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Digital Entrepreneurial Marketing and Industrial Transformation: Evidence from Food and Beverage Small and Medium Industries in Indonesia toward Sustainable Development Goals (SDGs)

Anny Nurbasari[1], Amir Machmud[2,], Agus Aribowo[1], Suci Megawati[3]*

[1]Universitas Kristen Maranatha, Indonesia
[2]Universitas Pendidikan Indonesia, Indonesia
[3]Universitas Negeri Surabaya, Indonesia
*Correspondence: E-mail: amir@upi.edu

ABSTRACT

This study investigates the impact of digital entrepreneurial marketing on industrial transformation and marketing performance among food and beverage small and medium enterprises (SMEs) in Indonesia. Within the framework of the Sustainable Development Goals (SDGs), particularly SDG 8 (Decent Work and Economic Growth) and SDG 9 (Industry, Innovation, and Infrastructure), the research highlights how SMEs in the food and beverage industry adopt digital technologies to strengthen competitiveness and sustainable growth. A quantitative approach was employed, using Partial Least Squares Structural Equation Modeling (PLS-SEM) on data collected from 102 SMEs in West Java Province. The results revealed that digital entrepreneurial marketing significantly improved marketing performance, although many SMEs faced challenges in fully implementing technology due to resource and capability constraints. The findings emphasize the importance of industrial upgrading, cluster-based development, and sustainability practices, providing insights for policymakers and industry stakeholders to align digital strategies with national industrial policies and global development objectives.

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1. INTRODUCTION

Marketing performance in the digital era has become a critical determinant of organizational success, particularly for Small and Medium Enterprises (SMEs) that play a central role in sustainable economic development. As emphasized in the United Nations Sustainable Development Goals (SDGs), especially SDG 8 (Decent Work and Economic Growth) and SDG 9 (Industry, Innovation, and Infrastructure), SMEs are expected to contribute to inclusive growth through innovation and industrial transformation. In Indonesia, SMEs represent 99.9% of all businesses and employ more than 89% of the workforce, with the food and beverage industry accounting for nearly 45% of the total sector. Despite this dominant position, SMEs continue to face challenges in achieving optimal marketing performance, including limited productivity, weak competitiveness, and difficulties in adapting to rapid technological change.

The food and beverage industry is particularly strategic within Indonesia's industrial structure. It not only ensures food security but also drives export potential and industrial diversification. However, competition in this sector is intense, and many SMEs struggle to improve profitability, market share, and sales growth. Research suggests that entrepreneurial marketing offers SMEs an alternative strategy to respond to these challenges by exploiting opportunities, innovating in customer engagement, and building sustainable value creation [1,2]. Entrepreneurial marketing is especially relevant in industries that are highly competitive and resource-constrained, as it enables firms to act proactively, take calculated risks, and develop customer-oriented innovations [3,4].

In the context of Industry 4.0, the integration of digital technologies has transformed marketing practices, providing SMEs with new tools to compete with larger enterprises. Social media platforms, e-commerce systems, and data analytics allow SMEs to strengthen market proximity, co-create value with partners, and enhance customer loyalty at relatively low costs [5,6]. For the food and beverage industry, digital entrepreneurial marketing is increasingly viewed as a mechanism to achieve industrial upgrading and sustainable competitiveness. Moreover, digital adoption contributes directly to broader SDG objectives by fostering innovation, promoting responsible production, and expanding inclusive participation in global markets.

Despite these opportunities, empirical evidence on how digital entrepreneurial marketing contributes to industrial transformation and marketing performance in Indonesian SMEs remains limited. Previous studies have often focused on financial performance or innovation capacity without fully integrating sustainability and industrial perspectives. This research addresses this gap by examining the relationship between digital entrepreneurial marketing and marketing performance in food and beverage SMEs, while situating the analysis within the framework of industrial development and the Sustainable Development Goals. The novelty of this study lies in its dual focus on digital transformation and industrial competitiveness, providing both theoretical insights and practical recommendations for SMEs, policymakers, and industry stakeholders.

