

AN ERGONOMICS-BASED MARKETING STRATEGY FOR SOLO SPECIALTY CULINARY SOUVENIR PRODUCTS USING EWM

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ABSTRACT

This study aims to identify the priority of ergonomics-based marketing strategies for Solo specialty culinary souvenir products to enhance the competitiveness and long-term sustainability of SMEs. The study employs the Entropy Weight Method (EWM) to objectively determine the relative priority of alternative marketing strategies based on the information contained in the evaluation data. The alternatives include social media-based digital marketing, sales through marketplaces and e-commerce, strengthening local branding and product packaging design and pricing strategy. The evaluation is conducted using criteria related to implementation cost, ease of strategy implementation, potential for increasing sales, market reach, competitiveness enhancement, support for digital transformation, and long-term sustainability. The findings indicate that all evaluated have relatively similar levels of importance, demonstrating that each strategy contributes significantly to the improvement of marketing performance and business development. Among the evaluated alternatives, pricing strategy emerged as the highest-priority option of 0,2514, while digital marketing, e-commerce utilization, and local branding and packaging development also showed comparable importance.

KEYWORDS

Marketing Strategy, Ergonomics Based, SMEs, Solo Specialty Culinary Souvenir Product, EWM



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INTRODUCTION

According to data from the Surakarta City Statistics Agency (BPS), the accommodation and food and beverage service sector recorded economic growth of 5,15% in 2024 (BPS RI, 2025). This growth indicates the increasing contribution of the culinary and hospitality sectors to the local economy of Surakarta. The development of this sector

is also supported by the growing demand for local culinary products, particularly traditional food and beverages that have the potential to serve as distinctive souvenirs for visitors. Therefore, strengthening the competitiveness and market reach of local culinary products is essential to maximize their economic potential (Setyawan et al., 2026). In this context, the implementation of effective marketing strategies is needed to help culinary MSMEs expand their consumer base, increase sales, adapt to digital transformation, and maintain long-term business sustainability.

The growth rate of Gross Domestic Product (GDP) in the accommodation and food and beverage service sector reached 10,17% in the second quarter of 2024, supported by an increase in the number of international tourist visits and various regional events (Indonesia, 2024). This growth was supported by an increase in the number of international tourist visits, as well as the implementation of various regional events that stimulated demand for accommodation, food, and beverage services. The increasing flow of tourists and visitors provides opportunities for the development of local culinary businesses, particularly those offering traditional and distinctive regional products. Consequently, the growing culinary sector presents significant potential for strengthening local economic activity, while also creating opportunities for micro, small, and medium enterprises (MSMEs) to expand their market reach and enhance competitiveness through appropriate and sustainable marketing strategies (Anitasari & Zoniarti, 2025).

Despite the promising growth of the culinary sector, marketing activities among culinary MSMEs in Surakarta remain relatively limited (Darmaningrum et al., 2025), with many businesses relying primarily on existing customers and word-of-mouth promotion without a well-structured strategy to reach broader market segments. This condition highlights the need for a systematic approach to identify and prioritize effective marketing strategies based on objective criteria. Therefore, the Entropy Weight Method (EWM) is employed to determine the objective weights of the evaluation criteria by measuring the degree of variation and information contained in each criterion (Ningsih & Priandika, 2024). The application of EWM is expected to provide a more objective basis for evaluating marketing strategies and support the development of targeted, competitive, and sustainable marketing strategies for culinary MSMEs in Surakarta.

The urgency of this research is driven by the increasingly competitive market faced by culinary MSMEs producing traditional Solo culinary souvenirs. Limited adoption of technology and digital transformation may hinder MSMEs from utilizing data effectively to develop targeted marketing strategies and reach broader market segments. Therefore, this research aims to analyze and prioritize marketing strategies by integrating an ergonomics approach and the Entropy Weight Method (EWM). EWM is used to objectively determine the weight of each evaluation criterion based on the information contained in the data, while the ergonomics approach considers the feasibility, ease of implementation, workload, and sustainability of the proposed strategies. Another study applied the TOPSIS using a transportation ergonomics approach to identify and recommend the most optimal public transportation alternative in Surakarta (Diansari et al., 2025). Regarding marketing strategies, previous studies have examined the 4P marketing mix to improve sales productivity in the culinary industry (Afnita Ardilla et al., 2023) and the 7P marketing mix to enhance customer satisfaction in the batik industry (Arif Ramadhan et al., 2024). The results of this research are expected to support the development of effective, competitive, and sustainable marketing strategies for Solo culinary MSMEs. This research is aligned with the Sustainable Development Goals (SDGs), particularly Goal 8, which focuses on decent work and economic growth.

