Quality Development of Products Based on Consumer Preferences: A Case Study of the Bread and Chocolate Cake Product

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ABSTRACT : *Quality product is an important aspect for consumers before dealing to accept or reject a product or service. Consumers preference include quality attributes who desired become the basic of product development priorities. This study aimed to identify quality attributes of bread and chocolate cake product that are a priority of development. There were an eleven bar chocolate product quality attributes identified, namely: taste, texture, aroma, product appearance, portion, variety, freshness, health, packaging, price fairness and discount. Consumer preferences to the quality of bread and chocolate cake product was acquired through filling questionnaires on the importance and performance level by the consumers. The analysis result using importance performance analysis method shows that taste, texture, aroma, product appearance, variety, freshness, health and packaging are priority attributes to be developed.*

Keywords- *chocolate cake and bread, quality product, consumer preference, importance performance analysis*

I. INTRODUCTION

The world chocolate industry has a tendency to grow every year. Cacao is strategic commodity and very important to the world due to its flavor and aroma that can not be not replaced by other commodities [1]. Based on the calculation of the international cocoa organization (International Cocoa Organization-ICCO), the transaction value of cocoa commodities reaches USD 10 billion per year during 2011-2012. The retail sale value of all chocolate products in 2012 was reported at USD 107 billion [2]. The 2014 Global chocolate industry revenues reached USD 117 billion, with chocolate industry growth up to 6% [2].

In the past twenty years, there is a tendency for an increase in chocolate consumption in the world (three countries with the highest consumption per capita: Swiss 9 kg / capita; Germany 7.9 kg / capita; Austria 7.8 kg / capita), whereas the increasing of chocolate consumption was estimated to continue to occur in the future. Public knowledge about the health benefits of the chemical content found in cocoa, is one of the main causes of the continued increase in the world chocolate consumption, including in Indonesia [3]. In addition as food and beverages, nowadays other types of cocoa derivative products as raw materials of cosmetics and medicines has widely been introduced to the market.

Indonesia has an opportunity to be center of the world's chocolate producers through the availability cocoa beans and producing quality chocolate products. Product development with a technology approach that continues to grow enables Indonesia not only as a cocoa producer, but also as a producer of quality and globally competitive chocolate. The downstream cocoa industry are complicated due to the final product as a chocolate, it is an amalgamation of raw materials such as sugar, milk and the other ingredients with various portions as additional ingredients [4]. Strengthening the cocoa processing industry through processing into end products are needed, because it has potential to gain added value for cocoa commodities which are generally in the downstream sector [5].

The growth of chocolate consumption in world who tend to increase every year also occurs in Indonesia. National consumption per capita level has now reached 0.25 kg/per person/year, before it only reached 0.1 kg/capita as seen in Figure 1. This potential require to be responded by industry through good quality chocolate products based on consumer preferences. The development quality product based on consumer preferences needs to be carried out by producers along changes in the needs and desires of consumers for a product or service [3].

Efforts to do cocoa industry are also carried out by the world's major cocoa bean producing countries. Ivory Coast and Ghana made the establishment of cocoa processing plants into intermediate products and even quality end product chocolate [6], [7], [8]. As the number four producer of cocoa beans in the world (260,000 tons/year), with national chocolate consumption rates continuing to grow, Indonesia has the potential for the availability of raw materials and potential markets to be developed. The development of quality bar chocolate based on consumer preferences is highly required by SMEs in order to produce chocolate products that have the potential to be well received by the market [5].
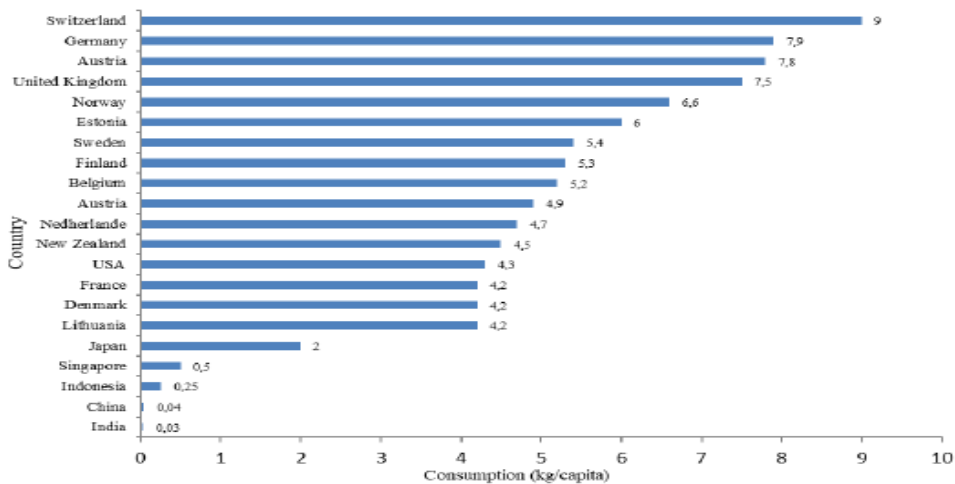
Figure 1. Chocolate consumption per capita in several countries by 2015.
(ICCO; Euromonitor; Faostat, edited).

