

ANALYSIS OF PEPPER SALES LEVEL IN BANGKA BELITUNG: SOCIAL MEDIA AND E-COMMERCE THROUGH MARKETING PERFORMANCE

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Abstract

This study aims to examine the influence of social media and e-commerce on the marketing performance and sales levels of Bangka Belitung white pepper products, with marketing performance acting as a mediating variable. The research employs a quantitative approach and uses Partial Least Squares–Structural Equation Modeling (PLS-SEM) to analyze data collected from local micro, small, and medium enterprises (MSMEs). The results indicate that social media has a significant positive effect on both marketing performance and sales levels, both directly and indirectly, highlighting its effectiveness as a marketing tool. This is attributed to its ease of access, wide reach, cost efficiency, and interactive capabilities, which enable MSMEs to engage directly with consumers and expand their market presence. In contrast, e-commerce does not demonstrate a significant impact on either marketing performance or sales levels. This lack of effect is likely due to limited adoption among MSMEs, who perceive e-commerce platforms as less practical because of registration complexities, associated fees, and concerns regarding consumer trust and payment security. The study suggests that while social media can be leveraged effectively for marketing Bangka Belitung white pepper, greater awareness, training, and support are needed to increase MSMEs' engagement with e-commerce to enhance their overall sales and competitive performance in the digital market.

Keywords: Social Media, E-Commerce, Marketing Performance, Sales Performance

INTRODUCTION

Technological advancement has had a broad impact on various aspects of life, not only in the field of technology itself but also in the economic sector (Tarantang et al., 2019). The economy plays a crucial role in improving the welfare of the Indonesian people. The more developed a country's economy is, the more likely the welfare of its population will increase (Fitri, 2019). On the other hand, this also leads to increasingly intense competition in the business world. Currently, Indonesia's economic growth is largely supported by the export of commodities such as plantation products, mining, minerals, and oil and gas, whose contributions are greater than exports from the manufacturing sector (Indonesia, S., 2020). Indonesia is known as a country rich in natural resources and is often referred to as an agrarian nation (Rosalina, D. I., 2022; Zinah et al, 2024). The agricultural sector is one of the strategic sectors in driving economic growth and community development. At present, this sector is entering a phase of high and sustainable growth. One example is the white pepper industry.

Pepper (*Piper nigrum*) is one of the most important types of spices among others (the "King of Spices"), both in terms of its role in contributing to the nation's foreign exchange and its unique uses that cannot be replaced by other spices (Yulia, Y., 2021). White pepper is classified as a non-oil and gas plantation commodity with great potential to be developed as a source of national foreign exchange. This potential is supported by Indonesia's significant role in the production and export of white pepper in the global market (Saranani, M., 2024). However, both the volume and value of this commodity's exports tend to fluctuate, heavily influenced by the dynamics of the international white pepper trade. Indonesia is recognized as one of the world's leading producers and exporters of pepper, with around 90% of its total production aimed at export markets (Aulia, I., 2021). Nevertheless, Indonesia's export share of pepper in the global market has shown a declining trend, dropping by 9.2% and 15.5% in two consecutive periods (Bahtera, Purwasih, & Yulia, 2020).

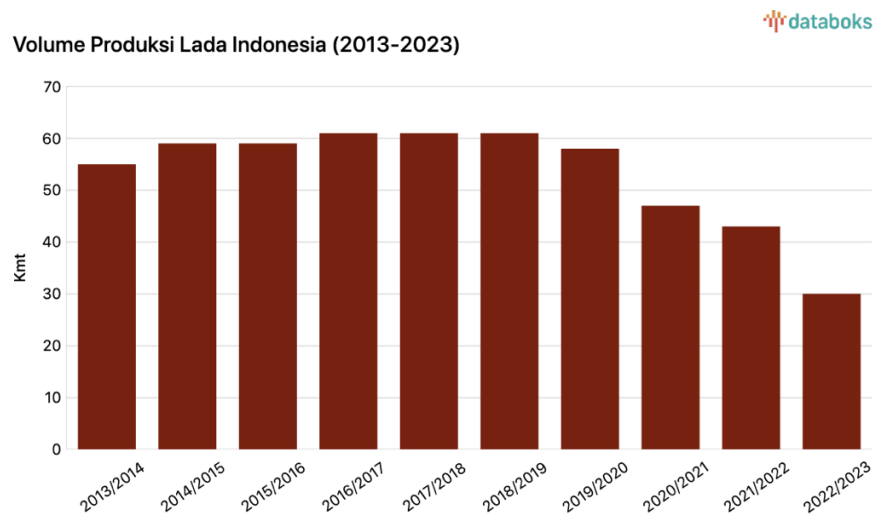


Figure 1
Indonesia's Pepper Production Volume (2013–2023)