RESEARCH METHOD

The Entropy Weight Method (EWM) is a widely used weighting technique for measuring the dispersion of values in decision-making by objectively determining the weights of evaluation criteria (Yulianti & Nugroho, 2023). The fundamental principle of this method is to assess the degree of uncertainty and information variation contained within each criterion based on the available data (Yudhistira, 2024). A higher degree of variation indicates greater information content, resulting in a higher weight for the corresponding criterion. This approach minimizes subjectivity in the weighting process and provides a more objective basis for evaluating the alternatives. This study aims to determine the weights of the criteria for marketing strategies integrated with ergonomic aspects for Solo specialty culinary souvenir products using the EWM. This study involved 30 culinary souvenir MSME owners in Solo as respondents, with the inclusion criterion that their businesses had been operating for at least two years. The respondents were selected to ensure that the assessment was based on sufficient practical experience in managing and marketing Solo specialty culinary souvenir products.

The steps of the Entropy Weight Method are as follows:

1. Developing a decision matrix

$$X = \begin{bmatrix} X_{11} & X_{12} & X_{1n} \\ X_{21} & X_{22} & X_{2n} \\ X_{m1} & X_{m2} & X_{mn} \end{bmatrix} \quad (1)$$

Where:

m = number of alternatives

n = number of criteria

X_{ij} = performance value of alternative A_i with respect to criterion C_j

2. Decision matrix normalization

$$r_{ij} = \frac{X_{ij}}{\max(X_{ij})} \text{ for Benefit Criteria} \quad (2)$$

$$r_{ij} = \frac{\min(X_{ij})}{X_{ij}} \text{ for Cost Criteria} \quad (3)$$

Where:

r_{ij} = normalized value of element X_{ij} for alternative i and criterion j

X_{ij} = performance value of alternative A_i with respect to criterion C_j

$\max(X_{ij})$ = maximum value of criterion j across all alternatives

$\min(X_{ij})$ = minimum value of criterion j across all alternatives

3. Calculating the proportion values

$$P_{ij} = \frac{r_{ij}}{\sum_{i=1}^m r_{ij}} \quad (4)$$

Where:

P_{ij} = the value of an element in the normalized decision matrix r_{ij}

4. Calculating the entropy value

$$E_j = \left[\frac{-1}{\ln m} \right] \sum_{i=1}^n [P_{ij} * \ln (P_{ij})] \quad (5)$$

Where:

E_j = Entropy value for criterion j

m = number of alternatives

n = number of criteria

P_{ij} = the value of alternative i for criterion j, normalized into a proportion

ln = natural logarithm function

5. Calculating the dispersion value

$$d_j = 1 - E_j \quad (6)$$

Where:

d_j = Dispersion value for criterion j

E_j = Entropy value for criterion j

6. Calculating the criteria weights

$$W_j = \frac{d_j}{\sum_{j=1}^n d_j} \quad (7)$$

Where:

W_j = Weight of criterion j

d_j = Dispersion value for criterion j

n = number of criteria

RESULT AND DISCUSSION

To solve the problem above using the Entropy Weight Method (EWM), the process will follow the steps provided. The research method described as:

Criteria Data

Data on the criteria in the Entropy Weight Method (EWM) is used to measure the degree of information variation in each criterion, thereby enabling the determination of objective weights for each criterion.

Table 1. Criteria Data

Code	Criteria	Type of Criteria
C1	Strategy Implementation Cost	Cost
C2	Ease of Strategy Implementation	Benefit
C3	Potential for Increasing Sales	Benefit
C4	Market Reach Achieved	Benefit
C5	Ability to Enhance Competitiveness	Benefit
C6	Support to Digital Transformation	Benefit
C7	Long-Term Sustainability of The Strategy	Benefit

C1 reflects the efficiency of resource utilization within the work system, a low-cost strategy enables SMEs to implement system improvements without requiring substantial investment, making the strategy easier to adopt. C2 describes the effectiveness of the marketing system in generating higher outputs using the same resources, thereby reflecting

an improvement in work system productivity (Ghazali et al., 2025). C3 describes the effectiveness of the marketing system in generating higher outputs using the same resources, thereby reflecting an improvement in work system productivity (Lusi Feronika Situmeang, Gebi Oktavia Tampubolon, Ardin Dolok Saribu et al., 2025). C4 is related to the ability of the work system to expand market access through the utilization of digital technology, thereby making the marketing process more effective and efficient (Alamin et al., 2022). C5 demonstrates the ability of the work system to adapt to changes in the business environment through process innovation, improved service quality, and operational efficiency, which are key focuses of Industrial Engineering (Kristin Handayani, 2024). C6 is closely related to cognitive ergonomics, Human Computer Interaction (HCI) and digital work systems, strategies that support digital transformation can enhance information integration, process automation and ease of decision making (Ghazali et al., 2025). C7 is related to system sustainability, a sustainable strategy is capable of maintaining work system performance, reducing resource waste, maintaining a balanced workload and enhancing the long-term resilience of SMEs (Baskoro et al., 2026).

Alternative Data

Alternative data in the EWM refers to the performance values of each alternative evaluated against each criterion. These data are arranged in a decision matrix and are used to calculate the proportion, entropy value, dispersion value and objective weight of each criterion.

