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3	Delivery of proof of payment for Article Processing Charges-APCs as a requirement for articles to be reviewed	3 November 2021
4	Acceptance of submissions from the editor regarding sending APCs evidence as a requirement for reviewing articles sent to the editor	15 November 2021
5	Delivery of letters Confirm the status of the article process review	1 Desember 2021
7	Receiving submissions to send articles that have been corrected in the form of word format files	11 juni 2022
8	Making improvements to articles based on the ARPN Journal of Engineering and Applied Sciences writing format (improving several editors, bibliography writing style and improving conclusions) and sending them based on the editor's request in the form of a word file.	23 Juni 2022
9	Editor's decision: an article entitled Product diversification to increase the competitiveness of the SMEs Scale Cocoa Industry in South Sulawesi was accepted and published in Volume 17 Issue 14 July 2022	27 Juli 2022

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Subject: submission of new manuscript for evaluation

Dear Sir/Madam,

I am enclosing herewith a manuscript entitled “Product diversification to increase the competitiveness of the SMEs-Scale Cocoa Industry in South Sulawesi” for possible evaluation as a **Research article** in ARPN Journal of Engineering and Applied Sciences.

This article discusses the Product diversification to increase the competitiveness of the SMEs-Scale Cocoa Industry. This research focuses on the study of determining alternative variations of product diversification based on consumer desires and approvals. The analytical methods used are data validity and reliability tests, descriptive statistical analysis, and justification for the impact of product diversification on increasing competitiveness through literature review. The main finding in this study is that 42 product diversification variations can be developed based on the addition of various fruit flavors, additional spices, and plant ingredients and the original chocolate content approach. Empirical studies from the results of previous studies can justify those product diversification strategies developed in SME scale industries such as the chocolate processing industry can improve performance and competitiveness.

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version. Additionally, there are no conflicts of interest in connection with this paper, and the material described is not under publication or consideration for publication elsewhere.

Thank you.



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Product Diversification to Increase the Competitiveness of the SMEs Scale Cocoa Industry in South Sulawesi

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Abstract

Product diversification of the cocoa processing industry on the scale of Small and Medium Enterprises (SMEs) is an important thing to do to improve performance and competitiveness. In connection with this, this research focuses on the study of determining alternative variations of product diversification based on consumer desires and approvals. The analytical methods used are data validity and reliability tests, descriptive statistical analysis, and justification for the impact of product diversification on increasing competitiveness through literature review. The results of the data test show that the data is considered valid because the calculated r-value is > 0.1381 and the data is considered to have perfect reliability because the Cronbach's Alpha value is > 0.90 , which is 0.975 . The results of valid and reliable data indicate that the alternative results of 42 variations of chocolate product diversification can be believed and accepted for development because it has a value > 3 which means it is approved. The main finding in this study is that 42 product diversification variations can be developed based on the addition of various fruit flavors, additional spices, and plant ingredients and the original chocolate content approach. Empirical studies from the results of previous studies can justify those product diversification strategies developed in SME scale industries such as the chocolate processing industry can improve performance and competitiveness.

Keywords: Product diversification, cocoa, chocolate, competitiveness, SMEs

1. Introduction

In Indonesia, cocoa is a leading commodity in the plantation sector which plays an important role as a driver for the development of agro-industry areas. Based on data from the Central Statistics Agency [BPS, 2018], South Sulawesi province is the second-largest cocoa producer in Indonesia with a total production of 100,600 tons or 16.94% of the total national cocoa production. The low added value of primary cocoa processing has encouraged a group of people from several cocoa production centers in South Sulawesi to develop a small and medium-sized enterprise (SMEs) cocoa processing industry to increase added value. One of the largest cocoa-producing regions

in Indonesia that have developed a SMEs-based cocoa processing industry in South Sulawesi, including in the areas of Makassar, Palopo, and North Luwu. The SMEs-scale cocoa processing industry developed is faced with problems of product quality, diversification, and product innovation and marketing. The development of cocoa processing industry products is urgently needed as an alternative solution to increase product competitiveness to be able to compete in local, national, and international markets.

The problems faced by the SMEs-scale cocoa processing industry are related to product quality, product diversification and innovation, product marketing, and product competitiveness. The development of cocoa processing industry products is needed as an alternative solution to increase product competitiveness. Based on this, it is necessary to have a diversification analysis method and product innovation. Product development has a relationship with the use of product innovation knowledge (Zhang, Benedetto, and Hoenig, 2009). This is very important to increase the added value and competitiveness of processed products of the SME-scale cocoa industry (Lamatinulu, et al., 2017) because diversification and innovation activities have a positive impact on the production, marketing, and financial performance of an industry (Tuan, et al., 2016). The initial step for the development of product diversification requires initial information about the perception of consumer desires for the type of processed product that will be made in the SME-scale cocoa processing industry. Product development through diversification can be realized through production process activities that are oriented towards product innovation through the application of knowledge and expertise possessed by the workforce. The ability to realize product diversification and innovation is very important to increase the added value and competitiveness of the processed products of the SME-scale cocoa industry. Through diversification, it is hoped that it will increase the ability of small cocoa processing industries to improve performance from a customer perspective, financial performance, and production process performance. Product diversification strategies need to be planned and applied to the SME-scale cocoa processing industry because this can improve a company's performance in the long term (Puplampu, 2017). Product diversification strategy is product development to achieve increased sales, profitability, and flexibility. Product diversification is a strategic process to expand business opportunities through the market potential of additional existing products.

This study aims to determine the diversification of processed chocolate products based on customer perceptions and desires of the products planned to be developed by the SMEs-scale cocoa processing industry in South Sulawesi. The basis for product diversification that will be developed is processed cocoa products based on fruit flavors, spice flavors based on a review of health benefits and nutritional content. The method approach used in determining product diversification based on consumer desires and perceptions is through survey activities on chocolate industry managers and consumers of processed chocolate products. The results obtained from interviews and questionnaires were processed using a statistical analysis approach. The benefits of the results of this research are expected to be the main basis for the SMEs-scale cocoa processing industry in South Sulawesi to diversify and innovate products with a scientific study approach. The novelty of this study is different from other previous

researchers because this study focuses on determining product diversification variations based on consumer desires for SME-scale cocoa processing industry products.

