



RESEARCH ARTICLE

ANALYSIS OF CONSUMER ATTITUDE TOWARD PRODUCT ATTRIBUTES OF FLOW CYTOMETER

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ABSTRACT

Guava is one of Flow Cytometers that marketed in Indonesia. The aims of this study were to identify which product attributes of Flow Cytometer are most important to consumer, to analyze the consumer attitude toward product attributes of Guava comparing to the two competitors, and to identify Guava brand positioning in the market. The study involved 50 respondents that were selected by convenience sampling, in which the respondents had knowledge and experience in using Flow Cytometer. Descriptive analysis, Thurstone scale, Multiattribute Fishbein, and Biplot were used to analyze the data. The product attributes that were examined include: size, laser, detector, flow cell, sample, application, sample input, software, reagent, consumable, price, warranty, sales team, marketing team and technician team. The result showed that laser, detector, flow cell, software and application are the most important product attributes of Flow Cytometer to consumer. Consumer had the more positive attitude toward product attributes of Guava compare to its competitor. The result suggested the brand owner of Guava have to maintain its product attributes excellence and to improve its attributes weakness.

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INTRODUCTION

Currently biotechnology has become one of the symbols of the latest development of science and technology to improve the quality of human life. Biotechnology-based research includes areas such as molecular biology, cell biology, biochemistry, genetics, microbiology, chemistry, and process engineering and chemical engineering (Rothaermel and Deeds, 2004; Baumann, 2006; Buckel, 1996). Indonesia is a country with developing biotechnology based research. The research, especially in the field of cell biology, requires support of high technology equipment. One of the most crucial laboratory equipment in cell biology research is flow cytometer (Merril, 1998; Behrman et al, 2008).

The first commercial flow cytometer products were present in the market in 1974. Along with the development of research in the field of cell biology, the flow cytometer market is increasing. To date, there are dozens of flow cytometer products in the market. The availability of a wide range of flow cytometer products provides many alternative choices for consumer. Accurate, precise, and easy to obtain information are important things that consumer need in choosing flow

cytometer products that suit their needs (Dean and Hoffman, 2007; Shapiro, 1995).

The process of purchasing flow cytometer in Indonesia has been done through business to business (B2B), so that the role of consumers are companies, universities, hospitals, research institutes, and other institutions conducting research or diagnostics based on cell biology. Purchases can be made directly or through a tender process. The direct purchasing process is generally done by private institutions, while purchasing through tendering process is usually done by government institution. However, although the purchase process is done on a B2B basis, the proposal or purchase initiatives still come from researchers or laboratory staff as users of flow cytometer.

One of marketed flow cytometer in Indonesia is Guava. The presence of Guava is quite late in Indonesia comparing to its competitors. In the face of competition, companies need to know exactly what expectations, attitudes, behaviors, and attributes as the main considerations of the consumers in using flow cytometer products so that companies can determine the correct marketing strategy and product development. Moreover, the company should know the strengths and weaknesses of its

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products in the eyes of consumers compared with competitors to find out product positioning in the market (Engel et al, 1995; Kotler and Armstrong, 1996).

The aims of this study were to identify which product attributes of flow cytometer are most important to consumer, to analyze the consumer attitude toward product attributes of Guava comparing to the two competitors, and to identify Guava brand positioning in the market.

**MATERIAL AND METHODS**

**Research Approach**

This research used descriptive method with survey approach that was conducting interviews with respondents researchers and cell biology laboratory staff at two universities and three research institutes in Java. Surveys were conducted on samples that expected to represent the population. Primary data needed to answer the purpose of research obtained by interviewing respondents. In addition, to complement the implementation of this study also collected other data in the form of secondary data. Secondary data in this research obtained from other references that support the implementation of this research.

