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Smoked Fish Business Marketing Development Model Using the Structural Equation Modelling (SEM) Method

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ABSTRACT: This research aims to explore the marketing development model within the smoked fish processing industry in Bone Regency. Carried out November 2023, the study employed the Accidental Sampling method to gather primary data from all consumers making purchases from smoked fish entrepreneurs in Bone Regency. The PLS SEM was used to assess the business development model, and 96 questionnaires were distributed to smoked fish consumers for data collection. The analysis of the smoked fish business development model indicates that product (with p values of 0.000 and 0.043), price (with p values of 0.000 and 0.000), promotion (with p values of 0.000 and 0.032), and place (with a p value of 0.003) significantly influence consumer satisfaction and loyalty in the growth of smoked fish marketing businesses in Bone Regency. However, the factor of place, with a p value of 0.578, does not show a significant effect on the marketing development model of smoked fish businesses in Bone Regency. This journal reveals developments in marketing the smoked fish business to increase the income of the business producers. To gain sustainable benefits from the local food movement, smoked fish needs to be developed through business marketing.

Keywords: Marketing Development, Smoked Fish Business, Structural Equation Modeling (SEM), Consumers, Satisfaction, Loyalty

Introduction

Maritime affairs and fisheries represent a sector in Indonesia with significant natural resource potential, garnering substantial attention. The marine fishing resources in the country amount to approximately 6.5 million tons per year. Among the fishery resources contributing notably to the economy are large pelagic fish such as tuna, skipjack, and tuna, constituting over 16% of the global catch supply (Triyastuti, et.al., 2021). South Sulawesi, serving as the primary hub for capture fisheries, possesses a considerable potential catch of 257,116 tons per year (DKP South Sulawesi, 2022).

Leveraging the data provided on the potential of large pelagic fish fisheries holds the promise of making a substantial impact on both the regional and national economies. However, in order to promote the optimal utilization of fish resources and concurrently generate high economic value, it is imperative to engage in sustainable processing activities for fishery products. It is crucial to understand that the sustainable management of fish resources is essential to unlock the potential of fisheries, given the rapid

deterioration in quality and susceptibility to spoilage associated with fish due to its high protein content (18-30%) and water content (70-80%). Fish serves as an ideal medium for the growth of spoilage bacteria, particularly when fresh. Therefore, it becomes essential to preserve fish, particularly in certain regions of South Sulawesi that undertake traditional fish processing methods, such as fish smoking (Amir, et.al., 2018).

Preserving fish through smoking has been a longstanding practice employed by communities over an extended period. Smoking technology, a widely adopted method for fish preservation, involves the absorption of various chemical compounds from wood smoke into fish flesh. This process is typically accompanied by semi-drying and often precedes a salting procedure. Fumigation is frequently combined with sun drying and/or pretreatment through salting. The perishable nature of fish flesh, providing an ideal substrate for microbial growth, particularly bacteria, necessitates these preservation measures. The popularity of processed smoked fish lies in its distinctive characteristics, making it well-recognized among consumers. Additionally, the final product is ready to eat, requiring no further processing before consumption (Anti, et.al., 2019).

The traditional fish smoking practices persist in various areas of South Sulawesi, including Bone Regency, where the largest group of processors operates with 38 active producers. This is facilitated by the substantial potential for large pelagic fish catches in the region, expected to reach 33,564.7 tons/year in 2022 (DKP South Sulawesi, 2022). However, the traditional preservation methods have garnered a negative reputation among consumers due to perceived issues such as low quality, inconsistent functional properties, and the absence of safety and quality assurances. Traditional processors often neglect safety and quality concerns, evident in the lack of adherence to packaging and branding standards. Despite this, smoked fish holds promise as a lucrative business commodity if processed and seasoned with appealing flavors. The future prospects for the development and marketing of smoked fish products appear promising, especially for export purposes, given the high consumption levels of fish products in many countries. Therefore, concerted efforts to enhance the production and quality of smoked fish are essential, with development initiatives playing a crucial role (Anti, et.al., 2019).

