Generating Competitive Priority Strategy in Transformer Industry

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Abstract: The transformer market competition in Indonesia is getting more attractive and dynamic. This encourages transformer manufacturers to improve competitiveness, such as quality, cost, timely delivery, and service. Therefore, companies need to understand customer needs and choose the right competition strategy. There are three alternative strategies to compete, cost leadership, differentiation, and focus. This research understands the customer needs and choose the right strategy to face the competition. The design of this study used survey and data collection through questionnaires. Data analysis methods using QFD and AHP combined with Focus Group Discussion (FGD) implementation. QFD analysis results in the form of the house of quality shows two major things: recommendations action for internal improvement and priority contribution value which will be the next input analysis with AHP method. The result of AHP analysis on the priority of contribution value in choosing an alternative strategy shows that the most appropriate strategy is differentiation, with the company focus on its competitive advantage. Practical implications of this research, for the management need to increase production through efficiency and cost reduction. This research develops product development theory by digging priority customer needs as one element to determine the competition strategy.

1   INTRODUCTION

Energy is the most important thing in human life. Parallel with increasing the human population and social economical increment, people's needs of electricity continues to increase year to year, including the need for transformers. This condition is in line with the government's policy to upgrade Indonesia's Electricity Supply to be 35,000 MW in the next five years (Abdurrahman, 2015). Relating to today's business competition, each company should pay attention to competition factors, such as quality, product features, functionality and reliability of products, services, available stock, the company's reputation, knowledge of sales people to their product, and competitive prices (Fahey, 1999). The above background explains that transformer market competition concentrated on four main keywords there are quality, cost, delivery, and services. Therefore this study can answer the five competitive forces (rival competition, newcomer threats, product substitution threats, supplier bargaining power, customer bargaining power), there are three generic successful strategic approaches to outperform the competitors: Cost Leadership, Differentiation, and Focus on specific target markets (Porter M., 1980). Therefore company should able to define the right strategy.

Research related to QCDS is from Rochmoeljati, (2006) which perform performance measurement of supplier based on vendor performance indicator (VPI) with the method of quality cost delivery flexibility responsiveness at the stainless steel company. From the result of the research, it finds that the important supplier plate performance evaluation system at the stainless steel company is for Quality (0,408), Cost (0,204), Delivery (0,204), Responsiveness (0,071), flexibility (0,112). Several studies related to the strategy of market competition and customer satisfaction based on AHP methods are among others by Ocampo and Clark in An AHP-MOLP Approach on Prioritizing Competitive Strategies Toward Sustainable Business (Ocampo & Clark, 2014) and research conducted by Wang, Liu, and Ou, The Evaluation Study of Customer Satisfaction Based on Gray–AHP Method for B2C Electronic-Commerce Enterprise (Wang, Liu, & Ou, 2007). Ocampo and Clark research on the select

strategies in their correlation competition with the triple bottom line where the business not only focus on the benefits alone, but rather need to pay attention to environmental aspects and human support of develop he business itself. The AHP and Multi Aim Linear Programing methods used to find the optimal correlation value of the above three focuses (Profit, People, and Planet). In conclusion Ocampo's research finds an alternative of business priority competitively in terms of economic, social and environmental dimensions. While Wang, Liu, and Ou's research focused more on mathematical calculations by incorporating Gray's evaluation and hierarchy evaluation to test the level of customer satisfaction with B2C (Business to Consumer) electronic commerce companies. Using Gray-AHP to test mathematical models and build a customer satisfaction evaluation system through conditioning the evaluation indicator system. In his research, Wang, Liu, and Ou used 3 level criteria with each of the 4 indicator levels. Meanwhile, research based on the QFD method has done by Felice and Petrillo from the University of Cassino, Faculty of Engineering, ITALY that combines the use of QFD with AHP to assess the customer needs (De Felice & Petrillo, 2010). De Felice and Petrillo research on filter products from ceramic materials, so they compile survey questions with only nine indicators, namely: filtering power, capacity of regulating the flow, lifetime, dimensional of specification of coupling, product certificated, and competitive price. This research uses QFD method to determine attribute criteria of QCDS and AHP based market competition to determine market competition strategy. attributes used in this study are twenty indicators. This is due to the level of complexity of transformer products is much more complex.