2. Material And Method

The research was conducted by collecting secondary data and primary data. Secondary data was collected from the SME-scale cocoa processing industry in South Sulawesi Province, namely in East Luwu Regency, Palopo City, and Makassar City. Respondents in this study consisted of respondents who were involved in managing the SME-scale cocoa industry and respondents who had consumed processed chocolate products and liked chocolate processed products. The materials used in this research are samples of processed cocoa products that will be developed in product diversification. Samples of chocolate products will be tasted tested on expert respondents as a justification for the results of consumer perceptions of the selection of chocolate products that will be developed in product diversification and innovation. The data analysis method used is descriptive statistics to determine the weight value of the approval of the product to be developed in diversification. The application of the descriptive statistical method of calculating the average to determine the weight value has been applied by several previous researchers (Charnes, et al., 1978; Coelli, 1996; Memon, et al., 2015; Lamatinulu, 2021). To obtain an assessment of consumer acceptance of alternative product diversification variations, a questionnaire instrument is used. The level of assessment of consumer acceptance and desire uses a Likert scale with a numerical rating level of 1 = disagree, 2 = disagree, 3 = agree, 4 = strongly agree and 5 = very-very strongly agree. In connection with this study, the number of populations cannot be determined, so the technique used in determining the number of samples is using the Lemeshow formula (Lemeshow, et al., 1990), namely:

$$n = \frac{Z^2 P(1 - P)}{D^2}$$

Where: n = Number of Samples, Z = degree of confidence, the ideal value is 95% = 1.645 (t Table), P= the proportion of consumers of processed chocolate products in the SME industry, the ideal value = 0.5, D = ideal deviation = 10%. Based on this formulation, the minimum number of respondents (consumers) samples determined in this study are:

$$n = \frac{1,96^2 \cdot 0,5(1 - 0,5)}{0,1^2} = \frac{0,9604}{0,01} = 96,04$$

Based on the results of the calculations above, the minimum number of respondents (consumers of processed cocoa products on the scale of SMEs) is determined, which is theoretically 96.04, and the actual number is rounded up to 97 respondents. However, in this study, the number of consumers who were used as respondents was 202 respondents. To justify the impact of diversification on increasing product competitiveness, it is necessary to review previous research literature and the perceptions of expert respondents. Briefly, the stages of the research can be shown in Figure 1.

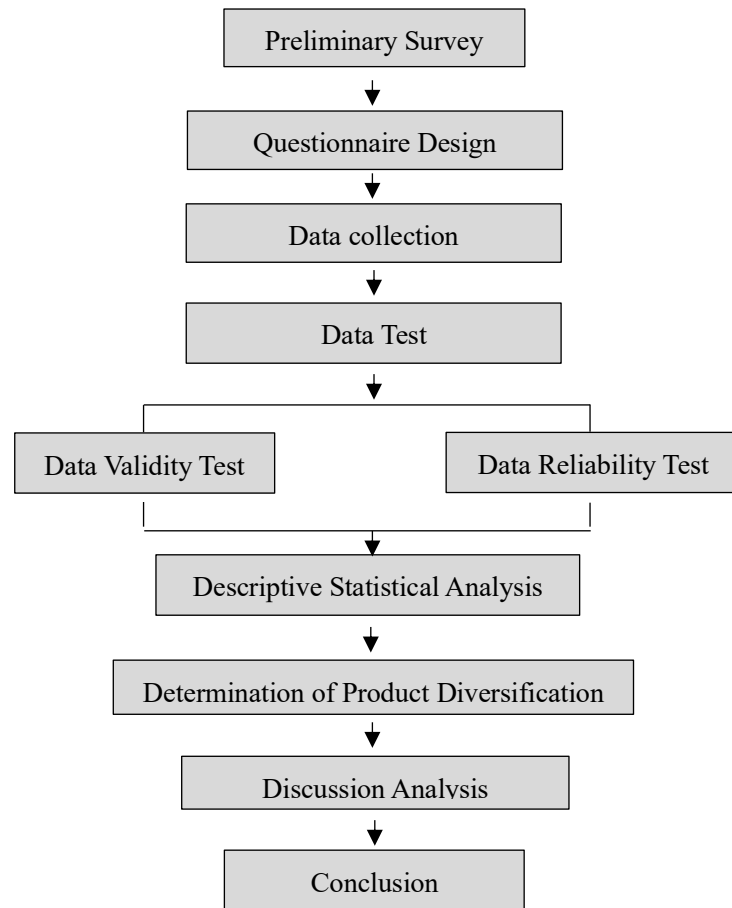


Figure 1. Research stages

3. Results and Discussion

Based on the distribution of questionnaires to get input on the type of product diversification, the validity and reliability of the data were first tested. This is done so that the questionnaire used as a measuring tool can measure the level of consumer approval assessment so that the research results are valid and reliable. The results of the statement items obtained from the answers of 202 consumers of chocolate products were first tested for validity and reliability. To identify variations in the diversification of processed cocoa products, it is determined based on the average value of respondents' answers that have passed validity and reliability tests. This is done to ensure that the assessment of consumer perceptions and desires can be accepted and trusted. The results of the validity test have shown that the questionnaire instrument used has been able to measure the weight of consumer approval of alternative variations of product diversification. The results of the validity test of 202 respondents' answers to 42 statement attributes were all declared valid because all t-count values were greater than the t-table value (0.1381) as shown in Table 1.

Table 1. The results of the validity of the research data

Statement code	Validity Test			Statement code	Validity Test		
	r count	r table			r count	r tabel	
C01	0.5888	0.1381	Valid	C22	0,6710	0.1381	Valid
C02	0,5684	0.1381	Valid	C23	0,6921	0.1381	Valid
C03	0,5755	0.1381	Valid	C24	0,7181	0.1381	Valid
C04	0,6249	0.1381	Valid	C25	0,6500	0.1381	Valid
C05	0,6522	0.1381	Valid	C26	0,7491	0.1381	Valid
C06	0,5773	0.1381	Valid	C27	0,7825	0.1381	Valid
C07	0,6037	0.1381	Valid	C28	0,7194	0.1381	Valid
C08	0,6601	0.1381	Valid	C29	0,6806	0.1381	Valid
C09	0,7046	0.1381	Valid	C30	0,7672	0.1381	Valid
C10	0,6949	0.1381	Valid	C31	0,6445	0.1381	Valid
C11	0,7036	0.1381	Valid	C32	0,6903	0.1381	Valid
C12	0,6843	0.1381	Valid	C33	0,7155	0.1381	Valid
C13	0,6688	0.1381	Valid	C34	0,7085	0.1381	Valid
C14	0,7342	0.1381	Valid	C35	0,6980	0.1381	Valid
C15	0,7807	0.1381	Valid	C36	0,7451	0.1381	Valid
C16	0,8002	0.1381	Valid	C37	0,7277	0.1381	Valid
C17	0,8109	0.1381	Valid	C38	0,6885	0.1381	Valid
C18	0,8235	0.1381	Valid	C39	0,7363	0.1381	Valid
C19	0,7939	0.1381	Valid	C40	0,7409	0.1381	Valid
C20	0,7975	0.1381	Valid	C41	0,6664	0.1381	Valid
C21	0,6505	0.1381	Valid	C42	0,7444	0.1381	Valid

The results of the validity test have shown that the questionnaire instrument used has been able to measure the weight of consumer approval of alternative variations of product diversification. The results of the validity test of the answers of 202 respondents to 42 statements were declared valid because all t-count values were greater than the t-table value (0.1381) as shown in Table 1. In connection with the test results the data had been declared valid, then the data reliability test was carried out. The results of the reliability test using the Cronbach's method showed that the questionnaire was declared to have a perfect reliability value because the Cronbach Alpha value (0.975) was greater than 0.900. The results of the data reliability test using the SPSS Version 24 application are as shown in Table 3.

Table 3. Test the reliability of research data

Reliability Statistics	
Cronbach's Alpha	N of Items
0,975	42

Based on the results of the validity and reliability tests, it can be stated that the questionnaire as a measuring tool has accuracy and accuracy because the values of all statement items are declared valid and reliable. The questionnaire instrument as a measuring tool used in this study can be trusted and relied upon because it has a perfect

reliability value. With these considerations, the respondent's assessment of statements related to consumer approval of product diversification variations is acceptable. The results of the assessment using descriptive statistical analysis showed that 42 alternative variations of product diversification were acceptable because all of the assessment results were greater than 3, which meant that they were approved. The average results of the approval assessment of respondents (consumers) and expert respondents are as shown in Figure 2.

