The Effect of Double Date Discounts on Sales Levels In E-Commerce Shopee (Case Study on Students of Padjadjaran University in Jatinangor)

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Abstract

This study aims to analyze the impact of double date sale discounts on sales levels on the Shopee e-commerce platform, focusing on students from Universitas Padjadjaran in Jatinangor, who are primarily from the millennial and Generation Z cohorts. The method used is simple linear regression, linking discount variables to sales. Additionally, the study conducts classical assumption testing to ensure the model's validity and sensitivity analysis to assess the effect of parameter changes on the predicted outcomes. The results show that double date sale discounts significantly influence sales, with the double date sale coefficient (β_1) being highly sensitive to changes. The regression model yields a low MSE, indicating good prediction accuracy. While changes in the intercept (β_0) also affect the predictions, the impact is smaller compared to changes in the double date sale coefficient.

Keywords: double date sale, sales levels, linear regression, sensitivity analysis

1. Introduction

The rapid development of technology makes daily needs easier to fulfill because it can be done only through cellphones (Cyntia & Ramadanty, 2023). Likewise, in the field of trade with the ease of regulation and increasing consumer demand, it has made digital-based business activities more widespread through online media platforms, namely e-commerce (Malik et al., 2022). According to Handayani & Munawar (2024) E-commerce is a business model that helps make it easier for consumers and entrepreneurs or companies to buy or offer products / services through online media.

The development of a digital-based economy has encouraged the emergence of various e-commerce platforms such as Shopee, Tokopedia, Lazada, Bukalapak, Bli-bli, Zalora and others (Maulana & Aminah, 2024). Shopee Pte. Ltd. is a Singaporean multinational technology company specializing in e-commerce founded by Forrest Li. Shopee was first launched in Singapore in 2015 under the auspices of SEA Group (Ermansyah, 2024). Shopee expanded its company to Malaysia, Thailand, Taiwan, Vietnam and the Philippines. Shopee officially entered Indonesia on December 1, 2015.

In recent years, the phenomenon of "double date sale discount" or "double date sale" promotions has become a trend on e-commerce platforms, especially on Shopee (Mudrikah & Ayuningtyas, 2021). Every month, Shopee consistently launches massive discount campaigns on Double dates, such as January 1 (1.1), February 2 (2.2), March 3 (3.3), and others, with the aim of increasing consumer shopping interest (Hamzah & Adiprabowo, 2023). Big discounts and attractive promotions, such as free shipping and cashback, are offered to attract more consumers (Cyntia & Ramadanty, 2023). This phenomenon not only increases visits to the app, but also increases the number of transactions on Shopee.

Several studies that have been conducted previously show that there is a good influence between double date sale discounts on product sales in Shopee e-commerce. Ruung et al. (2024) found in their research that viral marketing, flash sales, 12.12, and free shipping taglines have a significant positive effect on purchasing decisions at the Shopee

marketplace. Maulana & Aminah (2024) in their research also found that the correlation between the Double date sale event and people's buying interest in Shopee is a modelevel correlation which is positive. In addition, the relationship obtained from research conducted by Tarka et al. (2023) regarding the intensity of e-commerce access on double date sale discounts (X), with buying interest and consumptive behavior (Y) also has a positive influence. The higher the intensity when accessing e-commerce on double dates will increase shopping interest.

The reason researchers chose the case study of Padjadjaran University students in Jatinagor as the research subject is because it is in accordance with the data that occurs in the field, where based on data obtained from the Central Bureau of Statistics, it is known that West Java is the province with the largest number of e-commerce businesses with 642,772 business units. In addition, data shows that as many as 56.6% of young people aged 18-26 years, known as generation Z in Indonesia, have made purchases through e-commerce (Martaputri, 2023). This is the reason for researchers to make students as research respondents because students are known as generation Z with an age range of 18 to 26.