This research problem limited: (1) The study focuses on twenty indicators offered by Fahey, as mentioned above (Fahey, 1999); (2) The transformer product limited to the distribution transformer. Referring to the research problem formulation, the research objectives planned: understand the customer needs and choose the right strategy in facing transformer market competition in Indonesia. The results expected to be useful create strategic management science. Also, to be an input to improve the company's competition strategy, make continuous improvement to improve the company's advantage.

2 LITERATURE REVIEW

2.1 Product Review

A transformer is a device that transfers power between two or more electrical circuits through electromagnetic induction. An alternating voltage (Vp) applied to the PRIMARY creates an alternating current (Ip) through the primary. This current produces an alternating magnetic flux in the magnetic core. This alternating magnetic flux induces a voltage in each turn of the primary and in each turn of the SECONDARY. The transformer production process divided into three steps, there are:

- Mechanical Process: The process of making a tank that uses as a transformer's body.
- Electrical Process: we call or inner transformer or active part, the inside sub assembly parts is the active source of the generation power or voltage drop, and
- Final Assembly Process: The process of combining the active part into the tank and finally is the installation process of all transformer accessories.

Since these 3 steps finished, whole units of the produced transformer must follow quality test phase. Once it passed, therefore transformer can deliver, otherwise reworked. In addition, several service processes that also a concern of the company are technical training and technical services under customer needs and demands.

2.2 Management Strategy Concept

Strategy Management is a series of managerial decisions that determine the success of the company in the long term (Ambarwati, *et al*., 2014). It comprises three stages: strategy formulation, strategy implementation, and strategy evaluation. Strategy formulation includes developing the vision and mission, identifying external opportunities and threats, determining internal strengths and weaknesses, establishing long-term goals, planning alternatives, and selecting strategies to implement (Porter M., 1987). In strategic management, corporate management activities involved plan multiple business units as an operational sequence (Goold, Campbell, Alexander, 1994). Implementation strategies require companies to set an annual goal, create policies, motivate employees, and divide resources so that a planned strategy can run (David, 2011). Strategy evaluation is the final stage in strategic management. Market competition will

dynamically follow the businesses and industry grows. There are five forces of competition considered: *Competition rival*, *Competition among similar industries*; *The threat of newcomers*, it can be a serious threat to old players, including in the transformer industry; *The threat of replacement products*, technological changes enable significant threats, such as the experienced by Kodak and Nokia; *Supplier bargaining power*, supplier relationship with the customer should be a partner, and *Bargaining power of customers*, customers have its own bargaining power for suppliers and can suppress them. Answering this competitive challenge, there are three alternative competitive strategies, **Cost Leadership**, **Differentiation**, and **Focus** (Porter M., 1980):

Cost Leadership, this strategy guides companies to aggressively perform efficiency, tightening controls in cost reduction process. The principle is to avoid costs that are not the main post of the business process, with consistently keep the product quality, services, and proximity to customers.

Differentiation, the second strategy is provides a distinctive value of products and services offered, creates something unique to customers, and is a competitive advantage over the competitors.

Focus, This strategy is on a particular market group. A goal is to serve a certain target well, and every functional policy within the organization on this strategy. A key of this strategy is the belief that companies can reach their strategic targets more effective or efficient than competitors playing in the broader segment. Referring to Dr. Liam Fahey, the competitive indicators in this study can be seen in Appendix 1.

3 RESEARCH METHODOLOGY

This study aims to understand the customer needs and choose the right strategy to face the competition. Locate this study is all of BCD branches in Indonesia. This research is within a three month period is from October to December 2017.

The research data is in two stages. First, questionnaires distributed to 33 companies of BCD's customers who also bought the competitor's products. Questions is focuses to the level of Customer Interests of the attributes, the level of satisfaction on PT. BCD's product, and the level of satisfaction on the competitor's product. The second stage is discussion with the BODs and managers of the PT. BCD to discuss the alternative options of a strategy through pair-wise comparison matrix on the

AHP method. Respondents were 10 managers and 3 directors as organizational decision maker.