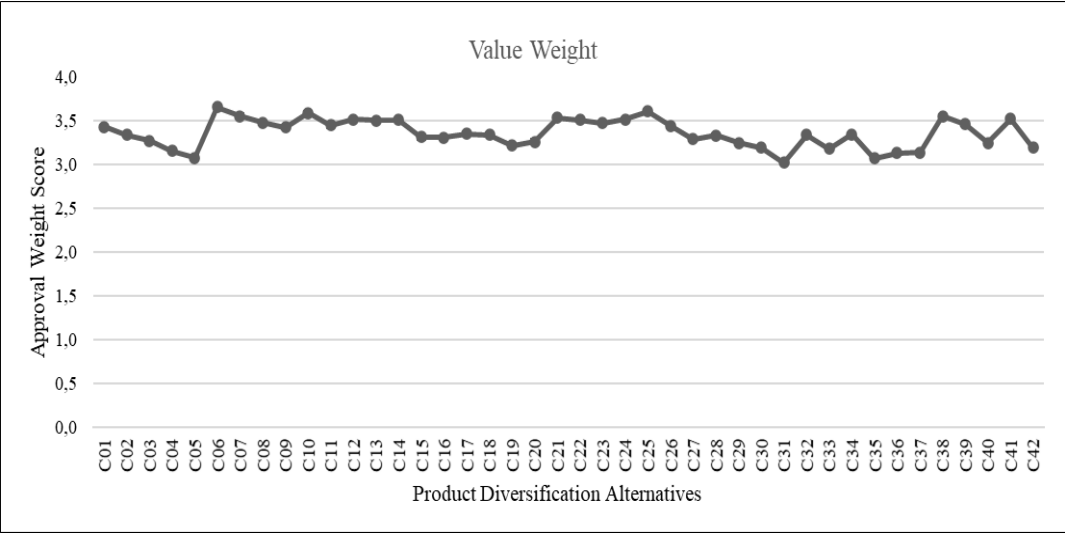


Figure 2. Graph of the average value of the respondent's (consumer) approval rating

Based on the results of the approval weight values for the alternative product diversification variations in Figure 2, product diversification can be grouped based on the addition of various flavors, the addition of plant extracts and spices, and based on the content of chocolate. Diversification of chocolate products that consumers want to develop in the SME-scale Cocoa processing industry, there are 42 types of product variations. Product diversification based on the variety of fruit flavors consists of 10 types of chocolate products with Strawberry flavor, Blueberry flavor, Raspberry flavor, Grape flavor, Lemon flavor, Avocado flavor, Coconut flavor, Chili flavor, Coconut flavor, and Date fruit flavor. The variety of flavors of chocolate products sourced from fruits is a good thing to do in product diversification because it can add to the nutritional value and health benefits of chocolate (Çağındı, and İleş 2009). Product diversification based on chocolate content is distinguished by the percentage of chocolate content in the product made. Chocolate with a percentage of 99% is a product that does not have a mixture of other ingredients, but for products with a chocolate content of 80%, 72%, 60% and 54% it contains a mixture of milk and sugar. There are also products with a content of 80% with a mixture of cashew nuts. Product diversification based on the ingredients of plant leaves and spices includes chocolate mixed with cinnamon, chocolate mixed with ginger and lemongrass products, chocolate mixed with sesame products, chocolate mint leaves products, chocolate products mixed with Moringa leaves, chocolate mix nuts Hezelnuts. Variations of other chocolate product mixes such as chocolate made from milk and cream. The alternative variations of product diversification that can be developed in the SME-scale cocoa processing industry can be seen in Table 2.

Table 2. Variations of diversification of chocolate products

No	Product Diversification Variations	
1	Chocolate content 99%	C01
2	Chocolate content 80%	C02
3	Chocolate grade 72%	C03
4	Chocolate content 60%	C04
5	Chocolate content 54%	C05
6	Chocolate content 80% cashew nuts mix	C06
7	100% real cocoa powder	C07
8	Cheese flavored chocolate	C08
9	Strawberry flavored chocolate	C09
10	Date chocolate	C10
11	Green tea chocolate	C11
12	Couverture Dark Chocolate	C12
13	Couverture Milk Chocolate	C13
14	Couverture White Chocolate	C14
15	Lemon flavored chocolate	C15
16	Wine flavored chocolate	C16
17	Blueberry flavored chocolate	C17
18	Raspberry flavored chocolate	C18
19	Melon flavored chocolate	C19
20	Apple flavored chocolate	C20
21	Avocado Chocolate	C21
22	Hazelnut flavored chocolate	C22
23	Chocolate Cream	C23
24	White Chocolate Mix Cream	C24
25	Milk Chocolate	C25
26	Dark Chocolate	C26
27	Mango flavored chocolate	C27
28	Coconut chocolate mix	C28
29	Chocolate mix Sesame	C29
30	Chocolate mix of coconut and sesame	C30
31	Chili flavored chocolate	C31
32	Cinnamon Chocolate	C32
33	Clove mix chocolate	C33
34	Mint Leaf Chocolate	C34
35	Rice kencur flavored chocolate	C35
36	Lemongrass Chocolate Spice, and Stevia Leaves	C36
37	Moringa leaf chocolate	C37
38	Fat Free Cocoa Powder	C38
39	Product mix cocoa powder, milk and sugar	C39
40	A mixture of cocoa powder, ginger, lemongrass	C40
41	Caramel Chocolate	C41
42	Sago Combination Chocolate	C42

The taste factor is very important in product diversification innovation because the taste is the main driving factor for consumer interest in choosing, buying, and consuming a product (Cardello, and Schutz, 2003; Adrianto, 2019; Liem and Russel, 2019). Innovations for other product diversification are carried out based on the original content of chocolate flavor which is considered beneficial for health. This has a strong reason because consuming real chocolate which contains enough antioxidants can have a positive impact on human health (Visioli, et al., 2009; Montagna, et al., 2019). Product diversification innovation based on consumer desires is also carried out by adding spices and vegetable ingredients that are considered beneficial for health. Product diversification by combining chocolate with natural ingredients in the form of spices such as cinnamon, ginger, cloves, lemongrass, sesame, mint leaves can have its charm because spices can give chocolate products a distinctive aroma and taste. In addition, the spice content in chocolate can have a good impact on health because spices contain high antioxidants (Embuscado, 2015; Jiang, 2019). This can be the basis for diversifying chocolate products through the addition of spices such as cinnamon extract, ginger, lemongrass, sesame, mint leaves, moringa leaves, cloves, chili, green tea, and sago. In addition to adding fruit flavors, spices and plant innovations, diversification of chocolate products can also be done by adding levels of cashew nuts, sugar, milk, and cream. Product diversification in the SME-scale cocoa processing industry is very important to implement because it can improve financial performance and expand market share (Jayathilake, 2018).

