Model For Marketing Strategy Decision Based On Multicriteria Decision Making: A Case Study In Batik Madura Industry

I D Anna, I Cahyadi, A Yakin

Department of Industrial Engineering, University of Trunojoyo Madura, Jl. Raya Telang, Kamal, Bangkalan, Madura 69162 Indonesia

Email : deefi_fian@yahoo.com

Abstract. Selection of marketing strategy is a prominent competitive advantage for small and medium enterprises business development. The selection process is is a multiple criteria decision-making problem, which includes evaluation of various attributes or criteria in a process of strategy formulation. The objective of this paper is to develop a model for the selection of a marketing strategy in Batik Madura industry. The current study proposes an integrated approach based on analytic network process (ANP) and technique for order preference by similarity to ideal solution (TOPSIS) to determine the best strategy for Batik Madura marketing problems. Based on the results of group decision-making technique, this study selected fourteen criteria, including consistency, cost, trend following, customer loyalty, business volume, uniqueness manpower, customer numbers, promotion, branding, business network, outlet location, credibility and the innovation as Batik Madura marketing strategy evaluation criteria. A survey questionnaire developed from literature review was distributed to a sample frame of Batik Madura SMEs in Pamekasan. In the decision procedure step, expert evaluators were asked to establish the decision matrix by comparing the marketing strategy alternatives under each of the individual criteria. Then, considerations obtained from ANP and TOPSIS methods were applied to build the specific criteria constraints and range of the launch strategy in the model. The model in this study demonstrates that, under current business situation, Straight-focus marketing strategy is the best marketing strategy for Batik Madura SMEs in Pamekasan.

1. Introduction

Batik industry plays an important role in the economy development in Madura. In the case of Madura island, batik industry has shown its potential to boost income and employment rate of the Madura’s people through expansive domestic and international trade. Currently, Batik Madura industry is undergoing a transformation process, from home-based business entities into a more organized Small and Medium Enterprises (SMEs), capable of developing economies in the local villages in Madura. In order to improve the competitiveness of Batik Madura industry in the era of global trade and the implementation of ASEAN Economic Community (AEC) in 2015, SMEs involved in the batik industry must be able to manage their business processes and increase their efficiency, productivity, speed and flexibility.

Batik Madura should optimize their business process as an anticipation of AEC 2015 implementation and the international trade liberalization. This situation actually offer many opportunities for Batik Madura industry to expand their marketing areas in order to meet domestic and...
international customers' demand and trend. However, marketing of textile industry products is generally characterized by uncertainty and difficult to predict [1]. In particular, Batik industry endures high level of competition, which makes batik industry highly dependent to their consumers as their product price is wholly determined by the market [2]. This is due to the short life cycle of a product, since the types of products in the textile market vary widely from one place to another. Thus, the marketing strategies needs to be carefully developed so that textile industry can quickly meet their consumer demand and have better chances to compete [3]. Based on the above description, the characteristics of the batik industry, as a textile industry should focus on timely fulfillment of the market’s demand which requires an accurate, precise and effective product marketing strategy.

Batik Madura industry poses many challenges, such as intense competition and ineffective marketing that will ultimately affect their business performance and reduce their profits. As a result, many Batik Madura companies would suffer losses, go out of business or switch to other types of businesses. In the long run, the sustainability of Batik industry in Madura Island is threatened. Management of marketing strategies will help SMEs to survive in an increasingly unpredictable business environment. A good marketing strategy is expected to help the parties involved in the supply chain of batik industry to improve the operational efficiency of the company and improve the existing marketing process. So that Batik Madura industry can maintain its profit and able to compete in free market. The strategy proposes in this research refers to Porter's [4] business unit level marketing strategies of differentiation strategy, focus and cost leadership, and people-based network marketing proposed by Van den Bulte [5].

Decision-making in selecting appropriate marketing strategy are influenced by many criteria. In this research, the integration ANP and TOPSIS is used to select the marketing strategy of Batik industry in Madura Island. ANP is an effective tool for evaluating the multicriteria decision making [6]. ANP can capture the outcome of dependence within and between cluster of elements [7]. ANP and TOPSIS can consider not only tangible and intangible criteria but also multi-choice aspiration levels [8]. The ANP method will generate the priorities of criteria and alternative that will be used as the input of the TOPSIS method. The result of TOPSIS method will be used in determining the priority of marketing strategy. Data processing to know the weight of each alternative marketing strategy based on existing criteria will be obtained, so that the optimal marketing strategy for Batik Madura SMEs can be selected based on the largest weight.

