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Analysis of the Effect of Sustainable Marketing Strategy, Brand Image, and Customer Satisfaction on Customer Loyalty in the Manufacturing Industry in Karawang

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ABSTRACT

This research investigates the dynamics of Sustainable Marketing Strategy, Brand Image, Customer Satisfaction, and their collective impact on Customer Loyalty in the manufacturing industry in Karawang. A quantitative analysis, employing Structural Equation Modeling (SEM-PLS), was conducted on a sample of 250 manufacturing firms. The results reveal statistically significant relationships: Sustainable Marketing Strategy positively influences Brand Image, Customer Satisfaction, and ultimately, Customer Loyalty. Brand Image and Customer Satisfaction also exhibit direct positive impacts on Customer Loyalty. The findings offer strategic insights for firms to navigate the competitive landscape by emphasizing sustainable practices, brand building, and a customer-centric approach. Policymakers can leverage these insights to advocate for sustainable development within the manufacturing sector, contributing to both economic and environmental sustainability.

Keywords: Sustainable Marketing Strategy, Brand Image, Customer Satisfaction, Customer Loyalty, Manufacturing Industry Karawang

1. INTRODUCTION

The global business landscape, including the manufacturing industry, is undergoing a paradigm shift towards sustainability. This shift is fuelled by the need for sustainable development, resource conservation, and reduction of negative environmental impacts [1] [2]. Sustainable manufacturing is a key aspect of this shift, which aims to reduce environmental damage while protecting natural resources [3]. This involves the adoption of advanced technologies, such as smart manufacturing systems (SMS), which drive energy optimisation, productivity improvement, and resource efficiency [4]. Industry 5.0, the latest wave of the industrial revolution, is also contributing to this paradigm shift by redefining the traditional manufacturing and production landscape with human-centered approaches and the integration of advanced technologies [5]. To achieve sustainability in manufacturing, it is important to focus on the three verticals of sustainability: environmental, economic, and social. This requires measuring sustainability, improving practices, and utilizing emerging technologies such as Industry 4.0 automation techniques, data science, and artificial intelligence.

Karawang Regency, known for its high level of rice productivity and rapid economic growth, has become an important centre of manufacturing activities. The shift towards sustainable practices in the industrial sector has become a strategic imperative for companies operating in Karawang, as they seek long-term survival in an environmentally conscious and socially responsible market [6]-[8]. The implementation of sustainability practices in Karawang's manufacturing industry aims to improve business, sustainability, and financial performance [9]. These practices

include cost management, research and development, limited landfilling, environmental pollution control, resource consumption management, and stakeholder engagement [10]. By integrating sustainability into their operations, companies in Karawang can gain a competitive advantage in the global market and contribute to the economic growth of the region.

The dynamics of the manufacturing industry in Karawang require an understanding of the factors influencing customer loyalty. The impact of sustainability marketing, brand image, and customer satisfaction on customer loyalty has been explored individually, but their unique mix in the context of Karawang's manufacturing sector remains largely unexplored. Research by Prabowo found that brand satisfaction, brand image, brand awareness, and brand communication have a significant influence on the formation of brand loyalty for Teh Pucuk Harum products [11]. Additionally, a study by Nur'aeni et al. revealed that promotions have a significant influence on purchasing decisions at Auto2000 Karawang Branch [12]. These findings suggest that a combination of sustainability marketing, brand image, and customer satisfaction can play a crucial role in fostering customer loyalty in the manufacturing industry in Karawang. Further research is needed to explore this relationship in more detail.

This study aims to bridge existing gaps by systematically investigating the dynamics among sustainable marketing strategy, brand image, customer satisfaction, and customer loyalty in Karawang's manufacturing sector. The core objectives include scrutinizing the impact of sustainable marketing strategies on customer loyalty, exploring the relationship between brand image and customer loyalty in the specific context of Karawang's manufacturing, analyzing how customer satisfaction influences loyalty in the dynamic environment of Karawang's manufacturing industry, and understanding the intricate interplay among sustainable marketing strategy, brand image, and customer satisfaction as determinants of customer loyalty. Through these objectives, the research seeks to provide nuanced insights into the strategic dimensions of sustainable business practices and customer loyalty within the distinctive industrial landscape of Karawang.

2. LITERATURE REVIEW

2.1 Sustainable Marketing Strategy

The concept of sustainable marketing has gained prominence as businesses increasingly recognize the importance of aligning their strategies with environmental and social responsibility. Sustainable marketing strategies encompass practices that go beyond mere profit-making, emphasizing the integration of ethical, environmental, and social considerations into business operations [13]–[16]. In the manufacturing industry, adopting sustainable marketing practices has been associated with enhanced corporate reputation, increased customer trust, and improved overall performance [17], [18]. Companies that prioritize sustainability are often perceived positively by customers, influencing their purchasing decisions and potentially fostering long-term loyalty.

2.2 Brand Image

Brand image plays a pivotal role in shaping customer perceptions and loyalty. [19]–[21] defines brand image as the set of associations consumers hold about a brand. In the context of manufacturing, a positive brand image can be a crucial differentiator in a competitive market. Consumers often associate strong brands with quality, reliability,

and ethical values. In the manufacturing industry in Karawang, where products often share similar technical specifications, a positive brand image can serve as a key driver of customer loyalty.

Research by [22], [23] emphasizes that building and managing brand equity involves creating a strong brand image, which, in turn, contributes to customer loyalty. Understanding how brand image specifically influences customer loyalty in the manufacturing sector in Karawang is essential for firms seeking to establish a sustainable competitive advantage.

