



Analysis of Linear Regression Level of Customer Satisfaction New Smartphone Purchase Decisions

Priatno¹, Bilal Abdul Wahid²

¹Teknologi Informasi, Fakultas Teknik dan Infomatika, Universitas Bina Sarana Informatika

²Sistem Informasi, Fakultas Teknik dan Infomatika, Universitas Bina Sarana Informatika

E-mail: priatno.prn@bsi.ac.id, bilal.baw@bsi.ac.id

ARTICLE INFO

Article history:

Received: 10/01/2021

Revised: 20/01/2021

Accepted: 30/01/2021

Keywords:

Customer Satisfaction, Purchase Decision, Smartphone

ABSTRACT

Smartphone technology is currently implementing the latest and most comprehensive technology, which in addition to this technology also allows you to do many things such as making video conferences, playing e-sport games, and other transactions. Research conducted by the author uses the SPSS Ver.22 application program to report the data obtained by distributing questionnaires to 80 respondents who will buy or have used new smartphone products. After the analysis is carried out, the results obtained from the independent variables are based on brand (X1), price (X2), product specifications (X3), design (X4), and together have a positive effect on the related variables, namely the purchase decision (Y), so that the following equation is obtained: $Y = 7.244 - 0.012X1 + 0.210X2 + 0.464X3 - 0.003X4$.

Copyright © 2021 Jurnal Mantik.
All rights reserved.

1. Introduction

The development of current modern globalization is increasing rapidly so that the existence of technology itself, especially in the field of telecommunications, as a medium of communication is very important for people in various layers. The use of communication technology is used, the faster the process of exchanging information, and also telecommunications functions as a connector of information so that it can make from one place to another far away, and can make it easier for people to get the information needed

In the business world, competition is part of the product innovation competition to be superior, so every smartphone company tries to display products that are more attractive and innovative. According to Mayasari (2012: 94) Meanwhile, competition among smartphones.

2. Methods

At the stage of using existing instruments in data collection, the instruments in the research must first be tested for validity, reliability, normality, and multiple linear regression. Where applying the validity test is used to measure the ability of a measuring instrument, reliability can be used to measure the extent to which the measurement can be trusted, the next stage is the Normality test which is used to determine whether the data population is normally distributed or not and Multiple Linear Regression has used to know the extent to which the direction of the relationship between the independent variable and the dependent variable, whether each of the independent variables has a positive or negative relationship. To be able to predict the value of the dependent variable if the value of the independent variable has increased or decreased.

Table 1.
Variables in Research

Variable	Information
X1	Brand (Brand Image)
X2	Price (Price)
X3	Product Specifications
X4	Design (Design)
Y	Buying decision

Source: Kotler and Keller (2007: 177)



2.1 Validity test

According to Priyatno (2014: 51), "the validity test is a data instrument to find out how accurate an item is in measuring what it wants to measure". This item can be declared valid if there is a very significant correlation with the total score of the item, in this case, it can be shown by the support of the item to reveal what it wants to produce. Items can usually be statements or questions directed to respondents using a questionnaire to reveal the results. Testing the validity of items in SPSS using three models of analysis methods, namely factor analysis, Pearson Correlation, and Corrected Item Total.

2.2 Reliability Test

According to Priyatno (2014: 64), "the reliability test is used to determine the consistency or consistency of measuring instruments that usually use a questionnaire". This means whether the measuring instrument will be able to produce a measurement that remains consistent if the measurement is repeated. The method often used in research to make measurements with a range scale (such as 1-5) is Cronbach Alpha. This study, using Cronbach's Alpha method because the questionnaire score was in the form of a scale (1-5). The form of reliability formula using Cronbach's Alpha method is:

$$r_{11} = \left(\frac{n}{n-1} \right) \left(1 - \frac{\sum \sigma_t^2}{\sigma^2} \right) \dots \dots \dots (1)$$

Information:

- r₁₁ : Reliability sought
- n : The number of question items tested
- $\sum \sigma_t^2$: The sum of the variance in the score of each item
- σ^2 : Total variance

2.3 Normality test

According to Priyatno (2014: 69), "the normality test is a basic requirement that must be met in parametric analysis". The normality of data is important because, with normally distributed data, the data can be considered representative of the population.

