significant sales growth amid competition from herbal products.

In the context of green innovation, herbal products in Medan City, including Haseda, face a rather interesting phenomenon. Although based on natural ingredients, not all herbal producers have fully implemented sustainability principles in their production, packaging, and distribution processes. Many herbal products still use single-use plastic packaging, which causes environmental problems. In fact, modern consumer trends are shifting towards a preference for environmentally friendly products. A study (Rustiarini et al., 2022) shows that consumers are increasingly inclined to choose products that implement green innovation, as sustainability has become part of their purchasing decisions. Thus, the integration of green innovation is an urgent need so that herbal products, including Haseda, not only provide health benefits but also contribute to environmental sustainability.

In addition to green innovation, the use of digital technology is also an important issue in marketing herbal products in Medan. Haseda products have so far utilized various digital channels, such as social media, marketplaces, and even radio talk shows, but their effectiveness still faces obstacles. Challenges such as low optimization of digital marketing strategies, limited attractive educational content, and competition with other more aggressive herbal brands on digital platforms are obstacles to increasing brand awareness. According to (Costa Melo et al., 2023), the strategic use of digital technology can improve the performance of SMEs by expanding market reach and strengthening interactions with consumers. In line with this, local research also emphasizes the importance of strengthening digital literacy and innovation as efforts to improve the competitiveness of MSMEs in Indonesia (Irawan, 2024; PenKoMi et al., 2025). Therefore, more strategic use of digital technology is essential to expand market reach, increase consumer confidence, and achieve sustainable competitive advantage (Sharabati et al., 2024a).

LITERATURE REVIEW

Sustainable Competitive Advantage (Y)

Sustainable competitive advantage is a company's ability to maintain long-term superiority through strategies that are difficult for competitors to imitate, including product quality, reputation, and continuous innovation (Weerawardena & Mavondo, 2011). According to (Hu et al., 2020; Jiang, 2025), integrating green innovation into business strategies contributes to increased competitiveness because companies not only sell products but also offer sustainability values that consumers appreciate. From a digitalization perspective, (Broccardo et al., 2022; Lu, 2024) explain that the use of digital technology increases transparency, efficiency, and communication of green values to consumers, which ultimately strengthens competitive advantage. This means that sustainable competitive advantage emerges when Haseda is able to combine green innovation practices with digital strategies to form consistent and long-term differentiation.

Green Innovation (X1)

Green innovation is a form of innovation that focuses on reducing environmental impact through the development of environmentally friendly products, processes, and business models (Dachi et al., 2025; Hu et al., 2020; Rustiarini et al., 2022; Silvério et al., 2025). In the context of small and medium-sized enterprises (SMEs), green innovation not only improves energy efficiency and reduces waste, but also provides a competitive advantage in the eyes of increasingly environmentally conscious consumers. (Baeshen et al., 2021) found that green innovation contributes significantly to improving sustainable business performance, as environmentally friendly practices strengthen consumer reputation and loyalty. Research (Rezai et al., 2015) focusing on herbal-based SMEs also confirms that the adoption of green practices such as the use of certified natural ingredients and biodegradable packaging is an important factor in attracting modern

consumers. Thus, green innovation can be seen as a strategic factor that drives the sustainability of herbal products such as Haseda.

Digital Technology (X2)

The use of digital technology refers to the adoption of e-commerce, social media, digital marketing, and information technology to support business processes. Digital transformation can increase the speed of information distribution, expand market access, and strengthen company interactions with consumers (Broccardo et al., 2022). Studies ((Cheng et al., 2024; Costa Melo et al., 2023) show that the digitization of SMEs has a positive effect on sustainable performance, particularly by strengthening the social (customer relations) and environmental (supply chain efficiency) dimensions. Research (Sharabati et al., 2024b) also confirms that effective digital marketing strategies can increase brand awareness while fostering consumer confidence in new products, including those in the herbal sector. Digital transformation has also been proven to strengthen green innovation practices by supporting supply chain collaboration and increasing management awareness of environmental issues (Li et al., 2025; Xi & Wang, 2024). Thus, Haseda's use of digital technology can be a strategic instrument to expand its consumer reach in Medan while strengthening the value of its health- and environment-oriented products.

