VOL. 17, NO. 14, JULY 2022 ISSN 1819-6608
ARPN Journal of Engineering and Applied Sciences

www.arpnjournals.com

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

Lamatinulu[1], Mardin[2] and Muhammad Dahlan[3]
[1]Department of Industrial Engineering, Faculty of Industrial Technology, Universitas Muslim, Indonesia
[2]Department of Mechanical Engineering, Faculty of Engineering, Universitas Muslim, Indonesia
E-Mail: lamatinulu@gmail.com

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:

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

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.

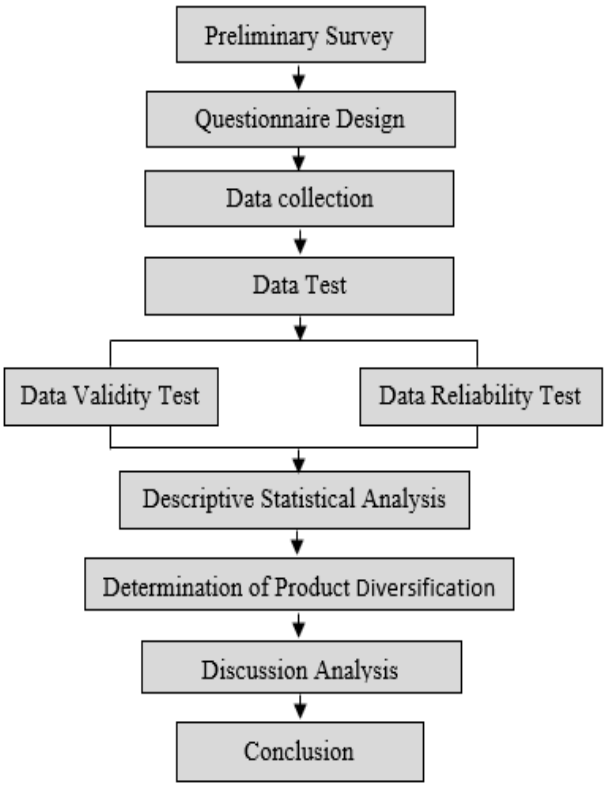

Figure-1. Research stages.

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

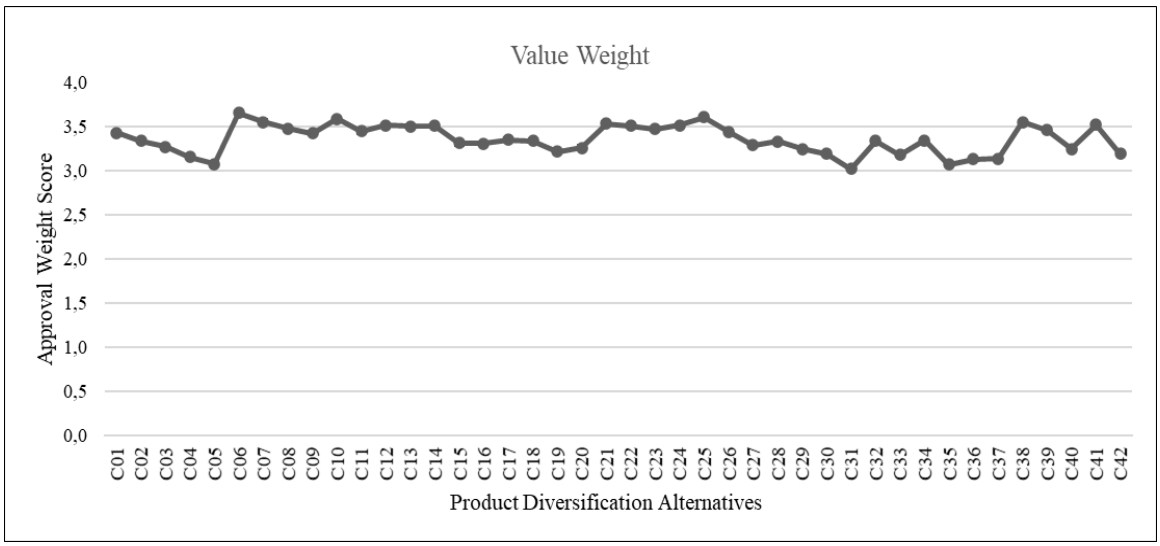

Figure-2. Graph of the average value of the respondent's (consumer) approval rating.

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 tleş 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 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.

ACKNOWLEDGMENTS

The authors would like to thank the Directorate of Resources, Directorate General of Higher Education, Ministry of Education, Culture, Research and Technology of the Republic of Indonesia for the financial support that has been provided for the implementation of this research.

REFERENCES

[1] Adrianto F. 2019. The Influence of Taste and Product Quality to Purchasing Decisions and Customer Satisfaction (Case study of consumers who buy Entrasol milk in Surabaya). Journal of World Conference. 1(1): 106-110.

[2] BPS. 2018. Luas danproduksitanamankakaoperkebunanrakyat. Luas Tanaman Rakyat menurut Jenis Tanaman. Available https://bps.go.id/ linkTabelStatis/view/idhtm.

[3] Charnes A., Cooper W. W., Rhodes E. 1978. Measuring the efficiency of Decision- Making Units (DMU*).* European Journal of Operations Research. 2: 429-444.