**Data Collection, Information Techniques and Sampling**

Data collection techniques were individual direct or indirect interviews using telephone or email. The direct interviews are conducted at the respondents' institution. Sampling in this research applied using judgmental sampling technique. The population in this study were researchers and laboratory staff that working in the field of cell biology in Java. Based on internal data from brand owner of Guava, the number of researchers and laboratory staff working in the field of cell biology amounted to 100 people. The sample of this research was a member of a population that meets the criteria of the sample unit, sample element, and time specified. The sample criteria were respondents who have knowledge of flow cytometer and have worked in the laboratory using flow cytometer. The number of samples was obtained based on the use of the Slovin formula, where n = number of examples, N = population size and e = the percentage of sample error that can still be tolerated. With 10% error percentage, the sample size used was 50 respondents that consist of 25 respondents from university and 25 respondents from research institute.

$$n = \frac{N}{1 + Ne^2}$$

**Data Analysis**

Collected data were analyzed using descriptive analysis, Thurstone scale, multi-attribute Fishbein and Biplot analysis. The Thurstone scale was performed by the scoring of five most important attributes of flow cytometer products. Respondents gave score 5 on the the most important attribute and 1 on the least one. The 15 attributes were summarized in table 1. The Fishbein Multiattribute Model formula was as follows, where  $A_0$  = attitude to object,  $b_i$  = the strength of consumer confidence in the i-th attribute,  $e_i$  = consumer evaluation of the i-th attribute, n = number of attributes on flow cytometer, i = attribute:

$$A_0 = \sum_{i=1}^n b_i e_i$$

**Table 1** Attributes of flow cytometer products

No	Atributes	No	Attributes
1	Size	9	Reagent
2	Laser	10	Disposable
3	Detector	11	Price
4	Flow Cell	12	Warranty
5	Sample	13	Sales team
6	Application	14	Marketing Team
7	Sample Input	15	Technician team
8	Software		

**RESULT AND DISCUSSIONS**

In this study, validity testing was obtained from the approval of experts who had been appointed (validity of Expert Judgment) while the reliability of the instrument of this study was tested by using the Crombachs Alpha reliability test. In the reliability test with Crombachs Alpha, the research instrument is considered reliable if it has crombachs value  $\alpha > 0.6$ . The result showed that all instruments had Crombachs Alpha value  $> 0.6$ , thus the instruments can be declared reliable and can be used as a research instrument. The reliability test results of the four research instruments was shown in table 2.

**Table 2** The reliability test results of the four research instruments

Instrument	Number of Valid Items	Crombachs Alpha	Reliability
Evaluate the importance level of the flow cytometer attribute	15	0.857	Reliable
Consumer confidence in the Guava brand attribute	15	0.830	Reliable
Consumer confidence in the competitor 1 brand attribute	15	0.830	Reliable
Consumer confidence in the competitor 2 brand attribute	15	0.920	Reliable

The characteristics of respondents classified based on gender, age, education level, time of working experience, position and institution were summarized in table 3. Based on the characteristics, most of the respondents were less than 40 years old with master education level and 1-10 year working experience. So they were expected to provide ideas as well as accurate information about the product attributes importance of flow cytometer.

**Table 3** The characteristics of respondents

Characteristics	Category	Frequency(f)	Percentage (%)
Gender	Female	36	72%
	Male	14	28%
Age	< 25 years old	3	6%
	25 - 30 years old	9	18%
	30 - 35 years old	14	28%
	35 - 40 years old	10	20%
	> 40 years old	14	28%
Qualification	Associate degree	3	6%
	Bachelor	11	22%
	Master	24	48%
Position	Doctor	12	24%
	Researcher	35	70%

	Researcher assistant	10	20%
	Technician	4	8%
	Student	1	2%
	Others	0	0%
	< 1 year	5	10%
Working experience	1 - 5 year	19	38%
	6 - 15 year	18	36%
	16 - 25 year	8	16%
	> 25 year	0	0%

In this study, the assessment of the most important attributes of flow cytometer products in the eyes of consumers was conducted by Thurstone scale method 5, that respondents were asked to name the 5 most important attributes. Thurstone score calculation results was shown in Figure 1.