2. LITERATURE REVIEW

In recent years, the digital perspective has become central to discussions on entrepreneurial marketing in SMEs. The rapid development of technologies such as e-commerce platforms, customer relationship management (CRM) systems, big data analytics, and social media has provided unprecedented opportunities for SMEs to reach customers,

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personalize offerings, and improve efficiency at relatively low costs. These tools enable real-time interaction with consumers, generate valuable data-driven insights, and support targeted strategies that strengthen customer loyalty and lifetime value. The integration of artificial intelligence and machine learning further enhances marketing effectiveness by predicting consumer behavior and optimizing campaigns with greater accuracy [6]. From this perspective, digital entrepreneurial marketing is not merely a firm-level strategy but a pathway toward broader industrial development and sustainability, as it aligns business practices with the global wave of digital transformation and the SDGs.

The importance of digital transformation is particularly evident in the food and beverage industry, which represents one of the most vital components of Indonesia's economic and industrial structure. Many reports regarding food and beverages have been well-documented (**Table 1**). SMEs in this sector contribute significantly to employment generation, GDP growth, and community welfare, while also shaping industrial diversification and national competitiveness. With food and beverage SMEs comprising nearly half of the total SME population, the sector holds strategic potential for driving industrial progress. At the same time, these enterprises face growing pressure to adapt to changing consumer behavior, intensifying competition, and the demand for more sustainable business practices. Digital entrepreneurial marketing provides a viable mechanism for these SMEs to strengthen their competitiveness, expand into broader markets, and align growth strategies with sustainable development priorities.

In the era of Industry 4.0, the transformation of traditional industries into technology-driven systems has become a key industrial priority. For food and beverage SMEs, adopting digital platforms, data analytics, and e-commerce systems is no longer optional but essential to remain competitive in both domestic and international markets [5,6]. Integrating technology into entrepreneurial marketing practices ensures that SMEs contribute to SDG 9 (Industry, Innovation, and Infrastructure) by fostering innovation capacity, promoting industrial upgrading, and building resilient networks. In this way, entrepreneurial marketing evolves from an operational activity into a strategic industrial mechanism that links micro-level firm performance with macro-level industrial development.

The industrial literature further highlights the role of cluster-based development in supporting SMEs' technological and marketing capabilities. Participation in industrial clusters enables SMEs to access shared resources, engage in knowledge exchange, and innovate collaboratively with stakeholders. Such collaboration fosters industrial synergy and resilience, particularly in dynamic markets where flexibility and adaptability are essential for survival [7]. These models of cooperation resonate with SDG 17 (Partnerships for the Goals), as they illustrate how industry-level partnerships and networks can enhance competitiveness and sustainability across the sector.

In addition, sustainability considerations are reshaping strategies in the food and beverage industry. Research emphasizes that SMEs incorporating environmentally responsible practices (such as sustainable sourcing, waste reduction, and circular economy initiatives) are more likely to enhance brand reputation, build customer loyalty, and secure long-term market positions [8,9]. Such practices align directly with SDG 12 (Responsible Consumption and Production), positioning SMEs as not only economic contributors but also agents of sustainable industrial development. This dual emphasis on profitability and sustainability underscores the evolving role of SMEs in responding to both market demands and global environmental challenges.

Taken together, the literature indicates that entrepreneurial marketing in the food and beverage industry must be understood within a broader industrial and technological context.

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Digital adoption, cluster-based collaboration, and sustainable practices represent key enablers of marketing performance, industrial competitiveness, and alignment with national transformation agendas. However, existing studies often treat these dimensions in isolation, focusing either on firm-level outcomes or broad industrial trends, without integrating them into a unified framework. This research addresses this gap by examining how digital entrepreneurial marketing influences the marketing performance of food and beverage SMEs while situating the analysis within industrial transformation and the SDGs.

Table 1. Previous studies on food and beverage.