Smoked fish processing producers encounter various challenges in marketing, encompassing difficulties in promoting processed products, a lack of market information, issues related to packaging design for processed items, and a limited implementation of quality management for raw materials in smoked fish products. These challenges pose obstacles to marketing efforts, stemming from constrained access to market information that affects market orientation and reduces the competitiveness of processed products on a global scale. Additionally, a lack of market understanding results in unclear business development aspects for producers of processed smoked fish, leading to stagnation and reduced recognition in the industry (Ohorella, 2022). Empirical evidence also underscores the volatility of the smoked fish market, where consumer demand can fluctuate significantly due to factors such as seasonal variations, consumption trends, lifestyle changes, or economic conditions. This volatility presents a challenge in developing effective smoked fish marketing strategies, emphasizing the need for a comprehensive understanding of consumer preferences and market dynamics. Against this backdrop, the research aims to analyze the development model of smoked fish business marketing using Structural Equation Modeling

Material and Methods

Geographical, Temporal, and Data Research Characteristics

The study was conducted in Bone Regency, South Sulawesi. The research spanned November 2023, encompassing various stages, including data collection, processing, analysis, and the compilation of research outcomes

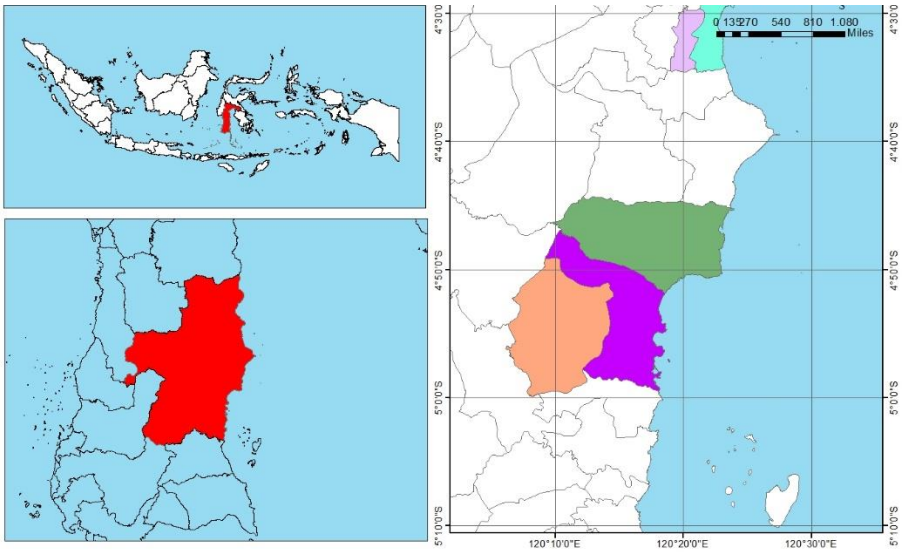

Figure 1. The map of the sampling sites for smoked fish business marketing in Bone Regency, South Sulawesi Province, Indonesia

The selection of the research location was carried out purposively with the consideration that the location chosen was a central area for the processing of processed smoked fish products based on data from the South Sulawesi Maritime Affairs and Fisheries Service 2022.

Primary data was directly sourced from respondents, specifically consumers of smoked fish businesses, selected through the accidental sampling method employing the Slovin formula (Ryan, 2013):

$$n = \frac{Z^2}{4\,(Moe)^2}$$

$$n = \frac{1{,}96^2}{4\,(5\%)^2}$$

$$n = 96{,}04$$

Information:

n = Number of samples

Z = Level of confidence required in determining the sample (95% = 1.96)

Moe = Margin of error, namely the maximum level of error that can be tolerated, is determined at 5%.

The data used in this research was collected by conducting interviews and giving a list of questions (questionnaire) directly to respondents. The variables and indicators used for the questionnaire are shown in table 1 as follows.