Product diversification in the SME-scale cocoa processing industry in South Sulawesi is very important to implement because diversification has a positive impact on performance (Oladimeji, and Udosen, 2019). Diversification is an important thing to do because one of the main performance indicators that are important for the SMEs-scale cocoa processing industry is the right product diversification (Lamatinulu, et al., 2019). The implementation of a diversification strategy of 42 product variations can offer consumers several alternative product choices so that they have the potential to increase the competitiveness of the SME-scale cocoa industry. Product diversification developed through innovation that focuses on consumer desires is a holistic competitive strategy. This is consistent with research findings showing that diversification in the industry can increase excellence and competitiveness (Halliwell, 2003; Hron, et al., 2008; Marangu, et al., 2014; Wang and Nie, 2018; Vogl, 2018). The findings of alternative product diversification variations in the cocoa processing industry can be the basis for product innovation to increase added value and competitiveness. This is supported by the findings of research conducted by Lamatinulu, et al, 2017 which states that one strategy to increase added value and competitiveness of the SMEs-scale cocoa processing industry is product diversification and innovation. Developing products with a variety of 42 types of chocolate products is a way to produce diverse chocolate products, which is a form of a diversification strategy that can be carried out by the SMEs-scale cocoa processing industry. Based on the determination of product diversification variations, chocolate product innovation can be carried out based on the addition of various fruit flavors and various spices and plant leaf extracts that can increase added value. The existence of product innovation to support diversification can have an impact on increasing product advantages and competitiveness (Lamatinulu, et al., 2017; Jeong, et al., 2019)

4. Conclusion

Based on the data processing and analysis of the discussion, it is found that there are 42 variations of diversification of chocolate products that can be developed as product innovations. Product diversification that needs to be realized by the SMEs-scale chocolate processing industry should be based on consumer perceptions and desires. Based on the results of this study, diversified products according to consumer expectations in the market share should be made based on the consideration of adding a variety of fruit flavors, a mixture of ingredients from spices and ingredients from plants as well as consideration of the dominant chocolate content with the original taste. It is very important to diversify chocolate products through product innovation because it can have an impact on improving performance and competitiveness.

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IDENTIFICATION OF CUSTOMER NEEDS RELATED TO GENERAL AND ORGANOLEPTIC ASPECTS AS A BASIS FOR PRODUCT DEVELOPMENT IN THE SMEs-SCALE CHOCOLATE INDUSTRY IN SOUTH SULAWESI

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ABSTRACT

Product development in the SME-scale cocoa processing industry in South Sulawesi needs to be improved as a form of product innovation. Product development is in dire need of information about customer needs related to chocolate products. In connection with this, this research analyzes the determination of customer needs related to general and organoleptic aspects as the basis for developing chocolate products. The method used is descriptive statistical analysis. The findings of this study are to determine the level of importance of the eight parameters needed by consumers in the development of processed cocoa products which include general and organoleptic aspects.

Keywords: Chocolate, product development, SMEs, Organoleptic

1. INTRODUCTION

Based on the literature study, it shows that about 80% of cocoa beans produced are exported in the form of beans that have very low economic added value because they have not gone through the process of developing value-added processed products. The reality of the low added value of cocoa produced in cocoa bean producing centers has motivated a group of people in the South Sulawesi region to develop an SME-scale cocoa processing industry.

The problems faced by the SME-scale cocoa industry are low product competitiveness, product quality and marketing aspects. Based on this, it is necessary to have alternative solutions in the form of product development by considering aspects of quality-based innovation. Product development has a relationship with the use of product innovation knowledge [1]. This is very important to increase the added value and competitiveness of processed products of the SME-scale cocoa industry [2] because innovation activities have a positive impact on the production, marketing and financial performance of an industry [3]. Product development performance must be supported by marketing innovation because marketing innovation can have a positive impact on improving the performance of industrial companies.

Based on the problem, the purpose of this research is to focus on product development. Product development is expected to have an impact on increasing added value and competitiveness of SME-scale cocoa industry products so that they are able to compete in local, national and international markets. In this study, product development analysis is also integrated with the justification of the impact of product development on performance and productivity. This research is oriented towards product development and innovation of chocolate products based on aspects of taste, texture, aroma and product packaging which are associated with technical aspects which are expected to have an impact on improving the performance and productivity of the SME-scale cocoa industry. The method approach applied is the Quality Function Deployment (QFD) method. The QFD method is an

analytical method that focuses on customer wants and needs related to the development of processed cocoa products in the SME scale industry in South Sulawesi.

2. RESEARCH METHODS

A. Place and location of research

This research was conducted in the South Sulawesi region, specifically in the small and medium scale cocoa processing industry in Palopo, Masamba and Makassar

B. Data Collection

Data collection activities were carried out through literature studies, surveys, interviews and distributing research questionnaires to 218 respondents. The respondents in this study are the owners of the chocolate industry, consumers of processed chocolate products.

C. Data Processing

➤ Data Validity and Reliability Test

To test the extent to which the questionnaire in research as a measuring tool used in collecting research data can be declared valid. To assess the level of accuracy and feasibility of the questionnaire instrument used in the implementation of this study, validity and reliability tests were carried out. The results of the validity and reliability tests become the basis used in selecting and determining the attributes of customer needs that can be used in the development of processed cocoa products.

➤ Descriptive Statistical Analysis

To determine the attributes of customer needs that are selected and used in preparing the development of product innovation based on Kansei Engineering and Quality Function Deployment, descriptive statistical analysis is carried out. This method approach can be used to determine the weight value based on the average value that has been applied by previous researchers [4,5,6,7]. assessment of consumer acceptance of the attributes of needs that are considered very important by consumers as attributes that can be used in product development. The assessment was carried out using a Likert scale, namely 1 = very

unimportant, 2 = not important, 3 = important, and 4 = very important.

3. RESULTS AND DISCUSSION

In the early stages of developing chocolate processed products, it is to identify customer needs whose objectives are: to convince customers, to identify. hidden customer needs, the basis for compiling product specifications, being an archive for the product development process, being a guarantee that no customer needs are forgotten, formulating a common understanding of knowing customer needs. In this study, identification of customer needs related to processed chocolate products is the basis for developing chocolate products. Based on the survey results through interviews and the distribution of research questionnaires it was identified that there were eight customer needs related to chocolate products produced in the SME-scale cocoa processing industry.

3.1. Identify customer needs regarding general and organoleptic aspects

The identification results show that there are eight parameters needed by the customer which are determined based on the value of the level of importance which can be seen in Table 1. The value of the importance of the eight attributes needed by the customer as a whole is 4.0 which means that all the attributes are important to be needed.

Table 1. Identification of customer needs in general and organoleptic aspects

No.	Customer requirement	Code	Value of Importance
1	The beauty of product appearance	UO1	3,528
2	Product freshness	UO2	3,688
3	Product taste/flavor	UO3	3,706
4	Product texture	UO4	3,482
5	Product Smell/ Smell	UO5	3,596
6	Product price	UO6	3,610
7	Raw materials for products	UO7	3,642
8	Product color	UO8	3,326

The data from the data collection carried out using a questionnaire instrument has been tested for the level of validity and reliability. The results of the data test using SPSS Version 24 can be seen. A summary of the results of the data validity test related to customer needs in general and organoleptic aspects can be seen in Table 2.