Theoretical Conclusion

The integration of the Resource-Based View, Innovation Theory, and Technology Adoption Theory shows that sustainable competitive advantage arises when a company combines green innovation with digital capabilities as mutually reinforcing strategic resources. Green innovation creates sustainability-based differentiation, while digital technology strengthens efficiency, transparency, and market reach. When aligned, these elements form valuable and difficult-to-imitate capabilities that support long-term competitiveness. This study concludes that the synergy between environmental innovation and digital transformation is the primary theoretical foundation for achieving sustainable competitive advantage in the herbal industry.

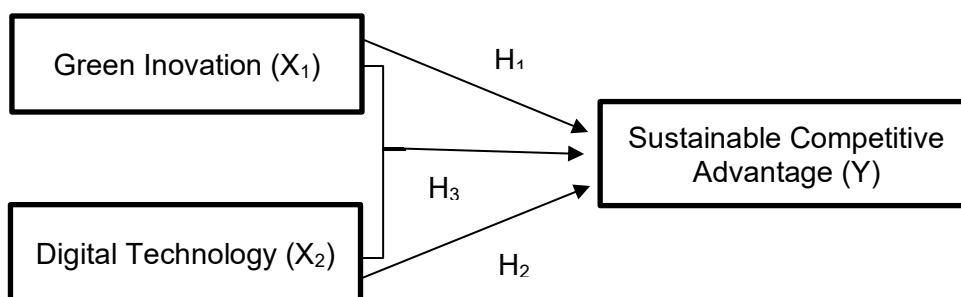


Figure 1. Theoretical Framework

The hypotheses in this study are:

H₁: Green innovation has an effect on sustainable competitive advantage.

H₂: Digital technology has an effect on sustainable competitive advantage.

H₃: Green innovation and digital technology have an effect on sustainable competitive advantage.

The framework of this research illustrates how Green Innovation (X₁) and Digital Technology (X₂) contribute to Sustainable Competitive Advantage (Y). The first relationship proposes that green innovation enhances sustainable competitive advantage by embedding environmental value into products and processes, making them unique, credible, and aligned with consumer expectations for natural and eco-friendly goods. The second relationship suggests that digital technology strengthens

competitive advantage by expanding market reach, improving customer communication, and enabling more effective dissemination of product value and sustainability initiatives. When both variables operate together, they create a reinforcing effect in which environmentally responsible innovation is amplified through digital communication and engagement, resulting in a competitive advantage that is more durable and difficult for competitors to replicate.

RESEARCH METHOD

This research was conducted at PT. Amanah Berkah Kencana, located at Jl. Denai, Komplek Ruko Denai Avenue, No. 8L, Medan. Specifically, it focused on Haseda herbal products manufactured by PT. Amanah Berkah Kencana. This study will use a quantitative approach by distributing questionnaires to Haseda consumers and later analyzing the data using SPSS software, through several stages (validity test, reliability test, normality test, multicollinearity test, heteroscedasticity test, multiple linear regression analysis, and interpretation of results) (Dan, n.d.).

The population in this study is consumers of Haseda herbal products in the city of Medan. Because the population size is not known with certainty, the sample size is determined using Hair's formula, which is a minimum of 5-10 times the number of indicators used in the study. With 12 research indicators, the minimum sample size is 60 respondents and the maximum is 120 respondents. The sampling technique used in this study was purposive sampling, which is a technique for determining samples based on certain criteria relevant to the research objectives. According to (Etikan, 2016), purposive sampling is a non-probability sampling method that allows researchers to select respondents with specific characteristics who are able to provide the most accurate information related to the phenomenon being studied. Thus, 100 respondents were selected with the criteria of being Haseda consumers who had used the product at least twice and resided in Medan City.