Table 1. Variables and Indicators

Variables	Indicator	Source
Product (X1)	Resistance (X1.1)	Kotler dan Keller (2016:47)
	Quality (X1.2)	
	Label (X1.3)	
	Packaging (X1.4)	
Price (X2)	Affordability (X2.1)	Kotler dan Keller (2016:78)
	Competitiveness (X2.2)	
	Product Compatibility (X2.3)	
	Capability (X2.4)	
Place (X3)	Great Location (X3.1)	Noverisman (2019)

	Distribution channel (X3.2)	
	Availability (X3.3)	
	Visibility (X3.4)	
Promotion (X4)	*Adversiting (*X4.1)	Kotler (2009:172)
	Sales Promotion(X4.2)	
	Personal selling(X4.3)	
Satisfaction (Y1)	Quality (Y1.1)	Noverisman (2019)
	Service (Y1.2)	
	Price (Y1.3)	
	Practical (Y1.4)	
Loyalty (Y2)	Repeat order (Y2.1)	Steven (2014)
	Refesr other (Y2.2)	
	Purcase across (Y2.3)	

The survey employs a Likert scale of the Forced Choice Scale type. This scale is utilized to mitigate the inclination of respondents to opt for a neutral response, thereby enhancing the accuracy of the obtained data. The scoring weights assigned are as follows: a) Strongly Agree (SS) is allocated a weight of 4; b) Agree (S) is assigned a score of 3; c) Disagree (KS) carries a weight of 2; and d) Strongly Disagree (TS) holds a score of 1.

Results and Discussion

Patorani fishermen are one of the fishing communities in South Sulawesi whose reality conditi Smoked Fish Enterprises in Bone Regency

The smoked fish industry in Bone Regency is distributed across 5 distinct business locations organized by sub-districts. A significant concentration of smoked fish businesses, comprising a total of 27 units, is observed in the East Tanete Riattang District. This concentration is attributed to East Tanete Riattang being recognized as an area where a considerable portion of the population engages in smoked fish processing within Bone Regency. Additionally, 11 other smoked fish business units are dispersed in various sub-district locations, including Tanete Riattang, Tonra, Mare, and Patimpeng.

Derived from the outcomes of research conducted on various smoked fish business units in Bone Regency, the highest production recorded in a single batch amounted to 200 kg, utilizing large pelagic fish (Tuna/Tongkol/Cakalang) as raw materials, equivalent to approximately 1,044 slices of smoked fish. Conversely, the lowest production in a single batch was 50 kg, utilizing large pelagic fish as raw material, equating to around 192 slices of smoked fish. The pricing of smoked fish varies across different marketing institutions, commencing from Rp. 5,000 per slice. The smoked fish business units in Bone Regency function as suppliers, providing smoked fish products to retailers in the market.

The processors in Bone Regency utilize a straightforward and traditional method for smoking fish. The smoke is generated by burning either shells or sawdust, with a preference for coconut shells due to various considerations. Coconut shells are favored for their ability to produce smoke with distinctive qualities, resulting in a unique taste and color (shiny and golden brown or yellowish-brown texture) of the fish meat. Moreover, this method does not harm the fish's color during smoking, and the resulting product features a relatively large and durable volume of smoke. In contrast, using soft wood or charcoal typically results in blackened smoked fish with undesirable odors and other unexpected characteristics. This aligns with the findings of research conducted by Amir, et.al. (2018), which emphasizes that coconut shell and fiber fuel can enhance the flavor and improve the color of fish by leveraging chemical compounds in the smoke, thereby creating smoked fish products that are more preferable in terms of shape, color, smell, and taste.

According to the findings from the investigation into smoked fish businesses in Bone Regency, the smoking process involves the use of uncomplicated equipment. Some businesses utilize an oven designed specifically for fish smoking, commonly referred to as a smoking house, while others create a 1-meter deep excavation or construct a foundation half a meter high to support the iron. Iron and bamboo are

commonly employed as materials for placing the fish. The storage area for the fish is positioned above the burner, installed horizontally on a metal or bamboo display. The smoked fish processing procedures conducted by producers in Bone Regency can be categorized into three distinct processes. The initial phase involves preliminary steps such as cleaning the fish, removing entrails, and ensuring no blood remains. Subsequently, the fish is sliced according to predetermined sizes and undergoes skewering. The second stage involves the smoking process, followed by the third stage, which focuses on packaging.