This research will focus on the effect of double date discounts on product sales in Shopee e-commerce, with the aim of understanding whether the increased number of promotions and discounts during the double date campaign can consistently predict an increase in sales. In this case, the mathematical use of the Granger causality method will help see if there is a causal relationship between the promotions conducted and the surge in sales that occurred during the promotion period. More specifically, this method will be used to find out whether there is a predictive relationship between discounts on double dates and sales in the following periods and whether high sales on double dates create momentum that can increase sales in the following periods. Ultimately, the results of this study are expected to help e-commerce platforms understand the impact of double date discounts more deeply and design more effective promotional stlevelgies.

2. Literature Review

2.1. Double Date Discount

Double date discount is one of the sales promotion methods carried out by e-commerce using dates and months with the same digits, for example January 1 (1.1), February 2 (2.2), March 3 (3.3), and others which are carried out to increase sales. These discounts will usually vary on each platform, some of which offer discounts of more than 50%, cashback, flash sales, and various shopping vouchers (Putri et al., 2023). The effect of these discounts, for consumers, will increase enthusiasm for shopping because products can be purchased at more affordable prices, while for sellers, these discounts encourage an increase in large transactions.

2.2. Sales Level

Sales level refers to the number of products or services that are successfully sold within a certain period of time. It is a quantitative measure used to assess the sales performance of a business or product in the discount period as well as after the period. If it occurs continuously, it will create the phenomenon of customer loyalty, where consumers will wait for the promo the following month to make repeat purchases. The sales level aims to determine how successfully a product or service is sold and how much it contributes to the company's revenue (Martaputri, 2023).

2.3. Simple Linear Regression Analysis

Simple Regression Analysis is an analytical tool that can be used to determine whether there is a significant influence between one independent variable (independent variable) on one dependent variable or dependent variable. The general form of Simple Linear Regression Analysis will result in (Arifin & Rizqiawan, (2024):

$$Y = \beta_0 + \beta_1 X + e \tag{1}$$

with :
Y = Bound variable (Sales Level)
β_0 = Constant (intercept that affects the sales level)
β_1 = Double Date Sale Discount Coefficient
X = Independent variable
e = *Variable* Error Disrupting Linear Regression Analysis

The research model is:

Double Date Sale Discount (X)	→	Sales Level (Y)
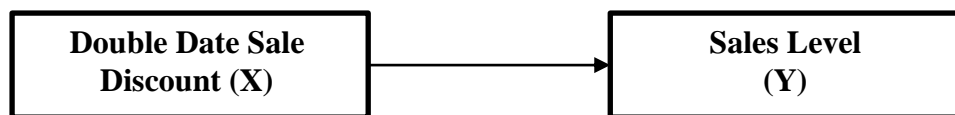
Figure 1: Research Models

The type of relationship between variables X and Y can be positive and negative. The decision-making criteria are as follows (Shabrina & Nurasik, 2022):
a). If the Significance value (Sig) > 0.05 then there is no correlation between variables X and Y.
b). If the Significance value (Sig) < 0.05 then there is a correlation between variables X and Y.

2.4. Research Instrument Testing

2.4.1. Validity Test

The validity test is a test used to ensure that the data reported by researchers and the data that actually occurs on the research object are the same (not different) (Shabrina & Nurasik, 2022). He validity test test criteria are as follows:
a). If the Significance value ($Sig\ 2 - tailed$) > 0.05 then the data used is invalid.
b). If the Significance value ($Sig\ 2 - tailed$) < 0.05 then the data used is valid.

2.4.2. Reliability Test

Reliability is an index that shows the extent to which a measuring device can be trusted or reliable. The instrument is said to be reliable or reliable if it provides relatively consistent measurement results (Shabrina & Nurasik, 2022). The criteria for testing the reliability test are said to be reliable if the Cronbach Alpha value is > 0.70.

2.5. Classical Assumption Test

2.5.1. Normality Test

Normality test is used to check whether the residual data (residual) of the regression model is normally distributed. Normal residual distribution is one of the important requirements in linear regression because it will affect the validity of the significant tests carried out (Sarcia, 2009). The normality test used is the Kolmogorov-Smirnov test, with criteria (Ainiyah et al., 2016) :
a). If the $Asymp.Sig\ 2 - tailed$ > 0.05 the residual data value is normally distributed.
b). If the $Asymp.Sig\ 2 - tailed$ < 0.05 he residual data value is not normally distributed.