Source: *katadata.co.id*

Based on the graph above, Indonesia's black and white pepper production has experienced fluctuations over the past decade, but shows a declining trend over the past three years. During the 2013/2014 period, production volume reached 55 kilo metric tons (KMT), then increased to 59 KMT between 2014 and 2016, and further rose to 61 KMT during 2016–2020, marking the highest achievement in the past decade. However, since 2020/2021, production has consistently declined, falling to 47 KMT in 2020/2021, down to 43 KMT in 2021/2022, and only 30 KMT in 2022/2023. According to Ned Spice, this production decline is not only occurring in Indonesia but also in other major producing countries due to a reduction in cultivated land and unfavorable weather conditions.

Nationally, the Bangka Belitung Province is recorded as the largest pepper-producing region, contributing 25% of the country's total production. Meanwhile, global pepper production at the start of the 2024 season is estimated to reach 465 KMT, with stock levels at 428 KMT, while demand has surged to 529 KMT (katadata.co.id).

Central Bangka Regency is one of the largest producers of white pepper (Muntok White Pepper) in the Bangka Belitung Islands Province (Gani, R. A., 2017). The white pepper produced in this province mostly comes from smallholder plantations, which are generally cultivated in monoculture systems (Agustina, F., Yulia, & Astuti, 2018). To date, the Bangka Belitung Islands Province holds the second-largest pepper cultivation area in Indonesia after Lampung Province. This potential is supported by favorable regional conditions and agro-climate suitable for pepper cultivation, making the province a strategic area for white pepper commodity development (Karsiningsih et al., 2023). The region has a sizeable pepper cultivation area, approximately 2,528 hectares (Yulia, Y., & Bahtera, 2020). However, white pepper production in this region has seen a significant decline due to extreme weather conditions that cause many pepper fruits to fall prematurely before the harvest season. Under normal conditions, one pepper plant can yield up to one kilogram of fruit, but due to early fruit drop, the harvest yield drastically decreased to only around 0.5 kilograms per plant (Yulia et al., 2019).

Specifically, in the Bangka Belitung Province, white pepper production declined from 9,000 tons in 2022 to 6,000 tons in 2023. This drop is attributed to several factors, including extreme weather caused by prolonged droughts and the El Niño phenomenon, which led to plant death due to water shortages. In addition, the low selling price at the farmer level, ranging between IDR 80,000 to IDR 85,000 per kilogram, has reduced farmers' interest in expanding pepper plantations (antaranews.com).

The ability to reach customers worldwide without geographic limitations is one of the main advantages of e-commerce. This is highly relevant to the growing agricultural industry, as it allows producers to market their products to international markets at relatively low costs. Moreover, e-commerce provides valuable analytical data that can be used to understand customer behavior and optimize marketing strategies. In the study by Anjelly, A., & Kamener, D. (2023), e-commerce was found to have a positive effect on marketing performance. However, research by Prihadi, D., & Susilawati, A. D. (2018) found that e-commerce capabilities did not significantly influence the marketing performance of traders in traditional markets.

REVIEW OF LITERATURE

Digital Marketing

Marketing is a series of activities aimed at introducing, promoting, and selling products or services to make them known to potential consumers. Digital marketing is an online-based marketing strategy that involves buying and selling transactions through digital platforms, where communication between sellers and buyers does not occur directly, but through media such as applications or websites accessible via electronic devices (Aditiya, Y., et al., 2021).

