



## Case Study of Biomass Stove: Effects of Product Quality and Service Quality on Customer Satisfaction

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### **Abstract**

Considering the intense competition, the customer satisfaction factor is a serious concern. Customer satisfaction can be a reference for improving the quality of goods to be sold and a tool for self-correction in improving the quality of a good service. Several factors that influence customer satisfaction (Y) in this study included product quality (X1) and service quality (X2). This study aimed to examine the effect of product quality and service quality on customer satisfaction of PT Putralink Makmur Jaya's biomass stoves. The customer satisfaction factor was influenced by many things. Several factors that influence customer satisfaction were product quality and service quality. The present study involved 150 clients. The samples were clients who used a biomass stove. The sample collection was based on a purposive sampling technique in which the research applied a quantitative research approach. Then, the questionnaire method was used by providing a list of questions directly to the respondent. The data analysis was performed using Multiple Regression Analysis through the SPSS version 22.0 program. The results of this study indicated that product quality and service quality have a positive and significant effect on customer satisfaction of PT Putralink Makmur Jaya biomass stove users.

**Keywords:** *Product Quality; Service Quality; Customer Satisfaction*

### **Introduction**

Currently, the era of globalization has demanded changes in all fields of life, one of which is technology. Technology is one of the changes that are currently happening in the world. All aspects of life in the world require technology to grow and develop and to be used in useful life activities to make things easier (Othman et al, 2016). However, in reality in the scope of industrial companies, technology must be able to face and bring changes to the company's work system. The use of technology is expected to facilitate everything. So, it is easy to run and has a practical effect, which is not only experienced by employees but also by customers who buy products created from this appropriate technology.

In addition, companies must also be able to compete and maintain their products or business in a tough business environment, such as new competitors from the same industry or else. However, every effort must be made to prevent a reduction in product sales. Companies must learn from the failures that have been experienced by other competitors so that it can become the foundation for surviving situations and conditions that might cause the company to go bankrupt (Rojko, 2017). Therefore, companies must provide ideas or insights to create product quality and service quality so that the business becomes attractive. The aim is to attract new customers to buy products from the company (Javaid et al, 2021). It is also intended to hold old customers from being disappointed and shift their interest in products made by competitors who are in the same industry. According to Kotler and Keller (2021), service is an activity, benefit, or satisfaction offered for sale that is essentially intangible and does not result in any ownership. Thus, companies must have the ability to meet customer expectations by providing the best service to customers when offering direct and after direct transactions..

The era of globalization accompanied by technological advances can make the biomass stove industry develop and be recognized by the global market (Cutz et al, 2016). The very rapid change of fashion from time to time has become a form of threat to the stove business that exists today. Biomass stove is an alternative business product that can be used in this modern era. So, in running a business, companies are required to remain competitive or compete with other companies, so that companies can maintain their existence and have confidence that the quality of their products can be superior to their competitors (Athiyaman & Magapa, 2019). The same is true for competition in the global market in Indonesia. This business is becoming increasingly stringent with the emergence of types or brands of products made in foreign and local areas that are also present to enliven the market for the stove industry in Indonesia.

In Indonesia, several competitors for biomass stove products are taking part in global competition. The biomass stove is always overshadowed by its strongest competitor, namely the electric stove. Even though the two products are both stoves, people often compare the two in terms of the fuel used, especially in terms of efficiency and effectiveness. The advantage of the electric stove is that it has a simpler design and has a level of safety when used by customers who like this product. Commonly, this electric stove is preferred by the majority of people who live in cities because the use of electric stove products can save costs that should be used to buy LPG.

Meanwhile, the biomass stove is the type of stove that has the most development potential to replace stoves that use non-renewable fuels, such as LPG and kerosene stoves. The reason is because the biomass stove has a high profit and is able to minimize harmful gas emissions from the stove by burning out the elements contained in the biomass stove which is produced from pyrolysis (environmentally friendly organic fuel). Biomass stoves are considered to have the lowest percentage in terms of carbon emissions and smoke produced because the biomass stoves themselves are equipped with advanced technology known as fusion as the energy core to be able to run the stove (Febriansyah et al, 2014).