Table 2. Alternative Data

Code	Alternative
A1	Social Media-Based Digital Marketing
A2	Sales Through Marketplaces and E-Commerce
A3	Strengthening Local Branding and Product Packaging Design
A4	Pricing Strategy

Entropy Weight Method (EWM)

The following are the steps for conducting measurements using the Entropy Weight Method (EWM):

1. Developing a decision matrix

$$X = \begin{bmatrix} 3,033 & 2,967 & 3,000 & 3,000 & 3,000 & 2,967 & 3,067 \\ 3,067 & 2,900 & 3,033 & 3,033 & 2,967 & 3,067 & 2,967 \\ 3,033 & 3,000 & 2,967 & 3,100 & 2,933 & 3,033 & 3,000 \\ 3,033 & 3,033 & 2,900 & 3,133 & 2,933 & 3,000 & 3,100 \end{bmatrix}$$

2. Matrix normalization

$$X = \begin{bmatrix} 1,000 & 0,978 & 0,989 & 0,957 & 1,000 & 0,967 & 0,989 \\ 0,989 & 1,000 & 0,956 & 1,000 & 0,989 & 0,978 & 1,000 \\ 1,000 & 1,000 & 0,978 & 1,000 & 1,000 & 0,989 & 1,000 \\ 1,000 & 1,000 & 1,000 & 1,000 & 1,000 & 1,000 & 1,000 \end{bmatrix}$$

3. Calculating the proportion values

Table 3. Proportion Values

Code	C1	C2	C3	C4	C5	C6	C7
A1	0,251	0,246	0,252	0,242	0,251	0,246	0,248
A2	0,248	0,251	0,244	0,253	0,248	0,249	0,251
A3	0,251	0,251	0,249	0,253	0,251	0,251	0,251
A4	0,251	0,251	0,255	0,253	0,251	0,254	0,251

4. Calculating the entropy value

Table 4. Entropy Values

Code	C1	C2	C3	C4	C5	C6	C7
A1	-1,384	-1,403	-1,378	-1,419	-1,383	-1,403	-1,394
A2	-1,395	-1,381	-1,412	-1,376	-1,395	-1,392	-1,384
A3	-1,384	-1,381	-1,389	-1,376	-1,383	-1,381	-1,384
A4	-1,384	-1,381	-1,367	-1,376	-1,383	-1,370	-1,384

5. Calculating the dispersion value

Table 5. Dispersion Values

Code	Dispersion Value
A1	-0,746
A2	-0,748
A3	-0,752
A4	-0,754

6. Calculating the criteria weights

Table 6. Criteria Weight

Code	Weight	Criterion Weight Value
A1	W1	0,2486
A2	W2	0,2493
A3	W3	0,2506
A4	W4	0,2514

The result of the EWM calculation shows that the four marketing strategy alternatives have relatively similar weight values, indicated that each alternative has a comparable level of importance based on the evaluated criteria. A4 (Pricing Strategy) obtained the highest weight value of 0,2514. Therefore, pricing strategy can be considered the most preferred alternative based on the EWM weighting results, although the differences among the alternatives are relatively small.

CONCLUSION

The EWM analysis results show that the four marketing strategy alternatives have relatively similar weight values, indicating that each alternative has a comparable level of importance in supporting the marketing development of local culinary souvenir products. A4 (Pricing Strategy) obtained the highest weight value of 0,2514, followed by A3 (Strengthening Local Branding and Product Packaging Design) with 0,2506, A2 (Sales Through Marketplaces and E-Commerce) with 0,2493, and A1 (Social Media-Based Digital Marketing) with 0,2486.

Based on these results, pricing strategy can be considered the most influential alternative according to the EWM weighting process. However, the relatively small differences among the weight values indicate that all four alternatives remain important and should not be considered independently. Therefore, integrating pricing strategies with digital marketing, e-commerce utilization, and improvement in local branding and product packaging can provide a more comprehensive and sustainable approach to strengthening the competitiveness and long-term development of local culinary SMEs.

ACKNOWLEDGEMENT

The research team -Brillian Nur Diansari, Ringgo Ismoyo Buwono, Garnet Filemon Waluyono, Nadhif Hasby Wikasa, Nadya Melani Putri Vika Kaemba- would like to express their sincere gratitude to the Direktorat Penelitian dan Pengabdian kepada Masyarakat, Direktorat Jenderal Riset dan Pengembangan, Kementerian Pendidikan Tinggi, Sains, dan Teknologi for funding this research through the 2026 Research and Community Service Grant Program, under Grant Number 285/C3/DT.05.00/PL-BARU/2026; 042/LL6/AL.04.03/PL-BARU/2026; 053/UDB.LPPM/A.34-HK/II/2026. This study is based on a Penelitian Dosen Pemula (PDP) titled “Marketing Strategy Modeling for Solo Traditional Culinary Souvenir Products Using a Hybrid TOPSIS-EWM Approach to Support Microeconomic Sustainability”. We thank to Universitas Duta Bangsa Surakarta, PLUT DINKOP UKM Surakarta for the collaboration and support. We also acknowledge the valuable contributions of the participating students, experts and respondents, whose insights have enriched this research. Finally, we express our deepest appreciation to all individuals and institutions who contributed, directly or indirectly, to the successful completion of this research.

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