Based on the calculated r value from the results of data processing using SPSS software version 24 (attachment 3) which has been summarized in Table 2 above, it shows that all data on the 8 question items in the questionnaire can be declared valid because they have a calculated r value greater than 0.134. (r table). The results of the reliability test generated from the SPSS output provide information about the number of samples or respondents (N) in the research analyzed in the SPSS program, namely N as many as 218 respondents who are customers of processed cocoa products on a scale of SMEs. These results indicate that there is no empty data in the sense that all respondents' answers are filled so that the total is 100% valid.

Table 2. Data validity test results on general and organoleptic aspects

Customer requirement	Code	Score $r_{xy}(r \text{ count})$	Score $r \text{ table}$	Status
The beauty of product appearance	UO1	0,698	0,133	Valid
Product freshness	UO2	0,682	0,133	Valid
Product taste/flavor	UO3	0,773	0,133	Valid
Product texture	UO4	0,785	0,133	Valid
Product Smell/ Smell	UO5	0,716	0,133	Valid
Product price	UO6	0,651	0,133	Valid
Raw materials for products	UO7	0,743	0,133	Valid
Product color	UO8	0,686	0,133	Valid

Based on the results of the SPSS output in Table 3, it is listed N of items or the number of questions on the questionnaire instrument, namely 8 question items with a Cronbach's Alpha value of 0.862. In relation to Cronbach's Alpha value of $0.862 > 0.60$, the reliability test can be concluded that the 8 question items on the questionnaire are reliable or consistent. Based on the results of this test, it shows that the questionnaire instrument used to identify the attributes of customer needs for chocolate products can be trusted.

Table 3. Cronbach's Alpha data reliability test of general and organoleptic aspects

Reliability Statistics	
Cronbach's Alpha	N of Items
0,862	8

In connection with the importance of data testing to ensure the level of confidence in identifying customer needs related to general and organoleptic aspects needed by consumers related to chocolate products, valid and reliable data is needed for 8 question items related to the identification of customer needs. The results of the reliability test for each question item related to the identification of customer needs in general and organoleptic aspects can be seen in Table 4.

Table 4. The results of the overall data reliability test items

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
UO1	25,0505	10,140	0,590	0,847
UO2	24,8899	10,403	0,582	0,848
UO3	24,8716	10,131	0,699	0,837
UO4	25,0963	9,682	0,700	0,834
UO5	24,9817	9,972	0,609	0,845
UO6	24,9679	10,381	0,534	0,853
UO7	24,9358	9,941	0,648	0,841
UO8	25,2523	9,747	0,548	0,855

Table 4 shows the results of statistical values for the 8 statement items on the research questionnaire. In Cronbach's Alpha if Item Deleted column, Cronbach's Alpha value for all items is > 0.60 . This shows that the 8 statement items on the questionnaire are reliable or trusted. Based on the results of the validity and reliability tests, it

can be concluded that the 8 items attribute customer needs in general and organoleptic aspects for chocolate products as shown in Table 4.1. Assessment of the level of importance of customer needs related to chocolate processed products uses a rating scale, namely: number 1 = very unimportant, number 2 = not important, number 3 = important, number 4 = very important. Based on the results of a survey using a questionnaire instrument, it shows that all attributes of needs can be used as attributes of customer needs because all have an average value of importance level > 3.0 which is significant.

3.2 Interpretive Analysis related to general and organoleptic aspects

▪ The beauty of product appearance

Attributes of customer needs related to product appearance related to white spots and the impression of melting in hand (melting in hand): Knowing the degree of melting of processed chocolate products after 30 seconds in the hand Important customer requirements related to white spots on processed cocoa products in the form of candy chocolate and chocolate bars are important thing to consider in the development of processed chocolate products. The presence of white spots on chocolate products is an undesirable condition for customers. To develop chocolate processed products, efforts are needed to avoid white spots on the product. This white spot (blooming) occurs in processed chocolate products due to the migration of brown fat (fat blooming) and spots due to changes in the humidity of the sugar raw material (sugar blooming). Fat blooming found on the surface of chocolate products such as chocolate candies and chocolate bars usually occurs due to the wrong tempering process, warm storage conditions, improper cooling methods, addition of fat other than chocolate fat that is not suitable. There are three factors that can cause blooming, namely the production process, product material composition and storage conditions.

▪ Consumer needs related to taste/flavor

The requirements of the customer's desire for the development of processed chocolate products related to sweetness parameters are closely related to the quality parameters of chocolate product development related to bitter taste. The presence of the right composition of sweet and bitter tastes can produce processed chocolate products that are liked by customers. Parameters of processed chocolate products related to this sweetness can be influenced by the content of refined sugar raw materials used in the production process. The higher the use of sugar content will cause the processed chocolate product to be sweeter. The requirements of the customer's desire for the development of processed chocolate products related to cocoa body parameters are important quality parameters that must exist in chocolate processed products produced by the SME-scale cocoa processing industry. The final product that has a sense of wholeness of cocoa will have a distinctive chocolate taste in terms of taste, aroma, texture and other cocoa flavor characteristics. Chocolate aroma can be developed from the proper fermentation and drying process while the chocolate flavor enhancement is influenced by the roasting process.

▪ Consumer needs related to Texture

Parameter requirements that consumers want in the development of processed chocolate products related to product texture in the form of first bite impressions on chocolate candy products and chocolate bars are closely related to consumer preferences. In the development of processed chocolate products, product texture parameters related to the oily impression in the mouth are one of the critical quality parameter requirements that are important to consider in a processed chocolate product. Consumers do not want the texture of the product with a non-greasy or even too oily impression on chocolate bar and candy chocolate products when they consume chocolate products.

▪ Scent of processed cocoa products

The product aroma parameter is one of the requirements of the customer's desire for the development of processed chocolate products. Product aroma is also one of the factors that affect product acceptance. Related to the development of processed chocolate products, the aroma of natural products can be developed in the form of the original aroma of cocoa and the aroma of processed cocoa products combined with other fruit aromas. Through the roasting process, the aroma and distinctive taste of chocolate can be found from cocoa beans by heat treatment [8]. To get chocolate that has a good aroma, the raw material used in making chocolate is fermented cocoa beans [9].

▪ Chocolate product price

The price of the product has a very important role for product marketing, especially in attracting buyers. Related to the price of processed chocolate products, it is necessary to analyze the determination of the cost of production and cost of goods sold based on market share segmentation. Pricing strategies can have an impact on customer loyalty and customer satisfaction [10,11], so to maintain and increase market share, setting the right price according to customer conditions can improve the performance and productivity of the cocoa processing industry. SME scale.

▪ Raw material for chocolate products

Customer requirements for product development and product quality improvement are parameters of raw materials. The criteria for quality raw material for cocoa beans that can support the quality of processed chocolate products are raw materials for cocoa beans that have been fermented and in accordance with SNI standardization. In connection with the findings of research on the effect of the origin of cocoa beans on the quality and taste of [12] stated that the formulation and area of origin of fermented cocoa beans can affect the quality and taste of dark chocolate, especially those related to amino acid content, melting point, fatty acids, polyphenol content and taste value. The quality of the raw material for cocoa beans used to produce dark chocolate can affect the quality of the resulting product.

▪ Product Color

The color aspect of chocolate products is one of the requirements that customers want in the development of processed chocolate products. This is related to organoleptic testing of chocolate products, where the product color factor is one part of the customer's favorite factor [13]. The results of the House of Quality analysis show that the color of the product is strongly

influenced by the raw material for fermented cocoa beans, cocoa fat content, chocolate paste, refined sugar ingredients, mixing process and roasting process. The results of previous research [13] have explained that the color of processed chocolate bar products is preferred by consumers if the composition of the chocolate product consists of 35% chocolate paste and 30% chocolate fat.