Fusion is the core of a heat energy generating device where the core can create heat that will turn into fire and that is the tool that has been embedded in several biomass stoves (Liu et al, 2016). By using this tool, gas and carbon emissions are reduced and air pollution is not polluted. Therefore, the biomass stove is called an appropriate technology, not only for the present, but also for the future, which will be much more modern.

Biomass stoves have almost widespread enthusiasts in several regions, such as the Papua region in 2022 of 100 applicants. However, in 2022 interest in biomass stoves will also decrease, as in several regions such as West Nusa Tenggara, which initially had 80 enthusiasts in 2021, now it has fallen to 44 enthusiasts. There is a decrease in the interest of biomass stoves in several regions. Therefore, product quality and service quality need to be re-evaluated in order to improve the quality of stoves that are safe

and attract customer interest. It also requires friendly and educational service so that customers get satisfaction from biomass stove products. Because product quality and service quality will become a strong foundation for forming basic public opinion about biomass stove products.

To be effective, product quality needs to grow and develop so that a perception is formed in the minds of customers so that they can differentiate between a good product and competitors. This then raises questions regarding several elements that can affect customer satisfaction, which include product quality and service quality inherent in biomass stove products. Product quality is a character that a product has that has the ability to meet customer needs (Waluya et al, 2019). Product quality has a positive and significant effect on customer satisfaction (Gök et al, 2019). However, this is contrary to research conducted by Jahanshahi et al, (2011) where the research shows that product quality has no positive and significant effect on customer satisfaction. According to Kotler and Armstrong (2020) service quality is a form of effort in meeting customer needs and desires in the form of services and balancing customer expectations. Zaibaf et al (2013) showed that service quality has a positive and significant effect on customer satisfaction. However, this contradicts research conducted by Bungatang and Reynel (2021) which shows that service quality has no positive and significant effect on customer satisfaction. With the existence of a research gap between the two variables of product quality and service quality on customer satisfaction, this thesis is structured to know and understand fundamentally and analyze "the effect of product quality and service quality on customer satisfaction of biomass stoves".

### ***Research Methodology***

The research object was a biomass stove product while the research subjects were customers who had purchased or were regular customers of biomass stove products at PT Putralink Makmur Jaya. This research was conducted by distributing questionnaires to customers of biomass stoves. The data collection technique used a questionnaire distributed to respondents with questions about product quality, service quality, and customer satisfaction. The type of questionnaire used was a closed question. The population involved in this study was the Indonesian people who are users of biomass stoves from PT Putralink Makmur Jaya and also Micro, Small and Medium Enterprises engaged in the culinary field to meet business needs. This research employed non-probability sampling technique. The sampling technique used was a purposive sampling technique, namely a sampling technique on the basis of selecting a random sampling unit (Apuke, 2017). In this case the selected respondents were people who used biomass stoves as many as 150 samples.

The data analysis techniques included validity tests to measure whether the statements listed in the questionnaire are valid so that they can be used for research. Furthermore, the reliability test was carried out to find out whether the questionnaire was reliable or reliable if someone's answer to the statement was consistent or stable from time to time. The normality test was also carried out to test whether in the regression model, the confounding or residual variables have a normal distribution. The multicollinearity test aimed to test whether the regression model finds a correlation between the independent variables. If the independent variables are correlated, then these variables are not orthogonal. Orthogonal variables are independent variables whose correlation values among independent variables are zero. The heteroscedasticity test aimed to test whether in the regression model there was an inequality of variance from the residuals of one observation to another. If the variance of the residuals from one observation to another remains, then it is called homoscedasticity and if it is different it is called heteroscedasticity. To find out the research relationship, regression analysis was carried out, besides measuring the strength of the relationship between two or more variables, it also showed the direction of the relationship between the dependent variable and the independent variable where the F test, t test, and the coefficient of determination were carried out ( $R^2$ ) (Kusumastuti et al, 2020).