2.5.2. Linearity Test

The Linearity test aims to ensure that the relationship between the independent and dependent variables is linear (Sarcia, 2009). This is important so that the regression model can provide valid estimates. Several methods that can be used to test linearity are as follows (Shabrina & Nurasik,2022). The decision-making criteria for the Linearity Test are:
a). If the Deviation from Linearity Sig > 0,05 there is a significant linear relationship between the independent variable and the dependent variable.
b). If the Deviation from Linearity Sig < 0,05 there is no significant linear relationship between the independent variable and the dependent variable.

2.5.3. Heteroscedasticity Test

The heteroscedasticity test aims to check whether the variation of errors (residual errors) is constant across observations in the model (Meuleman et al., 2015). If the error variance is not constant (heteroscedasticity), the regression results are no longer efficient and can affect the inference results. Heteroscedasticity test decision making used is the Glejser test with criteria (Shabrina & Nurasik, 2022):
1. If the Significance (Sig) > 0,05 then there are no symptoms of heteroscedasticity.
2. If the Significance (Sig) < 0,05 then there are symptoms of heteroscedasticity.

2.6. Model Feasibility Test

2.6.1. Test t (partially)

The t test is used to show how much influence one independent variable individually has in explaining the variation in the dependent variable. The decision-making criteria for the t test are (Shabrina & Nurasik, 2022):

1. If the Significance (Sig) > 0,05 the regression coefficient is not significant or the independent variable has no significant effect on the dependent variable.
2. If the Significance (Sig) < 0,05 the regression coefficient is significant or the independent variable has a significant effect on the dependent variable.

2.6.2. F test (simultaneously)

The F statistical test basically shows whether the independent or independent variables included in the model have an influence on the dependent or dependent variable. The decision-making criteria for the F test are (Shabrina & Nurasik, 2022) :

1. If the $P - Value$ > 0,05 then the regression model is not significant.
2. If the $P - Value$ < 0,05 then the regression model is significant.

2.6.3. Coefficient of Determination (R^2)

The coefficient of determination (R^2) essentially measures how far the model's ability to explain variations in the dependent variable (Sarcia, 2009). The coefficient of determination is between zero and one.

3. Materials and Methods

3.1. Research Data

3.1.1. Type of Data

This research is a type of correlational quantitative research to determine the effect of Double date discounts on the level of product sales in Shopee e-commerce. This study uses secondary data in the form of a questionnaire in the form of a Likert scale obtained from previous research.

3.1.2. Population and Sample

The population in this study refers to Padjadjaran University students in Jatinangor, totaling 29,830 students. While the number of samples used was 1000 respondents obtained using nonprobability sampling method, specifically purposive sampling, namely sample selection based on certain criteria, not randomly, so that not all members of the population have the same opportunity to be selected (Martaputri, 2023). The targeted sample is students who have shopped at Shopee during the Double date promotion at least twice. This analysis aims to determine the relationship or correlation between the independent variable and the dependent variable.

3.2. Methods

This study uses the concept of Granger Causality which aims to see the causal or reciprocal relationship between the two research variables so that it can be known whether the two variables statistically affect each other (two-way or reciprocal relationship), have a unidirectional relationship or do not affect each other at all. (Triandini, 2024). Broadly speaking, the research steps taken are:

a). Conduct a literature study
b). Taking and collecting research data
c). Determining the test criteria that will be used
d). Conducting research instrument testing, which includes:
    a. Validity Test
    b. Reliability Test
e). Conducting classical assumption testing, which includes:
    a. Normality Test
    b. Linearity Test
    c. Heteroscedasticity Test
f). Perform simple linear regression analysis
g). Conducting model feasibility tests, which include:

a. T Test
b. F Test
c. Coefficient of determination (R^2)

h). Conduct data analysis based on the test results that have been carried out
i). Make a conclusion.

