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QUALITY DEVELOPMENT OF BAR CHOCOLATE PRODUCTS BASED ON CONSUMER PREFERENCES: CASE STUDY ON SMEs

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Abstract. Increased tight business competition requires organizations or companies to raise its competitiveness level. Increasing industrial competitiveness can be done through the development of product quality based on consumer preferences. This study aims to determine the quality attributes of bar chocolate products which are the priority development. There are eleven bar chocolate product quality attributes identified, namely taste, texture, aroma, product appearance, portion, variety, freshness, health, packaging, price fairness, and discount. The assessment of consumer preferences for the quality of bar chocolate products was done by filling out questionnaires based on consumer ratings on the importance and performance level. The analysis result using Importance Performance Analysis (IPA) method shows that taste, aroma, texture, product appearance, variety, health and packaging are priority attributes developed.

Introduction

Cocoa is an important commodity in the world as the main ingredient of chocolate products, which have taste and aroma cannot be replaced by other commodities [1]. Currently, people throughout the world enjoy chocolate in thousand different forms and types of products, consuming more than 4.7 million tons of cacao beans in 2016-2017 [2]. Based on the calculation of the international cocoa organization (International Cocoa Organization-ICCO), the transaction value of cocoa commodities reached USD 10 billion per year during 2011-2012. The retail sale value of all chocolate products in 2012 was recorded at USD 107 billion [2]. The 2014 global chocolate industry revenues reached USD 117 billion, with chocolate industry growth reaching 6% [2,3]. The trend of increasing consumption of chocolate products in the world (including Indonesia), is expected to continously occur in the future. Community knowledge of the chemical content benefits found in cocoa is one of the main causes of continued increase in the world chocolate consumption as food, beverage, cosmetics, medicines and other types of cocoa derivative products.

The main chocolate producer buys cacao beans and cocoa from cacao producing countries (including Indonesia) to be further processed, packaged and marketed in a modern way to produce quality chocolate products with high added value [2,3]. The problem on the low downstream industry in cacao beans processesing into cocoa and final products does not only occur in Indonesia, which is known as the world's leading cocoa producer, but also happens inpther main cocoa producing countries, such as Ivory Coast and Ghana. Most of the cocoa trade in the world market is in the form of cacao beans, although cocoa butter and powder are also traded [4]. Types of processed cocoa products are cocoa liquor, paste, butter, powder, and cocoa, which in addition to cocoa powder, are intermediate products used to make various chocolate products. Chocolate powder is used in flavored desserts; cocoa butter for making chocolate and cosmetics such as moisturizing creams and soaps, and cocoa liquor is used to make chocolate. Chocolate is the most easily identified final retail cocoa product, made from cocoa liquor and cocoa butter and other ingredients such as butter and sugar, estimating that around two-thirds of cocoa production is used for making chocolate [2,5]. Bar chocolate is one type of chocolate that is widely consumed throughout the world. One key element of chocolate texture is having a semi-solid base at room

temperature, but it is easy to melt when consumed in the mouth at 37ºC (normal body temperature) [6]. The main chocolate products are categorized into three types, namely, dark chocolate, milk chocolate, and white chocolate [7].

The economic value of cocoa that has not been optimally obtained also occurs in Ghana, Ivory Coast, Nigeria and Cameroon, due to the high export of cacao beans without processing. Cocoa industrialization in the world's main producer of cacao beans in the form of the establishment of cocoa processing plants as intermediate products and even quality end product chocolate is highly necessary [8,9,10]. National chocolate small and medium-sized enterprises (SMEs) have potential market development. The development of bar chocolate quality based on consumer preferences is very much needed by SMEs to be able to produce chocolate products to receive positive response from the market. The development of product quality based on consumer preferences needs to be done by producers along with changes in the needs and desires of consumers for a product or service [11].

Method and Materials

Customer satisfaction variables are dependent variables that depend on product quality variables, whereas product quality variables are examined at the level of importance and level of performance. This study uses sensory quality dimensions, namely taste, texture, aroma, product appearance and freshness, referring to the sensory quality of food products in the form of bread and cakes [11,12] . Taste refers to [13,14,15]. Texture refers to [12,15]. Aroma refers to [12,16,17]. Product appearance refers to [12,16]. Freshness refers to [18,19]. Health is chosen as the dimension of product quality because healthy nutritious food shows good product quality. Some references to health indicators include [19, 20]. The packaging indicator refers to several references such as [18, 21]. Variations in bar chocolate products are included in the dimensions of product quality referring to the study conducted by [12,19]. The quality of price fairness and discount refers to [12,19,20].