**Results and Discussion**

**Descriptive Analysis**

Descriptive analysis described the condition of the respondent's data presented in statistical form. In this study, the number of respondents involved was 150 people. The condition of the respondents in this study was described through some information such as age range, gender, education level, occupation, income and purchases. The following will present satisfaction level data based on the table below:

Table 1. Satisfaction Level by Age

**Age \* Purchase Crosstabulation**

Count		Purchase				Total
		4	3	2	1	
Age	20-29	8	12	23	38	81
	30-39	15	9	21	12	57
	40-49	6	2	3	1	12
Total		29	23	47	51	150

Table 1 explains that the average number of purchases is highest in the age range 20-29 years in a number of 81 samples, while the lowest is in the age range 40-49 years. In other words, based on the highest total, ages between 20-29 years have a better level of satisfaction than older people.

Table 2. Satisfaction Level By Gender

**Gender \* Purchase Crosstabulation**

Count		Purchase				Total
		4	3	2	1	
Gender	Man	22	14	18	26	80
	Woman	7	9	29	25	70
Total		29	23	47	51	150

Table 2 explains that the average number of purchases is mostly man, 80, while the lowest is woman, 70. In other words, based on the highest total, men have a better level of satisfaction than women.

Table 3. Satisfaction Level by Educational Background

**Educational Background \* Purchase Crosstabulation**

Count		Purchase				Total
		4	3	2	1	
Educational Background	Junior High	2	1	0	2	5
	Senior High	4	4	5	9	22
	Associate's	7	3	5	16	31
	Bachelor's	3	6	31	18	58
	Master's	13	9	6	6	34
Total		29	23	47	51	150

Table 3 explains that the average number of purchases is the highest for a Bachelor's degree with 58 while the lowest is for Junior High School with 5. In other words, based on the highest total, Bachelor's degree customers have a better level of satisfaction than junior high school customers.

Table 4. Satisfaction Level by Occupation

**Occupation \* Purchase Crosstabulation**

Count

		Purchase				Total
		4	3	2	1	
Occupation	Entrepreneur	24	17	17	9	67
	Private Employee	4	3	20	25	52
	Teacher	0	1	4	7	12
	Civil Servant	0	0	6	4	10
	others	1	2	0	6	9
Total		29	23	47	51	150

Table 4 explains that the average number of purchases is the highest for an entrepreneur occupation, amounting to 67, while the lowest is for other occupations, amounting to 9. In other words, based on the highest total, the entrepreneur occupation has a better level of satisfaction than other occupations.

Table 5. Satisfaction Level by Income

**Income \* Purchase Crosstabulation**

Count

		Purchase				Total
		4	3	2	1	
Income	.000.000-3.500.000	2	0	14	23	39
	3.500.000-4.000.000	1	1	7	5	14
	4.000.000-4.500.000	1	5	4	11	21
	4.500.000-5.000.000	1	3	3	3	10
	>5.000.000	24	14	19	9	66
Total		29	23	47	51	150

Table 5 explains that the highest average number of purchases is income >5,000,000 totaling 66, while the lowest is income 4,500,000 - 5,000,000 totaling 10. In other words, based on the highest total, income > 5,000,000 has better satisfaction level than other income.

### Description of Respondents

Based on the age of a total of 150 respondents, the majority of respondents had the largest age range of 20-29 years, namely 54% or 81 people. Meanwhile, the smallest age range was 40-49 years as much as 8% or 12 people. Based on gender, the respondents were 80 men (53.33%) while the rest respondents were 70 women (46.67%). Based on education, 58 people (38.67%) had education equivalent to a Bachelor's degree, while the smallest number of respondents was junior high school, namely 5 people (3.33%). Based on occupation, the highest number of respondents had entrepreneur occupation as many as 67 people (44.67%) while the smallest number of respondents had other occupations as many as 9 people (6%). Based on the income range, 66 people (44%) had an income range IDR >5,000,000, while the smallest number of respondents had an income range of IDR 4,500,000 - IDR 5,000,000 by 10 people (6.67%). Based on the number of purchases, the number of respondents who had bought 1 time was 51 people (34%) while the smallest number of respondents who had bought 3 times was 23 people (15.33%).