No	Title	Ref
1	The impact of flooding on dairy cattle farms: Challenges, consequences, and mitigation strategies	[10]
2	Enhancement of sensory qualities of papaya leaf extract (PLE) gummy candy	[11]
3	Nutrition and dietetics concerning diabetes mellitus: Type 1 diabetes mellitus	[12]
4	Nutrition and dietetics concerning diabetes mellitus: Type 2 diabetes mellitus	[13]
5	Nutrition and dietetics concerning diabetes mellitus: Gestational diabetes mellitus	[14]
6	Unraveling the factors behind the soaring tomato prices: A comprehensive analysis	[15]
7	Navigating rice export restrictions: The impact of India's policy on domestic and international markets	[16]
8	Health-related problems associated with women garri producers in the agricultural zone	[17]
9	Insight into assessment tools for culinary competence and nutritional knowledge for Nigerian tertiary students	[18]
10	Efforts to improve sustainable development goals (SDGs) through education on diversification of food using infographic: Animal and vegetable protein	[19]
11	Presence of intestinal parasites in cabbage (B. oleracea var. capitata) sold at public market	[20]
12	Examining the potential of sustainability marketing adoption on the performance of beverages company	[21]
13	Acceptability of Theobroma cacao as an alternative tea	[22]
14	Phytoremediation with Cucumis sativus: A bibliometric study	[23]
15	Effect of antioxidant compounds on nitrites as inhibitors of N-Nitrosamine formation: A short review	[24]
16	Correlation of metabolomics and functional foods research in 2020 to 2023: Bibliometric analysis	[25]
17	Trend analysis of eco-friendly food packaging among street vendors: A case study in Gegerkalong street, Bandung, Indonesia	[26]
18	Gender differentials in the agricultural specialization in higher education	[27]
19	Citrullus lanatus (Watermelon): Biofertilizer for eggplants	[28]
20	Food security strategy through regenerative agriculture for capacity building of farmers with "integrated nutrient management training program"	[29]
21	The influence of environmentally friendly packaging on consumer interest in implementing zero waste in the food industry to meet sustainable development goals (SDGs) needs	[30]
22	Flipbook table setup as teaching media in the food and beverage service course	[31]
23	Education on the importance of food consumed by breastfeeding mothers and exclusive breastfeeding against stunting prevention through PowerPoint media	[32]
24	Understanding biodiversity mapping of school relating to types of plant and animal species and ecological roles	[33]
25	Analysis of student's awareness of sustainable diet in reducing carbon footprint to support Sustainable Development Goals (SDGs) 2030	[34]
26	Knowledge of students on about the impact of ice cream consumption on blood sugar	[35]
27	Citronella (Cymbopogon Nardus) and peppermint (Mentha x Piperita) oil extracts as ant-repelling spray	[36]

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Table 1 (continue). Previous studies on food and beverage.

No	Title	Ref
28	Anti-inflammatory activity of Kalanchoe pinnata stem extract on acetic acid-induced inflammation in mice	[37]
29	Effect of post-harvest storage temperature on physical parameters of Cavendish banana (Musa Paradisiaca)	[38]
30	Influence of ICT availability, accessibility, and utilization on agriculture students' academic performance in universities	[39]
31	The association between the digestive system and liver injury in COVID-19 patients	[40]
32	Analysis of the effectiveness of the formation and distribution of financial results of business entities engaged in poultry farming	[41]
33	Farmers' coping mechanism during the pandemic	[42]
34	Analysis of the application of Mediterranean diet patterns on sustainability to support the achievement of SDGs	[43]
35	A bibliometric analysis of seed priming: Global research advances	[44]
36	Farmers buying behavior toward the fertilizers	[45]
37	Development and evaluation of chicken feedstuff using banana peel	[46]
38	The influence of digital literacy and product innovation on the competitive advantage of modern beverage businesses	[47]
39	Safe food treatment technology: The key to realizing the SDGs zero hunger and optimal health	[48]
40	Smart packaging innovation for food: Enhancing shelf life and quality of perishable goods	[49]
41	The effect of electronic word of mouth (E-WOM) on social media TikTok to brand trust and its impact on buying interest in Mixue brand ice cream products	[50]
42	Influence of grower agent on growth of Bayam (Amaranthus sp.) plants with nutrient film technique in hydroponic system	[51]
43	Education of dietary habit and drinking water quality to increase body immunity for elementary school	[52]
44	Kerson fruit and golden apple snail as food pellet additives for chicken growth performance	[53]
45	Culinary tradition of cassava rice in indigenous villages Cireundeu, Cimahi, Indonesia as food security heritage in the era of gastro colonialism	[54]
46	Optimizing psychomotor skills through project-based learning in seaweed dodol processing	[55]

3. METHOD

3.1. Research Model and Hypothesis

Based on the literature review integrating digital transformation and sustainable development perspectives, this study proposes a conceptual model examining the relationship between technology-enhanced entrepreneurial marketing and sustainable marketing performance among Indonesian SMEs.