4. Results and Discussion

4.1. Results

4.1.1. Validity Test

Table 1 : Validity Test

No.	Variable	Question Items	Significance Value	Description
1.	Double Date Sale	X.1	0.000	Valid
		X.2	0.000	Valid
		X.3	0.000	Valid
		X.4	0.000	Valid
		X.5	0.000	Valid
2.	Sales Level	Y.1	0.000	Valid
		Y.2	0.000	Valid
		Y.3	0.000	Valid
		Y.4	0.000	Valid
		Y.5	0.000	Valid

. Source: (SPSS 25 data processing results, 2024)

Based on Table 1 above, it is known that all significance values of the Double Date Sale Discount and Sales Level variable indicators have a value of $0.000 < 0.05$ so it can be concluded that all data used in this study are valid.

4.1.2. Reliability Test

Table 2: Reliability Test

Variable	Cronbach Alpha Value	Description
Double Date Sale	0.940	2
Sales Level	0.942	4
Composite Variable	0.970	6

Source: (output SPSS 25, 2024)

Based on Table 2, it is known that the Double Date Sale Discount variable obtained a Cronbach Alpha value of $0.940 > 0.70$, meaning that the Double Date Discount variable is reliable, then the Sales Level variable obtained a Cronbach Alpha value of $0.942 > 0.70$, meaning that the Sales Level variable is reliable. The overall combined variable also obtained a Cronbach Alpha value of $0.970 > 0.70$, meaning that all variables were reliable.

4.1.3. Normality Test

Table 3: Normality Test

One Sample Kolmogorov-Smirnov Test		Unstandardized Residual
N		1000
Normal Parameters[a,b]	Mean	0.0000000
	Std. Deviation	1.23457256
Most Extreme Differences	Absolute	0.163
	Positive	0.067
	Negative	-0.163
Test Statistic		0.163
Asymp.Sig. (2-tailed)		0.073[c]

Source: (output SPSS 25, 2024)

Based on Table 3 above, the Asymo.Sig (2-tailed) value is 0.073, which means that the significance value is $0.073 > 0.05$, so the data used in the study can be said to be normally distributed.

4.1.4. Linearity Test

Table 4: Linearity Test

ANOVA Table

			SS	df	MS	F	Sig.
Tingkat Penjualan*	Between Groups	(Combined)	14093.460	14	1006.676	1060.890	0.000
		Linearity	13505.479	1	13505.479	14232.807	0.000
Diskon Tanggal		Deviation from Linearity	587.981	13	45.229	47.665	0.146
Kembar	Within Groups		934.664	985	0.949		
	Total		15028.124	999	999		

Source: (output SPSS 25, 2024)

Based on Table 4 above, the Deviation from Linearity value is $0.146 > 0.05$, so it can be interpreted that there is a significant linear relationship between the independent variable X (Double Date Sale Discount) and the dependent variable Y (Sales level).

4.1.5. Heteroscedasticity Test

Table 5: Heteroscedasticity Test

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients		
Models		B	Std. Error	Beta	t	Sig.
1.	(Constant)	1.853	0.116		16.029	0.558
	Double Date Sale	-0.051	0.006	-0.263	-8.605	0.964

Source: (output SPSS 25, 2024)

Based on the data obtained in Table 5 above, the significance value of the Double Date Discount variable is $0.964 > 0.05$ so it can be concluded that there are no symptoms of heteroscedasticity.

4.1.6. Simple Linear Regression Analysis

Because the independent variables and dependent variables used in this study have met the classical assumption test, the Simple Linear Regression Analysis process can be carried out using the help of SPSS 25. The results of the Simple Linear Regression Analysis can be seen in Table 6 below:

Table 6: Simple Linear Regression Analysis

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1.	(Constant)	2.632	0.172		15.320	0.000
	Double Date Sale	0.834	0.009	0.948	94.085	0.000

Source: (output SPSS 25, 2024)

Based on Table 6, a simple linear regression equation is obtained as follows:

$$Y = 2.632 + 0.834X + e$$

The interpretation of the simple linear regression equation above is as follows:

a). Based on the simple linear regression equation, it is known that the constant value has a positive value of 2.632, which means it shows a unidirectional relationship between the independent variable and the dependent variable. This shows that if the independent variable Double Date Sale Discount (X) is 0, the Sales Level value will still increase by 0.834.

b). The coefficient value of $A = 0.834$ indicates that there is a positive relationship between the Double Date Sale Discount variable and the Sales Level. This means that if the Double Date Sale Discount variable increases by 1%, the Sales Level variable will increase by 0.834.