2. Methodology

A survey questionnaire developed from literature review was distributed to a sample frame of Batik Madura SMEs in Pamekasan. The survey was conducted to identify the SMEs’ marketing strategy and related criteria in selecting their strategy. Then, the marketing strategy alternatives and the selection criteria were consulted with the owners of the SMEs and government officials, considered as the experts of Batik Madura and relevant stakeholders of SMEs development in Pamekasan. The results from the interviews with those respondents were used to plot the relationships between the marketing strategy alternatives and the selection criteria. ANP methodology was employed to develop a model that reflect the interrelationships among criteria in marketing strategy selection. The ANP model is required to define the elements and their assignment to relationships, as well as their clusters. Moreover, the priority over certain marketing strategy was obtained through calculation of a supermatrix, which is a partitioned matrix of the interdependence influences among the criteria. The output from ANP model was carried upon TOPSIS methodology to determine an appropriate alternative that is farthest the negative-ideal solution and closest to the ideal solution in a multidimensional computing space as the preferred choice.

3. Results and Discussion

The influence between criteria and marketing strategy has been explored in previous studies. There are 14 criteria considered in this research. Six criteria are derived from Puspitasari and Ciptomulyono [9] which includes consistency (A), cost (B), trend following (C), customer loyalty (D),
business volume (E), and uniqueness (F). Two criteria come from Fidian [10] consisting of manpower (G) and the customer numbers (H) and the rest of criteria from the group discussion were promotion (I), branding (J), business network (K), outlet location (L), credibility (M) and the innovation (N).

According the literature review and interview results, this research adopted marketing strategies classified by Porter (1980), including cost leadership (P), differentiation (Q), focus (R) as well as People (S) and Place-based (T) marketing strategy coined by Puspitasari and Ciptomulyono [9].

A group discussion were conducted in order to determine the work structure or relationship in the considered criteria of marketing strategy alternatives. This research developed an interdependence relationship between the evaluation criteria, which was obtained from the interview results with the experts of Batik Madura in Pamekasan. The network model along with the influential criteria of marketing strategy alternatives were used as the foundation for ANP model development. The ANP model for Batik Madura SMEs in Pamekasan is shown in Figure 1.

Figure 1. The ANP model for Batik Madura SMEs in Pamekasan

The weighing evaluation of all proposed criteria were conducted by the respondents, pairwise without assuming their interdependence. The results were used to calculate the geometric means based on this formula:

$$U = \sqrt[n]{x_1 x_2 \ldots x_n}$$  \hspace{1cm} (1)

Table 1, 2, 3, 4 and 5 present the geometric mean of the evaluators’ pair wise comparison values for the alternatives cost leadership, focus, differentiation, people, and place.

| Table 1. Criteria pairwise comparison matrix for cost leadership alternative |
|-------------------------|---------|-------|-------|-------|-------|-------|-------|
| Criteria | B    | D    | E    | H    | K    | M    | N    |
| B        | 1     | 0.404 | 0.583 | 0.142 | 0.584 | 0.393 | 0.464 |
| D        | 2.458 | 1     | 0.194 | 0.479 | 0.383 | 0.393 | 0.476 |
| E        | 1.704 | 5.13  | 1     | 0.479 | 0.583 | 0.393 | 0.491 |
| H        | 7.114 | 2.08  | 2.08  | 1     | 0.518 | 0.425 | 0.476 |
| K        | 1.741 | 2.612 | 1.704 | 1.907 | 1     | 0.425 | 0.503 |
| M        | 2.530 | 2.53  | 2.53  | 2.327 | 2.327 | 1     | 0.917 |
Table 2. Criteria pairwise comparison matrix for focus alternative

