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ECONOMIC ANALYSIS AND FACTORS INFLUENCING CUSTOMER SATISFACTION AND ELECTRICITY PURCHASE DECISIONS IN A CASE STUDY AT PT. PLN IN INDONESIA

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Abstract

This research aims to explore the factors that impact customer satisfaction and purchasing decisions among PT PLN (Persero) electricity consumers across Indonesia. A sample of 70 consumers was surveyed using a questionnaire to collect data. The analysis utilized linear regression through SPSS Statistics, considering variables such as product, price, distribution channel, promotion, and service quality as independent, intervening, and dependent factors. The study uncovered several significant findings: firstly, both price and service quality play crucial roles in influencing customer satisfaction. Secondly, distribution channels and customer satisfaction notably affect PT PLN (Persero)'s electricity purchasing decisions in Indonesia. Thirdly, collectively, products, prices, distribution channels, promotions, and service quality contribute to customer satisfaction, consequently impacting PT PLN (Persero)'s electricity purchasing decisions across these regions. Particularly noteworthy is the introduction of a novel model depicting the relationship between promotional activities promoting electricity conservation, customer satisfaction, and purchasing decisions. The implications of this research are expected to aid electricity management and industry professionals in enhancing customer satisfaction and guiding PT PLN (Persero)'s electricity purchasing decisions in Indonesia. Furthermore, it could serve as a valuable resource for future research endeavors and corporate decision-making processes.

Keywords: Customer Satisfaction, Purchase Decision, PT PLN (Persero) Indonesia Customer

INTRODUCTION

The development of the electricity sector is intended to ensure the availability of sufficient electricity, good quality, and reasonable prices to enhance the welfare and prosperity of the people fairly and evenly, achieving sustainable development.

Electricity in Indonesia is still predominantly fueled by fossil energy, which can have environmental impacts such as air pollution, climate change, and global warming that will disrupt the balance of the environment (Pratama, 2015). The use of fossil fuels in electricity facilities, transportation, and uncontrolled industries is generally concentrated in large cities and household activities. This high dependence on fossil energy is a challenge for the Indonesian government to reduce fossil energy consumption by developing new renewable energy sources (EBT) in the electricity sector and maintaining national energy security (Jiang et al., 2020).

The commitment to prioritize EBT is also a follow-up to the 2015 Paris Agreement and COP26 on agreements between countries around the world to reduce the impact of warming global and greenhouse gas impacts. National energy policy sets mix targets EBT in 2025 will be 23 percent and in 2050 it will be 31 percent. Sadly, the current realization of EBT (in 2020) is still 11.2 percent, can it catch up? EBT targets for 2025 and 2050? (Afrianda, 2023).

One of the main challenges in developing EBT is that its price is not yet affordable compete with fossil energy (coal, oil, and gas), except for a few types of renewable energy only. The price of fossil energy is becoming cheaper, among other reasons by the cost of environmental damage to fossil energy which is not included in the cost's generation (Wardhana, 2020). The investment costs for developing EBT are still high domestic industry support in providing EBT components and difficulties Low interest funding is also a cause of hampered development EBT so that the use of fossil energy is still maintained (Tim Sekretaris Jenderal Dewan Energi Nasional, 2019).

The use of fossil energy is also increasing with the influx of several additions The coal-fired power plant is part of the 35 GW project with an IPP or private electricity contract increase the availability and reserves of national electricity. Besides that, impact Covid19 pandemic with restrictions on office activities, business and industry has an impact on reducing electricity consumption, especially in the industrial, business and sectors office. This condition causes an excess of available power capacity. electricity compared to demand, especially on the islands of Indonesia or there is an excess supply means that electricity supply increases while electricity demand or consumption does not will increase so that by the end of 2022 the island of Java is predicted to have excess electrical power reaching 10 GW (Afrianda, 2020).