Validation and Reliability Test

This assessment is conducted through the analysis of the measurement model (outer model), which involves a comprehensive examination across four distinct stages of testing. These stages encompass individual item reliability, internal consistency reliability, average variance extracted, and discriminant validity. The subsequent section outlines the outcomes of the measurement model analysis, elucidating the results across the four stages.

Individual Item Reliability

During the initial phase, testing was conducted to validate each indicator concerning its outer loading value. An outer loading value surpassing 0.7 is considered favorable, indicating the indicator's validity as a reliable measurement indicator (Yamin & Kurniawan, 2011). Nevertheless, Fornell and Laker (1981) suggest a method to enhance the Average Variance Extracted (AVE) value, which involves removing one or more indicators with the lowest factor loading value or eliminating indicators that could significantly impact the AVE value. According to Setiawan (2016), the AVE value should exceed 0.5.

Table 2. Output Outer Loading

Indicator	Value	Information	Indicator	Value	Information
X1.1	0.965	**Valid**	**X3.4**	0.908	**Valid**
X1.2	0.835	**Valid**	**X4.1**	0.928	**Valid**
X1.3	0.963	**Valid**	**X4.2**	0.887	**Valid**
X1.4	0.836	**Valid**	**X4.3**	0.822	**Valid**
X2.1	0.927	**Valid**	**Y1.1**	0.728	**Valid**
X2.2	0.856	**Valid**	**Y1.2**	0.873	**Valid**
X2.3	0.904	**Valid**	**Y1.3**	0.904	**Valid**
X2.4	0.832	**Valid**	**Y1.4**	0.912	**Valid**
X3.1	0.862	**Valid**	**Y2.1**	0.887	**Valid**
X3.2	0.873	**Valid**	**Y2.2**	0.843	**Valid**
X3.3	0.934	**Valid**	**Y2.3**	0.829	**Valid**

Table 2 reveals that all indicators exceed the threshold of 0.7, indicating that the data fulfills the specified criteria. Consequently, the subsequent phase of testing can proceed.

Internal Consistency Reliability

The examination involved the use of the composite reliability (CR) value. This internal consistency serves as an assessment of accuracy between observers or measurement instruments utilized in the research. Both the composite reliability and Cronbach's Alpha values are considered optimal when they approach the threshold of 0.7 (Yamin & Kurniawan, 2011).

Table 3. Composite Reliability Value

Variable	*Cronbach's Alpha*	*Composite Reliability*
Product	0.879	0.917
Price	0.813	0.889
Place	0.917	0.941

Promotion	0.903	0.932
Satisfaction	0.922	0.946
Loyality	0.854	0.912

The results from the test, as presented in Table 3, demonstrate that each variable possesses a composite reliability and Cronbach's Alpha value exceeding 0.7. This signifies that all these variables are valid and deemed acceptable.

Average Variance Extracted (AVE)

At this testing stage, the assessment is based on the average value of the variance extracted (AVE). A variable is considered to have good convergent validity if its AVE value exceeds 0,5 (Yamin & Kurniawan, 2011).

Table 4. Nilai *Average Variance Extract* (AVE)

Variable	*Average Variance Extracted*
Product	0.736
Price	0.728
Place	0.800
Promotion	0.775
Satisfaction	0.813
Loyality	0.775

The results in the provided table indicate that the AVE values for each variable surpass the minimum threshold of 0,5. Consequently, all AVE values are deemed satisfactory and fulfill the specified criteria in the value test.

Discriminant Validity

The assessment of discriminant validity is conducted through two methods: examining cross-loading values between indicators and utilizing Fornell-Lacker's cross-loading. The initial approach involves scrutinizing the cross-loading value and subsequently comparing the correlation of the indicator with its construct and other constructs in the block. If the correlation between an indicator and its construct surpasses the correlation with other constructs in the block, it indicates that the construct more effectively predicts the size of its block compared to other blocks (Wong, 2013).