The research model incorporates three dimensions of digital entrepreneurial marketing:

(i) Digital Customer Focus: technology-enabled understanding and serving of target markets through CRM systems, social media analytics, and digital customer service platforms.

(ii) Technology-Mediated Value Creation: digital collaboration with network partners to create superior value propositions through co-creation platforms, digital innovation tools, and online partnership networks.

(iii) Digital Market Proximity: continuous market engagement through digital channels, real-time market monitoring, and technology-enabled customer relationship management.

The research model on the effect of entrepreneurial marketing on the marketing performance of SMEs in the food and beverage sector in Indonesia was formed based on a literature review. The research model proposed in full is presented in **Figure 1**. This figure

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illustrates the research model compiled with PLS SEM, based on a literature review. The research hypotheses proposed to determine the effect of entrepreneurial marketing on marketing performance are in the following hypothesis: Entrepreneurial marketing influences marketing performance.

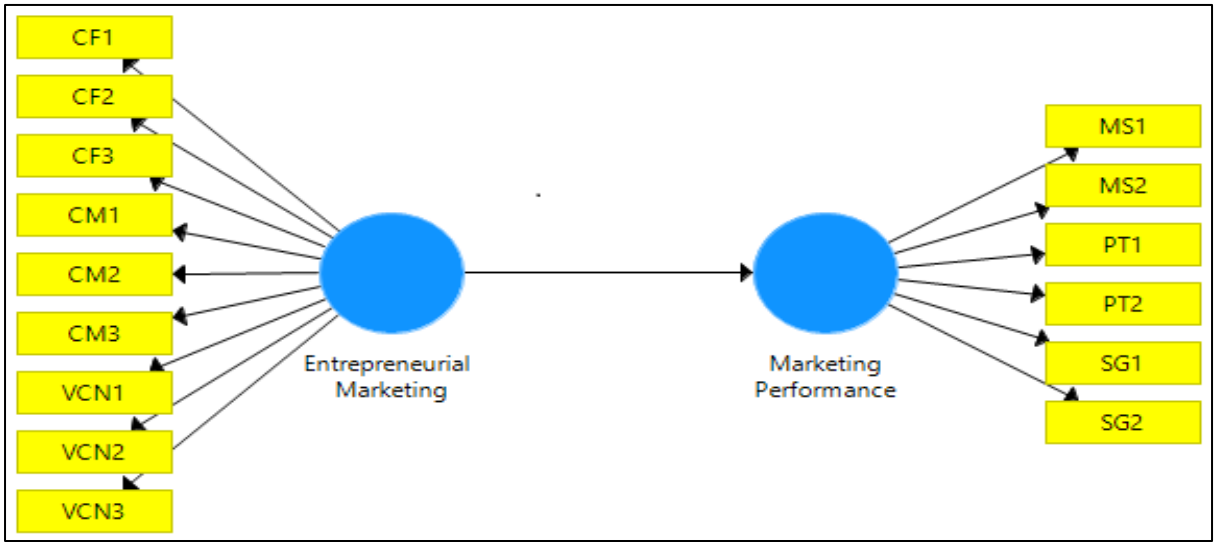


Figure 1. Research model.

3.2. Research Methodology

The study used quantitative methods to determine and analyse the effect of entrepreneurial marketing on marketing performance. Data obtained by questionnaire distribution. Data analysis using structural equation modelling with Partial Least Squares (PLS). The use of PLS SEM aimed to predict and test proposed research hypotheses.

The method of data collection was by conducting interviews with guide questions contained in the questionnaire. The study population was the food and beverage sector SMEs fostered by the Office of SMEs in West Java Province. The research sample of 102 SMEs' obtained by proportional simple random sampling. The research questionnaire consisted of 2 parts: the first part was questions relating to the general description of respondents related to demographics and behaviour of SMEs, the second part was questions related to the measurement of research variables, consisting of 15 questions.