The government continues to maintain the continuity of electricity supply, including in Indonesia islands by appointing PT PLN (Persero) or abbreviated as PLN, namely the agency state-owned enterprises (BUMN) which are tasked by the government with managing energy electricity by carrying out electricity business activities, and maintaining balance the life of the company besides serving the community as an instrument of the state also carries out corporate duties as a business entity that manages electricity (ESDM, 2022).

Excess electricity capacity can result in losses due to existing electricity produced cannot be stored efficiently. Therefore, this research focuses to explore the factors that influence electricity purchasing decisions through PLN electricity customer satisfaction. This research complements previous research by using the 4P marketing mix variables and service quality is a key variable that can influence customer satisfaction, decisions purchasing and increasing sales.

This research is expected to contribute to decision making for electricity management and practitioners in increasing electricity sales through customer satisfaction and electricity purchasing decisions.

The formulation of this research problem is broken down into several research questions, is 1) does the product influence customer satisfaction? 2) does the price have an effect on customer satisfaction?, 3) distribution channels influence satisfaction customers?, 4) promotion affects customer satisfaction?, 5) quality service influences customer satisfaction?, 6) product, price, channel distribution, promotion together influence customer satisfaction? 7) Does the product influence the decision to purchase electricity? 8) Price influences on electricity purchase decisions? 9) distribution channels influence electricity purchasing decisions? 10) promotions influence decisions purchasing electricity?, 11) service quality influences decisions purchasing electricity?, 12) product, price, distribution channels, promotion, service quality and customer satisfaction together influence decisions purchasing electricity? and 13) does customer satisfaction have an effect on electricity purchasing decisions?

The aim of this research is to analyze the influence of the marketing mix which consists of (product, price, distribution channels and promotions) and service quality on satisfaction customers and electricity purchasing decisions at PT PLN (Persero) in Indonesia. Study This method uses a variable relationship model of product, price, distribution channels, promotion, service quality, customer satisfaction, and purchasing decisions. Novelty from

This research is a model of the relationship between variables promoting savings in electricity use with customer satisfaction and purchasing decisions. It is hoped that the implications of this research can contribute to management and practitioners' electricity in achieving customer satisfaction and electricity purchasing decisions PT PLN (Persero) in Indonesiaand can be a reference for future research and company management to consider its implementation.

Electricity System

An electrical system is a collection of components or tools electricity such as generators, transformers, transmission lines, distribution lines, and loads, which are connected to form a system (Murthy, 2017). Electricity system starting from generation which produces electricity, then through the transmission system distributed to the

main substation, then to the distribution substation and consumption location. (Blume, 2018).

The product of electrical energy is often also called final energy, namely a form of energi useful for consumers, for example, electricity. Electricity is the final form of energi the most versatile, can be transported, but not easy to store, even if you try Storage in the form of batteries is very expensive.

Based on the energy source, power plants consist of power plants fossil energy and EBT power plants. There is still potential for EBT development in Indonesia very large because currently installed EBT is still below 10% of the EBT energy potential in Indonesia.