| Criteria | B   | C   | D   | E   | F   | H   | J   | K   | N   |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| B        | 1   | 0.691 | 0.794 | 0.197 | 0.23 | 0.134 | 0.439 | 0.478 | 0.393 |
| C        | 1.442 | 1   | 0.479 | 0.402 | 0.28 | 0.249 | 0.476 | 0.68  | 0.461 |
| D        | 1.26 | 2.08 | 1   | 0.28 | 0.263 | 0.172 | 0.476 | 0.518 | 0.425 |
| E        | 5.013 | 2.52 | 3.557 | 1   | 0.23 | 0.479 | 0.536 | 0.552 | 0.393 |
| F        | 4.327 | 3.557 | 3.826 | 4.327 | 1   | 0.32 | 0.476 | 0.518 | 0.45 |
| H        | 7.399 | 3.979 | 5.739 | 2.08 | 3.302 | 1   | 0.503 | 0.583 | 0.425 |
| J        | 2.247 | 2.066 | 2.066 | 1.847 | 2.066 | 1.987 | 1   | 0.439 | 0.425 |
| K        | 2.073 | 1.455 | 1.907 | 1.811 | 1.907 | 1.704 | 2.247 | 1   | 0.425 |
| N        | 2.53  | 2.14  | 2.327 | 2.53 | 2.433 | 2.327 | 2.327 | 2.237 | 1   |

Table 3. Criteria pairwise comparison matrix for differentiation alternative

| Criteria | B   | C   | F   | I   | J   | N   |
|----------|-----|-----|-----|-----|-----|-----|
| B        | 1   | 0.249 | 0.11 | 0.116 | 0.116 | 0.11 |
| C        | 3.979 | 1   | 0.23 | 0.507 | 0.28  | 0.281 |
| F        | 9   | 4.327 | 1   | 0.383 | 0.331 | 0.243 |
| I        | 8.653 | 2   | 2.612 | 1   | 0.23 | 0.249 |
| J        | 8.653 | 3.42 | 2.99 | 4.327 | 1   | 0.331 |
| N        | 9   | 3.78  | 4.16 | 3.979 | 3   | 1   |

Table 4. Criteria pairwise comparison matrix for people alternative

| Criteria | G   | I   | K   | L   | M   |
|----------|-----|-----|-----|-----|-----|
| G        | 1   | 0.997 | 0.478 | 0.731 | 0.296 |
| I        | 0.997 | 1   | 0.209 | 0.263 | 0.168 |
| K        | 2.073 | 1.437 | 1   | 0.691 | 0.249 |
| L        | 1.382 | 3.979 | 1.437 | 1   | 1.116 |
| M        | 3.42  | 6   | 3.979 | 8.653 | 1   |

Table 5. Criteria pairwise comparison matrix for place alternative

| Criteria | I   | L   |
|----------|-----|-----|
| I        | 1   | 0.2 |
| L        | 5   | 1   |

Super Decision Software was used to construct ANP supermatrix based on the geometric means value of the alternatives under each of the individual criteria. Results from ANP methodology were used as input for TOPSIS methodology to determine the preference value of each criteria from the selected marketing strategy, in this particular case, a more focused marketing strategy. The TOPSIS method is started by constructing positive ideal solution matrix and a negative ideal solution matrix.
The positive ideal solution is the best value of each criteria in the chosen alternative, whereas the value of the negative ideal solution is the lowest value of each criteria (table 6).

### Table 6. The overall priorities for the candidate marketing strategies

| Alternatives          | B  | J  | N  | K  | H  | G  | E  | A  | M  | L  | D  | C  | I  | K  |
|-----------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Cost leadership       | 0.195 | 0 | 0.159 | 0.223 | 0.26 | 0 | 0.81 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 |
| Differentiation       | 0.805 | 0.099 | 0.464 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.28 | 0.5 | 0.3 |
| Focus                 | 0 | 0.9 | 0.77 | 0.458 | 0.74 | 0 | 0.18 | 1 | 0 | 0 | 0.8 | 0.72 | 0 | 0.7 |
| People                | 0 | 0 | 0 | 0.19 | 0 | 1 | 0 | 0 | 0.45 | 0.8 | 0 | 0 | 0.23 | 0 |
| Place                 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.55 | 0.1 | 0 | 0 | 0.27 | 0 |
| Value of positive ideal solution | 0.805 | 0.9 | 0.464 | 0.457 | 0.74 | 1 | 0.81 | 1 | 0.55 | 0.8 | 0.8 | 0.72 | 0.5 | 0.7 |
| Value of negative ideal solution | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 0 |

The distances of each criteria to the ideal solution and the negative-ideal solution were calculated by using these formulas:

\[
S_i^+ = \sqrt{\sum_{j=1}^{n}(v_{ij} - v_{ij}^+)^2} \tag{2}
\]

\[
S_i^- = \sqrt{\sum_{j=1}^{n}(v_{ij} - v_{ij}^-)^2} \tag{3}
\]

The distances of each criteria to the positive- ideal solution \((S_i^+\) and the negative-ideal solution \((S_i^-)\) were calculated by using these formulas and the result is shown in table 7.