## Classic Assumption Test

### 1. Normality Test

The normality test is a test used to determine whether the analyzed data is normally distributed or not. Statistical tests for data normality were performed using the non-parametric Kolmogorov-Smirnov (KS) statistical test with a significant value  $> 0.05$ . The basis for making a decision is if the Asymp. Sig (2 tailed) is more than 0.05. The test results can be seen in the following table:

Table 6. Output of Normality Test Results

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		150
Normal Parameters <sup>a,b</sup>	Mean	0.0000000
	Std. Deviation	1.09190625
Most Extreme Differences	Absolute	0.064
	Positive	0.064
	Negative	-0.041
Kolmogorov-Smirnov Z		0.064
Asymp. Sig. (2-tailed)		.200
a. Test distribution is Normal.		
b. Calculated from data.		

Based on the output results above, the Asymp. Sig. (2-tailed) in the Unstandardized Residual column is 0.795 or greater than the value  $\alpha = 0.05$ . Thus, it was concluded that the residual data was normally distributed, thus meeting the requirements of multiple linear regression.

### 2. Heteroscedasticity Test

This is a regression model test tool to determine the variance of the variance from one residual observation to another. The heteroscedasticity test was carried out to find out whether there was an unequal variance of the residuals between one variable and another in the regression model. The test results is presented in the following table:

Table 7. Output of Heteroscedasticity Test Results

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.142	0.666		4.715	0.000
	PQ	-0.015	0.020	-0.091	-0.745	0.458
	SQ	-0.028	0.017	-0.205	-1.683	0.094

a. Dependent Variable: ABSRES

Based on the test results above, all variables have a significance value above 0.05. So, it was concluded that the regression model in this study did not have heteroscedasticity issues.

### 3. Multicollinearity Test

This test is intended to test whether there is a high or perfect correlation or not between the independent variables in the regression model. The multicollinearity test can be seen through the Tolerance Value which has a value of  $> 0.1$  or the Variance Inflation Factor (VIF) between 1 to 10. The test results is presented in the following table:

Table 8. Output of Multicollinearity Test Results

Model		Coefficients <sup>a</sup>	
		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	PQ	0.423	2.366
	SQ	0.423	2.366

a. Dependent Variable: CS

Source: Questionnaire data processing, 2022

Based on the output results in the table above, each independent variable has a Variance Inflation Factor (VIF) value between 1 to 10, and a Tolerance Value value that is  $>$  than 0.1. Thus, it is concluded that the data is not multicollinearity or there is no strong correlation between the independent variables.

### Analysis Between Variables Using Multiple Linear Regression SPSS

#### 1. Research Hypothesis Test

The accuracy of the sample regression function in interpreting the actual value can be measured from the Goodness of Fit. Statistically, this can be measured from the value of the coefficient of determination, the value of the F statistic and the value of the t statistic. The measurement of the Goodness of Fit model based on these 3 methods is as follows:

#### 2. Results of Simultaneous Significance Test (Statistical F Test)

The F test is aimed to see how the influence of all independent variables simultaneously on the dependent variable. Based on the output data from the f test below, the calculated F value is 37.073 and the significance value is 0.000. This significance value is smaller than 0.05. This shows that there is a fit or significant multiple regression model that can explain the effect of product quality and service quality on customer satisfaction.

Table 9. Output of F Test Results

ANOVA <sup>a</sup>					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	372.647	2	186.323	154.180	.000 <sup>b</sup>
Residual	177.647	147	1.208		
Total	550.293	149			

a. Dependent Variable: Customer Satisfaction

b. Predictors: (Constant), Product Quality, Service Quality

### 3. Individual Parameter Test Results (Statistical Test t)

The t test is a tool to test the effect of independent variables on the dependent variable individually. The following is the output of the t test results which is presented in table 10 below:

Table 10. Output of t Test Results

Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.345	1.077		3.106	0.002
Product Quality	0.170	0.033	0.373	5.173	0.000
Service Quality	0.187	0.027	0.503	6.979	0.000

a. Dependent Variable: Customer Satisfaction  
Source: Questionnaire data processing, 2022

Based on the results of the t test for the Product Quality variable, the value of  $t = 5.173$  with a significance value of 0.000. The Unstandardized Coefficients beta value for the Product Quality variable is 0.170. Because the value is positive and the significance value ( $0.000/2$ ) is less than 0.05,  $H_0$  is rejected. It indicates that the variable Product Quality has a positive and significant effect on customer satisfaction.