The research instrument was designed based on the operationalization of the research variables based on the proposed research model. The questionnaire designed in this study uses a scale of 1-7, where scale 1 shows very low and scale 7 shows very high.

The dimensions of marketing performance measured in this study describe the success measures of marketing strategies and activities [56] consisting of market share (MS1-MS2), profitability (PT1-PT2), and sales growth (SG1-SG2). In this study, a research instrument test was conducted, which aimed to determine whether the questions used in the study were valid to reveal something that would be measured by the questionnaire. Testing the validity of research instruments based on convergent values and discriminant validity. If the convergent value and discriminant validity give a value > 0.5, then the dimensions used in the research instrument can reveal and measure the phenomena in accordance with the research objectives. Testing the next research instrument is reliability. A reliable research instrument is a picture of the degree of consistency or reliability of an indicator used to measure a study. The construct or research variable is said to be reliable if the Cronbach's alpha value is higher than 0.7.

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The results of testing the validity and reliability of research instruments indicate that the research variables, as well as the dimensions used in the study, are valid because the convergent and discriminant validity values indicate values > 0.5, and Cronbach's alpha values of each study variable indicate values > 0.7. The construct or research variables have a degree of consistency to measure research. The validity and reliability values of the research instruments are presented in full in **Table 2**.

Table 2. Validity and reliability of research instruments.

Research variable	Convergent validity	Discriminant validity	Cronbach's Alpha
Entrepreneurial Marketing:		0.721	0.959
CF1 <- Entrepreneurial _Marketing	0.817		
CF2 <- Entrepreneurial _Marketing	0.807		
CF3 <- Entrepreneurial _Marketing	0.853		
CM1 <- Entrepreneurial _Marketing	0.782		
CM2 <- Entrepreneurial _Marketing	0.877		
CM3 <- Entrepreneurial _Marketing	0.835		
VCN1 <- Entrepreneurial _Marketing	0.912		
VCN2 <- Entrepreneurial _Marketing	0.861		
VCN3 <- Entrepreneurial _Marketing	0.890		
Marketing_Performance :		0.685	0.889
MS1 <- Marketing_Performance	0.922		
MS2 <- Marketing_Performance	0.943		
PT1 <- Marketing_Performance	0.281		
PT2 <- Marketing_Performance	0.932		
SG1 <- Marketing_Performance	0.832		
SG2 <- Marketing_Performance	0.856		

4. RESULTS AND DISCUSSION

This research was conducted on food and beverage sector SMEs, which amounted to 102. Characteristics of SMEs based on the results of the study, it is known that the SMEs' owners of the food and beverage sector are dominated by women (68%), the age of SME owners or managers between 36-45 years (31%), long time doing business in the food and beverage sector be-tween 11-15 years (37%), the number of workers owned by 5-19 people (28%) and marketing with social media (64%). The full results of the characteristics of the study sample are presented in **Table 3**.

The description of the extent of entrepreneurial marketing and marketing performance in the food and beverage sector SMEs is presented in **Tables 4 and 5**. **Table 4** shows that food and beverage SMEs in the sector have not yet implemented entrepreneurial marketing by developing marketing strategies and activities. The achievement of marketing performance of SMEs in the food and beverage sector, based on the results of the study, is not optimal. These conditions are completely presented in **Table 5**. **Table 5** explains that the SME marketing performance of the food and beverage sector is not optimal. This can be seen from the size of the success of SME marketing, both in terms of sales growth, profits, and market share is still low.

To find out whether entrepreneurial marketing influences marketing performance, the next step is to test the measurement model (outer model) as an initial step in the analysis aimed at finding out whether the proposed construct or research variable is able to reveal the research problem and has a degree of consistency to measure the research. The complete

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outer model test results are presented in **Table 2**, which explains that the loading factor of each indicator gives a value > 0.5.

Table 3. Sample characteristics.