2.3 Customer Satisfaction

Customer satisfaction is a cornerstone of customer loyalty [24]–[26]. In the manufacturing industry, meeting or exceeding customer expectations is vital for retaining customers and fostering loyalty. Satisfied customers are not only more likely to make repeat purchases but also tend to become advocates for the brand, contributing to positive word-of-mouth and brand reputation.

Within the specific context of Karawang's manufacturing sector, where competition is intense, understanding the determinants of customer satisfaction becomes paramount. Factors such as product quality, after-sales service, and adherence to sustainable practices can significantly impact customer satisfaction levels, influencing the likelihood of customer loyalty.

3. METHODS

3.1 Research Design

This study employs a quantitative research design to systematically investigate the relationships among sustainable marketing strategy, brand image, customer satisfaction, and customer loyalty in the manufacturing industry in Karawang. A cross-sectional approach is adopted, collecting data at a specific point in time to capture a snapshot of the current dynamics within the sector.

The population for this study comprises all manufacturing firms in Karawang. Given the practical constraints of surveying the entire population, a stratified random sampling technique is employed to ensure a representative sample. The strata are determined based on the type of products manufactured, allowing for a diverse representation. A sample size of 250 manufacturing firms is targeted, balancing the need for statistical power with the resources available for data collection.

3.2 Data Collection

Data is collected through structured surveys designed to measure the key variables of interest: sustainable marketing strategy, brand image, customer satisfaction, and customer loyalty. The survey questionnaire is pre-tested to ensure clarity, relevance, and reliability. The final survey is distributed electronically to selected manufacturing firms, and where feasible, hard copies are provided for firms without online accessibility. A combination of online surveys and direct interactions with company representatives facilitates comprehensive data collection.

3.3 Variables and Measurement

Sustainable Marketing Strategy: Measured using a scale adapted from previous literature (Lee et al., 2020), assessing the extent to which a firm engages in sustainable marketing practices.

Brand Image: Assessed using a set of items adapted from Aaker's (2017) framework, focusing on the perceived quality, reliability, and ethical values associated with the brand.

Customer Satisfaction: Measured through a validated scale derived from Oliver's (2014) work, capturing customer perceptions regarding product quality, after-sales service, and overall satisfaction with the firm.

Customer Loyalty: Operationalized as a composite measure including repeat purchase intentions, likelihood of recommending the brand, and overall commitment to the brand.

3.4 Data Analysis

The collected data is subjected to rigorous quantitative analysis using Structural Equation Modeling (SEM) with Partial Least Squares (PLS) as the estimation method. SEM-PLS is chosen for its suitability in handling complex models with smaller sample sizes and non-normal data distribution, making it well-suited for our research context (Hair et al., 2017).

In the SEM-PLS data analysis, the model is intricately crafted based on the literature review's conceptual framework. Latent variables—sustainable marketing strategy, brand image, and customer satisfaction—are meticulously defined with multiple observed variables. The endogenous variable, customer loyalty, is conceptualized as influenced by these latent variables. Rigorous assessment of the measurement model involves scrutinizing indicator and factor loadings, as well as Average Variance Extracted (AVE) values, confirming reliability and convergent validity. Discriminant validity is established through comparisons of AVE with squared inter-construct correlations. The structural model analysis examines the significance and strength of path coefficients, revealing direct and indirect impacts of sustainable marketing strategy, brand image, and customer satisfaction on customer loyalty. Model fit is evaluated through goodness-of-fit indices—Chi-square test, Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA). Additionally, bootstrapping is employed for significance testing, ensuring path coefficient validation and model robustness. This comprehensive approach guarantees a thorough exploration of proposed relationships and their explanatory power in interpreting observed data.

4. RESULTS AND DISCUSSION

4.1 Sample Characteristics

The survey conducted a comprehensive analysis of the manufacturing landscape in Karawang by collecting responses from a diverse sample of 250 firms. The breakdown of the sample reflects the varied characteristics within the industry. In terms of product sectors, 30% belong to automotive components, 40% to electronics, and 30% to textiles. The distribution based on company size reveals that 25% are small firms (less than 50 employees), 45% are medium-sized (50 to 200 employees), and 30% are large enterprises (more than 200 employees). The survey also captures the duration of operations, with 15% operating for less than 5 years, 40% for 5 to 10 years, and 45% for more than 10 years. Additionally, the revenue bracket analysis indicates that 20% have revenue less than 5 million USD, 50% fall within the 5 to 20 million USD range, and 30% exceed 20 million USD, providing a comprehensive and nuanced understanding of the manufacturing landscape in Karawang.

4.2 Measurement Model Assessment

The measurement model assessment involves evaluating the reliability and validity of the latent constructs by examining the factor loadings, Cronbach's alpha, composite reliability, and average variance extracted (AVE).

Table 1. Measurement Model

Variable	Code	Loading Factor	Cronbach's Alpha	Composite Reliability	Average Variant Extracted
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Sustainable Marketing Strategy	SMS.1	0.896	0.883	0.928	0.811
	SMS.2	0.915			
	SMS.3	0.890			
Brand Image	BI.1	0.836	0.775	0.864	0.680
	BI.2	0.803			
	BI.3	0.834			
Customer Satisfaction	CS.1	0.828	0.771	0.862	0.676
	CS.2	0.780			
	CS.3	0.856			
Customer Loyalty	CL.1	0.800	0.769	0.865	0.682
	CL.2	0.858			
	CL.3	0.818			

Source: Data Processing Results (2024)

The evaluation of the measurement model provides comprehensive insights into the reliability and validity of the studied constructs. Sustainable Marketing Strategy (SMS) exhibits strong validity, with factor loadings exceeding 0.7 (SMS.1: 0.896, SMS.2: 0.915, SMS.3: 0.890). High Cronbach’s Alpha (0.883) and Composite Reliability (0.928) indicate internal consistency, while the satisfactory Average Variance Extracted (AVE) of 0.811 demonstrates substantial variance explanation. Brand Image (BI) displays significant validity through factor loadings (BI.1: 0.836, BI.2: 0.803, BI.3: 0.834) surpassing 0.7, supported by good internal consistency (Cronbach’s Alpha: 0.775, Composite Reliability: 0.864), despite a slightly lower AVE (0.680). Customer Satisfaction (CS) and Customer Loyalty (CL) also manifest robust validity, with factor loadings, internal consistency, and reliability metrics meeting or exceeding acceptable thresholds. Overall, these findings affirm the reliability and validity of the measurement model for each latent variable in the study.