The customer satisfaction questionnaire organized according to Fahey's attributes. While the data collection getting by distribution of questionnaires through BCD's sales team directly visit to customer get discussion over there. Validity and reliability test begins the data processing steps if valid and reliable then the research continued.

4 ANALYSIS AND DISCUSSION

In this section, the author will explain the data processing on this research by using QFD and AHP methods.

4.1 Data Sufficiency test

For n = 33 with the error rate 0.05 where $Z_{(\alpha/2)}$ = 1.96 and the proportion of respondents satisfied and not satisfied is 0.5. The number of respondents who meet the criteria is 30 respondents while the minimum sample size is 28 respondents. Then the sufficiency test of the data declared has fulfilled

4.2 Validity and Reliability test

Validity test of customer satisfaction data and value Customer Interests data on Fahey's attributes with the number of responded, n = 30 and α = 5%, where r table 0.3 result from SolAnd 2.1 calculation of correlation coefficient value for both data is valid.

The result of running SolAnd 2.1, in got that coefficient α Cronbach declared reliable, with a value of customer satisfaction reliability, consecutively are BCD 0,920; TFD 0.918; And AST 0.909. While the reliability for value Customer Interests is 0.93.

4.3 Preparation of HOQ (House of Quality)

The steps of HOQ preparation are: First determine the value of customer satisfaction and competitive satisfaction performance got from the data of the respondent's satisfaction level of each attribute. Next, set the goals for each attribute determined by management. The basis of goal value, determined from the highest level of satisfaction on each product attribute even though it occurs on other brands (Wijaya, 2011). The important customer interest on attributes can take directly from the questionnaire. The value of customer needs as to explain the value

of customer interest can be seen in Appendix 2 about HOQ below.

Improvement ratio results from goals devided by today's customer satisfaction value, that is showing if the determined goal has reached. Averages, the value of BCD's customer satisfaction has outperformed its competitors, so BCD's improvement ratio is 1, except the brand image.

Sales point is the ability to sell the product attributes based on management perceptions on the value added of each attribute. Sales point setting based on: 1.0=No Sales Point, no value added to the product; 1.2=Medium Sales Point, there is value added but not significant; 1.5=Strong Sales Point, value added to the product is high.

Raw weight is the weight of an attribute, multiplication between customer needs with improvement ratio and sales point. While *normalized raw weight*, is the value of raw weight divided by total raw weight. This raw weight value will be useful for calculating the contribution value when you have determined the technical response and the numerical value for each technical response. *Contribution value* is the output of the QFD analysis seen in the house of quality.

4.4 Technical Response and Correlation of Technical Requirement

Generating Technical Response is the answer to the problems of customers on each product attribute. Technical responses can be seen in the house of quality.

4.5 Action Priority

In choosing the priority of technical response calculated based on value of customer interest. First is state contribute each technical response. *Contribution value* of the technical response is the multiplication of raw weight with the relationship value (numeric number as a differentiation to replace the correlation code: ● = 9; ○ = 3; △ = 1).

4.6 Own Performance and Competitive Benchmarking

Own performance is customer satisfaction value multiple with relationship value, it is forecasting the future customer satisfaction if the technical response done. The competitive benchmark value is similar methods, with own performance calculation by change the satisfaction value using the competitor's customer satisfaction value, respectively. Assuming

the value of relationship is equal with BCD to the easy compare of benchmarking purposes.

4.7 Important Action and Improvement Target

Important Action is the numeric value from technical response multiple with the value of customer interest. Improvement target of the action returned to management judgment. The important action value is in the house of a quality image.

4.8 Priority of Improvement Action

The improvement project is impossible to do in one short activity, but there have to be an action and step by step, how to do? we need to prioritize the action. The priority chosen based on the important action at HOQ. If the priority of action organized according to its importance action, then we will find the Figure 1 about Pareto curve as shown below:
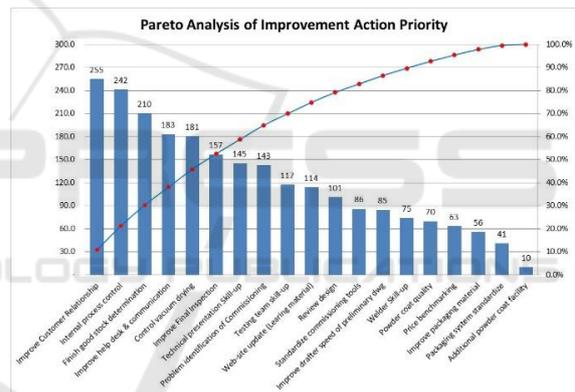
Figure 1: Pareto Analysis of Improvement Action.