Social Media

Social media consists of two words: "media" and "social." The word "media" refers to tools or means of communication, while "social" refers to the social reality in which individuals engage in actions or activities that contribute to society. According to Nabila et al. (2020), social media is an online platform that utilizes web-based technology to transform communication patterns from one-way to interactive two-way communication. Social media functions as a tool, service, and medium that allows individuals to connect, express themselves, and share information with the help of the internet. Furthermore, according to Ardiansah and Maharani (2021), social media is a platform that facilitates user interaction with two-way communication. Additionally, social media is often used to build personal branding or individual profiles, and is utilized by companies as a marketing tool.

E-Commerce

E-commerce is a form of trade transaction between sellers and buyers using electronic media. The advantage of using e-commerce for transactions is the potential to increase revenue through online sales at lower costs. E-commerce is a commonly used term today related to the internet, although its precise definition is not always clearly understood (Wirapraja, 2018).

Marketing Performance

Performance can be understood as the result of task execution or the level of achievement of work carried out. According to Rivai, performance reflects how successfully a task has been accomplished. In an organizational context, performance indicates the success of individuals, teams, or units in achieving predetermined strategic goals through behavior that aligns with expectations. In general, performance can also be defined as a record of achievement related to the outcomes of a specific function or activity within a particular time frame. In other words, performance reflects how effectively tasks have been executed and whether the targeted objectives have been successfully achieved (Nikous Soter Sihombing, 2022).

Sales Level

Sales level refers to the amount or volume of goods or services sold within a specific time period. It is one of the key indicators used to measure the success of marketing activities and business performance. According to Kotler and Keller (2016), sales level is the result of the effectiveness of marketing strategies, including promotion, pricing, product quality, and distribution channels. A high level of sales indicates strong customer demand and effective marketing, while declining sales may signal issues in market relevance or strategy execution. Sales levels are also influenced by external factors such as market trends, economic conditions, consumer behavior, and technological advancements. In the context of digital marketing, the use of social media and e-commerce platforms can significantly impact sales levels by expanding market reach and providing real-time interaction with consumers

(Aditiya et al., 2021). Moreover, performance in sales is closely linked to marketing performance, where effective digital engagement often results in increased conversions and sustained customer interest. Thus, analyzing sales levels is essential to evaluate the outcomes of marketing efforts and to design more effective strategies to boost business growth.

RESEARCH METHOD

This study employs a quantitative approach using a survey method to collect data from business actors or white pepper sellers in the Bangka Belitung Province who utilize social media and e-commerce in their marketing activities. The aim of this research is to analyze the influence of social media and e-commerce usage on marketing performance and its impact on sales levels.

Data Collection Technique

Data were collected through the distribution of structured questionnaires delivered to respondents online. The instrument consisted of closed-ended questions using a Likert scale to measure respondents' perceptions of the research variables.

Population and Sample

The population in this study includes all business actors or white pepper sellers in Bangka Belitung who utilize social media and/or e-commerce. Since the exact population size is unknown, the sample size was determined using the Lemeshow formula, which is commonly used for unknown populations. Based on a 95% confidence level and a 10% margin of error, the minimum sample size required was 57 respondents.

Data Analysis Technique

The collected data were analyzed using the Structural Equation Modeling (SEM) technique with the Partial Least Squares (PLS) approach through the SmartPLS software. This model was chosen for its strength in analyzing causal relationships among latent variables simultaneously, particularly in predictive and exploratory models.

The analysis was carried out in several stages, including:

- a. Instrument validity and reliability testing, to ensure that the data used are valid and consistent.
- b. Measurement model (outer model) assessment, to evaluate the indicators that form the latent variables.
- c. Structural model (inner model) testing, to examine the relationships among latent variables and the significance of the influence of social media and e-commerce on marketing performance and sales levels.