4.1.7. t Test

Based on the significance value from Table 6, the significance value is $0.000 < 0.05$, so it can be concluded that the Double Date Sale Discount variable (X) has a significant effect on the Sales Level variable (Y).

4.1.8. F Test

Table 7: F Test Results

ANOVAª

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13505.479	1	13505.479	8852.008	0.000ᵇ
	Residual	1522.645	998	1.526		
	Total	15028.124	999			

Source: (output SPSS 25, 2024)

Based on Table 7, the significance value is $0.000 < 0.05$, which means that the independent variable Double Date Sale Discount (X) included in the model has a significant effect on the dependent variable Sales Level (Y).

4.1.9. Determination Test (R^2)

Table 8: Determination Test

Model Summaryᵇ

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.948	0.899	0.899	1.235

Source: (output SPSS 25, 2024)

Table 8 above shows the correlation value of 0.948. From the R Square value, it is known that the coefficient of determination is 0.899, which means that the effect of the independent variable Double Date Sale Discount (X) on the dependent variable Sales Level (Y) is 89.9% and the remaining 10.1% is influenced by other factors not in this study.

4.2. Discussion

A series of tests that have been carried out can show how the effect of the Double Date Sale discount on the level of sales in Shopee e-commerce. Based on the results of the regression analysis in Table 6, it can be seen that every one percent increase in variable X, can increase variable Y by 0.834. The relationship that occurs is a one-way relationship from variable X to variable Y. Thus it can be seen that the independent variable X has a positive influence on the dependent variable Y, which means that the existence of Double Date Sale discounts can positively affect the level of sales in Shopee e-commerce. For further information, it will be shown how the effect of the Double Date Sale discount on the level of sales in Shopee e-commerce is reviewed from the results of the t test and the F test.

4.2.1. The Effect of Double Date Discounts on Shopee User Sales Levels for Padjadjaran University Students in Jatinangor Based on the Results of the t Test

The results of the t test show how the individual significance of variable X. Statistically, Table 6 shows that variable X has a p value of $(0.000) < 0.05$, which means that variable X (Double Date Sale discount) has a significant relationship or influence on variable Y (sales level). These results also prove that the more discounts available on Double dates, can trigger consumer desire to make purchases, thereby significantly increasing sales levels. In fact, it is not uncommon for many Shopee users to wait for the Double date discount to buy products at a much cheaper price compared to normal days.

In conclusion, discounts on Double dates individually (apart from other factors) have a significant influence on changes in sales levels. These results are also in line with the results of Hamzah & Adiprabowo (2023) which states that the Price Discount variable has a partial and significant effect on Impulse Buying.

4.2.2. The Effect of Double Date Discounts on Shopee User Sales Levels for Padjadjaran University Students in Jatinangor Based on the Results of the F Test

The result of the F test shows the overall significance of the regression model. Statistically, Table 7 shows that the regression model has a significance value or p value $(0.000) < 0.05$ and f count $(8852.008) >$ f table (3.84) which means that the regression model used is appropriate and has the ability to explain the relationship between variable X (discount) and variable Y (sales level) thoroughly. In other words, this result proves that the Double Date

Sale discount price simultaneously has a positive effect on the sales level. The existence of a consistently increasing Double Date Sale discount promo can increase the sales level, this is because consumers will judge that if they buy products on Double dates, they can save money. This result is in accordance with the results of research by Wang et al. (2022) which states that simultaneously live streaming, price discount and free shipping affect impulse buying.

Based on the above, it can be concluded that the Double Date Sale discount can have a significant impact on the Sales Level. In addition, the results on the coefficient of determination (R^2) also show how much the Double Date Sale discount is able to explain changes in the sales level. As much as 89.9% of the change in sales level can be affected by the Double date discount and only 10.1% is caused by other factors. Thus, the significant relationship between the X variable and the regression model and the close relationship between the independent variable and the dependent variable also further strengthens the evidence that there is a relationship between Double Date Sale discounts on the sales level in Shopee e-commerce. By providing these discounts, it can encourage consumers to make large purchases. In addition, the provision of discounts can attract new customers thereby increasing sales profits and creating loyal customers.