Item	Description	(%)
Gender	Male	32
	Female	68
Age	25-35	28
	36-45	31
	46-55	23
	56-65	13
	>65	5
Duration of Business	5-10	27
	11-15	37
	16-20	11
	21-25	16
	>25	9
Amount of labor	1-4	43
	5-19	28
	20-99	19
	>100	10
Marketing through social media	Use social media marketing	64
	Without social media marketing	36

Table 4. Recapitulation of entrepreneurial marketing dimensions.

No	Item	% frequency		Performance Criteria
		1/2/3/4	5/6/7	
1	CF1	84.45%	15.55%	Tend to be low
2	CF2	79.83%	20.17%	Tend to be low
3	CF3	79.55%	20.45%	Tend to be low
4	VCN1	63.31%	36.69%	Tend to be low
5	VCN1	60.51%	39.49%	Tend to be low
6	VCN3	62.75%	37.25%	Tend to be low
7	CM1	79.83%	20.17%	Tend to be low
8	CM2	80.95%	19.05%	Tend to be low
9	CM3	79.55%	20.45%	Tend to be low
	Entrepreneurial Marketing (EM)	79.16%	20.84%	Tend to be low

Table 5. Marketing performance dimension recapitulation.

No	Dimension	Item	% score frequency		Performance Criteria
			1/2/3/4	5/6/7	
1	Sales Growth	SG1	60.51%	39.49%	Tend to be ow
2	(SG)	SG2	63.31%	36.69%	Tend to be low
3	Profitability	PT1	60.51%	39.49%	Tend to be low
4	(PT)	PT2	62.75%	37.25%	Tend to be low
5	Market Share	MS1	61.91%	38.09%	Tend to be low
6	(MS)	MS2	61.79%	38.23%	Tend to be low
	Marketing Performance (MP)	MP	61.79%	38.21%	Tend to be low

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The loading factor diagram for each indicator is presented in **Figure 2**. This figure explains that the loading factor value of each indicator provides the expected value, even though there is a PT1 indicator (profitability) used to measure marketing performance, showing a value < 0.5. For the next stage, the PT1 indicator is not used to analyze the effect of entrepreneurial marketing on marketing performance. The next outer model testing is presented based on the complete composite reliability values in **Table 6**.

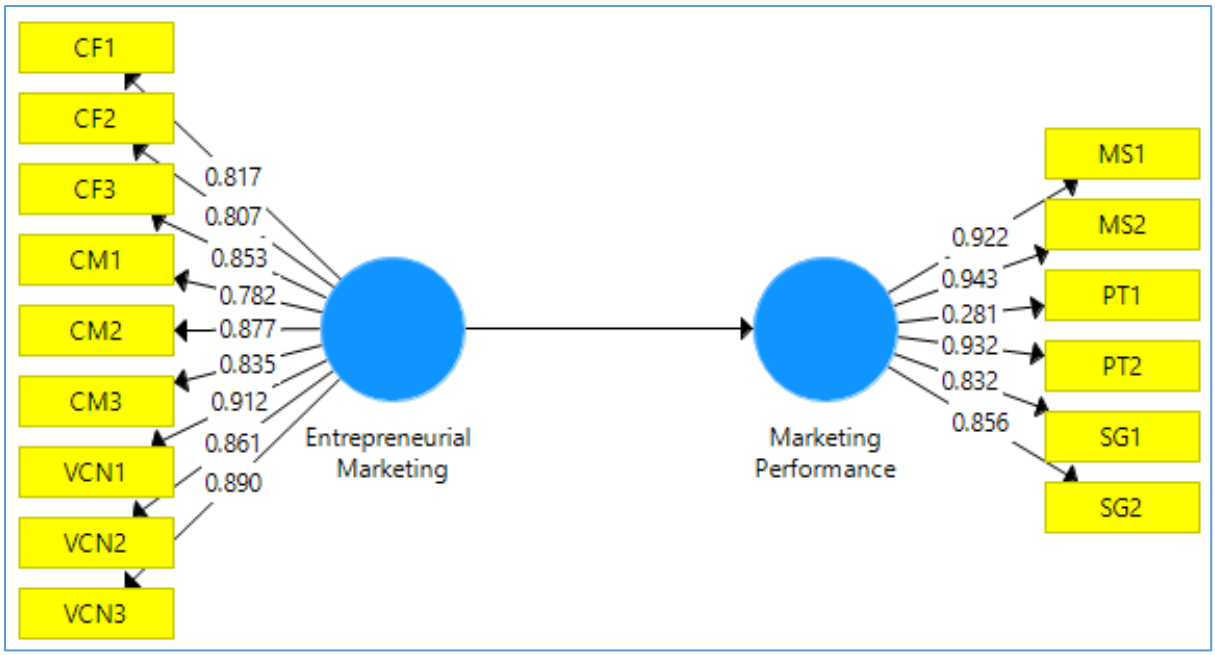


Figure 2. Loading factor value.