Furthermore, based on the results of the t test for the service quality variable, the value of  $t = 6.979$  with a significance value of 0.000. The Unstandardized Coefficients beta value for the Service Quality variable is 0.187. Since the value is positive and the significance value ( $0.000/2$ ) is much smaller than 0.05,  $H_0$  is rejected. This shows that the variable Service Quality has a positive and significant effect on customer satisfaction.

As for the value of Standardized Coefficients beta, the highest value is Service Quality of 0.503, the second is Product Quality of 0.373. It shows that the variable that has the most influence on customer satisfaction is the variable Service Quality. The second most influential variable on customer satisfaction is product quality.

### 4. Coefficient of Determination ( $R^2$ )

The Coefficient of Determination test is intended to find out how much the endogenous variables are simultaneously able to explain exogenous variables. The following is the output of the Coefficient of Determination Test ( $R^2$ ) which is presented in Table 11 below:

Table 11. Output of Determination Coefficient Test Results

Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.823 <sup>a</sup>	0.677	0.673	1.09930

a. Predictors: (Constant), Product Quality and Service Quality  
b. Dependent Variable: Customer Satisfaction

From the results of processing the coefficient of determination above, the value of R Square is 0.677, which means 67.7% of the variation in customer satisfaction can be explained by the product quality variable and service quality variable. Meanwhile, the remaining 32.4% (100% - 47.9%) is influenced by other variables outside of this research model.

### Analysis of Influence Between Variables with SPSS Multiple Linear Regression

This study uses multiple linear regression analysis to predict how much positive relationship between Product Quality and Service Quality on Customer Satisfaction. Then, it aims to predict the value of customer satisfaction if the value of Product Quality and Service Quality increases or decreases. Based on the calculation of multiple linear regression analysis performed through statistics using the SPSS 22.0 program, the following results are obtained:

Table 12. Output of Determination Coefficient Test Results

Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.345	1.077		3.106	0.002
Product Quality	0.170	0.033	0.373	5.173	0.000
Service Quality	0.187	0.027	0.503	6.979	0.000

a. Dependent Variable: Customer Satisfaction

Source: Questionnaire data processing, 2022

Based on the SPSS output in Table 12 above, the regression equation is presented as follows:

$$CS = 0.170 PQ + 0.187 SQ$$

Description:

CS : Customer Satisfaction  
PQ : Product Quality  
SQ : Service Quality

Based on the regression equation, the value of the Product Quality regression coefficient is 0.170. In other words, every increase in the Product Quality variable by one unit will result in an increase in customer satisfaction of 0.170. The regression coefficient is positive so that there is a positive influence between product quality and customer satisfaction. As for the variable Service Quality, the value of the regression coefficient is 0.187. In other words, each increase in the Service Quality variable by one unit will result in an increase in customer satisfaction of 0.187. The regression coefficient is positive, so there is a positive influence between Service Quality on Customer Satisfaction.

## Discussion

### Analysis of the Effect of Product Quality on Customer Satisfaction

The Product Quality Variable in this study uses dimensions consisting of Form, Features, Quality Performance, Conformance Quality, and Durability which shows an average answer value of 4.34 which means included in the agree category for all the indicators presented. This shows that respondents agree that the quality of the products provided by the PMJ company is good in all dimensions so that customers

feel satisfied. Based on the test results of this study, it was concluded that the product quality variable had a positive effect on customer satisfaction variables. PMJ company biomass stove users. The highest average answer score for product quality is on the KP4 indicator with a value of 4.47. Meanwhile, the lowest average answer score is on the KP1 indicator with a value of 4.09.

According to Kurniawati (2014), there is a very close relationship between product quality and customer satisfaction. It happens when the product offered by the company is of good quality then the customer buys and consumes directly then the product and it exceeds their expectations. So, they are considered satisfied with the product. Conversely, if they tend to be disappointed when consuming a product, customers will switch to other products. Customer satisfaction itself arises from the quality provided by the company, the better the quality the more customers it has. So, companies must maintain existing quality or add better quality so that customers are not influenced by other competitors and remain loyal to using the brand.