II. METHOD AND MATERIALS

This study used sensory quality dimensions, such as: *taste*, *texture*, *aroma*, *product appearance* and *freshness*, referring to the sensory quality of product, in this case were bread and cake [3], [9]. Taste attribute refers to research [10], [11], [12]. Texture attribute refers to research [10], [12], [13], [14]. Aroma attribute refers to research 10], [15], [16]. Product appearance attribute refers to reasearch [15]. Freshness attribute refers to research [11], [17]. Health attribute refers to research [17],[18]. Packaging attribute refers to research [11], [19]. Variation attribute of bread and chocolate cake products refers to research [9], [17]. Price fairness and discount refer to research [9], [20].

Importance Performance Analysis

The research [21], asserted that importance performance analysis-IPA method can help organizations to identify the most appropriate strategies in making improvements. Research conducted by [22], confirms that the IPA method is a powerful evaluation tool for practitioners and academics to recognize good attributes that need to be improved and require corrective action. IPA method was first introduced by [23] with the aim to measure the relationship between consumer perceptions and the priority of product or service quality improvement known as quadrant analysis. IPA analysis shows the relationship between the importance level of an attribute possessed by a particular object and its performance level.

The research [24], confirms that IPA can be applied to identify the strengths and weaknesses of quality attributes from the customer's point of view by evaluating simultaneously on the importance and performance level. The aim of the application of IPA method is to display information about the factors of product attributes based on rhe consumer needs improvement as they have not met consumer expectations in general. The gap occurrence between the importance and performance level based on consumer preferences, requires an analysis of IPA to map the quadrant position of each of bar chocolate products quality attribute value. The assessment of importance and performance level using Likert Scale applied on this research questionnaire is shown in Table 1.

Table 1. Value of importance level and performance level on Likert Scale

Importance/Expectation		Performance/Satisfaction	
Answer	Score	Answer	Score
Really Unimportant (RU)	1	Really Unsatisfied (RU)	1
Unimportant (U)	2	Unsatisfied (U)	2
Less Important (LI)	3	Less Satisfied (LS)	3
Important (I)	4	Satisfied (S)	4
Really Important (RI)	5	Really Satisfied (RS)	5

The results of questionnaire analysis of 328 respondents who specifically routinely consumed bread and chocolate cake products were then being tested statistically on its validity and reliability. Analysis using IBM SPSS Statistics 21 software showed that there were no attribute items in the table value that had a validity coefficient below 0.108 (r-table). This value statistically confirms that the eleven

tested survey questions are declared valid. The value in the reliability test table showed that Alpha reliability coefficient was 0.778, if this value was compared with r Table (for N = 63, r Table value was 0.248), through that value (Alpha = 0.778> 0.248), it provides confirmation that the research instrument is reliable. The average value of importance and performance level of bar chocolate products is shown in Table 2. The average value of importance and performance level in the table indicates that there is a gap between them.

Table 2. Average value of importance level and performance level of bread and chocolate cake product

Bread and chocolate product	Average value
Importance Level	42.70
Performance Level	28.63

Response of respondents to Importance and Performance

Response of respondent to importance level of the bread product and chocolate cake are shown in table 3. The table calculates the frequency of the answer score, percentage, sum of total score and ideal score. Table 3 describes the responses in the form of respondents' assessment of bread and chocolate cake products at an importance level. Based on the result, it can be seen that the total score of bread and chocolate cake at an importance level was 14 007 or 77.64% of the total number of ideal scores, 18 040.