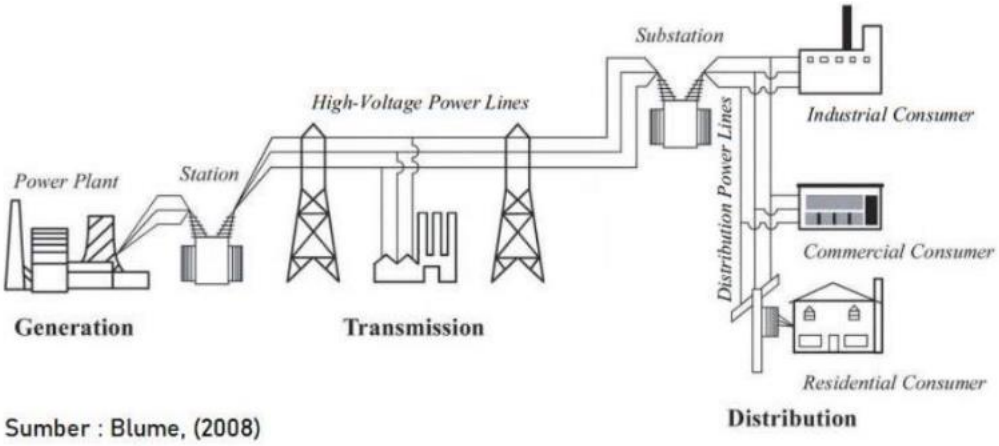

Figure 1. Electrical System

Table 1. Potential and Capacity of EBT Generators in Indonesia

Renewable Energy	Unit	Potency	Installed	%
Bioenergy	Mw	32654	42	0,13
Microhydro	Mw	94300	5032	5,34
Solar	Mwp	207898	105	0,05
Geothermal	MW	28500	2131	7,48
Wind	Mw	60647	154	0,25

The development of renewable energy is increasingly important, considering that the whole world has committed by 2015 to reducing carbon emissions, implementing a green economy, and reducing poverty which leads to sustainable development (Nurlaila, 2019).

Customers' electricity needs are increasing from time to time In order to serve these needs, an electric power system is required developed in line with the increasing need for electricity from customers (Electrical Energy Magazine, 2013).

Marketing Mix

The marketing mix is a set of tactical marketing tools to respond to targets the company's market, namely all efforts made by the company to influence product

demand, then broken down into four groups of variables, namely product, price, distribution channels and promotions. The 4P marketing mix blends into the program integrated that engages target customers and provides customer value (Kotler, 2013)

Price

Price is the most flexible element, which can be changed instantly, however, the consequences of price changes can be far-reaching, affecting organizations and competitor. Pricing involves financial transactions of a product, influencing buyer behavior (Drummond, 2005). Price indicators are as follows: a) Prices are affordable by consumer purchasing power. b) Match between price and quality. c) Price has competitiveness with other similar products (Kotler & Keller, 2008)

Distribution Channel

Distribution channels refer to the avenues through which customers conduct their purchases, encompassing various channels such as physical stores, online platforms, applications, social media platforms, or websites (Drummond, 2005). Key indicators of distribution channels include: a) Channel selection distribution, which encompasses the assistance offered by channel members and the extent of market coverage or customer reach (Drummond, 2005), b) Distribution strategy, which includes the options of ubiquitous, selective, and exclusive distribution (Russell, 2010).

Promotion

Promotion involves the strategic and tactical planning and execution of marketing activities for a brand, utilizing a comprehensive mix of business and consumer communications aimed at synergistically influencing behavior to boost sales and enhance brand image (Anthony, 2010). A well-executed promotional mix is crucial for achieving strong sales, and marketers should endeavor to create a favorable environment (Kotler & Keller, 2008). Key indicators of promotion include: a) advertising, sales force, and direct marketing (online), public relations (Drummond, 2005), b) sales promotion, advertising, sales force, public relations, direct marketing, and internet/social media (Kotler & Keller, 2008).

Service Quality

Service quality refers to the attributes and traits of a product or service that have the capacity to fulfill stated or implied needs. Companies that consistently meet the majority of their customers' needs are deemed high-quality companies, but it's important to differentiate between quality conformity and quality performance (Levitt, 1975). Customer-focused management is essential for sustaining industrial growth, operating under the belief that profits are ensured by a growing and more affluent population, thus benefiting every industry (Levitt, 1975). Indicators of service quality

include: 1) Reliability—The ability to consistently deliver promised services accurately and dependably, 2) Responsiveness—The willingness to assist customers promptly and provide swift service, 3) Assurance—Employee competence, courtesy, and their ability to convey trust and confidence, 4) Empathy—Demonstrating care and individualized attention towards customers, and 5) Tangibles—The appearance of physical facilities, equipment, staff, and communication materials.