RESULTS

Validity Test

The results of the validity test for all questionnaire items indicate that each statement used in this study meets the established validity criteria. The validity of an item is determined by comparing the value of the item-total correlation (r-count) with the critical value of the r-table, which in this study is 0.361 based on a sample size of 100 respondents.

For the **Green Innovation (X1)** variable, all eight items show r-count values greater than 0.361. Several items—such as the indicators related to environmentally friendly product development (IH3) and the use of biodegradable packaging (IH8)—demonstrate relatively high correlation values compared with other items. This indicates that these items strongly represent the construct being measured. Other indicators also exceed the minimum threshold, confirming that every item is valid.

For the **Digital Technology (X2)** variable, all items show r-count values surpassing the r-table value as well. Indicators measuring the use of social media, responsiveness to digital inquiries, and the consistency of digital marketing activities demonstrate adequate item-total correlations, showing that respondents' answers for each item align well with the overall construct.

Similarly, on the **Sustainable Competitive Advantage (Y)** variable, each indicator also has an r-count above the r-table value. Items related to product differentiation, reputation,

and loyalty show strong correlations, indicating that these items accurately measure the intended concept.

Overall, since **every item across the three variables has an r-count higher than 0.361**, it can be concluded that the entire set of questionnaire items is **valid**, meaning the instrument is capable of measuring the intended constructs accurately and appropriately.

Reliability Test

Based on the reliability test results was conducted using Cronbach's Alpha to determine the internal consistency of the measurement instrument. A variable is considered reliable when its Cronbach's Alpha value exceeds the minimum threshold of 0.60 for exploratory research.

The results show that the **Green Innovation (X1)** variable has a Cronbach's Alpha value of 0.625, which indicates moderate yet acceptable reliability. This means that the items within the Green Innovation construct are sufficiently consistent in measuring the same underlying concept.

The **Digital Technology (X2)** variable has a Cronbach's Alpha value of 0.611, also exceeding the minimum threshold. Although the value is not exceptionally high, it indicates that the items used to measure digital technology—such as the use of digital platforms, online communication, and digital service responsiveness—have adequate internal consistency.

The **Sustainable Competitive Advantage (Y)** variable demonstrates a Cronbach's Alpha of 0.659, the highest among the three variables. This value indicates that the indicators—such as differentiation, reputation, and long-term market performance—are consistently understood by respondents as part of the same construct.

Since the Cronbach's Alpha values for all variables fall within the acceptable range, it can be concluded that the entire measurement instrument possesses adequate reliability, meaning the questionnaire items are stable, consistent, and appropriate for further statistical analysis, including regression testing.

Table 2. Normality Test

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		100
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	1.80946332
Most Extreme Differences	Absolute	.076
	Positive	.039
	Negative	-.076
Test Statistic		.076
Asymp. Sig. (2-tailed) ^c		.174
a. Test distribution is Normal.		
b. Calculated from data.		
c. Lilliefors Significance Correction.		

The Kolmogorov-Smirnov normality test shows a significance value above 0.05. Thus, the regression residuals are normally distributed and the normality assumption is satisfied, meaning that the regression model is valid for use. This is important because linear regression tests require a normal distribution of residuals so that the coefficient estimates are unbiased.

Table 3. Multicollinearity test

Coefficients ^a			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Inovasi Hijau	.668	1.498
	Teknologi Digital	.668	1.498

a. Dependent Variable: Keunggulan Bersaing Berkelanjutan

The multicollinearity test results show a tolerance value of 0.667 (>0.1) and a VIF of 1.50 (<10) for both X1 and X2. This indicates that there are no signs of multicollinearity. In other words, Green Innovation and Digital Technology stand as independent variables that do not dominate each other, so they can be included together in the regression model.