Further specific categories at achievement of these performance values can be identified by the analysis of its position on continuum line. On the contimum line, it can be seen that the total score of bread and chocolate cake product at the importance level was in the range 68%-84%, thus the respondent's response concerning bread and chocolate cake products at the level of importance belongs to "**Important**" category. Respondents' responses to eleven bread and chocolate chocolate product attributes assessed were: Taste, Texture, Aroma, Product appearance, Portion, Variety, Freshness, Health, Packaging, Price fairness, and Discount.

Table 3. Response of respondents at the importance level of product

No	Statement	RI		I		LI		U		RU		Total		Total Score	Ideal Score
		f	%	f	%	f	%	f	%	f	%	f	%		
1	P1	116	35.37	107	32.62	102	31.10	3	0.91	0	0.00	328	100	1 320	1 640
2	P2	92	28.05	153	46.65	82	25.00	1	0.30	0	0.00	328	100	1 320	1 640
3	P3	213	64.94	81	24.70	34	10.37	0	0.00	0	0.00	328	100	1 491	1 640
4	P4	111	33.84	156	47.56	58	17.68	2	0.61	1	0.30	328	100	1 358	1 640
5	P5	14	4.27	74	22.56	157	47.87	50	15.24	33	10.06	328	100	970	1 640
6	P6	221	67.38	53	16.16	52	15.85	2	0.61	0	0.00	328	100	1 477	1 640
7	P7	85	25.91	167	50.91	75	22.87	1	0.30	0	0.00	328	100	1 320	1 640
8	P8	104	31.71	139	42.38	81	24.70	4	1.22	0	0.00	328	100	1 327	1 640
9	P9	217	66.16	81	24.70	28	8.54	2	0.61	0	0.00	328	100	1 497	1 640
10	P10	8	2.44	76	23.17	153	46.65	62	18.90	29	8.84	328	100	956	1 640
11	P11	47	14.33	50	15.24	111	33.84	83	25.30	37	11.28	328	100	971	1 640
	Total Score													14 007	
	Percentage of Total Score (%)													77.64	

Table 4 illustrates the responses of respondents to bread and chocolate products at satisfaction and performance level. Based on result the total score to bread and chocolate cake products at the satisfaction level was 9 392 or only reached 52.06% of the ideal score 18 040. The total score was then input continum line to find out the exact performance level. Through a continuum analysis of the total score of bread and chocolate cake products, it can be seen that the position of the performance value was in the range of 52% - 68%, whereas the value confirms that the respondent's response to the quality of bread and chocolate cake products belongs to "**Unsatisfied**" category. Priority attributes for improvement, then the importance performance analysis-IPA method was used.

Table 4. Respondents on the level of performance of products

No	Statement	RI		I		LI		U		RU		Total		Total Score	Ideal Score
		f	%	f	%	f	%	f	%	f	%	f	%		
1	P1	7	2.13	59	17.99	62	18.90	78	23.78	122	37.20	328	100	735	1 640
2	P2	40	12.20	36	10.98	28	8.54	90	27.44	134	40.85	328	100	742	1 640
3	P3	11	3.35	50	15.24	50	15.24	130	39.63	87	26.52	328	100	752	1 640
4	P4	38	11.59	49	14.94	10	3.05	85	25.91	146	44.51	328	100	732	1 640
5	P5	7	2.13	24	7.32	109	33.23	83	25.30	105	32.01	328	100	729	1 640
6	P6	24	7.32	18	5.49	54	16.46	166	50.61	66	20.12	328	100	752	1 640
7	P7	41	12.50	11	3.35	68	20.73	91	27.74	117	35.67	328	100	752	1 640
8	P8	13	3.96	23	7.01	99	30.18	105	32.01	88	26,83	328	100	752	1 640
9	P9	5	1.52	81	24.70	35	10.67	70	21.34	137	41.77	328	100	731	1 640
10	P10	205	62.50	27	8.23	83	25.30	12	3.66	1	0.30	328	100	1 407	1 640
11	P11	171	52.13	19	5.79	105	32.01	29	8.84	4	1.22	328	100	1 308	1 640
		Total Score												9 392	
		Percentage of Total Score (%)												52.06	

III. RESULT AND DISCUSSION

Consumer assesment on the eleven attributes of bread and chocolate cake, namely: taste, texture, aroma, product appearance, portion, variety, freshness, health, packaging, price fairness, dan discount are different (not exactly similar), as shown in table 5.