Importance Performance Analysis (IPA)

Research [22] states that IPA method can help organizations to identify the most appropriate strategies in making improvements. 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 [23]. IPA was firstly introduced by [24] with the aim of measuring 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 the performance level. Research [25] 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 purpose 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 63 respondents who specifically routinely consumed bar chocolate products were then being tested statistically on its validity and reliability. Analysis using IBM SPSS Statistics 21 software shows that there were no attribute items in the table value that had a validity coefficient below 0.248 (r-table). This value statistically confirms that the eleven tested survey questions are declared valid. The value in the reliability test table was known 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 confirms that there is a gap between them.

Table 2 Average value of importance level and performance level of bar chocolate

Bar chocolate product	Average value
Importance Level	48.62
Performance Level	23.29

Response of Respondents to Importance and Performance

The responses given by respondents regarding to importance level of bar chocolate are shown in Table 3. The table calculates the frequency of the answer score and its percentage as well as the sum of the total score and ideal score. Table 3 illustrates responses in the form of respondents' assessment of bar chocolate products at an importance level. Based on the data results shown in the table, it can be seen that the total score of importance level for bar chocolate products was 3 063 or 88.40% of the total number of ideal scores, 3 465. Further specific categories of achievement of these performance values can be identified through analysis of their position on continuum line. On the continuum line, it can be seen that the total score of bar chocolate products at the level of importance was in the range of 84% -100%, thus the respondent's response regarding bar chocolate products at the level of importance is in the "**Very Important**" category. Respondents' responses to eleven bar chocolate product attributes assessed were: Taste, Texture, Aroma, Product appearance, Portion, Variety, Freshness, Health, Packaging, Price fairness, and Discount, at the importance level.

Table 3 Responses of respondents on the importance level of bar chocolate products

No	Statement	RI		I		LI		U		RU		Total		Total Score	Ideal Score
		f	%	f	%	f	%	f	%	f	%	f	%		
1.	P1	47	74.60	12	19.05	4	6.35	0	0.00	0	0.00	63	100	295	315
2.	P2	47	74.60	16	25.40	0	0.00	0	0.00	0	0.00	63	100	299	315
3.	P3	36	57.14	22	34.92	5	7.94	0	0.00	0	0.00	63	100	283	315
4.	P4	39	61.90	18	28.57	4	6.35	2	3.17	0	0.00	63	100	283	315
5.	P5	13	20.63	42	66.67	8	12.70	0	0.00	0	0.00	63	100	257	315
6.	P6	33	52.38	28	44.44	2	3.17	0	0.00	0	0.00	63	100	283	315
7.	P7	38	60.32	23	36.51	2	3.17	0	0.00	0	0.00	63	100	288	315
8.	P8	38	60.32	25	39.68	0	0.00	0	0.00	0	0.00	63	100	290	315
9.	P9	39	61.90	19	30.16	5	7.94	0	0.00	0	0.00	63	100	286	315
10.	P10	17	26.98	32	50.79	2	3.17	12	19.05	0	0.00	63	100	243	315
11.	P11	29	46.03	9	14.29	25	39.68	0	0.00	0	0.00	63	100	256	315
Total Score															3 063
Percentage of total score (%)															88.40

Table 4 illustrates the responses of respondents to bar chocolate products at satisfaction or performance level. The total score for bar chocolate products at the satisfaction level was 1 462 or only reached 42.19% of the ideal score 3 465. The total score was then entered into the continuum line to find out the exact performance level. Through a continuum analysis of the total score of chocolate ice cream products, it can be seen that the position of the performance value was in the

range of 36% - 52%, whereas the value confirms that the respondent's response to the quality of chocolate bar products is in the category "**Unsatisfied**". Priority attributes for improvement, then the importance performance analysis-IPA method was used.