The normality test is used to determine whether the data population is normally distributed or not. The normality test on linear regression used charts. The basis for the decision is that if the data is scattered around the diagonal line and follows the direction of the histogram line towards a normal distribution pattern, the regression model fulfills the assumption of normality.

2.4 Multiple Linear Regression

According to Priyatno (2014: 148) "multiple linear regression analysis is used to determine the effect or linear relationship between two or more independent variables with one dependent variable".

In this study, the use of multiple linear regression analysis is to determine whether there is an effect of Brand, Price, Product Specifications, Design (Independent Variable) on smartphone purchasing decisions (dependent variable). The data used is usually an interval or ratio scale. The Multiple Linear Regression Equation is as follows:

$$y' = a + b_1x_1 + b_2x_2 + \dots + b_nx_n \dots \dots \dots (2)$$

Information:

- Y' = Dependent variable (predicted value)
- X₁, X₂, X₃, X₄ = Independent variable
- a = Constant (Y value 'if X₁, X₂... ..X_n = 0)
- b = Regression coefficient (value of increase or decrease)

2.5 Regression Coefficient Test Together (Test F)

To test the significance of the influence of several independent variables on the dependent variable (Priyatno, 2014: 157). The test uses a significance level of 0.05. In this stage test, price, product specifications, design, and brand variables are used simultaneously to influence in detail the variable product purchase decision making or to be able to find out the model used to predict the dependent variable or not.

The steps in the F test are as follows:

- a. Formulating a Hypothesis
- Ho : There is no significant effect of the independent variables in this study, namely Brand Image (X₁), Price (X₂), Product Specification (X₃), Design (X₄).) simultaneously to the dependent variable, namely Purchasing Decision (Y).
- Ha : There is a significant influence from the independent variables, namely Brand Image (X₁), Price (X₂), Product Specification (X₃), Design (Design) (X₄) on the dependent variable. namely the purchase decision (Y).



- b. Determine F count and Significance value
 By using a confidence level of 95% or a significant level of 5%, then if $F_{count} > F_{table}$ H_0 is rejected, meaning that each of the Independent variables together has a significant effect on the dependent variable.
 With a confidence level of 95%, or a significant level of 5%, then if $F_{count} < F_{table}$, then H_0 is accepted, meaning that each of the Independent variables together does not have a significant effect on the dependent variable.

2.6 Partial Regression Coefficient Test (t-test)

This test is used to determine whether the regression model variable (X) partially has a very significant influence on the dependent variable (Y). Testing criteria with a significant level of 0.05, (Priyatno2014: 161) is determined as follows:

- a. If $-t_{count} > t_{table}$ then H_0 is accepted.
- b. If $-t < -t_{count} > t_{table}$ then H_0 is rejected.

3. Results and Analysis

Multiple Linear Regression Analysis To See The Level Of Consumer Satisfaction In The Decision To Purchase A New Smartphone. The research location is located at the Sentra Ponsel Counter and in the area around Depok. The research was conducted by giving questionnaires to consumers as many as 80 questionnaires. Questionnaires were administered before the COVID-19 pandemic occurred in March, research was conducted in January and February 2020. In this section, the authors describe the effect of consumer satisfaction levels on smartphone purchasing decisions using multiple linear regression analysis. From the number of values obtained, the study of 80 respondents can be grouped by the following calculation:

3.1 Frequency Distribution Analysis Based on Questionnaire Questions

This research was conducted to measure consumer perceptions seen from the dimensions of Brand, Price, Product Specifications, Design, and Purchase Decisions. The data obtained through questionnaires are displayed in the tabular form and to facilitate the discussion of the frequency obtained, the number of respondents' answers is made in the form of a percentage. The following are the results of data processing taken from the questionnaire questions asked for smartphone consumers.