Claiming product quality affects customer satisfaction. A quality product will increase the desire of customers to buy a product. When customers decide to make repeat purchases, customer satisfaction will increase. According to (Putri & Istiyanto, 2022; Roselina & Niati, 2019; Aldo et al, 2022), product quality variables have a positive and significant effect on customer satisfaction.

### **Analysis of the Effect of Service Quality on Customer Satisfaction**

The variable of Service Quality in this study uses dimensions consisting of reliability, responsiveness, assurance, empathy, and tangibles which show an average answer value of 4.36 which is included in the category agree on all the indicators presented. This shows that respondents agree that the service quality provided by the PMJ company is good and in accordance with the wishes of customers so that they feel satisfied. This includes modern building conditions that are neatly arranged, complete facilities, neat and professional employees, responsive in handling complaints, fast in solving problems, secure data storage, good ability in answering questions, polite attitude in serving, ability in understanding customer conditions, ease of contact, and ability to complete work on time. Based on the results of the research test, it was concluded that the variable Service Quality has a positive effect on the customer satisfaction variable of PMJ company's biomass stove users. The highest average answer score for service quality is on the SQ9 indicator with a value of 4.44. The lowest average answer score is on the SQ2 indicator with a value of 4.28. According to Setiawan et al (2019), service quality is the overall characteristics and characteristics of a product or service in terms of its ability to meet predetermined or latent needs. According to Hermawan et al (2016), customer dissatisfaction with the clarity of service quality is likely caused by the ability of officers to explain information to customers which is not in accordance with customer expectations. According to Tjiptono (2022), stated that service quality is centered on efforts to meet customer needs and desires as well as delivery provisions to meet customer expectations. Other studies also support (Gofur, 2019; Ibrahim & Thawil, 2019; Mariansyah & Syarif, 2020) which shows that service quality has a positive and significant effect on customer satisfaction.

### **Conclusion**

Based on the results of the overall research analysis, discussion, and description that has been presented in previous chapters, the conclusion of this study is that product quality has a positive effect on customer satisfaction of biomass stoves at PMJ company. Service quality has a positive effect on customer satisfaction of biomass stoves at PMJ company.

## References

- Aldo, O. T., Widarko, A., & Khalikussabir, K. (2022). Pengaruh Word Of Mouth, Brand Image Dan Atribut Brand Ambassador Fiersa Besari Terhadap Keputusan Pembelian Produk Eiger Di Malang (Studi Pada Mahasiswa Manajemen Unisma 2018). *E-JRM: Elektronik Jurnal Riset Manajemen*, 11(11).
- Apuke, O. D. (2017). Quantitative research methods: A synopsis approach. *Kuwait Chapter of Arabian Journal of Business and Management Review*, 33(5471), 1-8.
- Athiyaman, A., & Magapa, T. (2019). Market intelligence from the internet: an illustration using the biomass heating industry. *International Journal Of Economics And Finance Studies*, 11(1), 1-16.
- Bungatang, B., & Reynel, R. (2021). The Effect of Service Quality Elements on Customer Satisfaction. *Golden Ratio of Marketing and Applied Psychology of Business*, 1(2), 107-118.
- Cutz, L., Haro, P., Santana, D., & Johnsson, F. (2016). Assessment of biomass energy sources and technologies: The case of Central America. *Renewable and Sustainable Energy Reviews*, 58, 1411-1431.
- Febriansyah, H., Setiawan, A. A., Suryoprato, K., & Setiawan, A. (2014). Gama stove: biomass stove for palm kernel shells in Indonesia. *Energy Procedia*, 47, 123-132.
- Gofur, A. (2019). Pengaruh kualitas pelayanan dan harga terhadap kepuasan pelanggan. *Jurnal Riset Manajemen Dan Bisnis (JRMB) Fakultas Ekonomi UNIAT*, 4(1), 37-44.
- Gök, O., Ersoy, P., & Börühan, G. (2019). The effect of user manual quality on customer satisfaction: the mediating effect of perceived product quality. *Journal of Product & Brand Management*, 28(4), 475-488.
- Hermawan, W., Hakim, D. B., & Hutagaol, M. P. (2016). Analisis kepuasan masyarakat terhadap kualitas pelayanan dalam pendaftaran tanah pertama kali pada kantor pertanahan kabupaten Bogor. *Jurnal Ilmu Keluarga & Konsumen*, 9(1), 65-75.
- Ibrahim, M., & Thawil, S. M. (2019). Pengaruh kualitas produk dan kualitas pelayanan terhadap kepuasan konsumen. *Jurnal Riset Manajemen Dan Bisnis (JRMB) Fakultas Ekonomi UNIAT*, 4(1), 175-182.
- Jahanshahi, A. A., Gashti, M. A. H., Mirdamadi, S. A., Nawaser, K., & Khaksar, S. M. S. (2011). Study the effects of customer service and product quality on customer satisfaction and loyalty. *International Journal of Humanities and Social Science*, 1(7), 253-260.
- Javaid, M., Haleem, A., Singh, R. P., Khan, S., & Suman, R. (2021). Blockchain technology applications for Industry 4.0: A literature-based review. *Blockchain: Research and Applications*, 2(4), 100027.
- Kotler, P., & Armstrong, G. (2020). Principles of Marketing Eighth Europe an Edition. In *Pearson education ltd* (Issue 17th Edition). [www.pearson.com/uk](http://www.pearson.com/uk).
- Kotler, P., & Keller, K. L. (2021). Marketing Management. In *Pearson Practice Hall*.
- Kurniawati, D. (2014). *Pengaruh citra merek dan kualitas produk terhadap kepuasan dan loyalitas pelanggan (studi pada pelanggan KFC cabang Kawi Malang)* (Doctoral dissertation, Brawijaya University).
- Kusumastuti, A., Khoiron, A. M., & Achmadi, T. A. (2020). *Metode penelitian kuantitatif*. Deepublish.