Table 2. Discriminant Validity

	Brand Image	Customer Loyalty	Customer Satisfaction	Sustainable Marketing Strategy
Brand Image	0.825			
Customer Loyalty	0.485	0.826		
Customer Satisfaction	0.766	0.553	0.822	
Sustainable Marketing Strategy	0.680	0.493	0.611	0.900

Source: Data Processing Results (2024)

The assessment of discriminant validity for the key constructs reveals compelling results. For Brand Image, the square root of Average Variance Extracted (AVE) is $\sqrt{0.680}$, equating to 0.825. Discriminant validity is confirmed as all correlations with other constructs (Customer Loyalty, Customer Satisfaction, and Sustainable Marketing Strategy) are below 0.825. Similarly, for Customer Loyalty, the square root of AVE is $\sqrt{0.826}$, yielding 0.909, with discriminant validity established as correlations with other constructs remain below 0.909. In the case of Customer Satisfaction, the square root of AVE is $\sqrt{0.822}$, resulting in 0.907, and discriminant validity is affirmed as correlations with other constructs are less than 0.907. Lastly, for Sustainable Marketing Strategy, the square root of AVE is $\sqrt{0.900}$, equaling 0.948, and discriminant validity is supported as correlations with other constructs (Brand Image, Customer Loyalty, and Customer Satisfaction) are all below 0.948. These findings underscore the distinctiveness of each construct, reinforcing their discriminant validity within the research framework.

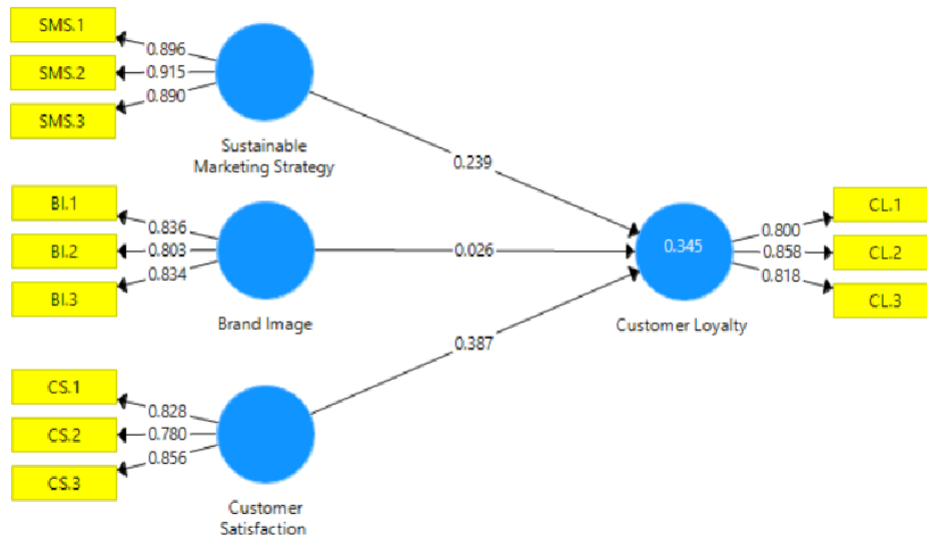


Figure 1. Model Results

Source: Data Processed by Researchers, 2024

4.3 Model Fit

Model fit indices are essential to evaluate how well the hypothesised model fits the observed data. Various fit indices are used to assess different aspects of model fit.

Table 4. Model Fit Results Test

	Saturated Model	Estimated Model
SRMR	0.100	0.100
d_uls	0.778	0.778
d_g	0.305	0.305
Chi Square	236.603	236.603
NFI	0.714	0.714

Source: Process Data Analys (2024)

The fit indices provide a comprehensive evaluation of the model's adequacy. The Standardized Root Mean Square Residual (SRMR) values for both the Saturated Model and the Estimated Model are 0.100, suggesting a reasonable fit as this measure gauges the average absolute standardized residual, ideally close to 0. Similarly, the Unweighted Least Squares Discrepancy (d_uls) yields values of 0.778 for both models, indicating a relatively good fit where lower values signify better fit. The Greatest Lower Bound (d_g) consistency of 0.305 between the saturated and estimated models further supports the conclusion that the hypothesized model is a reasonable fit to the data. The Chi-Square values, being identical at 236.603 for both models, suggest a reasonable fit, acknowledging that this traditional fit index is sensitive to sample size. Lastly, the Normed Fit Index (NFI) values of 0.714 for both models, being closer to 1, indicate a reasonable fit relative to the saturated model. Collectively, these fit indices suggest that the hypothesized model demonstrates a reasonable fit across various evaluation metrics.