The table shows the importance value and performance value of each attributes assessed on bread and chocolate cake products. The average value of each attribute at the importance level and the performance level was used as the basis for mapping the position of each quality attribute in the IPA Cartesian Diagram.

Table 5. Average values of importance and performance levels of bread and chocolate cake

Variable	IPA's code attribute	Name of attribute	Average value of importance level	Average value of performance level
Product	1	Taste	4.02	2.24
	2	Texture	4.02	2.26
	3	Aroma	4.55	2.29
	4	Product Appearance	4.14	2.23
	5	Portion	2.96	2.22
	6	Variety	4.50	2.29
	7	Freshness	4.02	2.29
	8	Health	4.05	2.29
	9	Packaging	4.56	2.23
	10	Price fairness	2.91	4.29
	11	Discount	2.96	3.99

Figure 2 is the code and position of attributes as the result of mapping in the IPA Cartesian Diagram, where each number indicates: [1] *Taste,* [2] *Texture,* [3] *Aroma,* [4] *Product appearance,* [5] *Portion,* [6] *Variety,* [7] *Freshness,* [8] *Health,* [9] *Packaging,* [10] *Price fairness,* dan[11] *Discount.*

Figure 2. Position indicator for IPA analysis of bread and chocolate cake products

Determination of the dividing line for each quadrant axis (crossing line) in the IPA analysis can be done by using the median value, where the importance was 4.02 and 2.29 for performance. The overall attributes

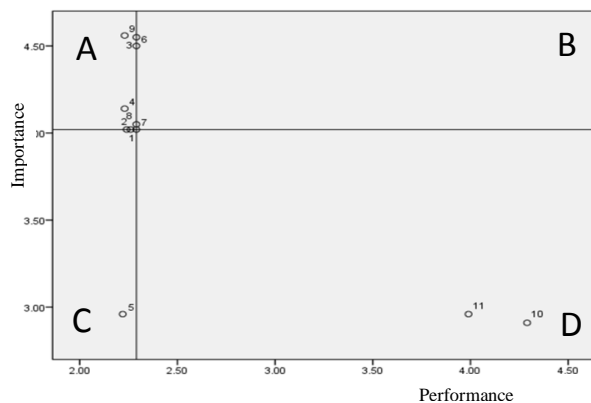of of bread and chocolate cake productes are in the Cartesian Diagram of quadrants A, B, C, and D as shown in Table 6.

Table 6. Position of product indicators on the Cartesian Diagram

Quadrant A	Quadrant B	Quadrant C	Quadrant D
1,2,3,4,6,7,8,9		5	11,10

In IPA analysis, attributes : *taste, texture, aroma, product appearance, variety, freshness, health* dan *packaging* were in diagram A (concentrate here). The portion was in quadrant C (possible overkill). *Pricefairness, discount* were in quadrant D (low priority). The IPA analysis results confirm that for bread and chocolate cake products there is priority attributes need to be improved which are: taste, aroma, texture, product appearance, variety, health and packaging.

IV. CONCLUSION

The development quality of the bread and chocolate cake products based on consumer preferences can be carried out to meet the needs and desires of consumers who tend to change. Bread and cake chocolate products produced based on an analysis of consumer ratings will have a good chance to be well-received by the market. Consumer assessment of the

importance level and the performance level of bread and cake chocolate products shows that there is a gap where consumers consider that the performance of chocolate SMEs products is still below the importance value. The results of the IPA method analysis show that the attributes that need to be improved in its performance are taste, aroma, texture, product appearance, variety, health and packaging. Priority attributes of quality bread and chocolate cake products that need to be developed, can provide alternative development priorities amid limited resources of SMEs.

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