Customer satisfaction

Satisfaction is determined by the alignment between expectations and the performance of a product or service experienced by consumers. When performance fails to meet expectations, consumers feel disappointed; when it meets expectations, they feel satisfied; and when it exceeds expectations, they feel delighted (Kotler & Keller, 2008). Dissatisfied customers may resort to alternative behaviors such as: a) switching to another brand or exiting the market, b) engaging in negative word-of-mouth communication, c) remaining passive despite dissatisfaction, or d) lodging complaints with the company or relevant third-party institutions (Stauss, 2019). Indicators of customer satisfaction include: a) Repeat purchases, b) product performance, c) alignment with needs, and d) alignment with expectations (Kotler, 2022).

Buying decision

The purchasing decision represents the ultimate choice made by a consumer to acquire goods or services, typically based on specific considerations. This decision-making process comprises five stages: recognizing the need, searching for information, evaluating alternatives, making the purchase decision, and exhibiting post-purchase behavior. It's evident that the purchasing process commences well before the actual transaction and extends far beyond it (Kotler, 2013).

Figure 2. Customer Purchase Decision Process

RESEARCH METHOD

Research design

This research uses a quantitative-descriptive approach, conducted in Jakarta by taking PLN customer research sample objects from several types of customers spread across the islands of Indonesia.

Populasi dan Sample

The population of this research is PLN electricity customers in Indonesia, from a total of 51,259,474 customers, a sample of 70 customers with installed electrical power ranging from 450 VA to above 200 KVA from several tariff groups was selected.

Sample Collection and Measurement Methods

The data collection method in this research uses a questionnaire that contains questions about the respondent's personal data and the respondent's perception of related variables. The sampling method in this research uses a nonprobability method sampling with quota sampling with a measurement scale using a nominal scale and ordinal scale. Sampling uses sample quotas, namely determining number of samples, and selecting samples and usually without a sample frame. Taking Samples like this are often used in public opinion surveys

Data Analysis Method

The data analysis method used is multiple regression analysis with using the SPSS application. Multiple regression analysis is used if the researcher intends to predict what the condition of the dependent variable will be, if there are two or more independent variables as predictor factors

Testing and calculating regression analysis data in this research, namely; 1) Test Questionnaire consisting of validity and reliability tests, 2) Classic Assumption Test consisting of multicollinearity, autocorrelation, heteroscedasticity, normality and linearity tests), 3) Correlation analysis, 4) Statistical test consisting of the F statistical test, t-test), 5) R2 test and 6) Test hypothesis.

$Z = b0+b1X1+b2X2+b3X3+b4X4+b5X5+e$ ..... [1]

Regression Equation Model 2: testing variables X, Z, against Y in hypothesis 7 to 13:

$Y=b0+b1X1+b2X2+b3X3+b4X4+b5X5+b6Z+e$ ..... [2]

Note:	X1= product	X5	= service quality
	X2= price	Z	= customer satisfaction
	X3= distribution chanel	Y7	= buying decision
	X4= promotion	b1.6	= regression coefficient

RESULT AND DISCUSSION

Respondent Data Analysis

The instrument used in this research was a questionnaire that was delivered to 70 respondents who were PLN electricity consumers on the islands of Indonesia. As for data respondents based on the completed questionnaire can be seen in table 2

Table 2. Data from PLN Indonesia Customer Respondents

Type of Work		Tariff Type		Electrical Power (VA)	
Description	**Amount**	**Description**	**Amount**	**Description**	**Amount**
PNS/BUMN/TNI/POLRI	25	Household	59	450-6.600	59
Private sector employee	19	Industry	0	>6.600-23.000	10
self-employed	5	Business	6	>23.000-200.000	1
Housewife	8	Social	3	>200.000	1
Student	2	Governance	2		
Etc …	11				
Amount	70		70		70

Table 3. Validity Test Results

Variable	SIG	R Count	R Table*)	Valid/ Not Valid
X1= product	,000	.557***	0,235	Valid
X2= price	,000	.659***	0,235	Valid
X3= distribution chanel	,000	.673***	0,235	Valid
X4= promotion	,000	.632***	0,235	Valid
X5= service quality	,000	.701***	0,235	Valid
Z= customer satisfaction	,000	.817***	0,235	Valid
b1.6= regression coefficient	,000	1,000	0,235	Valid

*) R Table (N 70, 5% =0,235)

Test Questionnaire

The questionnaire test instrument consists of a validity test and a reliability test. Validity test results using the Pearson Correlation (Pearson Product Moment) method and method Corrected Item Total Correlation.