5. Analysis

5.1. Relationship between Discount and Sales Level

Based on the results of the research that has been conducted, it shows that there is a strong correlation between the double date discount and the sales level. Simple Regression Analysis produces the equation $Y = 2.632 + 0.834X + e$, which means that every 1% increase in the Double Date Sale discount variable will increase the sales level by 0.834. The significance value obtained is 0.000 (< 0.05), which proves the significant effect of Double Date Sale Discount On Sales Level.

The success of this model can be seen in the coefficient of determination (R^2) of 89.9%, which indicates that most of the variation in sales level can be explained by the Double Date Sale discount variable. The high correlation value of 10.1% can be explained by other factors such as purchasing power, marketing strategies, and other external factors. In the results of data validation and reliability, it is known that all research data are valid with a significance value of each indicator of 0.000 (<0.05). These results guarantee that the measuring instrument used accurately describes the phenomenon under study. The reliability test with a Cornbach Alpha value of 0.970 indicates that the instrument used has very high reliability.

5.2. Implications

Double date discount is a promotional strategy that incentivizes consumers to make purchases. This strategy capitalizes on consumer psychology, where Double dates (such as 11.11 or 12.12) provide a unique perception (Maulana & Aminah, 2024). The results of this study show that Padjadjaran University students, as part of generation Z, tend to respond to promotions like this by making significant purchases. This is in accordance with the phenomenon that occurs in various e-commerce platforms, where Double date discount programs are often the main driver of increased transactions (Ermansyah, 2024).

From a consumer perspective, Double Date Sale discounts offer the opportunity to obtain products at lower prices, which not only increases the number of purchases but also encourages consumptive behavior (Lisdiantini et al., 2024). This is supported by the results of the F test, which shows the simultaneous significance of the model with a value of 0.000 < 0.05. As a result, Shopee is able to create sustainable sales momentum and increase customer loyalty. From the seller's perspective, this strategy provides an opportunity to increase product exposure and manage inventory more efficiently (Wiranti et al., 2023). Discount programs like this also provide opportunities for small and medium-sized enterprises (SMEs) to increase competitiveness in a competitive market.

The results of this study provide significant strategic recommendations for Shopee and other e-commerce platforms. Double Date Sale discount promotions should not only be seen as a short-term sales-boosting tool, but also as a strategy to build customer loyalty in the long run. A combination of discounts, free shipping, cashback, and other exclusive promotions can create an optimized shopping experience and entice new consumers. In addition, the implications of this research are also relevant for policy makers, especially in supporting an inclusive and sustainable e-commerce ecosystem. The government can encourage programs that are part of a strategy to increase MSME participation in the digital economy.

5.3. Sensitivity Analysis

Sensitivity analysis is conducted to evaluate the effect of changes in parameters β_0 and β_1 on the prediction of sales levels (Ye & Kim, 2018). This analysis aims to determine how stable the model results are in response to variations in parameters and to assess errors that may occur in model calculations (Hamby & Tarantola, 2010).

5.3.1. Effect of Coefficient Changes on Model Results

To analyze the sensitivity of the model, we tested how changes in the coefficients $\beta_1 = 0.834$ (the effect of Double Date Sale discount on Sales Level) and $\beta_0 = 2.632$ (intercept) can affect the prediction of Sales Level.
  a). The effect of changing the coefficient β_1 is $\pm 10\%$ of the estimated value. The initial value of $\beta_1 = 0.834$. The changes made are as follows:
  - $\beta_1^+ = 0.834 \times 1.1 = 0.917$ (Improved 10%)
  - $\beta_1^- = 0.834 \times 0.9 = 0.751$ (Improved 10%)

  b). The effect of a change in the β_0 intercept on the Sales Level is $\pm 10\%$ of the estimated value. The initial value of $\beta_0 = 2.632$ with the following changes:
  - $\beta_0^+ = 2,632 \times 1,1 = 2,895$ (Improved 10%)
 - $\beta_0^- = 2,632 \times 0,9 = 2,368$ (Improved 10%)

Based on changes in coefficients and intercepts, the effect of parameter changes on the prediction of the Sales Level can be seen in Table 9 as follows.