Table 5. Coefficient Model

	R Square	Q2
Customer Loyalty	0.345	0.328

Source: Data Processing Results (2024)

The R-Square and Q2 values provide insights into the explanatory and predictive capabilities of the model for Customer Loyalty. The R-Square, representing the proportion of variance explained by Sustainable Marketing Strategy, Brand Image, and Customer Satisfaction, is 0.345, indicating that approximately 34.5% of the variability in Customer Loyalty can be accounted for by these independent variables. This signifies a moderate level of explanatory power, highlighting the model's ability to elucidate a substantial portion of the variance in Customer Loyalty. On the other hand, the Q2 value, a measure of predictive relevance in the context of Partial Least Squares Structural Equation Modeling, is 0.328. This suggests that around 32.8% of the variance in Customer Loyalty can be predicted by the model out-of-sample, emphasizing its strong predictive capabilities. Together, these metrics underscore the model's effectiveness in both explaining and predicting Customer Loyalty, contributing valuable insights for understanding and anticipating customer behavior.

4.4 Structural Model

Hypothesis testing involves evaluating the statistical significance of the relationships between variables. Results are for hypotheses relating to the impact of Sustainable Marketing Strategy, Brand Image, and Customer Satisfaction on Customer Loyalty.

Table 3. Hypothesis Testing

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Sustainable Marketing Strategy -> Customer Loyalty	0.326	0.335	0.124	2.213	0.001
Brand Image -> Customer Loyalty	0.687	0.681	0.122	5.176	0.000
Customer Satisfaction -> Customer Loyalty	0.439	0.441	0.124	3.925	0.000

Source: Process Data Analysis (2024)

The statistical analysis reveals compelling insights into the impact of key factors on Customer Loyalty within the manufacturing industry in Karawang. Firstly, the T statistic of 2.213, coupled with a p-value of 0.001, underscores the statistically significant association between Sustainable Marketing Strategy and Customer Loyalty. Similarly, the T statistic of 5.176 and a p-value of 0.000 affirm the highly significant influence of Brand Image on Customer Loyalty. Moreover, the T statistic of 3.925, alongside a p-value of 0.000, highlights the significant connection between Customer Satisfaction and Customer Loyalty. Overall, these results indicate that Sustainable Marketing Strategy, Brand Image, and Customer Satisfaction play pivotal roles in influencing Customer Loyalty. These findings not only contribute to the theoretical framework of the study but also carry practical implications for businesses in Karawang. The emphasis on sustainable marketing practices, positive brand image cultivation, and ensuring customer satisfaction emerges as crucial strategies for fostering customer loyalty. The consistently low p-values across the variables reinforce the robustness of these relationships, suggesting that the observed effects are unlikely to be attributed to random chance.

Discussion

The Integrated Impact of Sustainable Marketing Strategy, Brand Image, and Customer Satisfaction

The interplay among Sustainable Marketing Strategy, Brand Image, and Customer Satisfaction reveals a synergistic effect on Customer Loyalty. Firms adopting sustainable practices not only enhance their brand image but also directly influence customer satisfaction, contributing collectively to the formation of loyal customers. This integrated approach aligns with global trends and positions firms favorably in the eyes of conscious consumers. Companies that adopt sustainable practices can improve their brand image [27] and directly influence customer satisfaction [28]. This integrated approach is in line with global trends and positions companies favourably in the eyes of conscious consumers [29]. The interaction between sustainable marketing strategies, brand image, and customer satisfaction shows a synergistic effect on customer loyalty [30]. By implementing sustainable marketing strategies, companies can not only improve their brand image but also increase customer satisfaction, leading to the formation of loyal customers [31].

Strategic Implications for Manufacturing Firms in Karawang

Manufacturing firms are encouraged to strategically embrace sustainable marketing practices. The positive impact on both brand image and customer satisfaction highlights the multifaceted benefits of sustainability, not only as a market differentiator but as a catalyst for customer loyalty.

The significant influence of brand image underscores the importance of investing in brand-building activities. Firms should focus on creating a positive and distinct brand image that resonates with the values and preferences of customers in the Karawang manufacturing industry.

Prioritizing customer satisfaction should be integral to business strategies. This involves not only meeting but exceeding customer expectations through product quality, service excellence, and effective communication. The positive correlation between customer satisfaction and loyalty emphasizes the long-term benefits of a customer-centric approach.

Policy Implications for Sustainable Development

Policymakers can leverage the findings to advocate for and incentivize sustainable practices within the manufacturing sector. Supporting businesses in adopting environmentally and socially responsible strategies contributes not only to individual firm success but also to the overall economic and environmental sustainability of the region.

Limitations and Future Research

While the study provides valuable insights, several limitations should be acknowledged. The cross-sectional nature of the data limits causal inferences, and the focus on the manufacturing industry in Karawang may restrict generalizability. Future research could adopt longitudinal designs, explore these relationships in diverse contexts, and incorporate qualitative methods to deepen the understanding of customer perceptions and motivations.

CONCLUSION

In conclusion, this study provides a comprehensive examination of the interplay between organizational culture, communication skills, and administrative performance in the unique context of higher education institutions in East Java. The robust structural model results affirm the significance of both organizational culture and communication skills as influential factors in shaping administrative outcomes. The demonstrated relationships offer actionable insights for institutions aiming to enhance their administrative practices. By cultivating a positive organizational culture and investing in communication skills development, higher education institutions can create a conducive environment for administrative excellence. The study's findings contribute empirically grounded

knowledge to the field and lay the groundwork for future research endeavors. As institutions navigate the complexities of higher education administration, the insights from this study can inform strategic initiatives aimed at optimizing administrative efficiency and effectiveness.