Table 5. Cross Loading Value

	Satisfaction	Loyalty	Product	Price	Place	Promotion
X1.1	0.879	0.113	0.965	0.059	0.867	0.089
X1.2	0.679	0.059	0.835	0.001	0.694	0.033
X1.3	0.879	0.089	0.963	0.033	0.850	0.059
X1.4	0.912	0.018	0.836	0.016	0.777	0.003
X2.1	0.040	0.903	-0.011	0.932	0.075	0.927
X2.2	0.017	0.788	-0.048	0.856	0.008	0.828
X2.3	0.045	0.864	-0.008	0.904	0.073	0.867
X2.4	-0.072	0.829	-0.081	0.832	-0.049	0.701
X3.1	0.660	-0.005	0.709	-0.024	0.863	-0.063
X3.2	0.862	0.002	0.873	0.008	0.931	0.020
X3.3	0.758	-0.015	0.802	-0.069	0.934	-0.073
X3.4	0.719	-0.004	0.781	-0.072	0.908	-0.066
X4.1	-0.004	0.887	-0.049	0.886	0.048	0.928
X4.2	0.037	0.737	-0.037	0.780	0.069	0.887
X4.3	0.021	0.774	-0.034	0.829	0.020	0.822
Y1.1	0.728	-0.064	0.538	-0.082	0.600	-0.053
Y1.2	0.926	0.106	0.836	0.048	0.873	0.056

Y1.3	0.904	0.026	0.797	0.022	0.809	0.037
Y1.4	0.912	0.018	0.777	0.016	0.836	0.003
Y2.1	-0.004	0.928	-0.049	0.886	0.048	0.887
Y2.2	0.182	0.843	0.132	0.735	0.216	0.690
Y2.3	-0.072	0.829	-0.081	0.832	-0.049	0.701

The outcomes presented in Table 5 reveal that each variable's cross-loading value is greater than that of the other constructs within the same block (indicated by the yellow color in the block indicator). Moving forward, the second approach involves examining Fornell-Lacker's cross-loading, specifically by comparing it with the AVE root value. In this comparison, the AVE root value should exceed the correlation between the construct and other constructs.

Table 6. Cross Loading Fornell-Lacker'

	Satisfaction	**Loyalty**	**Product**	**Price**	**Place**	**Promotion**
Satisfaction	**0.938**					
Loyalty	0.035	**0.963**				
Product	0.873	-0.006	**0.895**			
Price	0.009	0.853	-0.041	**0.947**		
Place	0.858	0.077	0.890	0.032	**0.902**	
Promotion	0.019	0.913	-0.046	0.880	0.052	**0.880**

Derived from the outcomes of the two-stage cross-loading measurement, it can be affirmed that no issues arise in the discriminant validity test. This affirmation is reinforced by the findings presented in Table 4, indicating that the AVE root value exceeds the correlation between the construct and other constructs.

Inner Model Testing (Structural Model)

The Inner Model, or structural model, is an analytical tool employed to examine the relationships among variables, significance values, and R-square values within the research model. This analytical model is assessed through R-square values for the dependent construct test, as well as significance and structural path parameter coefficients. In this PLS-based research approach, the examination begins by scrutinizing the R-square for each dependent latent variable. The ensuing section outlines the outcomes of the R-square estimation using the SmartPLS method.

Table 7. R-Square result

Variable	**R-Square**	**Adjust R Square**
Satisfaction (Y1)	0.888	0.883
Loyalty (Y2)	0.929	0.926

Referring to the provided table, it is evident that the R-Square value for satisfaction is 0.888. This implies that 88.8% of the satisfaction variable can be accounted for by the constructs of product, price, place, and promotion, while the remaining 12% is attributed to other variables not encompassed in the study. Similarly, loyalty attains an R-Square value of 0.929, indicating that loyalty can elucidate 92.9% of the variance in product, price, place, and promotion, with the residual 7.1% ascribed to unexplored variables. Both constructs fall within the robust category as their R-Square values exceed 0.75.