Tabel 2: Effect of Parameter Changes

X	Model Regresi	β_1^+	β_1^-	β_0^+	β_0^-
0	2.632	2.632	2.632	2.895	2.368
1	3.466	3.549	3.383	3.729	3.202
2	4.3	4.466	4.134	4.563	4.036
3	5.134	5.383	4.885	5.397	4.87
4	5.968	6.3	5.636	6.231	5.704
5	6.802	7.217	6.387	7.065	6.538
6	7.636	8.134	7.138	7.899	7.372
7	8.47	9.051	7.889	8.733	8.206
8	9.304	9.968	8.64	9.567	9.04
9	10.138	10.885	9.391	10.401	9.874
10	10.972	11.802	10.142	11.235	10.708

Source : (Excel data processing results, 2024)

To further clarify the effect of these parameter changes, a visualization in the form of a graph is done. The graph below shows the comparison between the original model and the models that have undergone parameter changes which can be seen in Figure 2 below.
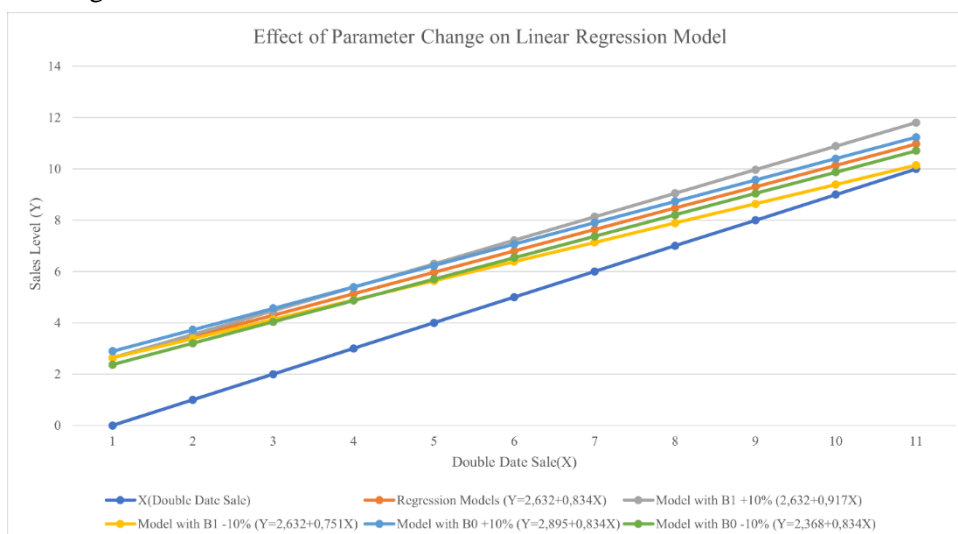
Figure 2: Effect of Change β_0 and β_1

Based on Figure 2, it is known that a change in the Double Date Sale Discount coefficient (β_1) causes a more significant change in the prediction of Sales Levels. If the value of β_1 increases (gray), the Sales Level also increases. Meanwhile, if β_1 decreases (yellow), the sales level also decreases. In addition, changes in the intercept (β_0) cause smaller changes in the prediction of the sales level. An increase in β_0 (light blue) leads to higher predictions, while a decrease in β_0 (green) leads to a decrease in predictions.

5.3.2. Evaluation of Model Error

When assessing the accuracy of the model, the main metric Mean Squared Error (MSE) is used. MSE is a metric that measures the average squared difference between the value predicted by the model and the actual value. The formula for calculating MSE is (Ye & Kim, 2018):

$$MSE = \frac{1}{n} \sum_{i=1}^{n} \left(Y_{prediction} - Y_{actual} \right)^2$$

But before calculating the MSE value, it is first necessary to determine the value of $Y_{prediction}$ (the value predicted by the model) and Y_{actual} (actual value). Based on calculations using 5 data (for $X = 0$ to 4), the following Table 10 is obtained.