[4] Çağındı Ö. and Ötleş S. 2009. The health benefits of chocolate enrichment with dried fruits. Acta Scientiarum Polonorum, Technologia Alimentaria. 8(4): 63-69.

[5] Cardello, A. V. and Schutz H. G. 2003. The importance of taste and other product factors to consumer interest in nutraceutical products: civilian and military comparisons. Journal of Food Science. 68(4): 1519-1524.

[6] Coelli T. J. 1996. A guide to DEAP version 2.1: A data envelopment analysis computer program. CEPA working paper 96/08, University of New England, Australia.

[7] Embuscado M. E. 2015. Spices and herbs: Natural sources of antioxidants - a mini review. Journal of Functional Foods. 18(B): 811-819.

[8] FeriAndrianto. 2019. The influence of taste and product quality to purchasing decisions and customer satisfaction (Case study of consumers who buy Entrasol milk in Surabaya). Journal of World Conference. 1(1): 106-110.

[9] Halliwell B. 2003. Health benefits of eating chocolate? *Nature.* 426,787.

[10] Hron J., Štůsek J., Arnošt M. and Huml J. 2008. Diversification strategy in small and medium-size agribusinesses in the Czech Republic - impulses for searching business opportunities. Agric. Econ. Czech. 11: 505-509.

[11] Jayathilake H. M. T. M. 2018 Product diversification strategies: A review of managerial skills for firm performance. International Journal of Advancements in Research & Technology. 7(7): 90-100.

[12] Jeong S. W., Chung J. E. and Roh J. S. 2019. Impact of external knowledge inflow on product and process innovation of Korean SMEs: Absorptive Capacity as a Mediator. Clothing and Textiles Research Journal. 37(4): 219-234.

[13] Lamatinulu Pratikto, P. B. Santoso Sugiono. 2017. Design of strategy to increase the added value and competitiveness of products mini cocoa processing industry based OVOP with using Interpretive Structural Modeling (ISM). Journal of Engineering Science and Technology Review. 10(5): 98-103.

[14] Lamatinulu Dahlan, M. and Ramlawati. 2019. Ranking of Priority Key Performance Indicators Internal Business Processes Cocoa Industry of SMEs Scale in South Sulawesi. Quality Access to Success. 20(173): 80-83.

[15] Lamatinulu. 2021. The Strategy design for integrating the One Village One Product (OVOP) program with the cocoa processing industry cooperative to increase farmers' income. International Journal of Scientific and Research Publications. 11(5): 57-64.

[16] Liem D. G. and Russell C. G. 2019. The influence of taste liking on the consumption of nutrient-rich and nutrient-poor foods. *Frontiers in Nutrition.* 6(174): 1-10.

[17] Lemeshow S, Hosmer D, Klar J, Lwanga S. 1990. Adequacy of sample size in health studies. John Wiley & Sons.

[18] Marangu M. W. N., N'gondu M. C. N. and Egessa R. K. W. 2014. An assessment of the effect of vertical diversification on organizational competitiveness: A case of sugar firms in Kenya. European Journal of Business and Management. 6(12): 21-29.

[19] Memon I. N., Noonari S, Asif M, Shah S. T., Peerzado M.B. 2015. Economic analysis of poultry egg production in Quetta district Balochistan. Journal of Fisheries & Livestock Production. 3: 1-7.

[20] Montagna M. T., Diella G, Triggiano F., Caponio G. R., Giglio O. D., Caggiano G., Ciaula A. D. and Portincasa P. 2019. Chocolate Food of the Gods History, Science, and Human Health. Int. J. Environ. Res. Public Health. 16(4960): 1-21.

[21] Oladimeji M. S. and Udosen I. 2019. The Effect of Diversification Strategy on Organizational Performance. Journal of Competitiveness. 11(4): 120-131.

[22] Puplampu S. A. A. 2017. Product diversification to improve investment returns for High-Net-Worth-Individuals in Ghana, Walden Dissertations and Doctoral Studies, Walden University.

[23] Tuan N., Nhan N., Giang P. and Ngoc N. 2016. The effects of innovation on firm performance of supporting industries in Hanoi - Vietnam. Journal of Industrial Engineering and Management. 9(2): 413-431.

[24] Visioli F., Herwig B., Corti R., Claudio F., Heptinstall S., Molinari E., Poli A., Mauro S., Smit H. J., Vinson J. A., Violi F. and Paoletti R. 2009. Chocolate, Lifestyle, and Health. Critical Reviews in Food Science and Nutrition. 49(4): 299-312.

[25] Vogl J. D. 2018. Implementing Product Diversification Strategies for Small and Medium Retail Businesses Sustainability. Walden Dissertations and Doctoral Studies, Walden University, Walden.

[26] Zhang J., Benedetto D. A. C., Hoenig S. 2009. Product Development Strategy, Product Innovation Performance, and the Mediating Role of Knowledge Utilization: Evidence from Subsidiaries in China. Journal of International Marketing. 17(2): 42-58.

[27] Wang X. and Nie Y. 2018. The Strategic choice: Specialization or diversification? Based on case analysis. Advances in Economics, Business, and Management Research (AEBMR). 62: 165-170.