The inner model, or structural model, was additionally assessed through a significance test employing the bootstrapping method. In this research, a 5% significance level (two-tailed) was utilized, with a t-value of 1.96. The hypothesis is deemed accepted if the T-statistic value surpasses the T-value of 1.96 (Muhammad, 2020).

Table 8. Output Path Coefficients

	Original Sample (O)	**T Statistics (|O/STDEV|)**	**P Values**	**Information**
Product > Satisfaction	0.787	8.988	0.000	Significant
Product > Loyalty	0.307	2.145	0.043	Significant

Price > Satisfaction	0.602	5.560	0.000	Significant
Price > Loyalty	0.966	8.866	0.000	Significant
Place > Satisfaction	0.324	2.994	0.003	Significant
Place > Loyalty	-0.040	0.556	0.578	Not significant
Promotion > Satisfaction	0,707	6,413	0,000	Significant
Promotin > Loyalty	0.178	2.026	0.032	Significant

According to the information in table 8, it is evident that all independent variables exert a positive and statistically significant impact on satisfaction and loyalty. However, there is an exception with one independent variable, specifically place, which does not demonstrate a positive and significant influence on loyalty. The outcomes of both the inner and outer model tests are presented in the image below:

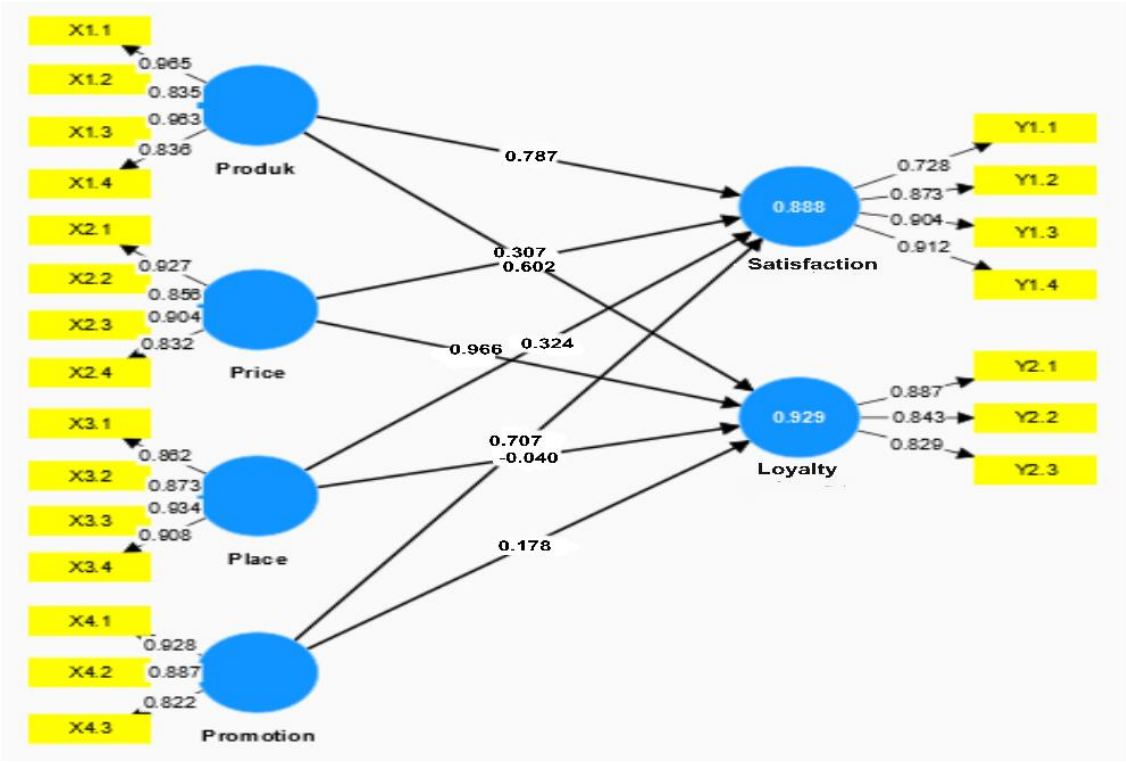

Figure 1. Outer model test results with SmartPLS 4.0

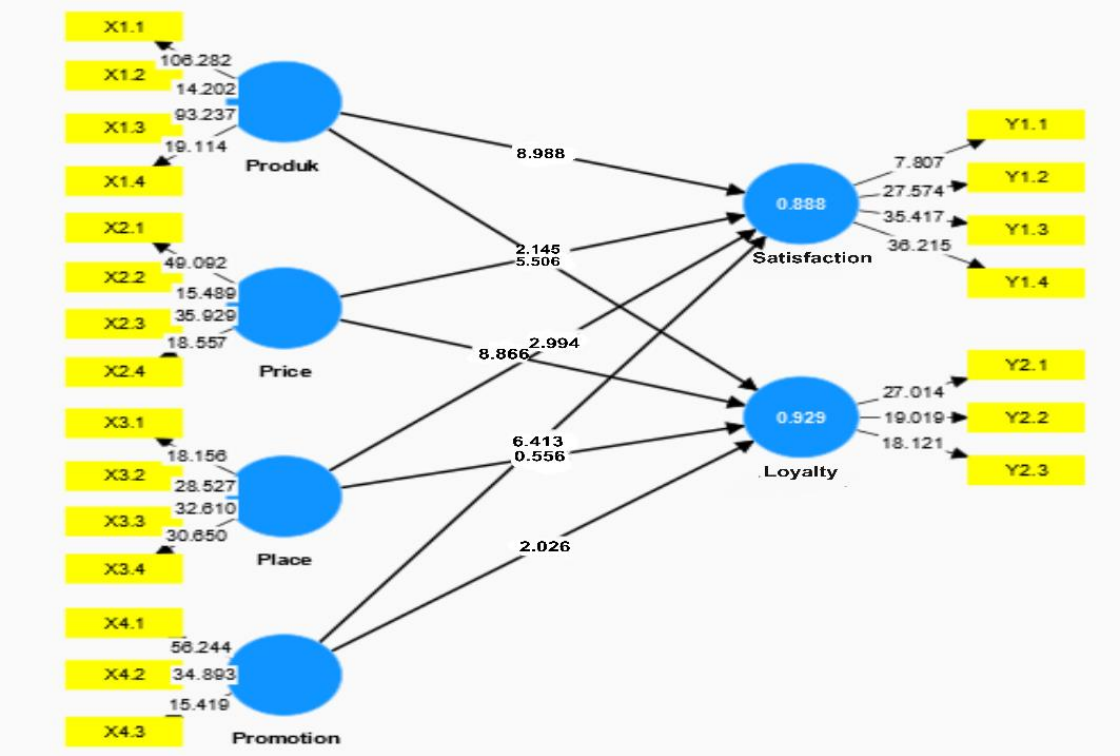

Figure 2. Inner model test results with SmartPLS 4.0