4. CONCLUSION

Based on the results of data processing and discussion, it shows that the parameters of customer needs that can be used to develop processed cocoa products on an SME scale include aspects of product appearance, taste, texture, aroma, product price, product raw materials and product color. These parameters of customer needs can be used as the basis for analyzing product development using the QFD method approach.

ACKNOWLEDGMENTS

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PRODUCT DIVERSIFICATION TO INCREASE THE COMPETITIVENESS OF THE SMEs-SCALE COCOA INDUSTRY IN SOUTH SULAWESI

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ABSTRACT

Product diversification of the SMEs-Scale Cocoa Industry is an important thing to do to improve performance and competitiveness. In connection with this, this research focuses on the study of determining alternative variations of product diversification based on consumer desires and approvals. The analytical methods used are data validity and reliability tests, descriptive statistical analysis, and justification for the impact of product diversification on increasing competitiveness through literature review. The results of the data test show that the data is considered valid because the calculated r-value is > 0.1381 and the data is considered to have perfect reliability because the Cronbach's Alpha value is > 0.90 , which is 0.975 . The results of valid and reliable data indicate that the alternative results of 42 variations of chocolate product diversification can be believed and accepted for development because it has a value > 3 which means it is approved. The main finding in this study is that 42 product diversification variations can be developed based on the addition of various fruit flavors, additional spices, and plant ingredients and the original chocolate content approach. Empirical studies from the results of previous studies can justify those product diversification strategies developed in SME scale industries such as the chocolate processing industry can improve performance and competitiveness.

Keywords: product diversification, cocoa, chocolate, competitiveness, SMEs.

INTRODUCTION

In Indonesia, cocoa is a leading commodity in the plantation sector which plays an important role as a driver for the development of agro-industry areas. Based on data from the Central Statistics Agency [BPS, 2018], South Sulawesi province is the second-largest cocoa producer in Indonesia with a total production of 100,600 tons or 16.94% of the total national cocoa production. The low added value of primary cocoa processing has encouraged a group of people from several cocoa production centers in South Sulawesi to develop a small and medium-sized enterprise (SMEs) cocoa processing industry to increase added value. One of the largest cocoa-producing regions in Indonesia that have developed a SMEs-based cocoa processing industry in South Sulawesi, including in the areas of Makassar, Palopo, and North Luwu. The SMEs-scale cocoa processing industry developed is faced with problems of product quality, diversification, and product innovation and marketing. The development of cocoa processing industry products is urgently needed as an alternative solution to increase product competitiveness to be able to compete in local, national, and international markets.

The problems faced by the SMEs-scale cocoa processing industry are related to product quality, product diversification and innovation, product marketing, and product competitiveness. The development of cocoa processing industry products is needed as an alternative solution to increase product competitiveness. Based on this, it is necessary to have a diversification analysis method and product innovation. Product development has a relationship with the use of product innovation knowledge (Zhang, Benedetto, and Hoenig, 2009). This is very important to increase the added value and competitiveness of processed products of the SME-scale

cocoa industry (Lamatinulu, *et al.*, 2017) because diversification and innovation activities have a positive impact on the production, financial, and marketing performance of an industry (Tuan, *et al.*, 2016). The initial step for the development of product diversification requires initial information about the perception of consumer desires for the type of processed product that will be made in the SME-scale cocoa processing industry. Product development through diversification can be realized through production process activities that are oriented towards product innovation through the application of knowledge and expertise possessed by the workforce. The ability to realize product diversification and innovation is very important to increase the added value and competitiveness of the processed products of the SME-scale cocoa industry. Through diversification, it is hoped that it will increase the ability of small cocoa processing industries to improve performance from a customer perspective, financial performance, and production process performance. Product diversification strategies need to be planned and applied to the SME-scale cocoa processing industry because this can improve a company's performance in the long term (Puplampu, 2017). Product diversification strategy is product development to achieve increased sales, profitability, and flexibility. Product diversification is a strategic process to expand business opportunities through the market potential of additional existing products.

This study aims to determine the diversification of processed chocolate products based on customer perceptions and desires of the products planned to be developed by the SMEs-scale cocoa processing industry in South Sulawesi. The basis for product diversification that will be developed is processed cocoa products based on fruit flavors, spice flavors based on a review of health



benefits and nutritional content. The method approach used in determining product diversification based on consumer desires and perceptions are through survey activities on chocolate industry managers and consumers of processed chocolate products. The results obtained from interviews and questionnaires were processed using a statistical analysis approach. The benefits of the results of this research are expected to be the main basis for the SMEs-scale cocoa processing industry in South Sulawesi to diversify and innovate products with a scientific study approach. The novelty of this study is different from other previous researchers because this study focuses on determining product diversification variations based on consumer desires for SME-scale cocoa processing industry products.

MATERIAL AND METHOD

The research was conducted by collecting secondary data and primary data. Secondary data was collected from the SME-scale cocoa processing industry in South Sulawesi Province, namely in East Luwu Regency, Palopo City, and Makassar City. Respondents in this study consisted of respondents who were involved in managing the SME-scale cocoa industry and respondents who had consumed processed chocolate products and liked chocolate processed products. The materials used in this research are samples of processed cocoa products that will be developed in product diversification. Samples of chocolate products will be tasted tested on expert respondents as a justification for the results of consumer perceptions of the selection of chocolate products that will be developed in product diversification and innovation. The data analysis method used is descriptive statistics to determine the weight value of the approval of the product to be developed in diversification. The application of the descriptive statistical method of calculating the average to determine the weight value has been applied by several previous researchers (Charnes, *et al.*, 1978; Coelli, 1996; Memon, *et al.*, 2015; Lamatinulu, 2021). To obtain an assessment of consumer acceptance of alternative product diversification variations, a questionnaire instrument is used. The level of assessment of consumer acceptance and desire uses a Likert scale with a numerical rating level of 1 = disagree, 2 = disagree, 3 = agree, 4 = strongly agree and 5 = very-very strongly agree. In connection with this study, the number of populations cannot be determined, so the technique used in determining the number of samples is using the Leme show formula (Lemeshow, *et al.*, 1990), namely:

$$n = \frac{Z^2 P(1 - P)}{D^2}$$

Where: n = Number of Samples, Z = degree of confidence, the ideal value is 95% = 1.645 (t Table), P = the proportion of consumers of processed chocolate products in the SME industry, the ideal value = 0.5, D = ideal deviation = 10%. Based on this formulation, the

minimum number of respondents (consumers) samples determined in this study are:

$$n = \frac{1,96^2 \cdot 0,5(1 - 0,5)}{0,1^2} = \frac{0,9604}{0,01} = 96,04$$

Based on the results of the calculations above, the minimum number of respondents (consumers of processed cocoa products on the scale of SMEs) is determined, which is theoretically 96.04, and the actual number is rounded up to 97 respondents. However, in this study, the number of consumers who were used as respondents was 202 respondents. To justify the impact of diversification on increasing product competitiveness, it is necessary to review previous research literature and the perceptions of expert respondents. Briefly, the stages of the research can be shown in Figure-1.