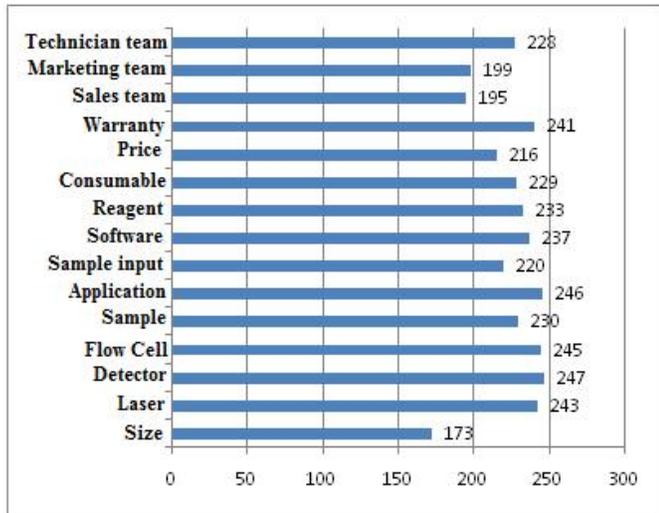


Figure 1 Thurstone score calculation results

Among the 15 attributes, there were 5 most important attributes according to the respondents. Figure 2 showed that attributes in Quadrant I (attributes that are the top priority) were: laser, detector, flow cell, sample and application. Further attributes in quadrant II were : sample intake, software, reagents, consumables, price, warranty, and technician team. While the attribute in quadrant III (low priority) was the equipment size, while the attributes that are in the quadrant IV (no priority) were sales and the marketing team.

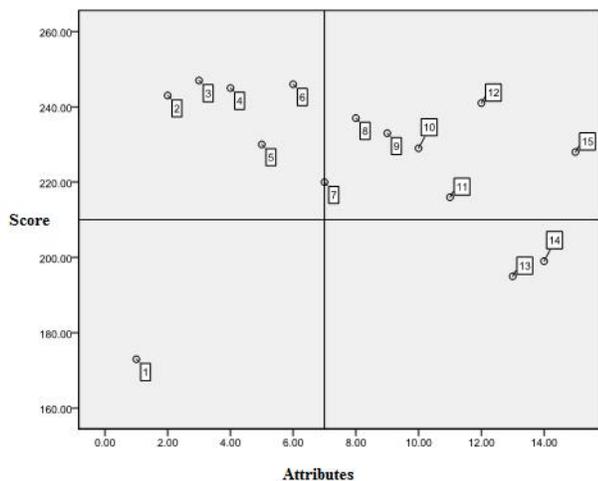


Figure 2 Important attributes of flowcytometer

The following was the result of respondents' attitudes toward Flow Cytometer products from the three brands studied, Guava, competitor 1 and competitor 2

Table 3 The characteristics of respondents

Atributes	ei	Guava		Competitor 1		Competitor 2	
		bi	ei x bi	bi	ei x bi	bi	ei x bi
Size	3.4	4.5	15.4	4.2	14.5	3.9	13.4
Laser	4.8	4.6	22.1	4.5	21.6	3.9	19.0
Detector	4.9	4.6	22.5	4.5	22.0	4.0	19.5
Flow Cell	4.8	4.5	21.7	4.5	21.6	4.0	19.4
Sample	4.5	4.5	20.4	4.4	19.9	3.9	17.7
Application	4.8	4.6	22.1	4.4	21.1	3.8	18.2
Sample input	4.3	4.6	19.7	4.3	18.5	3.3	14.1
Software	4.6	4.5	20.8	4.5	20.4	3.7	16.9
Reagent	4.5	4.3	19.4	4.2	18.6	3.8	17.1
Consumable	4.4	4.2	18.5	4.0	17.6	3.5	15.5
Price	4.1	4.1	17.0	3.5	14.4	3.5	14.2
Warranty	4.6	4.3	19.6	4.2	19.4	3.5	16.2
Sales team	3.6	3.8	13.8	3.8	13.8	3.4	12.2
Marketing team	3.7	3.9	14.3	3.9	14.3	3.2	11.8
Technician team	4.3	3.9	16.5	4.1	17.6	3.7	15.9
			283.8		275.3		227.7