Among the exogenous variables, the product variable holds the most substantial influence on satisfaction, as evidenced by the original sample estimate value of 0.787. This suggests that, in comparison to other variables, the product variable exhibits the highest impact. Similarly, concerning the loyalty variable, the price variable stands out with the highest influence, indicated by an original sample estimate value of 0.966. Consequently, it can be inferred that the price variable surpasses other variables in its impact on the loyalty variable.

The outcomes of the research, along with various tests conducted within this study, offer a more lucid understanding of how one variable and other variables investigated herein contribute to shaping the progression of smoked fish marketing. The study encompasses several constructs or variables, namely Product (X1), Price (X2), Place (X3), Promotion (X4), Satisfaction (Y1), and Loyalty (Y2). The discussion pertaining to images 1 and 2 can be elucidated as follows:

Product variables on satisfaction and loyalty

The test analysis results demonstrate that the product exerts a positive and significant impact on both satisfaction and loyalty. This is evident from the positive path coefficient values of 0.787 and 0.307, indicating that the Product variable positively influences both satisfaction and loyalty. Furthermore, the product variable also exhibits notable values, with a t-count of 8.988 and 2.145, surpassing the t-table value of 1.96. Additionally, the significance values of 0.000 and 0.043 are less than 0.05, further affirming that the product variable significantly influences satisfaction and loyalty.