4.9 Determine the Alternative Decision Making

The first aim of this study has answered with the results of QFD analysis and the above quality house. To answer the purpose of the second aim, the authors will present the result of BCD Management's discussion with AHP method. The output of QFD (the contribution value) becomes an input on AHP calculation to find out the alternative strategy.

4.10 Fair-wise comparison matrix, Eigen Vector, Normalized Eigen Vector, and Weight

The pair-wise comparison matrix generated by tabulating the data into the square matrix in the

columns and rows to the right of the diagonal. Eigen vector, calculate by completing the pair-wise comparison matrix on the left side of the diagonal with the reciprocal value of the pair comparison matrix. Weight calculation determined by normalizing the eigen vector (by summing each column and then dividing each cell with the sum of each column). The weight is the right-hand column which is the average of the sum of each line in the normalized eigen vector (Saaty, 1993).

To be proof the consistency of assessment, by sum the weight, if equal to 1, then we can declare that the matrix is consistent.

4.11 Management Decision Making

Sort the weight of each alternative strategy on the matrix, the greatest value is the best alternative value. To determine the best competition strategy is through discussion among managers and top management in FGD forum by use the QFD output becomes AHP input.

By making Pareto analysis of contribution value priority, got 14 attributes that have over 80% contribution. Then management selected 14 priority to mapping the alternative strategies by pair-wise comparison. From the results of AHP analysis we get the weight of the alternative strategy for each attribute can be seen in Appendix 3.

5 CONCLUSIONS

The conclusions that the authors take as the answer to the research question are: The biggest focus of customer attention is on the attributes of technical services such as commissioning, technical services, technical training, response time, and help desk. Looking at customer satisfaction goals, almost all of BCD's attributes has outperformed its competitors, except for the brand image, the competitor is superior. Thus, BCD Management needs more serious to improve Brand Image. Brand image becomes important after being given a technical response by management, although the customer places this attribute on the order of the 16 priority interests, but management gives the significant value for long-term strategy, that's why the priority of this attribute contribution becomes second priority after commissioning. In line with the value of contributions from priority of customer needs, there is eleven priority actions that need to be the concern for PT. BCD to improved. From the results of data analysis with AHP method, it concluded that the most appropriate strategy to implement by PT. BCD *is*

Differentiation strategy by the focus on the *company's advantage*. The *second alternative strategy is Cost Leadership* by a focus on improving product quality, functionality, and reliability, and an optimizing process efficiency.

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APPENDIX

Appendix 1. The Competitive Indicators of Transformer

Kriteria	Indikator	QCDS	Penjelasan
Quality	Q₁ *Visual of transformer*	Q	The visual quality of the transformer match with customer approved design.
	Q₂ *Electrical test result*	Q	Electrical testing result.
Features	F₁ *Packaging*	QD	Packanging of the transformer.
	F₂ *Coloring*	Q	The Color of tank
Functionality	U₁ *Performance*	Q	The transformer can work properly
	U₂ *Reliability*	Q	Life time of transformer in a normal work.
Services	S₁ *Commissioning*	Q S	The installation process in customer sites.
	S₂ *Help desk service*	S	Have a contact person clearly and care.
	S₃ *Technical training*	Q S	Company provide the knowledge sharing.
	S₄ *Technical service*	Q S	Ability of company to do refurbishment.
	S₅ *Response time*	Q S	How quick the response delivered.
Availability	A₁ *Remote warehouse & stock readiness*	D	Availability of out factory warehouse in ourder to provide available stock.
	A₂ *Delivery time*	QD	Ability to deliver on time as per contract.
Image and reputation	I₁ *Brand image*	Q S	Image of customer perception
	I₂ *Quick response reputation*	Q S	Reputation as per customer perception
Relationships and sales knowledge	R₁ *Relationship with customer*	Q S	The ability of the sales team to establish good relationships with customers.
	R₂ *Sales product knowledge*	Q S	Sales team knowledge on the product, such as technical, quality, specification, etc.
Price	P₁ *Quotation*	C S Q	Speed of the quotation offer according to customer expectations
	P₂ *Value*	C S	The price paid for the products and services the customer receives is worth.
	P₃ *Price performance*	CQ S	A price offering compared to competitors (cheaper, more expensive, equivalent)