Table 4 Respondents on the level of performance of chocolate bar products

No	Statement	RS		S		LS		U		RU		Total		Total Score	Ideal Score
		f	%	f	%	f	%	f	%	f	%	f	%		
1.	P1	0	0.00	4	6.35	19	30.16	7	11.11	33	52.38	63	100	120	315
2.	P2	0	0.00	4	6.35	19	30.16	8	12.70	32	50.79	63	100	121	315
3.	P3	2	3.17	6	9.52	13	20.63	6	9.52	36	57.14	63	100	121	315
4.	P4	0	0.00	0	0.00	17	26.98	22	34.92	24	38.10	63	100	119	315
5.	P5	0	0.00	16	25.40	19	30.16	17	26.98	11	17.46	63	100	166	315
6.	P6	0	0.00	4	6.35	15	23.81	9	14.29	35	55.56	63	100	114	315
7.	P7	3	4.76	5	7.94	22	34.92	4	6.35	29	46.03	63	100	138	315
8.	P8	0	0.00	1	1.59	17	26.98	2	3.17	43	68.25	63	100	102	315
9.	P9	5	7.94	0	0.00	19	30.16	0	0.00	39	61.90	63	100	121	315
10.	P10	0	0.00	14	22.22	16	25.40	33	52.38	0	0.00	63	100	170	315
11.	P11	2	3.17	12	19.05	14	22.22	35	55.56	0	0.00	63	100	170	315
Total Score															1 462
Percentage of total score (%)															42.19

Result and Discussion

Consumer assessment on the eleven bar chocolate attributes, namely: taste, texture, aroma, product appearance, portion, variety, freshness, health, packaging, price fairness, and discount, are different (not exactly similar), as shown in Table 5. The table shows the importance value and the performance value of each attribute assessed on bar chocolate 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 bar chocolate

Variable	IPA's code attribute	Name of attribute	Average value of importance level	Average value of performance level
Product	1	*Taste*	4.68	1.90
	2	*Texture*	4.75	1.92
	3	*Aroma*	4.49	1.92
	4	*Product Appearance*	4.49	1.89
	5	*Portion*	4.08	2.63
	6	*Variety*	4.49	1.81
	7	*Freshness*	4.57	2.19
	8	*Health*	4.60	1.62
	9	*Packaging*	4.54	1.92
	10	*Price fairness*	3.86	2.70
	11	*Discount*	4.06	2.70

(Fig. 1) is the code and position of attribute 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, and [11] Discount.

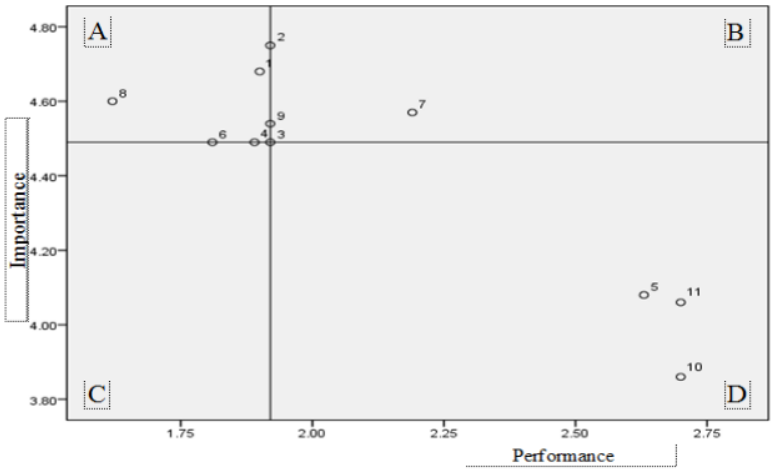

Figure 1 Position indicator for IPA analysis of bar chocolate products

Determination of the dividing line for each quadrant axis (crossing line) in the IPA analysis use the median value, where the importance was 4.49 and 1.92 for performance. The entire bar chocolate attribute is 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
1,2,3,4,6,8,9,	7		5,10,11

In IPA analysis, attributes: Taste, aroma, texture, product appearance, variety, health and packaging were included in diagram A (concentrate here). Freshness was in quadrant B (possible overkill). Portion, price fairness, and discount were in the D (low priority) quadrant, and there were no attributes in quadrant C. The IPA analysis results confirm that for bar chocolate products the priority attributes to be improved are: taste, aroma , texture, product appearance, variety, health and packaging.

Conclusion

The development of bar chocolate products quality based on consumer preferences can be carried out to meet the needs and desires of consumers who tend to change. Bar chocolate products that are 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 bar 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 analysis plotted on the Cartesian Diagram show that the attributes that need to be improved in its performance are taste, aroma, texture, product appearance, variety, health and packaging.

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