RESULTS AND DISCUSSION

Validity Testing

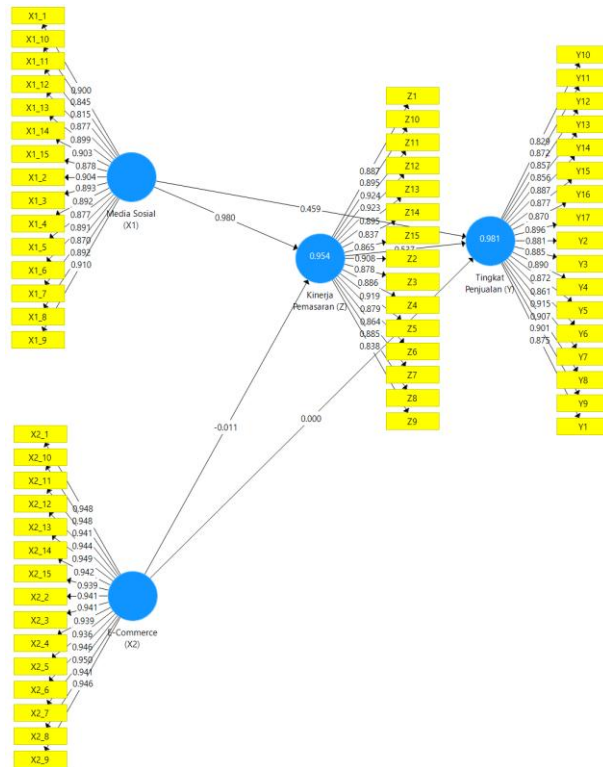


Figure 1.
Outer Model

Based on the outer model figure above, all indicators of the latent variables—Social Media (X1), E-Commerce (X2), Marketing Performance (Z), and Sales Level (Y)—have outer loading values above 0.7. This indicates that all indicators exhibit strong convergent validity and are suitable for use in the model. The Social Media (X1) variable shows the greatest contribution to Marketing Performance (Z) with a path coefficient of 0.980, indicating a very strong and significant influence. In contrast, the E-Commerce (X2) variable shows a very weak and insignificant influence on both Marketing Performance (Z) and Sales Level (Y), with negative and near-zero coefficient values. Marketing Performance acts as an important mediating variable, exerting a direct influence on Sales Level with a coefficient of 0.537. Overall, the model illustrates that social media is the dominant factor in enhancing the marketing performance and sales of white pepper products from Bangka Belitung, while e-commerce has not yet demonstrated a meaningful contribution in this context.

Outerloading

Table 1.
Outerloading

	E-Commerce (X2)	Marketing Performance (Z)	Social Media (X1)	Sales Level (Y)
X1_1			0.900	
X1_10			0.845	
X1_11			0.815	
X1_12			0.877	

X1_13		0.899
X1_14		0.903
X1_15		0.878
X1_2		0.904
X1_3		0.893
X1_4		0.892
X1_5		0.877
X1_6		0.891
X1_7		0.870
X1_8		0.892
X1_9		0.910
X2_1	0.948	
X2_10	0.948	
X2_11	0.941	
X2_12	0.944	
X2_13	0.949	
X2_14	0.942	
X2_15	0.939	
X2_2	0.941	
X2_3	0.941	
X2_4	0.939	
X2_5	0.936	
X2_6	0.946	
X2_7	0.950	
X2_8	0.941	
X2_9	0.946	
Y10		0.829
Y11		0.872
Y12		0.857
Y13		0.856
Y14		0.887
Y15		0.877
Y16		0.870
Y17		0.896
Y2		0.881
Y3		0.885
Y4		0.890
Y5		0.872
Y6		0.861
Y7		0.915
Y8		0.907
Y9		0.901
Z1	0.887	

Z10	0.895
Z11	0.924
Z12	0.923
Z13	0.895
Z14	0.837
Z15	0.865
Z2	0.908
Z3	0.878
Z4	0.886
Z5	0.919
Z6	0.879
Z7	0.864
Z8	0.885
Z9	0.838
Y1	0.875

Source: Output PLS, 2025

Based on the data analysis results using SEM-PLS, as presented in Table 1, all indicators of the variables—social media (X1), e-commerce (X2), marketing performance (Z), and sales level (Y)—show outer loading values above 0.70. This indicates that each indicator demonstrates good convergent validity and is strongly representative of its respective latent construct. The indicators of the social media variable (X1) have outer loading values ranging from 0.815 to 0.910, indicating that all statement items are relevant and consistent in measuring the dimension of social media usage. Similarly, the indicators for e-commerce (X2) show very high outer loading values, between 0.936 and 0.950, suggesting a strong contribution to the e-commerce construct. The marketing performance (Z) and sales level (Y) variables also display high consistency, with outer loading values ranging from 0.837–0.924 and 0.829–0.915, respectively. Therefore, all indicators of the four variables can be considered empirically valid and suitable to proceed to the inner model analysis stage of this research.