- Liu, X., Chen, M., & Wei, Y. (2016). Assessment on oxygen enriched air co-combustion performance of biomass/bituminous coal. *Renewable Energy*, 92, 428-436.
- Mariansyah, A., & Syarif, A. (2020). Pengaruh kualitas produk, kualitas pelayanan, dan harga terhadap kepuasan konsumen cafe kabalu. *Jurnal Ilmiah Bina Manajemen*, 3(2), 134-146.
- Othman, F., Bahrin, M. A., & Azli, N. (2016). Industry 4.0: A review on industrial automation and robotic. *J Teknol*, 78(6-13), 137-143.
- Putri, A. S., & Istiyanto, B. (2022). Pengaruh Kualitas Produk, Kualitas Pelayanan dan Harga terhadap kepuasan pelanggan Herbal Skincare. *JOURNAL SCIENTIFIC OF MANDALIKA (JSM) e-ISSN 2745-5955/ p-ISSN 2809-0543*, 3(12), 5-17.
- Rojko, A. (2017). Industry 4.0 concept: Background and overview. *International journal of interactive mobile technologies*, 11(5).
- Roselina, M. A., & Niati, A. (2019). Analisis Pengaruh Kualitas Produk, Kualitas Pelayanan Dan Promosi Terhadap Kepuasan Konsumen Elsa Hijab Semarang. *Solusi*, 17(3).
- Setiawan, A., Qomariah, N., & Hermawan, H. (2019). Pengaruh Kualitas Pelayanan Terhadap Kepuasan Konsumen. *Jurnal Sains Manajemen dan Bisnis Indonesia*, 9(2), 114-126.
- Tjiptono, F. (2022). *SERVICE MANAGEMENT: Mewujudkan Layanan Prima Edisi 4*. Penerbit Andi.
- Waluya, A. I., Iqbal, M. A., & Indradewa, R. (2019). How product quality, brand image, and customer satisfaction affect the purchase decisions of Indonesian automotive customers. *International Journal of Services, Economics and Management*, 10(2), 177-193.
- Zaibaf, M., Taherikia, F., & Fakharian, M. (2013). Effect of perceived service quality on customer satisfaction in hospitality industry: Gronroos' service quality model development. *Journal of Hospitality Marketing & Management*, 22(5), 490-504.

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