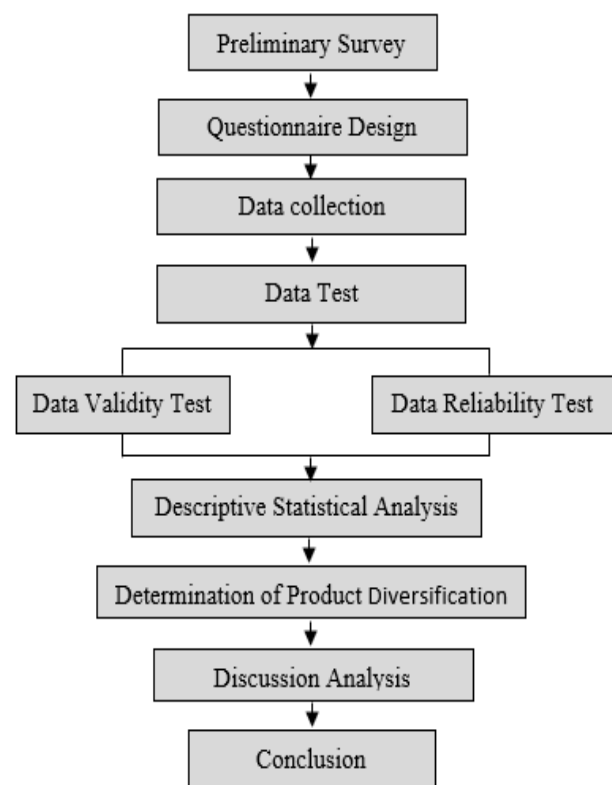


Figure-1. Research stages.

RESULTS AND DISCUSSIONS

Based on the distribution of questionnaires to get input on the type of product diversification, the validity and reliability of the data were first tested. This is done so that the questionnaire used as a measuring tool can measure the level of consumer approval assessment so that the research results are valid and reliable. The results of the statement items obtained from the answers of 202 consumers of chocolate products were first tested for validity and reliability. To identify variations in the diversification of processed cocoa products, it is determined based on the average value of respondents' answers that have passed validity and reliability tests. This



is done to ensure that the assessment of consumer perceptions and desires can be accepted and trusted. The results of the validity test have shown that the questionnaire instrument used has been able to measure the weight of consumer approval of alternative variations of product diversification. The results of the validity test of 202 respondents' answers to 42 statement attributes were all declared valid because all t-count values were greater than the t-table value (0.1381) as in Table-1.

The results of the validity test have shown that the questionnaire instrument used has been able to measure the weight of consumer approval of alternative variations of product diversification. The results of the validity test of the answers of 202 respondents to 42 statements were declared valid because all t-count values were greater than the t-table value (0.1381) as shown in the SPSS Version 24 application are shown in Table-3.

Table-1. The results of the validity of the research data

Statement code	Validity Test			Statement code	Validity Test		
	r count	r table	Explanation		r count	r tabel	Explanation
C01	0.5888	0.1381	Valid	C22	0,6710	0.1381	Valid
C02	0,5684	0.1381	Valid	C23	0,6921	0.1381	Valid
C03	0,5755	0.1381	Valid	C24	0,7181	0.1381	Valid
C04	0,6249	0.1381	Valid	C25	0,6500	0.1381	Valid
C05	0,6522	0.1381	Valid	C26	0,7491	0.1381	Valid
C06	0,5773	0.1381	Valid	C27	0,7825	0.1381	Valid
C07	0,6037	0.1381	Valid	C28	0,7194	0.1381	Valid
C08	0,6601	0.1381	Valid	C29	0,6806	0.1381	Valid
C09	0,7046	0.1381	Valid	C30	0,7672	0.1381	Valid
C10	0,6949	0.1381	Valid	C31	0,6445	0.1381	Valid
C11	0,7036	0.1381	Valid	C32	0,6903	0.1381	Valid
C12	0,6843	0.1381	Valid	C33	0,7155	0.1381	Valid
C13	0,6688	0.1381	Valid	C34	0,7085	0.1381	Valid
C14	0,7342	0.1381	Valid	C35	0,6980	0.1381	Valid
C15	0,7807	0.1381	Valid	C36	0,7451	0.1381	Valid
C16	0,8002	0.1381	Valid	C37	0,7277	0.1381	Valid
C17	0,8109	0.1381	Valid	C38	0,6885	0.1381	Valid
C18	0,8235	0.1381	Valid	C39	0,7363	0.1381	Valid
C19	0,7939	0.1381	Valid	C40	0,7409	0.1381	Valid
C20	0,7975	0.1381	Valid	C41	0,6664	0.1381	Valid
C21	0,6505	0.1381	Valid	C42	0,7444	0.1381	Valid

Based on the results of the validity and reliability tests, it can be stated that the questionnaire as a measuring tool has accuracy and accuracy because the values of all statement items are declared valid and reliable. The questionnaire instrument as a measuring tool used in this study can be trusted and relied upon because it has a perfect reliability value. With these considerations, the respondent's assessment of statements related to consumer approval of product diversification variations is acceptable. The results of the assessment using descriptive statistical analysis showed that 42 alternative variations of product diversification were acceptable because all of the

assessment results were greater than 3, which meant that they were approved. The average results of the approval assessment of respondents (consumers) and expert respondents are as shown in Figure-2.

Table-2. Test the reliability of research data.

Reliability Statistics	
Cronbach's Alpha	N of Items
0,975	42

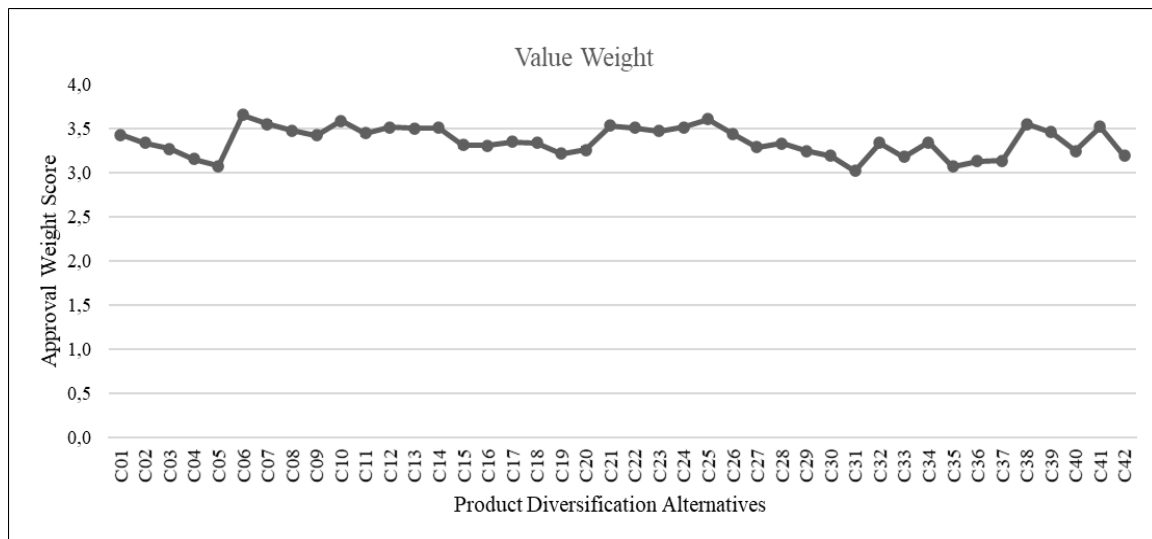


Figure-2. Graph of the average value of the respondent's (consumer) approval rating.