Table 2
Summary of Research Results

DIMENSIONS BRAND	SCORE	CATEGORY
1. Buy a smartphone on a well-known brand	314	Good
2. Not affected by the brand when you want to buy a smartphone	323	Good
3. They look expensive and prestigious	337	Very good
4. You can immediately recognize the smartphone by just looking at the model or type	339	Very good
Average Value	328.25	Good
Price		
1. Smartphone prices are in accordance with the uses and benefits they get	314	Very good
2. The price offered is in accordance with the quality	338	Good
3. The affordability of product prices affects me in making smartphone purchases	319	Very good
4. The price of each smartphone varies according to the brand you want	339	Very good
5. The price when resold is still high	346	Very good
Average Value	331.2	Very good
Product Specifications		
1. Has a high performance / operating system.	354	Very good
2. Sufficient storage capacity	349	Very good
3. Has interesting features	343	Very good



DIMENSIONS BRAND	SCORE	CATEGORY
4. Has the durability of use for a long time	353	Very good
5. Protection layer that is very strong, clean and comfortable to the touch	330	Very good
Design		
1. Comfortable to use	332	Very good
2. Has an attractive shape	349	Very good
3. Has dual cameras	350	Very good
4. Has an elegant color	360	Very good
5. The material of the smartphone looks solid	341	Very good
Average Value	346.04	Very good
Buying decision		
1. The ease of using a smartphone is a reason to make purchases	328	Good
2. Look for information on several smartphone brands before buying	335	Very good
3. Knowing the operating system (OS) is very satisfying	342	Very good
4. Confident of the information regarding the smartphone	348	Very good
5. Buy a smartphone because it is in accordance with the usage	353	Very good
Average Value	341.02	Very good
Summary of Average Value	338.57	Very good

Source: Author processed data

Based on the table above, it can be formulated that the average number of measurement instruments is 338.57 where this value is in the 336-399 interval class so it can be categorized as very good.

3.2 Analysis of Frequency Distribution Based on Age of Respondents

Respondents' age is divided into 3 categories, namely 18-25 years, 26-33 years, 34-41 years. The following is a table of the number of respondents based on age, namely:

Table 3.
Age of Respondents

Age Category	Frequency	Percentage
18-25 Year	24	31.25%
26-33 Year	43	51.25%
34-41 Year	13	17.50%
Total	80	100

Source: Author processed data

3.3 Analysis of Frequency Distribution Based on Gender of Respondents

Respondent data is divided based on two genders, namely male and female. The following is a table of the number of respondents based on gender, namely:

Table 4.
Gender of Respondents

Categories	Frequency	Percentage
Man	27	33.75%
Women	53	66.25%
Total	80	100

Source: Author processed data

Based on the table above, it can be seen that the sex of the respondents is male 27 (33.75%), female 53 (66.25%). Most of the respondents who became smartphone consumers were women with 53 respondents or 66.25% of respondents.

3.4 Frequency Distribution Analysis Based on Respondents' Occupation

Respondent data is divided based on the respondent's occupation. The following is a table of the number of respondents based on occupation, namely:

Table 5.
Respondents' occupation

Categories	Frequency	Percentage
Student / Student	30	37.50%
Employees	20	25.00%
entrepreneur	8	10.00%
Etc	22	27.50%
Total	80	100%

Source: Author processed data

Based on the table above, it can be seen that the respondents' occupations are 30 students (37.50%), 20 employees (25.00%), 8 entrepreneurs (10.00%), and 22 (27.50%) others.