Appendix 2. House of Quality

Technical characteristics (columns), left to right:
P3 Price performance, P2 Price Value, P1 Speed of Quotation, R2 Sales product knowledge, R1 Relationship with customer, I2 Quick response reputation, I1 Brand image, A2 Delivery time, A1 Remote warehouse & stock readiness, S5 Response time, S4 Technical service, S3 Technical training, S2 Help desk service, S1 Commissioning, U2 Reliability, U1 Performance, F2 Coloring, F1 Packaging, Q2 Electrical test result, Q1 Visual of Transformer

Important Action for Improvement (rows), with value:
- Welder Skill-up — 75
- Powder coat quality — 70
- Review design — 101
- Internal process control — 242
- Testing team skill-up — 117
- Improve packaging material — 56
- Packaging system standardize — 41
- Additional powder coat facility — 10
- Improve Final Inspection — 157
- Control vacuum drying — 181
- Standardize commissioning tools — 86
- Problem identification of Commissioning — 143
- Technical presentation Skill-up — 145
- Web-site update (Learing material) — 114
- Improve help desk & communication — 183
- Finish good stock determination — 210
- Improve Customer Relationship — 255
- Improve drafter speed of preliminary dwg — 85
- Price benchmarking — 63

	P3	P2	P1	R2	R1	I2	I1	A2	A1	S5	S4	S3	S2	S1	U2	U1	F2	F1	Q2	Q1
Important to customer	4.0	3.9	4.0	4.1	3.9	4.1	3.7	4.0	3.7	4.1	4.3	4.0	4.1	4.4	4.1	3.3	3.3	3.3	4.4	3.2
Raw weight	4.76	4.64	6.00	6.10	5.90	6.15	4.55	6.05	4.48	6.15	6.50	4.84	4.92	6.55	6.15	4.90	3.33	3.92	6.60	3.80
Contribution	195.2	102.1	114.0	128.1	194.7	227.6	286.6	127.1	40.3	153.8	182.0	159.7	152.5	334.1	123.0	132.3	83.3	86.2	204.6	152.0
BCD's Customer Satisfaction	4.000	4.100	4.133	4.000	4.200	4.000	3.933	3.900	3.967	3.767	3.933	3.733	4.233	4.033	4.033	4.233	3.933	3.967	4.367	4.100
BCD Performance	164.00	90.20	78.53	84.00	138.60	148.00	247.80	81.90	35.70	94.17	110.13	123.20	131.23	205.70	80.67	114.30	98.33	87.27	135.37	164.00
TFD Performance	154.43	81.40	65.87	73.50	113.30	131.97	256.20	76.30	32.70	84.17	93.33	103.40	104.37	183.60	72.67	102.60	92.50	83.60	125.03	148.00
AST Performance	136.67	73.33	59.53	65.80	106.70	115.93	197.40	67.20	28.20	78.33	93.33	104.50	99.20	168.30	65.33	95.40	81.67	74.07	108.50	129.33

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Appendix 3. Value of Weight for Priority Attributes

Alternatif Strategi	S1	I1	I2	Q2	P3	R1	S4	S3	S5	S2	Q1	U1	R2	A2	Sum
Cost Leadership	0.19	0.17	0.19	0.05	0.75	0.44	0.22	0.11	0.10	0.19	0.17	0.19	0.13	0.78	3.68
Differentiation	0.75	0.73	0.74	0.74	0.19	0.49	0.73	0.30	0.69	0.71	0.77	0.72	0.75	0.15	8.46
Focus	0.06	0.10	0.07	0.20	0.06	0.08	0.05	0.59	0.21	0.10	0.06	0.08	0.12	0.07	1.85

Value of Weight for Priority Attributes