Tabel 3: Calculation of Mean Squared Error (MSE)

X (Double Date Sale)	$Y_{prediction}$ (Regression Models)	Y_{actual}	Residual $(Y_{prediction} - Y_{actual})$	Residual^2 $\left(Y_{prediction} - Y_{actual} \right)^2$
0	2.632	2.600	2.632 - 2.600 = 0.032	0.001024
1	3.466	3.450	3.466 - 3.450 = 0.016	0.000256
2	4.300	4.280	4.300 - 4.280 = 0.020	0.000400
3	5.134	5.120	5.134 - 5.120 = 0.014	0.000196
4	5.968	5.950	5.968 - 5.950 = 0.018	0.000324
Total				0.0016

Source : (Excel data processing results, 2024)

After obtaining the total residual^2, the MSE value can be calculated, namely :

$$MSE = \frac{Total\ residual^2}{n} = \frac{0.0016}{5} = 0.00032$$

$MSE = 0.00032$, indicates that despite the changes in the parameters of this regression model, the model is still reasonably good at predicting sales levels. The small MSE value indicates that the regression model used is relatively accurate, but it is still important to consider further improvements to reduce the error further.

5.3.3. Sensitivity Implications of the Model

The results of this sensitivity analysis show that the linear regression model used is highly sensitive to changes in the parameter β_1 (Double Date Sale discount coefficient). As seen from the low MSE calculation (0.00032), a small change in β_1 can result in a significant change in the predicted sales level. This indicates that the Double Date Sale discount (variable X) has a strong influence on the sales level and is the main factor that determines the outcome of the prediction model. Thus, it is crucial to ensure that the estimation of the coefficient β_1 is done carefully and accurately so that the model can produce precise and reliable predictions.

Meanwhile, although a change in the intercept β_0 affects the prediction of the Sales Level, the impact is not as great as the change in β_1. Based on the results of the sensitivity analysis, it can be concluded that the baseline value (intercept) is more stable and less sensitive to small variations in the data than the discount coefficient. This means that a small change in β_0 will only cause a relatively small change in the prediction result, while a change in β_1 will have a larger effect on the sales level.

The very small MSE value also gives a positive picture of the model's accuracy. The low MSE (0.00032) indicates that this regression model has a good ability to predict sales levels based on Double Date Sale discounts, with minimal prediction error. This suggests that the model is very effective in capturing the relationship between discounts and sales. However, although the low MSE indicates good accuracy, it is important to always monitor changes in the data and evaluate the model periodically to avoid potential errors or biases that may arise under different market conditions.

Overall, this sensitivity analysis underlines that Double date discounts are the most significant factor in influencing sales levels in e-commerce. Therefore, companies need to ensure that the discount strategy implemented is in line with the prediction model estimates, as well as maintain the stability of the discount coefficient so that the results obtained remain accurate and relevant.

6. Conclussion

Based on the results of research conducted on the effect of Double date discounts on sales levels in Shopee e-commerce, with a focus on Padjadjaran University students, the majority of which consist of millennials and generation Z, it can be concluded that Double Date Sale discounts have a significant effect on sales levels. Linear regression analysis shows a strong relationship between discounts and increased sales, with the discount coefficient (β_1) being highly sensitive to change. This confirms that the discount factor, as a marketing strategy, has a great impact on the purchasing decisions of young consumers, who tend to be more responsive to discount offers. Furthermore, the low MSE result (0.00032) indicates that this regression model has good accuracy in predicting sales levels, despite the influence of other variables that have not been included in the model. However, the change in the baseline value of the intercept (β_0) has a much smaller impact compared to the change in the coefficient of the Double Date Sale discount, which confirms the importance of managing the Double Date Sale discount as a key strategy in increasing sales among young consumers, especially university students.

Future research, it is recommended that Shopee focus on optimizing the Double Date Sale discount strategy, given the significant influence of discounts on sales among Padjadjaran University students, the majority of whom are from the millennial and Z generations.The company should conduct trials to determine the most effective discount rate, while periodically monitoring the market response.In addition, the prediction model that has been built needs to be continuously evaluated and refined with more extensive data, as well as considering external factors such as online shopping trends and product quality, to ensure that marketing strategies remain relevant and responsive to the changing needs of young consumers.

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