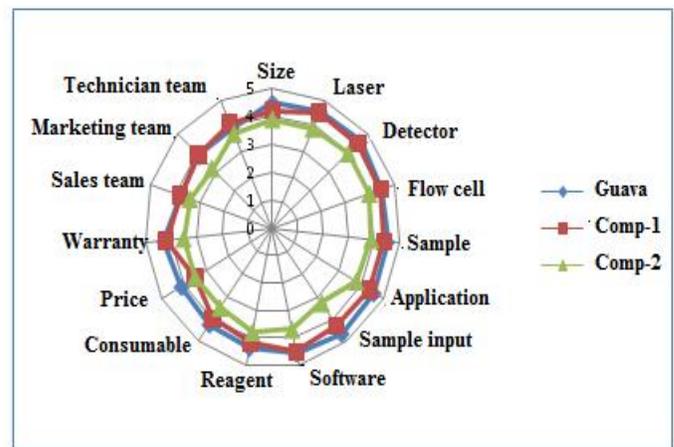


Figure 3 Multiattribute Fishbein analysis result

Based on the result of analysis of multi-attribute fishbein, attribute size, sample, sample input, price, sales team and technician team have bigger bi value compared with ei value, it showed that Guava brand was much preferred by consumers because its size, sample, sample input, price, sales team and marketing team. The owner of Guava brand should maintain the attributes of size, sample, sample input, price, sales team and product marketing team so that it is still favored by consumers. Furthermore, the competitor 1 results showed that the brand much preferred by consumers because of the size, sample input, sales team and marketing team. In addition, It had greater bi value than Guava brand for technician team attribute so that Guava owner should be able to consider the attributes of size, sample, sample input, sales team, marketing team as well as improve the performance of its technician team to improve competitiveness. Referring to the results of Fishbein multi-attribute analysis, it was known that generally Guava was preferred over the two competitors in all product attributes.

In this study, the positioning of Guava brand in the market was applied using biplot analysis. It can be seen in Figure 4 that indicated each brand had different characteristics. Furthermore the figure also informed that the 15 attributes clustered into 3 groups, namely group I which contains the attributes of technician team and sales team and group II which contains the

attributes flow cell, software, warranty, detector, sample, laser, consumabel , application, size, reagent and price. Based on the direction of the arrows, group I attributes tend to be in the same direction as the competitor 1 and group II attributes tend toward to Guava. This informed that consumers placed Guava as a better product for flow cell attributes, software, warranty, detector, sample, laser, consumables, application, size, reagent, marketing team and price compared to others. But consumers place the competitor 1 as a product with better technician and sales team compared to others. Competitor 2 had not been in a better position than two others.

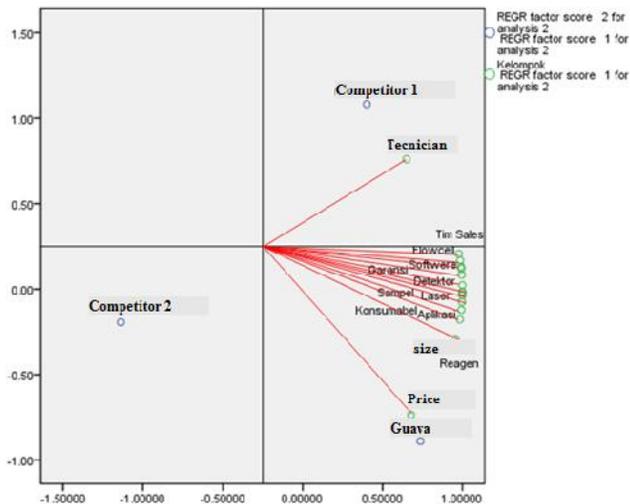


Figure 4 Positioning of Guava flow cytometer products in the analysis market

**CONCLUSIONS**

The most important flow cytometer attributes according to respondents were laser, detector, flow cell, software and application. Of the 15 attributes tested, the attributes that occupy the quadrant I (attributes of the top priority) are attributes Laser, Detector, Flow Cell, Samples and Applications, then attributes that are in quadrant II (the achievement needs to be maintained) were the attributes of sample intake, software, reagent, consumable, price, warranty and technician team.

Furthermore the attribute on quadrant III (low priority) was the size attribute, while the attributes that are in the quadrant IV (no priority) are the attributes of the sales team and the marketing team. Guava is widely favored by consumers for attributes: size, sample, sample intake, price, sales team and marketing team. The result suggested the brand owner of Guava to maintain its product attributes excellence and to improve its attributes weakness.

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