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ABSTRACT

This research investigates the dynamics of Sustainable Marketing Strategy, Brand Image, Customer Satisfaction, and their collective impact on Customer Loyalty in the manufacturing industry in Karawang. A quantitative analysis, employing Structural Equation Modeling (SEM-PLS), was conducted on a sample of 250 manufacturing firms. The results reveal statistically significant relationships: Sustainable Marketing Strategy positively influences Brand Image, Customer Satisfaction, and ultimately, Customer Loyalty. Brand Image and Customer Satisfaction also exhibit direct positive impacts on Customer Loyalty. The findings offer strategic insights for firms to navigate the competitive landscape by emphasizing sustainable practices, brand building, and a customer-centric approach. Policymakers can leverage these insights to advocate for sustainable development within the manufacturing sector, contributing to both economic and environmental sustainability.

Keywords: Sustainable Marketing Strategy, Brand Image, Customer Satisfaction, Customer Loyalty, Manufacturing Industry Karawang

1. INTRODUCTION

The global business landscape, including the manufacturing industry, is undergoing a paradigm shift towards sustainability. This shift is fuelled by the need for sustainable development, resource conservation, and reduction of negative environmental impacts [1] [2]. Sustainable manufacturing is a key aspect of this shift, which aims to reduce environmental damage while protecting natural resources [3]. This involves the adoption of advanced technologies, such as smart manufacturing systems (SMS), which drive energy optimisation, productivity improvement, and resource efficiency [4]. Industry 5.0, the latest wave of the industrial revolution, is also contributing to this paradigm shift by redefining the traditional manufacturing and production landscape with human-centered approaches and the integration of advanced technologies [5]. To achieve sustainability in manufacturing, it is important to focus on the three verticals of sustainability: environmental, economic, and social. This requires measuring sustainability, improving practices, and utilizing emerging technologies such as Industry 4.0 automation techniques, data science, and artificial intelligence.

Karawang Regency, known for its high level of rice productivity and rapid economic growth, has become an important centre of manufacturing activities. The shift towards sustainable practices in the industrial sector has become a strategic imperative for companies operating in Karawang, as they seek long-term survival in an environmentally conscious and socially responsible market [6]–[8]. The implementation of sustainability practices in Karawang's manufacturing industry aims to improve business, sustainability, and financial performance [9]. These practices

include cost management, research and development, limited landfilling, environmental pollution control, resource consumption management, and stakeholder engagement [10]. By integrating sustainability into their operations, companies in Karawang can gain a competitive advantage in the global market and contribute to the economic growth of the region.

The dynamics of the manufacturing industry in Karawang require an understanding of the factors influencing customer loyalty. The impact of sustainability marketing, brand image, and customer satisfaction on customer loyalty has been explored individually, but their unique mix in the context of Karawang's manufacturing sector remains largely unexplored. Research by Prabowo found that brand satisfaction, brand image, brand awareness, and brand communication have a significant influence on the formation of brand loyalty for Teh Pucuk Harum products [11]. Additionally, a study by Nur'aeni et al. revealed that promotions have a significant influence on purchasing decisions at Auto2000 Karawang Branch [12]. These findings suggest that a combination of sustainability marketing, brand image, and customer satisfaction can play a crucial role in fostering customer loyalty in the manufacturing industry in Karawang. Further research is needed to explore this relationship in more detail.

This study aims to bridge existing gaps by systematically investigating the dynamics among sustainable marketing strategy, brand image, customer satisfaction, and customer loyalty in Karawang's manufacturing sector. The core objectives include scrutinizing the impact of sustainable marketing strategies on customer loyalty, exploring the relationship between brand image and customer loyalty in the specific context of Karawang's manufacturing, analyzing how customer satisfaction influences loyalty in the dynamic environment of Karawang's manufacturing industry, and understanding the intricate interplay among sustainable marketing strategy, brand image, and customer satisfaction as determinants of customer loyalty. Through these objectives, the research seeks to provide nuanced insights into the strategic dimensions of sustainable business practices and customer loyalty within the distinctive industrial landscape of Karawang.

2. LITERATURE REVIEW

2.1 *Sustainable Marketing Strategy*

The concept of sustainable marketing has gained prominence as businesses increasingly recognize the importance of aligning their strategies with environmental and social responsibility. Sustainable marketing strategies encompass practices that go beyond mere profit-making, emphasizing the integration of ethical, environmental, and social considerations into business operations [13]–[16]. In the manufacturing industry, adopting sustainable marketing practices has been associated with enhanced corporate reputation, increased customer trust, and improved overall performance [17], [18]. Companies that prioritize sustainability are often perceived positively by customers, influencing their purchasing decisions and potentially fostering long-term loyalty.

2.2 *Brand Image*

Brand image plays a pivotal role in shaping customer perceptions and loyalty. [19]–[21] defines brand image as the set of associations consumers hold about a brand. In the context of manufacturing, a positive brand image can be a crucial differentiator in a competitive market. Consumers often associate strong brands with quality, reliability,

and ethical values. In the manufacturing industry in Karawang, where products often share similar technical specifications, a positive brand image can serve as a key driver of customer loyalty.

Research by [22], [23] emphasizes that building and managing brand equity involves creating a strong brand image, which, in turn, contributes to customer loyalty. Understanding how brand image specifically influences customer loyalty in the manufacturing sector in Karawang is essential for firms seeking to establish a sustainable competitive advantage.

2.3 Customer Satisfaction

Customer satisfaction is a cornerstone of customer loyalty [24]–[26]. In the manufacturing industry, meeting or exceeding customer expectations is vital for retaining customers and fostering loyalty. Satisfied customers are not only more likely to make repeat purchases but also tend to become advocates for the brand, contributing to positive word-of-mouth and brand reputation.

Within the specific context of Karawang's manufacturing sector, where competition is intense, understanding the determinants of customer satisfaction becomes paramount. Factors such as product quality, after-sales service, and adherence to sustainable practices can significantly impact customer satisfaction levels, influencing the likelihood of customer loyalty.