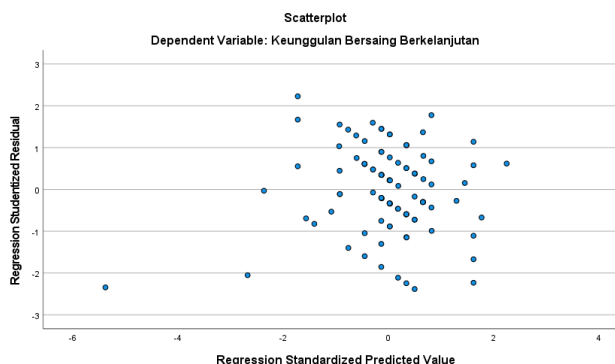


Figure 2. Heteroscedasticity Test

The heteroscedasticity test using the Glejser method shows that all independent variables have a significance value greater than 0.05. Thus, there is no heteroscedasticity in the regression model. This means that the residual variance at all levels of the independent variables is constant, so the regression model meets the assumption of homoscedasticity.

Table 5. Multiple Linear Regression Analysis

Coefficients ^a				
Model		Unstandardized Coefficients		Standardized Coefficients
		B	Std. Error	Beta
1	(Constant)	10.585	3.094	
	Inovasi Hijau	.234	.090	.251
	Teknologi Digital	.474	.100	.456

a. Dependent Variable: Keunggulan Bersaing Berkelanjutan

The results of multiple linear regression analysis produced the following equation:

$$Y=1,323+0,234X1+0,474X2+e$$

The regression coefficient for Green Innovation (X1) of 0.234 indicates that each unit increase in green innovation will increase sustainable competitive advantage by 0.234, assuming other variables remain constant. Meanwhile, the coefficient for Digital Technology (X2) is 0.474, which is greater than X1, indicating that the effect of digital technology utilization on sustainable competitive advantage is stronger.

Table 6. t Test (Parsial)

Coefficients ^a			
Model		t	Sig.
1	(Constant)	3.421	<.001
	Inovasi Hijau	2.613	.010
	Teknologi Digital	4.746	<.000

a. Dependent Variable: Keunggulan Bersaing Berkelanjutan

- Green Innovation Variable (X1) has a significant effect on Sustainable Competitive Advantage (t = 2.613; p = 0.010 < 0.05).
- The Digital Technology variable (X2) also has a significant effect on Sustainable Competitive Advantage (t = 4.746; p = 0.000 < 0.05).

Thus, partial hypotheses H1 and H2 are accepted. Although both are significant, the t-value of X2 is higher than that of X1, confirming that the role of digitization is more dominant than green innovation.

Table 7. F Test (Simultan)

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	218.498	2	109.249	32.693	<.000 ^b
	Residual	324.142	97	3.342		
	Total	542.640	99			

a. Dependent Variable: Keunggulan Bersaing Berkelanjutan

b. Predictors: (Constant), Teknologi Digital, Inovasi Hijau

The F test results show an F value of 32.690 with sig = 0.000 < 0.05. This means that Green Innovation (X1) and Digital Technology (X2) simultaneously have a significant effect on Sustainable Competitive Advantage (Y). Thus, the simultaneous hypothesis is accepted.

Table 8. Coefficient of Determination Test

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.635 ^a	.403	.390	1.828

a. Predictors: (Constant), Teknologi Digital, Inovasi Hijau

b. Dependent Variable: Keunggulan Bersaing Berkelanjutan

The R^2 value is 0.403, which means that 40.3% of the variation in Sustainable Competitive Advantage (Y) can be explained by the Green Innovation (X1) and Digital Technology (X2) variables. The remaining 59.7% is explained by other factors outside the scope of this study, such as product price, service quality, distribution network, or conventional promotional strategies. The moderate R^2 value indicates that although the model is quite good, other factors still play an important role in explaining Haseda's competitiveness.

DISCUSSION

The hypothesis testing results show that both green innovation (X1) and digital technology (X2) significantly influence sustainable competitive advantage (Y). These findings reinforce earlier studies stating that environmentally oriented innovation contributes to improved competitiveness, consumer trust, and long-term performance (Alshebami, 2023b; Baeshen et al., 2021; Megawati et al., 2024). In the context of Haseda herbal products, practices such as the use of eco-friendly packaging and natural-based product development function as differentiation attributes that enhance market credibility.