Based on the results of the approval weight values for the alternative product diversification variations in Figure-2, product diversification can be grouped based on the addition of various flavors, the addition of plant extracts and spices, and based on the content of chocolate. Diversification of chocolate products that consumers want to develop in the SME-scale Cocoa processing industry, there are 42 types of product variations. Product diversification based on the variety of fruit flavors consists of 10 types of chocolate products with Strawberry flavor, Blueberry flavor, Raspberry flavor, Grape flavor, Lemon flavor, Avocado flavor, Coconut flavor, Chili flavor, Coconut flavor, and Date fruit flavor. The variety of flavors of chocolate products sourced from fruits is a good thing to do in product diversification because it can add to the nutritional value and health benefits of chocolate (Çağındı, and İleş 2009). Product diversification based on chocolate content is distinguished by the percentage of chocolate content in the product made. Chocolate with a percentage of 99% is a product that does not have a mixture of other ingredients, but for products with a chocolate content of 80%, 72%, 60% and 54% it contains a mixture of milk and sugar. There are also products with a content of 80% with a mixture of cashew nuts. Product diversification based on the ingredients of plant leaves and spices includes chocolate mixed with cinnamon, chocolate mixed with ginger and lemongrass products, chocolate mixed with sesame products, chocolate mint leaves products, chocolate products mixed with Moringa leaves, chocolate mix nuts Hazelnuts. Variations of other chocolate product mixes such as chocolate made from milk and cream. The alternative variations of product diversification that can be developed in the SME-scale cocoa processing industry are as described in Table-2.

The taste factor is very important in product diversification innovation because the taste is the main driving factor for consumer interest in choosing, buying, and consuming a product (Cardello, and Schutz, 2003; Adrianto, 2019; Liem and Russel, 2019). Innovations for other product diversification are carried out based on the original content of chocolate flavor which is considered beneficial for health. This has a strong reason because consuming real chocolate which contains enough antioxidants can have a positive impact on human health (Visioli, *et al.*, 2009; Montagna, *et al.*, 2019). Product diversification innovation based on consumer desires is also carried out by adding spices and vegetable ingredients that are considered beneficial for health. Product diversification by combining chocolate with natural ingredients in the form of spices such as cinnamon, ginger, cloves, lemongrass, sesame, mint leaves can have its charm because spices can give chocolate products a distinctive aroma and taste. In addition, the spice content in chocolate can have a good impact on health because spices contain high antioxidants (Embuscado, 2015; Jiang, 2019). This can be the basis for diversifying chocolate products through the addition of spices such as cinnamon extract, ginger, lemongrass, sesame, mint leaves, moringa leaves, cloves, chili, green tea, and sago. In addition to adding fruit flavors, spices and plant innovations, diversification of chocolate products can also be done by adding levels of cashew nuts, sugar, milk, and cream. Product diversification in the SMEs-Scale Cocoa Industry is very important to implement because it can improve financial performance and expand market share (Jayathilake, 2018).

**Table-3.** Variations of chocolate products.

No	Product Diversification Variations	Product Code
1	Chocolate content 99%	C01
2	Chocolate content 80%	C02
3	Chocolate grade 72%	C03
4	Chocolate content 60%	C04
5	Chocolate content 54%	C05
6	Chocolate content 80% cashew nuts mix	C06
7	100% real cocoa powder	C07
8	Cheese flavored chocolate	C08
9	Strawberry flavored chocolate	C09
10	Date chocolate	C10
11	Green tea chocolate	C11
12	Couverture Dark Chocolate	C12
13	Couverture Milk Chocolate	C13
14	Couverture White Chocolate	C14
15	Lemon flavored chocolate	C15
16	Wine flavored chocolate	C16
17	Blueberry flavored chocolate	C17
18	Raspberry flavored chocolate	C18
19	Melon flavored chocolate	C19
20	Apple flavored chocolate	C20
21	Avocado Chocolate	C21
22	Hazelnut flavored chocolate	C22
23	Chocolate Cream	C23
24	White Chocolate Mix Cream	C24
25	Milk Chocolate	C25
26	Dark Chocolate	C26
27	Mango flavored chocolate	C27
28	Coconut chocolate mix	C28
29	Chocolate mix Sesame	C29
30	Chocolate mix of coconut and sesame	C30
31	Chili flavored chocolate	C31
32	Cinnamon Chocolate	C32
33	Clove mix chocolate	C33
34	Mint Leaf Chocolate	C34
35	Rice kencur flavored chocolate	C35
36	Lemongrass Chocolate Spice, and Stevia Leaves	C36
37	Moringa leaf chocolate	C37
38	Fat Free Cocoa Powder	C38
39	Product mix cocoa powder, milk and sugar	C39
40	A mixture of cocoa powder, ginger, lemongrass	C40
41	Caramel Chocolate	C41
42	Sago Combination Chocolate	C42



Product diversification in the SMEs-scale cocoa industry is very important to implement because diversification has a positive impact on performance (Oladimeji, and Udosen, 2019). Diversification is an important thing to do because one of the main performance indicators that are important for the SMEs-scale cocoa processing industry is the right product diversification (Lamatinulu, *et al.*, 2019). The implementation of a diversification strategy of 42 product variations can offer consumers several alternative product choices so that they have the potential to increase the competitiveness of the SMEs-scale cocoa industry. Product diversification developed through innovation that focuses on consumer desires is a holistic competitive strategy. This is consistent with research findings showing that diversification in the industry can increase excellence and competitiveness (Halliwell, 2003; Hron, *et al.*, 2008; Marangu, *et al.*, 2014; Wang and Nie, 2018; Vogl, 2018). The findings of alternative product diversification variations in the cocoa processing industry can be the basis for product innovation to increase added value and competitiveness. This is in accordance with the findings of research by Lamatinulu, *et al.*, 2017 which states that one strategy to increase added value and competitiveness of the SMEs-scale cocoa processing industry is product diversification and innovation. Developing products with a variety of 42 types of chocolate products is a way to produce diverse chocolate products, which is a form of a diversification strategy that can be carried out by the SMEs-scale cocoa processing industry. Based on the determination of product diversification variations, chocolate product innovation can be carried out based on the addition of various fruit flavors and various spices and plant leaf extracts that can increase added value. The existence of product innovation to support diversification can have an impact on increasing product advantages and competitiveness (Lamatinulu, *et al.*, 2017; Jeong, *et al.*, 2019)

CONCLUSIONS

Based on the data processing and analysis of the discussion, it is found that there are 42 variations of diversification of chocolate products that can be developed as product innovations. Product diversification that needs to be realized by the SMEs-scale chocolate processing industry should be based on consumer perceptions and desires. Based on the results of this study, diversified products according to consumer expectations in the market share should be made based on the consideration of adding a variety of fruit flavors, a mixture of ingredients from spices and ingredients from plants as well as consideration of the dominant chocolate content with the original taste. It is very important to diversify chocolate products through product innovation because it can have an impact on improving performance and competitiveness.

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