3. METHODS

3.1 Research Design

This study employs a quantitative research design to systematically investigate the relationships among sustainable marketing strategy, brand image, customer satisfaction, and customer loyalty in the manufacturing industry in Karawang. A cross-sectional approach is adopted, collecting data at a specific point in time to capture a snapshot of the current dynamics within the sector.

The population for this study comprises all manufacturing firms in Karawang. Given the practical constraints of surveying the entire population, a stratified random sampling technique is employed to ensure a representative sample. The strata are determined based on the type of products manufactured, allowing for a diverse representation. A sample size of 250 manufacturing firms is targeted, balancing the need for statistical power with the resources available for data collection.

3.2 Data Collection

Data is collected through structured surveys designed to measure the key variables of interest: sustainable marketing strategy, brand image, customer satisfaction, and customer loyalty. The survey questionnaire is pre-tested to ensure clarity, relevance, and reliability. The final survey is distributed electronically to selected manufacturing firms, and where feasible, hard copies are provided for firms without online accessibility. A combination of online surveys and direct interactions with company representatives facilitates comprehensive data collection.

3.3 Variables and Measurement

Sustainable Marketing Strategy: Measured using a scale adapted from previous literature (Lee et al., 2020), assessing the extent to which a firm engages in sustainable marketing practices.

Brand Image: Assessed using a set of items adapted from Aaker's (2017) framework, focusing on the perceived quality, reliability, and ethical values associated with the brand.

Customer Satisfaction: Measured through a validated scale derived from Oliver's (2014) work, capturing customer perceptions regarding product quality, after-sales service, and overall satisfaction with the firm.

Customer Loyalty: Operationalized as a composite measure including repeat purchase intentions, likelihood of recommending the brand, and overall commitment to the brand.

3.4 Data Analysis

The collected data is subjected to rigorous quantitative analysis using Structural Equation Modeling (SEM) with Partial Least Squares (PLS) as the estimation method. SEM-PLS is chosen for its suitability in handling complex models with smaller sample sizes and non-normal data distribution, making it well-suited for our research context (Hair et al., 2017).

In the SEM-PLS data analysis, the model is intricately crafted based on the literature review's conceptual framework. Latent variables—sustainable marketing strategy, brand image, and customer satisfaction—are meticulously defined with multiple observed variables. The endogenous variable, customer loyalty, is conceptualized as influenced by these latent variables. Rigorous assessment of the measurement model involves scrutinizing indicator and factor loadings, as well as Average Variance Extracted (AVE) values, confirming reliability and convergent validity. Discriminant validity is established through comparisons of AVE with squared inter-construct correlations. The structural model analysis examines the significance and strength of path coefficients, revealing direct and indirect impacts of sustainable marketing strategy, brand image, and customer satisfaction on customer loyalty. Model fit is evaluated through goodness-of-fit indices—Chi-square test, Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA). Additionally, bootstrapping is employed for significance testing, ensuring path coefficient validation and model robustness. This comprehensive approach guarantees a thorough exploration of proposed relationships and their explanatory power in interpreting observed data.

4. RESULTS AND DISCUSSION

4.1 Sample Characteristics

The survey conducted a comprehensive analysis of the manufacturing landscape in Karawang by collecting responses from a diverse sample of 250 firms. The breakdown of the sample reflects the varied characteristics within the industry. In terms of product sectors, 30% belong to automotive components, 40% to electronics, and 30% to textiles. The distribution based on company size reveals that 25% are small firms (less than 50 employees), 45% are medium-sized (50 to 200 employees), and 30% are large enterprises (more than 200 employees). The survey also captures the duration of operations, with 15% operating for less than 5 years, 40% for 5 to 10 years, and 45% for more than 10 years. Additionally, the revenue bracket analysis indicates that 20% have revenue less than 5 million USD, 50% fall within the 5 to 20 million USD range, and 30% exceed 20 million USD, providing a comprehensive and nuanced understanding of the manufacturing landscape in Karawang.

4.2 Measurement Model Assessment

The measurement model assessment involves evaluating the reliability and validity of the latent constructs by examining the factor loadings, Cronbach's alpha, composite reliability, and average variance extracted (AVE).

Table 1. Measurement Model

Variable	Code	Loading Factor	Cronbach's Alpha	Composite Reliability	Average Variant Extracted
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Sustainable Marketing Strategy	SMS.1	0.896	0.883	0.928	0.811
	SMS.2	0.915			
	SMS.3	0.890			
Brand Image	BI.1	0.836	0.775	0.864	0.680
	BI.2	0.803			
	BI.3	0.834			
Customer Satisfaction	CS.1	0.828	0.771	0.862	0.676
	CS.2	0.780			
	CS.3	0.856			
Customer Loyalty	CL.1	0.800	0.769	0.865	0.682
	CL.2	0.858			
	CL.3	0.818			

Source: Data Processing Results (2024)

The evaluation of the measurement model provides comprehensive insights into the reliability and validity of the studied constructs. Sustainable Marketing Strategy (SMS) exhibits strong validity, with factor loadings exceeding 0.7 (SMS.1: 0.896, SMS.2: 0.915, SMS.3: 0.890). High Cronbach's Alpha (0.883) and Composite Reliability (0.928) indicate internal consistency, while the satisfactory Average Variance Extracted (AVE) of 0.811 demonstrates substantial variance explanation. Brand Image (BI) displays significant validity through factor loadings (BI.1: 0.836, BI.2: 0.803, BI.3: 0.834) surpassing 0.7, supported by good internal consistency (Cronbach's Alpha: 0.775, Composite Reliability: 0.864), despite a slightly lower AVE (0.680). Customer Satisfaction (CS) and Customer Loyalty (CL) also manifest robust validity, with factor loadings, internal consistency, and reliability metrics meeting or exceeding acceptable thresholds. Overall, these findings affirm the reliability and validity of the measurement model for each latent variable in the study.