### Table 7. The overall priorities for the candidate marketing strategies

| Alternatives          | \(S_i^+\) | \(S_i^-\) |
|-----------------------|-----------|-----------|
| Cost leadership       | 2.515     | 0.910     |
| Differentiation       | 2.482     | 0.806     |
| Focus                 | 1.832     | 2.108     |
| People                | 2.384     | 1.454     |
| Place                 | 2.719     | 0.626     |

The preference value of each criteria is determined as follows:

\[
V_i = \frac{S_i^-}{S_i^+ + S_i^-} \tag{4}
\]
The overall priorities for the appropriate marketing strategy were calculated by multiplying the weighted normalized decision matrix by the relative importance of the criteria considering interdependence. The result is shown in Table 8. In table 8, it can seen that the focus strategy has the greatest preference value compared to the other alternatives which is 0.5350, followed by people strategy with preference value of 0.3788 and so on.

| Alternatives | Preference Value | Rank |
|--------------|------------------|------|
| Cost leadership | 0.2657 | 3 |
| Differentiation | 0.2451 | 4 |
| Focus | 0.5350 | 1 |
| People | 0.3788 | 2 |
| Place | 0.1872 | 5 |

4. Conclusion
When a company is going to sale their products to market, managers are always challenged with finding the appropriate marketing strategy. The selected marketing strategy adopted will determine whether a company succeeds or fails. In order to sustain their existence in current global trade liberalization, Batik Madura SMEs in Pamekasan should adopt the best method and accurate criteria to solve and determine proper marketing strategy. Using ANP and TOPSIS approach, this paper illustrates that Batik Madura SMEs in Pamekasan should concentrate on maintaining their consistency, which can be utilized in practice to leverage their focus marketing strategy.

5. Acknowledgment
The author would like to thank the referees for the constructive comments and suggestions. This research was supported by International Journal Grant of Engineering Faculty, University of Trunojoyo Madura.

References
[1] Lo WS, and Hong TP 2012 A three-level multiple-agent early warning mechanism for preventing loss of customers in fashion supply chains In Fashion supply chain management : Industry and business analysis IGI Global pp. 173-184.
[2] Soekesi AM 2013 Characteristics of SMEs Batik on Batik Cluster Seri Kajian Ilmiah 15 pp. 63-70.
[3] Ernst H, Wayne DH and Carsten R 2010 Sales, marketing, and research-and-development cooperation across new product development stages: implications for success Journal of Marketing 74 5 pp. 80-92.
[4] Porter ME 1980 Competitive Strategy Techniques For Analyzing Industries And Competitors. 60th Edition. Free Press. New York.
[5] Bulte VC 2010 Opportunities and challenges in studying customer networks, London: Routledge.
[6] Peng Y, Kou G, Wang G, and Shi Y 2011 A Fusion approach of MCDM methods to rank multiclass classification algorithm Omega 39 pp. 677-689.
[7] Wu W, Kou G, Peng Y, and Ergu D 2012 Improved AHP-group decision making for investment strategy selection Technological and Economic Development of Economy 18 2 pp. 299-316.
[8] Liao CN, Lin CH, and Fu YK 2015 Integrative model for the selection of a new product lunch strategy based on ANP, TOPSIS and MCGP : a case study Technological and Economic Development of Economy

[9] Fidian R 2012 Decision making of best marketing using ANP and TOPSIS Methods (Surabaya : Institut Teknologi Sepuluh Nopember).

[10] Puspitasari A, and Ciptomulyono U 2011 The application of Zero one goal programming, DEMATEL, and ANP for optimization of selection of marketing strategy (Surabaya : Institut Teknologi Sepuluh Nopember).