Table 6. Value of the reliability composite research model.

Variable	Composite reliability
Entrepreneurial _Marketing	0.959
Marketing_Performance	0.955

Table 5 explains that the results of the outer model testing based on composite reliability values give a value of > 0.7, meaning that the research variables have a degree of reliability to measure problems in the study.

The next stage is testing the structural model (inner model). By analyzing the value of R^2 and the value of predictive relevance (Q2), and testing the research hypothesis. The value of R^2 in the research model is known to be 0.164, which means that marketing performance is influenced by entrepreneurial marketing by 16.4%, and the rest is influenced by other variables outside the proposed research model. The predictive relevance (Q2) value of 0.164 indicates that the predictive capabilities of the research model are in the medium category.

Exploratory research methods enable researchers to test hypotheses. Hypothesis testing as part of structural model testing (inner model) by looking at the t-statistic value and the probability value used in the study. To test the hypothesis with an α value of 5%, the t-statistic used is 1.96. Thus, the criteria for acceptance or rejection of the hypothesis are that H1 is accepted and H0 is rejected when the t-statistic> 1.96.

The hypothesis testing in this study was conducted using probability values, where the alternative hypothesis (H1) is accepted if the p-value is less than 0.05. The analysis confirmed that entrepreneurial marketing significantly influences the marketing performance of SMEs

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in the food and beverage sector. This finding is supported by the statistical results, which show a t-value of 5.466, exceeding the critical value of 1.96, with a p-value of 0.000, well below the significance level of 0.05. The path coefficient obtained was 0.404, indicating a positive and meaningful relationship between entrepreneurial marketing and marketing performance. These results, further illustrated in **Figure 3**, demonstrate that the adoption of entrepreneurial marketing practices contributes directly to the improvement of SMEs' marketing performance in the food and beverage industry.