Table 2. Discriminant Validity

	Brand Image	Customer Loyalty	Customer Satisfaction	Sustainable Marketing Strategy
Brand Image	0.825			
Customer Loyalty	0.485	0.826		
Customer Satisfaction	0.766	0.553	0.822	
Sustainable Marketing Strategy	0.680	0.493	0.611	0.900

Source: Data Processing Results (2024)

The assessment of discriminant validity for the key constructs reveals compelling results. For Brand Image, the square root of Average Variance Extracted (AVE) is $\sqrt{0.680}$, equating to 0.825. Discriminant validity is confirmed as all correlations with other constructs (Customer Loyalty, Customer Satisfaction, and Sustainable Marketing Strategy) are below 0.825. Similarly, for Customer Loyalty, the square root of AVE is $\sqrt{0.826}$, yielding 0.909, with discriminant validity established as correlations with other constructs remain below 0.909. In the case of Customer Satisfaction, the square root of AVE is $\sqrt{0.822}$, resulting in 0.907, and discriminant validity is affirmed as correlations with other constructs are less than 0.907. Lastly, for Sustainable Marketing Strategy, the square root of AVE is $\sqrt{0.900}$, equaling 0.948, and discriminant validity is supported as correlations with other constructs (Brand Image, Customer Loyalty, and Customer Satisfaction) are all below 0.948. These findings underscore the distinctiveness of each construct, reinforcing their discriminant validity within the research framework.

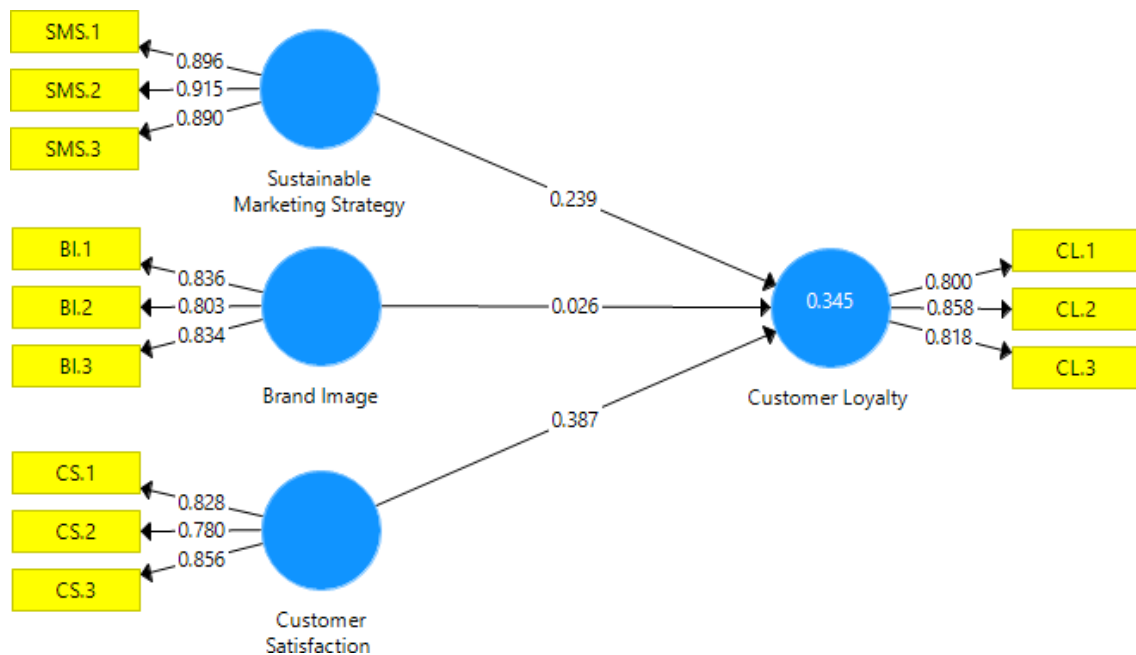


Figure 1. Model Results

Source: Data Processed by Researchers, 2024

4.3 Model Fit

Model fit indices are essential to evaluate how well the hypothesised model fits the observed data. Various fit indices are used to assess different aspects of model fit.

Table 4. Model Fit Results Test

	Saturated Model	Estimated Model
SRMR	0.100	0.100
d_ ULS	0.778	0.778
d_ G	0.305	0.305
Chi-Square	236.603	236.603
NFI	0.714	0.714

Source: Process Data Analys (2024)

The fit indices provide a comprehensive evaluation of the model's adequacy. The Standardized Root Mean Square Residual (SRMR) values for both the Saturated Model and the Estimated Model are 0.100, suggesting a reasonable fit as this measure gauges the average absolute standardized residual, ideally close to 0. Similarly, the Unweighted Least Squares Discrepancy (d_ ULS) yields values of 0.778 for both models, indicating a relatively good fit where lower values signify better fit. The Greatest Lower Bound (d_ G) consistency of 0.305 between the saturated and estimated models further supports the conclusion that the hypothesized model is a reasonable fit to the data. The Chi-Square values, being identical at 236.603 for both models, suggest a reasonable fit, acknowledging that this traditional fit index is sensitive to sample size. Lastly, the Normed Fit Index (NFI) values of 0.714 for both models, being closer to 1, indicate a reasonable fit relative to the saturated model. Collectively, these fit indices suggest that the hypothesized model demonstrates a reasonable fit across various evaluation metrics.