The findings of this study align with the research conducted by Ma'rufah, et al. (2015), affirming that collectively, the product significantly influences both consumer satisfaction and loyalty. The evidence further indicates that the price variable yielded a T-count of 2.440 with a Sig value of 0.015. This signifies a noteworthy impact of the product on consumer satisfaction and loyalty towards the product.

Price variable on satisfaction and loyalty

The test analysis results provide evidence that Price has a positive and significant impact on both satisfaction and loyalty, as indicated by the positive path coefficient values of 0.602 and 0.966. This signifies that the Price variable exerts a positive influence on both satisfaction and loyalty. Furthermore,

the price variable demonstrates significant values, with a t-count of 5.560 and 8.866, surpassing the t-table value of 1.96. The significance values of 0.000 and 0.000, less than 0.05, further affirm that the price variable significantly affects satisfaction and loyalty.

These research outcomes align with the findings of Trihantoro and Hadi (2023). The research shows that the price variable attains a T-count of 8.697 and a Sig value of 0.003, signifying a significant influence of price on purchasing decisions for smoked fish products. Consequently, it can be asserted that the price influences people's purchasing decisions (satisfaction and loyalty) toward smoked fish products; the more affordable the product price, the greater the inclination for people to purchase smoked fish products.

Place variables on satisfaction and loyalty

The analysis results confirm that Place has a significant positive effect on satisfaction and an insignificant negative effect on loyalty, as indicated by the positive path coefficient value of 0.324 and the negative value of -0.040. This implies that the Place variable positively influences satisfaction but negatively impacts loyalty. Additionally, the t-count value for this variable is 2.994, exceeding the t-table value of 1.96, with a significance value of 0.003, demonstrating significance for satisfaction. However, for loyalty, the t-count value is 0.556, below the t-table value of 1.96, with a significance value of 0.578, indicating a lack of significance for loyalty.

These findings align with Taufan (2020), who noted that the place variable obtained a sig value of 0.001, indicating that place influences consumer purchasing satisfaction. Thus, when the place is easily accessible and affordable, it positively affects consumer satisfaction. However, regarding loyalty, the results are consistent with the research by Lawrance, et al. (2022), stating that the place variable has a sig value of 0.954 and a calculated t of -0.058, signifying that place does not significantly impact consumer loyalty.

Promotion variables on satisfaction and loyalty

The test analysis results provide evidence that Promotion has a positive and significant impact on both satisfaction and loyalty, as demonstrated by the positive path coefficient values of 0.707 and 0.178. This implies that the Promotion variable positively influences both satisfaction and loyalty. Additionally, the Promotion variable exhibits significant values, with a t-count of 6.413 and 2.026, surpassing the t-table value of 1.96. The significance values of 0.000 and 0.032, less than 0.05, further affirm that the Promotion variable significantly affects satisfaction and loyalty.

These research outcomes align with the findings of Trihantoro & Hadi (2023), who asserted that, based on the t-count value of the Promotion variable (X3), which is 2.600, and the sig value of 0.001, promotions influence satisfaction and loyalty. This suggests that a more substantial promotional influence can enhance the visibility of smoked fish products among both local and external communities.

Conclusion

Based on the objectives and results of the discussion in this research, it can be concluded that the analysis of the smoked fish business development model shows that the product variables have a very significant effect (p value 0.000 and 0.043), Price (p value 0.000 and 0.000), Promotion (p value 0.000 and 0.032).) and Place (p value 0.003 and 0.578 (No significant effect)) on consumer satisfaction and loyalty in developing smoked fish marketing business in Bone Regency.

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