3.5 Validity test

According to Priyatno (2014: 51), "the validity test is a data instrument to find out how accurate an item is in measuring what it wants to measure". Items can be said to be valid if there is a significant correlation with the total score, this shows the support of the item in revealing something that you want to reveal. Items are usually in the form of questions or statements addressed to respondents using a questionnaire form to reveal something. r table at the significance level is 0.05 with a two-sided test, namely:

- a. If the value is positive and $r_{count} > r_{table}$ then the instrument or question items have a significant correlation to the total score (declared valid)
- b. If $r_{count} < r_{table}$ then the instrument or question items have a significant correlation to the total score (declared invalid)

To obtain the results of the validity test, the authors used the help of SPSS version 22 software which was then consulted with r table at the 0.05 level. With a total (n) of 79 people, the r table is 0.221. The results of the validity test can be seen below:

Table 6
Validity Results
Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Brand 1	97.66	44,733	.262	.834
Brand 2	97.56	44,072	.238	.837
Brand 3	97.39	42,772	.415	.829
Brand 4	97.36	43,171	.376	.830
HG 1	97.68	44,045	.293	.834
HG 2	97.38	44,921	.287	.833
HG 3	97.61	44,266	.251	.836
HG 4	97.36	42,816	.430	.828
HG 5	97.28	43,341	.389	.830
SP 1	97.16	43,986	.388	.830
SP 2	97.28	43,189	.480	.827
SP 3	97.31	41,154	.560	.822
SP 4	97.19	42,610	.622	.822
SP 5	97.48	43,392	.440	.828
Design 1	97.58	43,893	.333	.832
Design 2	97.23	43,670	.444	.828
Design 3	97.21	44,347	.310	.833
Design 4	97.10	44,066	.417	.829
Design 5	97.34	43,112	.402	.829
KP 1	97.50	44,532	.315	.832
KP 2	97.41	43,283	.365	.831
KP 3	97.33	42,880	.427	.828
KP 4	97.25	43,557	.444	.828
KP 5	97.18	43,842	.410	.829

Source: Author processed data

3.6 Reliability Test

According to Priyatno (20014: 64), "the reliability test is used to determine the consistency of measuring instruments that usually use a questionnaire". This means whether the measuring instrument will



get a consistent measurement if the measurement is repeated. The method often used in research to measure range scales (such as 1-5) is Cronbach Alpha. In this study, the test used was the Cronbach's Alpha method because the questionnaire scores were in the form of a scale (1-5).

Table 7.
Reliability Statistics

<i>Cronbach's Alpha</i>	<i>N of Items</i>
.836	24

Source: Author processed data

From the statistical reliability table above, it can be seen that the Cronbach's Alpha value is 0.836, so the reliability correlation coefficient is in a good category. According to Sekaran (1992) in Priyatno's (2014: 66) book, reliability of less than 0.6 is not good, while 0.7 is acceptable and above 0.8 is good. Because of the value of 0.6, the questionnaire instrument is declared reliable.

3.7 Normality test

According to Priyatno (2014: 69) "normality test is a basic requirement that must be met in parametric analysis". The normality of data is important because, with normally distributed data, the data can be considered representative of the population.

The normality test is used to determine whether the data population is normally distributed or not. The normality test on linear regression used charts. The basis for the decision is that if the data is scattered around the diagonal line and follows the direction of the histogram line towards a normal distribution pattern, the regression model fulfills the assumption of normality. Based on the results of the SPSS Normal Probability Plot test, the plot formed is as follows:

Table 8.
Analysis of Purchasing Decision Variables on Variables Brand, Price, Product Specifications, Design Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	7,244	2,650		2,733	.008
Total Brand	-.012	.109	-.011	-108	.914
Total HG	.210	.144	.180	1,454	.150
Total SP	.464	.121	.473	3,822	.000
Total Design	-.003	.131	-.003	-.025	.980

Source: Author processed data

3.8 Multiple Linear Regression Analysis

Multiple linear regression equations are calculated to find the relationship and influence of the Independent variable on the dependent variable. By calculating using SPSS 22 software, the following results can be seen:

From table 9, the analysis results obtained from the independent variables, namely the brand variable (X1), price (X2), product specifications (X3), design (X4), and together have a positive effect on the dependent variable, namely the purchase decision (Y), so that the following equation is obtained:

$$Y = 7,244 - 0.012X1 + 0.210X2 + 0.464X3 - 0.003X4$$

Where:

Y: Purchase Decision

X1: Brand Variable

X2: Variable Price

X3: Variable Product Specifications

X4: Design Variables The equation above can be described as follows:

- a. A constant of 7,244 states that if there are no Brand, Price, Product Specifications, and Design variables, the Purchase Decision for smartphones at the Sentra Ponsel and area around Depok is 7,244.
- b. The regression coefficient of X1 is 0.012, which states that every increase in the brand variable by 1 unit will decrease the purchase decision by 0.012.
- c. The X2 regression coefficient of 0.210 states that each increase in the variable price of 1 unit will increase the purchase decision by 0.210.
- d. The X3 regression coefficient of 0.464 states that each increase in the product specification variable of 1 unit will increase the purchase decision by 0.464.
- e. The X4 regression coefficient of 0.003 states that each increase in the design variable of 1 unit will decrease the purchase decision by 0.003.



3.9 Hypothesis test

a. F test

To test the significance of the influence of several independent variables on the dependent variable (Priyatno, 2014: 157). The test uses a significance level of 0.05. This test is used to determine whether the product specification variables together have a significant effect on the Purchasing Decision variable, whether the regression model can be used to predict the dependent variable or not. The following is a hypothesis for the F test, namely:

Ho: There is no significant effect of the independent variables in this study, namely Brand (X1), Price (X2), Product Specifications (X3), Design (X4) simultaneously on the dependent variable, namely Purchase Decision (Y)

Ha: There is a significant influence of the independent variables in this study, namely Brand (X1), Price (X2), Product Specifications (X3), Design (X4) simultaneously on the dependent variable, namely Purchase Decision (Y)

Based on the F test, it can be concluded that:

- 1) If F count <F table or P-value> 0.05 then Ho is accepted and Ha is rejected.
- 2) If F count <F table or P-value> 0.05 then Ho is rejected and Ha is accepted.

Table 9
Analysis of F Value
ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	104,510	4	26,128	9,928	.000b
Residual	197,377	75	2,632		
Total	301,887	79			

Source: Author processed data

Predictors: (Constant), Total Design, Total Brand, Total SP, Total HG

Based on the ANOVA table above, it can be seen that the F value is 9,928, so Ho is rejected and Ha is accepted or there is an influence on the purchase decision on the brand, price, product specifications, and design.

b. T-test

This test is used to determine whether the variable regression model (X) partially has a significant effect on the dependent variable (Y). Testing criteria with a significant level of 0.05, (Priyatno 2014: 161).

The test steps are to determine the hypothesis of the purchase decision variables for the brand, price, product specifications, and design:

Ho: Brand quality, price, product specifications, and design do not influence purchasing decisions.

Ha: Brand quality, price, product specifications, and design influences purchasing decisions.

Table 10.
Value analysis t
Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	7,244	2,650		2,733	.008
Total Brand	-.012	.109	-.011	-108	.914
Total HG	.210	.144	.180	1,454	.150
Total SP	.464	.121	.473	3,822	.000
Total Design	-.003	.131	-.003	-.025	.980

Source: Author processed data

From the output of SPSS version 22 in the table above, it can be seen that the brand variable has a significant value of 0.914 so that Ho is accepted and Ha is rejected, the price variable has a significant value of 0.150 so that Ho is accepted and Ha is rejected, the product specification variable has a significant value of 0.000 so that Ho is rejected and Ha accepted, the design variable has a significant value of 0.980 so that Ho is accepted, Ha is rejected. This means that brand, price, design variables do not have a significant effect on purchasing decisions, but product specification variables have a significant effect on purchasing decisions.

c. Determination Coefficient Testing (R2)