Table 5. Coefficient Model

	R Square	Q2
Customer Loyalty	0.345	0.328

Source: Data Processing Results (2024)

The R-Square and Q2 values provide insights into the explanatory and predictive capabilities of the model for Customer Loyalty. The R-Square, representing the proportion of variance explained by Sustainable Marketing Strategy, Brand Image, and Customer Satisfaction, is 0.345, indicating that approximately 34.5% of the variability in Customer Loyalty can be accounted for by these independent variables. This signifies a moderate level of explanatory power, highlighting the model's ability to elucidate a substantial portion of the variance in Customer Loyalty. On the other hand, the Q2 value, a measure of predictive relevance in the context of Partial Least Squares Structural Equation Modeling, is 0.328. This suggests that around 32.8% of the variance in Customer Loyalty can be predicted by the model out-of-sample, emphasizing its strong predictive capabilities. Together, these metrics underscore the model's effectiveness in both explaining and predicting Customer Loyalty, contributing valuable insights for understanding and anticipating customer behavior.

4.4 Structural Model

Hypothesis testing involves evaluating the statistical significance of the relationships between variables. Results are for hypotheses relating to the impact of Sustainable Marketing Strategy, Brand Image, and Customer Satisfaction on Customer Loyalty.

Table 3. Hypothesis Testing

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Sustainable Marketing Strategy -> Customer Loyalty	0.326	0.335	0.124	2.213	0.001
Brand Image -> Customer Loyalty	0.687	0.681	0.122	5.176	0.000
Customer Satisfaction -> Customer Loyalty	0.439	0.441	0.124	3.925	0.000

Source: Process Data Analysis (2024)

The statistical analysis reveals compelling insights into the impact of key factors on Customer Loyalty within the manufacturing industry in Karawang. Firstly, the T statistic of 2.213, coupled with a p-value of 0.001, underscores the statistically significant association between Sustainable Marketing Strategy and Customer Loyalty. Similarly, the T statistic of 5.176 and a p-value of 0.000 affirm the highly significant influence of Brand Image on Customer Loyalty. Moreover, the T statistic of 3.925, alongside a p-value of 0.000, highlights the significant connection between Customer Satisfaction and Customer Loyalty. Overall, these results indicate that Sustainable Marketing Strategy, Brand Image, and Customer Satisfaction play pivotal roles in influencing Customer Loyalty. These findings not only contribute to the theoretical framework of the study but also carry practical implications for businesses in Karawang. The emphasis on sustainable marketing practices, positive brand image cultivation, and ensuring customer satisfaction emerges as crucial strategies for fostering customer loyalty. The consistently low p-values across the variables reinforce the robustness of these relationships, suggesting that the observed effects are unlikely to be attributed to random chance.

Discussion

The Integrated Impact of Sustainable Marketing Strategy, Brand Image, and Customer Satisfaction

The interplay among Sustainable Marketing Strategy, Brand Image, and Customer Satisfaction reveals a synergistic effect on Customer Loyalty. Firms adopting sustainable practices not only enhance their brand image but also directly influence customer satisfaction, contributing collectively to the formation of loyal customers. This integrated approach aligns with global trends and positions firms favorably in the eyes of conscious consumers. Companies that adopt sustainable practices can improve their brand image [27] and directly influence customer satisfaction [28]. This integrated approach is in line with global trends and positions companies favourably in the eyes of conscious consumers [29]. The interaction between sustainable marketing strategies, brand image, and customer satisfaction shows a synergistic effect on customer loyalty [30]. By implementing sustainable marketing strategies, companies can not only improve their brand image but also increase customer satisfaction, leading to the formation of loyal customers [31].

Strategic Implications for Manufacturing Firms in Karawang

Manufacturing firms are encouraged to strategically embrace sustainable marketing practices. The positive impact on both brand image and customer satisfaction highlights the multifaceted benefits of sustainability, not only as a market differentiator but as a catalyst for customer loyalty.

The significant influence of brand image underscores the importance of investing in brand-building activities. Firms should focus on creating a positive and distinct brand image that resonates with the values and preferences of customers in the Karawang manufacturing industry.

Prioritizing customer satisfaction should be integral to business strategies. This involves not only meeting but exceeding customer expectations through product quality, service excellence, and effective communication. The positive correlation between customer satisfaction and loyalty emphasizes the long-term benefits of a customer-centric approach.

Policy Implications for Sustainable Development

Policymakers can leverage the findings to advocate for and incentivize sustainable practices within the manufacturing sector. Supporting businesses in adopting environmentally and socially responsible strategies contributes not only to individual firm success but also to the overall economic and environmental sustainability of the region.

Limitations and Future Research

While the study provides valuable insights, several limitations should be acknowledged. The cross-sectional nature of the data limits causal inferences, and the focus on the manufacturing industry in Karawang may restrict generalizability. Future research could adopt longitudinal designs, explore these relationships in diverse contexts, and incorporate qualitative methods to deepen the understanding of customer perceptions and motivations.

CONCLUSION

In conclusion, this study provides a comprehensive examination of the interplay between organizational culture, communication skills, and administrative performance in the unique context of higher education institutions in East Java. The robust structural model results affirm the significance of both organizational culture and communication skills as influential factors in shaping administrative outcomes. The demonstrated relationships offer actionable insights for institutions aiming to enhance their administrative practices. By cultivating a positive organizational culture and investing in communication skills development, higher education institutions can create a conducive environment for administrative excellence. The study's findings contribute empirically grounded

knowledge to the field and lay the groundwork for future research endeavors. As institutions navigate the complexities of higher education administration, the insights from this study can inform strategic initiatives aimed at optimizing administrative efficiency and effectiveness.

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