Validity test results show product, price, distribution channels, promotion, quality service, customer satisfaction and purchasing decisions are declared valid, because each items have a Sig level (2-tailed) 0.000 < 0.05 (5%), or and r value Count > d Table (N 70.5% = 0.235). Reliability is used as a measure of the stability and consistency of respondents in answering questions in the questionnaire.

The results of the reliability test using the Cronbach's Alpha method are as follows:

Table 4. Reliability Test Results

Variable	Crondbach's Alpha	< /> 0,70	Valid/ Not Valid
X1= product	,924	>0,70	Valid
X2= price	,920	>0,70	Valid
X3= distribution chanel	,921	>0,70	Valid
X4= promotion	,920	>0,70	Valid
X5= service quality	,917	>0,70	Valid

Z= customer satisfaction	,919	>0,70	Valid
b1.6= regression coefficient	,917	>0,70	Valid

Reliability test results with a Crombach's alpha limit of 0.7 and above are acceptable, namely, the Cronbach's Alpha value obtained is = 0.897 > 0.7, so it is stated that reliable measurement instruments for variables X, Z and Y.

Analysis/Discussion

The autocorrelation test aims to test whether there is a correlation in the linear regression model between the confounding error in period t and the confounding error in period t-1 (previous). The autocorrelation test uses the Durbin Watson method (Durbin Watson Test), as follows:

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.755[a]	.570	.529	1.705	1.744

The autocorrelation test results of the dependent variables are X and Z or (k) = 5, with the sample (n) = 70 with D.W. 5%. shows as follows:

- Calculated DW = 1.744
- DW table with n=70. DW 5%. dL 1.49434 dU1.73505
- 4 – 1.73505 = 2.2649, so dL = 1.49434 4 – dU = 2.2649

Because the calculated DW (1.744) > dL(1.49434) and <4-dU(2.2649), it is concluded that Nothere are symptoms of autocorrelation.

The F test (F-test) is carried out to see the effect of independent variables on dependent variable. A. F Test to test the effect of variable X on Z:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	227.871	5	45.574	25.316	.000[b]
	Residual	115.214	64	1.800		
	Total	343.086	69			

Sig value. variable X= 0.000 < 0.05 and calculated F value 25.316 > F table 2.36 meaning there is a simultaneous influence of variable X on Z. F table is calculated by formula: F table=F (k; n–k) = F (5; 70–5) = F (5;65). Table results F (5; 65) shows the number = 2.36. The results of this test show that simultaneously, products, prices, distribution channels, promotions, and service quality influence on customer satisfaction.

The results of research using the t test show the following: First, it is necessary to calculate the t table value to compare with the calculated t value in the Coefficient table from the SPSS calculation results. T-test: t table =t (α /2; n-k–1) = t (0.05/2, 70-5-1). Table results t (0.025; 64) = 1.669 Ad 1) T test – variable X against Z:

The partial test results above show that the factors are influential significant impact on purchasing decisions, namely service quality and customer satisfaction. Meanwhile, other factors do not have a significant influence on the decision purchasing, namely products, prices, distribution channels and promotions. Availability of electric power, price, distribution channels and promotions are not important in influencing customers buy electricity because they feel there is currently no other choice using electricity other than PLN electricity. However, service quality and satisfaction perceived by electricity customers is important because it can influence purchasing decisions such as reducing electricity consumption, using electricity alternative to solar panels even though the price is still higher than PLN electricity.