Construct Validity and Reliability

Table 2.
Construct Validity and Reliability

	Cronbach's Alpha	rho_A	Composite Reliability	AVE
E-Commerce (X2)	0.991	0.996	0.992	0.890
Marketing Performance (Z)	0.980	0.981	0.982	0.785
Social Media (X1)	0.980	0.980	0.982	0.780
Sales Level (Y)	0.981	0.982	0.983	0.772

Source: Output PLS, 2025

The results of the construct validity and reliability testing presented in Table 2 indicate that all variables in the research model have met the established criteria. The Cronbach's Alpha values for the four constructs—social media (X1), e-commerce (X2),

marketing performance (Z), and sales level (Y)—are all above 0.70, with some even approaching or exceeding 0.98, indicating a very high level of internal consistency for each construct. The composite reliability values for all constructs are also above the minimum threshold of 0.70, which signifies that the indicators consistently measure their respective constructs. In addition, the Average Variance Extracted (AVE) values for all variables are above 0.50, meaning that each construct demonstrates good convergent validity by explaining more than 50% of the variance in its indicators. Therefore, it can be concluded that all constructs in this model are valid and reliable, and suitable for further structural analysis.

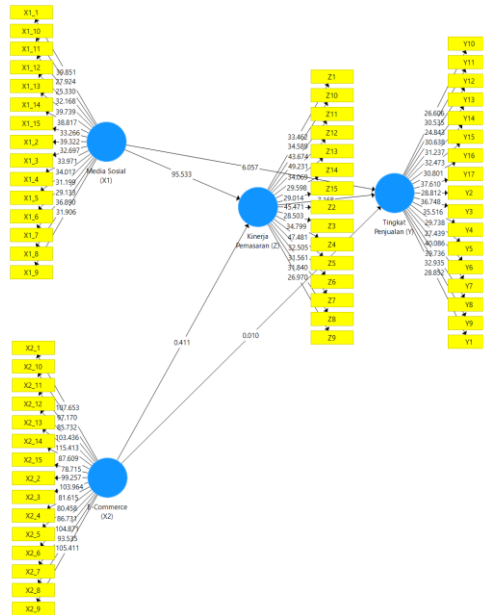


Figure 2.
Inner Model

Based on the visualization of the inner model above, it is evident that the Social Media (X1) variable has a highly significant influence on Marketing Performance (Z), with a t-statistic value of 95.533, far exceeding the significance threshold (>1.96). This indicates that social media makes a dominant contribution to enhancing marketing performance. Furthermore, Marketing Performance (Z) also has a significant effect on Sales Level (Y) with a t-statistic value of 7.168, suggesting that marketing performance serves as an important mediating variable in driving sales improvement. On the other hand, the influence of E-Commerce (X2) on both Marketing Performance (Z) and Sales Level (Y) shows very low t-statistic values, at 0.411 and 0.010, respectively, indicating no significant effect. Thus, it can be concluded that social media plays a critical role—both directly and indirectly—in increasing sales through improved marketing performance, whereas e-commerce has not yet demonstrated a meaningful contribution in this model.

Table 3.
Influence Test

	Original Sample	Sample Mean	Standard Deviation	T Statistic	P Values
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Direct Effect					
E-Commerce (X2) -> Marketing Performance (Z)	-0.011	-0.012	0.026	0.411	0.682
E-Commerce (X2) -> Sales Level (Y)	0.000	0.001	0.020	0.010	0.992
Marketing Performance (Z) -> Sales Level (Y)	0.537	0.540	0.075	7.168	0.000
Social Media (X1) -> Marketing Performance (Z)	0.980	0.982	0.010	95.533	0.000
Social Media (X1) -> Sales Level (Y)	0.459	0.456	0.076	6.057	0.000
Indirect Effect					
E-Commerce (X2) -> Marketing Performance (Z) -> Sales Level (Y)	-0.006	-0.007	0.014	0.401	0.689
Social Media (X1) -> Marketing Performance (Z) -> Sales Level (Y)	0.526	0.530	0.074	7.155	0.000

Source: Output PLS. 2025

Based on the path coefficient test results above, the following findings were obtained:

1. The variable Social Media (X1) → Marketing Performance (Z) has a P-value of $0.000 < 0.05$, indicating a significant effect. This means that the use of social media has a direct and positive influence on the marketing performance of Bangka Belitung white pepper products.
2. The variable Social Media (X1) → Sales Level (Y) has a P-value of $0.000 < 0.05$, indicating a significant effect. This suggests that social media also has a direct influence on increasing sales, beyond its impact on marketing performance.
3. The variable Marketing Performance (Z) → Sales Level (Y) has a P-value of $0.000 < 0.05$, indicating a significant effect. This implies that the better the marketing performance, the higher the sales level of white pepper products.
4. The variable E-Commerce (X2) → Marketing Performance (Z) has a P-value of $0.682 > 0.05$, indicating no significant effect. This means that the use of e-commerce has not yet provided a direct impact on improving marketing performance.
5. The variable E-Commerce (X2) → Sales Level (Y) has a P-value of $0.992 > 0.05$, indicating no significant effect. This means that e-commerce does not have a direct impact on increasing product sales.
6. The variable Social Media (X1) → Sales Level (Y) through Marketing Performance (Z) has a P-value of $0.000 < 0.05$, indicating a significant indirect effect. This means that social media not only has a direct impact but also indirectly increases sales through improved marketing performance.
7. The variable E-Commerce (X2) → Sales Level (Y) through Marketing Performance (Z) has a P-value of $0.689 > 0.05$, indicating no significant indirect effect. This suggests that e-commerce does not contribute to sales even when mediated through marketing performance.

The Influence of Social Media on Sales Levels

Social media has proven to have a significant effect on increasing the sales of white pepper MSME products in Bangka Belitung (t-statistic 6.057; $p = 0.000$). This reflects that social media is effective in attracting the attention of potential consumers and driving direct purchases, either through product posts or interactions via DM features. Platforms such as Instagram and Facebook enable MSME actors to build branding and receive instant responses from potential buyers who view products in real-time.

Several studies support this finding. Simawartin Putri & Thohiri (2025) found that the use of social media positively increases the effectiveness of marketing strategies and sales of MSME products in Medan. Diaprilia Sondakh et al. (2022) also reported that positive sentiment from Facebook users significantly impacts the revenue of MSMEs in North Sulawesi. Similarly, Khairani et al. (2025) found that active interaction and creative content on Instagram and TikTok can expand market reach and directly drive consumer purchases.

MSMEs in Bangka Belitung tend to choose social media because of its ease of access, low cost, and ability to build direct relationships with customers without administrative barriers. Social media allows consumers to ask about products directly, receive quick answers, and make purchases via chat. This creates a more dynamic and responsive sales process, unlike e-commerce platforms which are often considered complicated and require longer procedures.

The Influence of Social Media on Marketing Performance

Strong interaction and flexible content strategies make social media highly effective in improving the marketing performance of MSMEs. The very high t-statistic value (95.533) indicates that the social media variable is a major determinant in strengthening marketing effectiveness. Through features such as stories, posts, and direct messages, business owners can convey product information visually and personally.

Research by Ariyanti et al. (2022) in Makassar shows that while e-commerce is important, social media remains the main channel for MSMEs to build relationships with consumers and strengthen brand identity. Khairani et al. (2025) describe social media as a long-term tool for building brand awareness, establishing credibility, and enhancing customer engagement through interactive content.

Because social media allows two-way interaction, MSMEs can directly respond to customer comments, questions, or feedback. This not only speeds up the marketing process but also ensures that the marketing message is delivered effectively. MSMEs gain the opportunity to expand their market while maintaining warm and loyal customer relationships through a highly personalized approach.

The Influence of E-Commerce on Sales Levels

The research findings indicate that e-commerce does not have a significant effect on sales (t-statistic: 0.010; $p = 0.992$). Although theoretically, marketplace platforms can reach wider markets, in practice, many local MSMEs remain skeptical about online transactions. They are concerned about payment security, administrative costs, and intense price competition on such platforms.

According to Lune et al. (Dompou, 2023), e-commerce does not significantly affect MSME income due to low digital literacy, technological readiness, and limited technical support for local entrepreneurs. On the other hand, Ayem et al. (2025) noted that although many studies claim e-commerce can boost revenue, barriers such as limited internet access

and lack of digital capital remain major obstacles for Indonesian MSMEs. Ottari et al. (2024) also stated that while e-commerce provides market expansion opportunities, not all MSMEs are able to optimize its benefits due to limited resources and digital experience.