The determination coefficient test (R2) is carried out to measure the percentage of the ability of the independent variables, namely Brand (X1), Price (X2), Product Specifications (X3), Design (X4) in



explaining changes in the dependent variable, namely the Purchase Decision (Y) smartphone, where $0 \leq R \leq 1$. This test was carried out using the help of the SPSS version 22 program with the following results:

Table 11.
Correlation of Consumer Satisfaction Level Variables Against Purchasing Decisions

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.588a	.346	.311	1,622

Source: Author processed data

- a. Predictors: (Constant), Total Design
Total Brand, Total SP, Total HG
b. Dependent Variable: Total KP

From the Model Summary table, it can be interpreted that for the R column it is called the correlation coefficient which is 0.588, which means that the correlation coefficient between the variable level of customer satisfaction on smartphone purchasing decisions is 0.588 or 58.8% and has a positive effect. The Adjusted R Square column is referred to the coefficient of determination. The Adjusted R Square of the data is 0.311 (31.1%), which means that the decision to purchase a smartphone at the Sentra Ponsel counter and in the area around Depok is influenced by the Product Specification variable.

4. Conclusion

Based on the discussion in research regarding the analysis of the level of consumer satisfaction with smartphone purchasing decisions, in general, the authors conclude purchasing decisions which will be explained as follows:

- a. The characteristics of smartphone consumers in this study were mostly female consumers (66%), 21-24 years old (58%), and as many as 50% worked as employees.
- b. Product purchase decision process:
 - 1) At the need recognition stage, it is known that the reason or motivation of consumers in buying a smartphone is knowing the operating system (OS) which is very satisfying (51%). The benefits consumers are looking for is the ease of using a Smartphone (74%).
 - 2) In the information retrieval process, it is known that consumers seek information about several Smartphone brands before buying (56%).
 - 3) In the alternative evaluation process, consumers consider buying and using a Smartphone is that they are sure of all the information about the Smartphone they want to buy (58%).
 - 4) In the purchasing process, most consumers buy a Smartphone because it is by its use (53%).
- c. Among the four variables, name brand, price, product specifications, and design, the main factor in smartphone purchasing decisions is very much influenced by the product specification variable which can be seen from the t value or t-test of 3,822.

5. Reference

- [1] Hartono, Budi. Hari Dwi Utami and Nova Amanatullaili. 2010. Analysis of Influencing Factors in Purchasing Pasteurized Milk Products in Kudus Regency. ISSN 0126-4400. Malang: Animal Husbandry Bulletin. Vol. 34, No. 2. June 2010: 123-130.
- [2] Kotler, Philip and Armstrong G. 2008. Principles of Marketing. Volume 1 Edition 12. Jakarta: Erlangga.
- [3] Kotler, Philip and Kevin Lane Keller. 2007. Marketing Management. 12. Jakarta Edition: Index.
- [4] Maturidi, Ade Djohar. 2014. Informatics Engineering Research Methods. Yogyakarta: Deepublish.
- [5] Mayasari, Hesti. 2012. Analysis of Smartphone Purchasing Behavior (Smartphone): Between Consumer Needs and Lifestyle in the City of Padang. ISSN 2086-5013. Padang: Journal of Management and Entrepreneurship. Vol. 3, No. 1. January 2012: 93-120.
- [6] Priatno, Duwi. 2014. SPSS 22: Practical Data Manager. Andi: Yogyakarta.
- [7] Tjiptono, Fandy. 2008. Marketing Strategy: Edition 3. Yogyakarta: Andi Offset.
- [8] Sangadji, Etta Mamang. 2010. Research Methods Practical Approaches in Research. Yogyakarta: Andi.
- [9] Sugiyono. 2008. Qualitative and Quantitative Research Methods R & D. Bandung: Alfabeta.
- [10] Sumarwan, Ujang. Retnaningsih and Hanisa Ramina Fitriyana. 2010. Analysis of Laptop Brand Equity in Bogor Agricultural University Students. ISSN 1907-6037. Bogor: Journal of Family and Consumer Science. Vol. 3, No. 2. August 2010: 190-19