The partial test results above show that the factors are influential significant to customer satisfaction, namely price, promotion, and service quality. Meanwhile, other factors do not have a significant effect on customer satisfaction, namely products, distribution channels. Availability of electric power and distribution channels This is something that customers usually experience. Electric power has become very important needed when a power outage occurs. Meanwhile, electricity prices are felt by customers, as well as promotions carried out by PLN, especially if related to discounts on electricity connections and the quality of services provided by PLN both during electricity disruptions, payment systems and ease of service others that have been implemented through the PLN Mobil integrated application system.

Coefficient of Determination (R2)

Coefficient of Determination Test (R2) The coefficient of determination for variations in the dependent variable can be seen in the Model Table Summary generated by SPSS calculations.

Effect of Independent Variation X on Dependent Variable Z.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.815[a]	,664	,638	1,342

The Adjusted R Square value (coefficient of determination) is 0.664, which means influence of variable X consisting of X1 product, X2 price, X3 distribution channel, X4 promotion, X5 service quality to Z customer satisfaction of 66.4%. And the remaining 33.6% is influenced by other factors outside this research.

Effect of Independent Variations X, Z, on Dependent Variable Y.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,865[a]	,747	,723	1,306

The Adjusted R Square value (coefficient of determination) is 0.747, which means influence of variable X consisting of X1 product, X2 price, X3 distribution channel, X4 promotion, X5 service quality and Z customer satisfaction with decision Y purchases amounted to 74.7%. And the remaining 25.3% is influenced by factors others outside this research.

Hypothesis testing will be concluded with 2 (two) forms of regression equation results in coefficient table 1 and 2, as follows: A Regression Equation Model 1: To test variable X against Z in hypothesis 1 elementary school 6:

Z = 1.677-0.001X1+0.253X2+0.052X3+0.288X4+0.129X5

B Regression Equation Model 2: To test variables X, Z, against Y as well influence of M on Z with Y in hypotheses 7 to 13.

Y=1.220-0.12X1+0.009X2+0.356X3-0.31X4+1.02X5+0.617Z

CONCLUSION

1. Based on empirical observations, there are key influencing factors customer satisfaction and electricity purchasing decisions, namely, product, price, distribution channels, promotions, and service quality, as well as satisfaction customer.
2. Factors that have a significant influence on PT PLN electricity customer satisfaction (Persero) in Java Bali, namely price, promotion, and service quality.
3. Other factors that do not have a significant effect on customer satisfaction PT PLN (Persero) electricity in Java and Bali, namely products, distribution channels and promotions.
4. Together products, prices, distribution channels, promotions, and quality service influences PT PLN (Persero) electricity customer satisfaction in Java and Bali
5. Factors that have a significant influence on PT electricity purchasing decisions PLN (Persero) in Java Bali is a distribution channel and customer satisfaction.
6. Other factors that do not have a significant influence on purchasing decisions PT PLN (Persero) electricity in Java Bali, namely products, prices, service quality and customer satisfaction.
7. Together with product, price, distribution channels, promotion, quality service and customer satisfaction regarding electricity purchasing decisions PLN (Persero) in Indonesia.
8. Factors that influence customer satisfaction and decisions purchasing electricity, namely products, prices, distribution channels, promotions, and service quality. Customer satisfaction is also a factor influence purchasing decisions. And the

purchasing decision will be impact on the growth of PT PLN (Persero) electricity sales.

9. Influence of product, price, distribution channels, promotions, and service quality on the satisfaction of PT PLN (Persero) electricity customers in Java and Bali amounting to 66.4%, and the remaining 33.6% was influenced by other factors outside the research.
10. Influence of product, price, distribution channels, promotion, service quality and customer satisfaction with PT PLN (Persero) electricity purchasing decisions in Java Bali was 74.7%, and the remaining 25.3% was influenced by factors others outside this research.

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