Concerns about payment features, complex registration, hidden costs, and a lack of interest in digital transaction systems make MSMEs prefer direct channels such as social media. As a result, the role of e-commerce as a driver of sales has not yet shown significant impact among white pepper MSMEs in Bangka Belitung.

The Influence of E-Commerce on Marketing Performance

The influence of e-commerce on marketing performance is also not significant (t-statistic: 0.411; $p = 0.682$), indicating that MSMEs have not optimally utilized marketplace platforms for promotional and branding activities. The e-commerce operational model has not fully addressed the marketing needs of local MSMEs, which prioritize personal relationships and low costs.

Research in Makassar (Arianty et al., 2023) states that e-commerce contributes positively to MSME performance in general but is still considered an alternative channel and not yet a main strategy. Lismula (NTB, 2022) found that while e-commerce can improve MSME marketing and reach, its success depends on digital readiness and adequate assistance. Alfaqih (Binus, 2024) also mentioned that e-commerce has a positive influence on performance if supported by digital literacy and maximum utilization of platform features.

However, in the context of Bangka Belitung, limited digital support and low trust among MSMEs make e-commerce ineffective in marketing activities. Without training, promotion, or assistance, e-commerce platforms are difficult to adopt as the primary vehicle for marketing white pepper products.

The Influence of Social Media on Sales Levels through Marketing Performance

Mediation analysis shows that social media significantly influences sales indirectly through marketing performance (t-statistic: 7.155; $p = 0.000$). This indicates that the use of social media enhances marketing effectiveness—such as branding improvement, consumer interaction, and visual promotions—which in turn contributes to increased sales.

Khairani et al. (2025) and Simawartin Putri & Thohiri (2025) found that active and creative social media strategies can increase brand awareness and consumer engagement, thus driving both direct and comprehensive purchasing decisions. Similar findings in Ariyanti et al. (2022) emphasize the importance of digital interaction and consistent promotional frequency in boosting sales through digital marketing.

Social media becomes a primary source for building customer communities, generating social proof, and influencing consumer purchasing decisions through testimonials and real-time responses. Thus, social media functions not only as a marketing channel but also as a catalyst that strengthens the relationship between marketing and sales outcomes.

The Influence of E-Commerce on Sales Levels through Marketing Performance

The indirect influence of e-commerce on sales through marketing performance mediation is proven to be insignificant (t-statistic: 0.401; $p = 0.689$). This means that although e-commerce has the potential as a digital marketing tool, its low adoption and operational barriers prevent it from effectively strengthening the relationship between marketing and sales among local MSMEs.

Research in Dompu (Raden Lune et al., 2023) shows that limited digital literacy, low willingness to try, and administrative constraints make e-commerce ineffective in increasing

both revenue and marketing effectiveness. Ayem et al. (2025) also pointed out that although e-commerce theoretically has a positive impact on income, without digital literacy support and good infrastructure access, its long-term effectiveness remains low.

Additionally, a study in NTB (Lismula, 2022) shows that e-commerce is only effective if MSMEs receive proper training and mentoring in adopting the technology. With low trust and digital readiness, e-commerce has not been able to function as a strong mediator between marketing and sales. The platform is often perceived as complicated and unsuitable for the operational characteristics of MSMEs in Bangka Belitung, who prefer soc.

CONCLUSION

Based on the results of the analysis, it can be concluded that social media has a significant influence on both marketing performance and sales levels of Bangka Belitung's white pepper products—both directly and indirectly through marketing performance as a mediating variable. This indicates that social media serves as an effective and flexible promotional tool for MSMEs due to its ease of access, direct consumer interaction, and its ability to rapidly build brand awareness. In contrast, e-commerce does not demonstrate a significant influence on either marketing performance or sales. This may be attributed to the low level of interest and trust among MSME actors in e-commerce platforms, the complexity of registration processes, as well as administrative costs and high price competition. These findings underscore the importance of optimizing social media use in marketing strategies for local products, in order to increase visibility and competitiveness in the digital marketplace.

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