The results also indicate that digital technology (X2) has a stronger impact than green innovation (X1), confirming previous studies which highlight that digitalization enables MSMEs to improve marketing efficiency, expand customer reach, and strengthen brand visibility (Costa Melo et al., 2023). This is consistent with findings that emphasize the role of digital tools in driving operational efficiency and accelerating market penetration (Ayu et al., 2022; Romadhona, 2024). For Haseda, the use of online marketplaces and social media platforms has demonstrably increased sales growth throughout 2024.

Although green innovation contributes positively, its influence is relatively smaller compared to digital technology—a pattern also observed by (Rustiarini et al., 2022), who note that eco-innovation enhances loyalty but requires strong market communication channels to maximize impact. This indicates that achieving sustainable competitive advantage requires aligning green innovation initiatives with effective digital communication strategies.

Overall, this study supports the growing evidence that integrating digital transformation with sustainability-oriented innovation creates a mutually reinforcing effect. Green innovation builds credibility and sustainable value, while digital technology amplifies these values through wider dissemination and stronger customer engagement. Prior studies have also confirmed that digital-green integration drives environmental performance and long-term competitiveness (Li et al., 2025; Xi & Wang, 2024). Therefore, the findings emphasize the strategic importance for Haseda and similar herbal MSMEs to continuously strengthen eco-innovation practices while optimizing digital technology adoption to remain relevant and competitive in a rapidly evolving market environment.

CONCLUSION

Based on the hypothesis testing results, this study concludes that green innovation and the use of digital technology play a strategic and complementary role in shaping Haseda's sustainable competitive advantage. The positive and significant relationship between green innovation and competitive advantage indicates that environmentally responsible practices function not only as operational improvements but also as strategic differentiation tools. Analogically, when Haseda adopts greener processes—such as eco-friendly packaging and natural raw materials—it strengthens consumer trust in the same way that a company builds long-term credibility through consistent ethical behavior. Green innovation therefore becomes a symbolic signal that reassures consumers about product safety, cleanliness, and environmental responsibility, leading to stronger brand loyalty and competitive differentiation.

Meanwhile, the stronger influence of digital technology demonstrates that digitalization acts as an accelerator that amplifies the value created through green innovation. This relationship can be understood analogically: if green innovation is the “content,” then digital technology is the “channel” that delivers and amplifies it to a wider audience. Digital platforms expand market reach, facilitate rapid dissemination of product information, and create deeper interactions with consumers, thereby increasing awareness, interest, and purchasing decisions more effectively than conventional marketing methods. The dominance of digital technology confirms that in modern markets, visibility and accessibility are just as important as product quality itself.

When both variables are combined, they create a synergistic model in which sustainability-oriented innovation builds intrinsic value, and digital transformation projects that value outward to the market. This integration explains 40.3% of Haseda's sustainable competitive advantage, meaning that the company's future strength will increasingly depend on its ability to balance environmental responsibility with digital capability.

From a managerial perspective, PT. Amanah Berkah Kencana needs to deepen its commitment to green innovation by further increasing biodegradable packaging, adopting energy-efficient production processes, and strengthening sustainability messaging embedded in its supply chain practices. At the same time, the company must optimize its digital marketing activities by improving the quality of educational content, strengthening its presence on e-commerce platforms, and implementing more responsive digital customer service systems. Through this dual approach, Haseda can position itself not only as a herbal product brand but as a sustainable health solution supported by strong digital engagement.

Finally, recognizing that 59.7% of competitive advantage is influenced by factors outside the current model, the company can further expand its strategy by exploring pricing competitiveness, service quality improvements, distribution channel expansion, and continuous product innovation while remaining aligned with regulatory developments in the herbal industry. By doing so, Haseda can secure a more resilient and enduring competitive position in Medan and the broader national market.

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