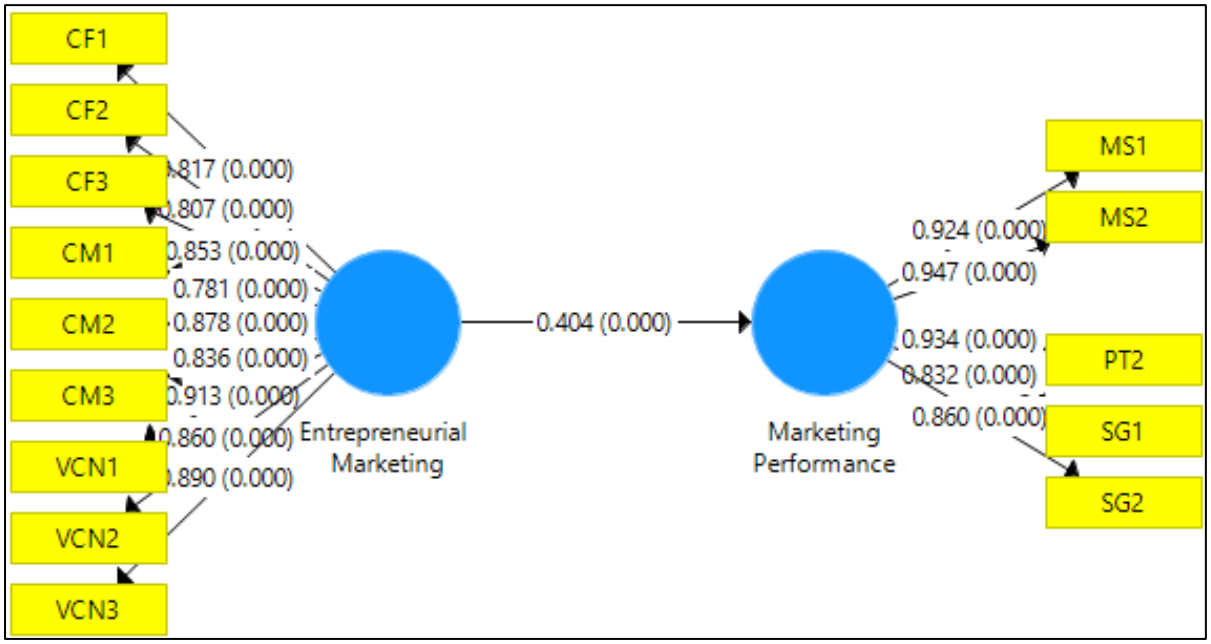


Figure 3. Final results of the PLS SEM research model.

Figure 3 shows that entrepreneurial marketing influences the marketing performance of SMEs in the food and beverage sector with a path coefficient of 0.404. The findings confirm that digital entrepreneurial marketing significantly enhances sustainable marketing performance among Indonesian food and beverage SMEs, providing empirical support for technology integration in SME marketing strategies aligned with sustainable development objectives.

SMEs that leverage digital technologies for customer understanding and engagement achieve superior marketing performance while simultaneously contributing to SDG 8 (Decent Work and Economic Growth) through enhanced customer satisfaction and business expansion. A technology-enabled customer focus allows SMEs to implement personalized marketing strategies that strengthen customer loyalty and increase lifetime value, while also minimizing resource waste through more targeted and efficient marketing efforts.

In addition, digital collaboration platforms empower SMEs to develop superior value propositions through networked innovation, thereby supporting SDG 9 (Industry, Innovation, and Infrastructure). By fostering technological advancement and industrial diversification, these platforms enable SMEs to co-create value with partners and stakeholders. Firms that utilize such collaborative digital tools report higher rates of innovation and enjoy stronger competitive positioning within their respective industries.

Real-time market monitoring and digital relationship management capabilities further enhance SME responsiveness and adaptability, enabling businesses to navigate dynamic environments more effectively. This technology-enabled market proximity allows firms to

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respond quickly to changing customer preferences and market conditions, thereby contributing to greater business resilience and sustainable growth.

The findings also reveal that SMEs integrating digital entrepreneurial marketing with sustainability practices attain superior performance outcomes while contributing to multiple SDGs. Indeed, this study adds new information regarding SDGs, as reported elsewhere [57-63]. Incorporating environmental considerations into digital marketing strategies strengthens brand reputation and fosters customer loyalty, especially among environmentally conscious consumers. This dual focus on performance and sustainability underscores the strategic role of digital transformation in aligning business goals with societal expectations.

Beyond these outcomes, the study highlights broader implications for the industrial context, particularly in Indonesia's food and beverage sector. The demonstrated positive relationship between entrepreneurial marketing and marketing performance suggests that SMEs adopting digital and innovative marketing approaches are better positioned to enhance industrial competitiveness. In line with the national agenda for industrial transformation and Industry 4.0, entrepreneurial marketing emerges as a bridge between micro-level business strategies and macro-level industrial development. By embedding digital technologies into marketing practices, SMEs not only achieve growth in sales and customer satisfaction but also contribute to industrial upgrading, value chain integration, and sustainable development goals. Thus, entrepreneurial marketing should be regarded not merely as a managerial approach but as a strategic industrial mechanism that drives innovation, resilience, and long-term competitiveness in the food and beverage industry.

5. CONCLUSION

This study concludes that digital entrepreneurial marketing has a significant impact on improving the marketing performance of food and beverage SMEs in Indonesia, while also supporting the achievement of the SDGs. By leveraging customer-focused technologies, digital collaboration platforms, and real-time market monitoring, SMEs strengthen competitiveness, enhance customer satisfaction, and achieve sustainable growth. The findings also highlight the industrial relevance of entrepreneurial marketing, showing its role as a strategic mechanism for industrial upgrading and alignment with Industry 4.0. Ultimately, integrating technology, innovation, and sustainability within marketing practices enables SMEs to contribute not only to business success but also to broader industrial and societal development.

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7. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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