The Third International Conference
on Innovations in Social Sciences Education and Engineering (ICoISSEE)-3
Bandung, Indonesia, July 08th, 2023

Effect of Online Transactions on Supply Chain Design Decision Through Cost and Customer Value

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Abstract. *The purpose of this study is to determine how much Effect of online transaction on supply chain design decision and whether the Effect is stronger when mediated by costs and customer value. This research is conducted with quantitative methods. This research uses primary data, which is surveyed directly to respondents whom are entrepreneurs that involve in online transactions, and processed using the SPSS statistical tool. The results showed that Online Transactions directly exert a significant influence on Supply Chain Design Decisions. If Online Transactions on Supply Chain Design Decisions are mediated with variables such as Cost and Consumer's Value, then mediation through Cost strengthens the Effect significantly as well as mediation through the Consumer Value also has a significant Effect. The new things in this study is the use of two mediating variables Cost and Consumer Value simultaneously to see the Effect of Online Transactions on Supply Chain Design Decisions.*

Keywords: *Online Transaction, Cost, Customer Value, Supply Chain Design Decisions.*

1. INTRODUCTION

Supply Chain Management is a term used in industrial and academic environments. But the design of supply chain management in companies varies depending on the type of industry that implements it. In this research, we want to know how companies or businesses decide their supply chain design, especially when online transactions are rampant. Whether the shift in transactions from offline to online will make companies change their supply chain design. In addition to knowing the direct influence, researchers also want to look at the indirect influence of online transactions on supply chain design when intervened by costs and value from consumers.

2. LITERATURE REVIEW

When considering distribution between supplier to manufacturer or manufacturer to customer, managers must make two key decisions when designing a distribution network: Will the product be delivered to the customer's location or picked up from a pre-arranged location? Will the product flow through an intermediary (or an intermediary location)? Based on the company's industry and the answers to these two questions, one of six different distribution network designs can be used to move products from factories to customers. Such designs are classified as follows: 1). Manufacturer's warehouse with direct delivery 2). Manufacturer's warehouse with direct delivery and incorporation in transit 3). Distributor warehouse with carrier delivery 4). Distributor warehouse with last-mile delivery 5). Manufacturer/distributor storage with customer pickup 6). Retail warehouse with customer pickup.

According to researchers, the design form of the distribution network or supply chain network can depend on the amount of costs incurred or the value of consumers and the form of transactions carried out.

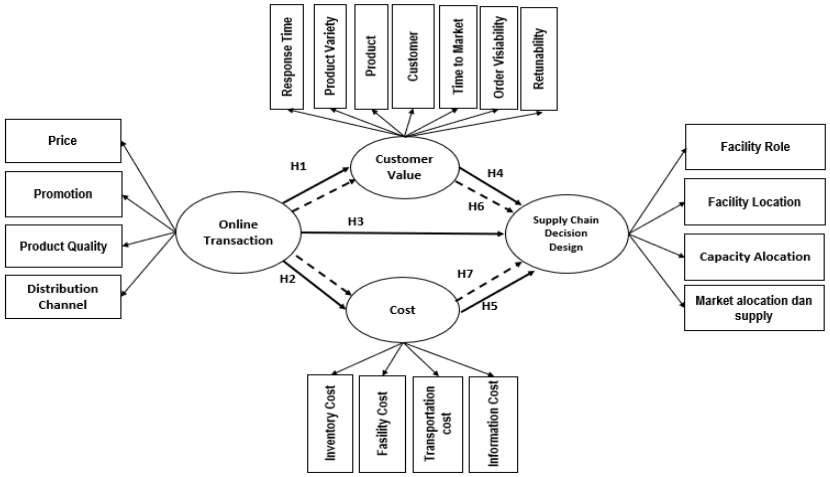

Figure 1. Research Model

Based on this conjecture researchers want to prove whether online transactions affect supply chain design, Online transactions affect costs, Online transactions affect consumer value, furthermore does the influence of online transactions on supply chain design will increase with the intervention of cost variables and consumer value?

Table 1. Operational Variable Definition

Variables/ Concepts	Indicator	Scale
Supply Chain Design Decision	1. The role of facilities 2. Facility location 3. Capacity allocation 4. Market allocation and supply	Interval 1-5
Online Transactions	1. Price 2. Promotion 3. Product Quality 4. Distribution channels	Interval 1-5
Costumer Value	1. Response Time 2. Product Variations 3. Product Availability 4. Consumer Experience 5. Time to market 6. Order Feasibility 7. Returns	Interval 1-5
Cost	1. Inventory Cost 2. Facility Fee 3. Transportation Costs 4. Information Fee	Interval 1-5

3. RESEARCH METHODS/METHODOLOGY

This research was carried out using quantitative methods with primary data obtained through surveys to respondents. The population used as respondents are the people in the Cikarang area who has online business that can be contacted directly. This research has been conducted since January 2023 for one semester with detailed schedules as listed in table 2 below.

Table 2 Reserch Schedules

No	Activities	Month					
		1	2	3	4	5	6
1	Proposal prepation						
2	Data collection						
3	Data Processing						
4	Report Preparation						
5	Publication / Prociding						

The implementation of research carried out after normal conditions when the covid period has passed already to minimize the direct effects of the pandemic on consumer and business behavior. Business respondents contacted are those who perform online transactions both through market places and social media. The data collection method is carried out through surveys using questionnaires with Linkert scales.

The data that have been collected were processed using SPSS software. The processing stage starts from testing the validity and reliability of each variable then continued with classical assumption tests to see whether the data is normal and free from autocorrelation or heteroscedasticity symptoms. These steps are followed by a path analysis test.

4. RESULTS AND DISCUSSION

4.1 RESULT

4.1.1 Test Instruments

The purpose of the validity test is to determine and test the level of reliability, validity of the questionnaire and to determine the extent of the accuracy and accuracy of a measuring instrument in performing its functions. It is known in this study from the comparison of r-count and r-table values with N = 100 at 5% significance. The r-table number obtained is 0.195. And from the SPSS test results in table 2, it is known that all r-count values in each variable are greater than the r-table values so that all questionnaire items are declared valid. The data in the table also shows that all variables are considered reliable because they have a Cronbach's Alpha value greater than the critical value of 0.600.

Table 2. Summary of Instrument Test Results

Variable; Indicator		Pearson Correlation	Cronbach's Alpha	Critical Value	Remarks
Supply Chain Design Decision			0,834	0,600	Reliable
Y.1.1	The role of facilities	0,864		0,195	Valid
Y.1.2	Facility location	0,835		0,195	Valid
Y.1.3	Capacity allocation	0,814		0,195	Valid
Y.1.4	Market allocation and supply	0,797		0,195	Valid
Online Transaction			0,818	0,600	Reliable
X.1.1	Price	0,663		0,195	Valid
X.1.2	Promotion	0,758		0,195	Valid
X.1.3	Product Quality	0,892		0,195	Valid
X.1.4	Distribution channels	0,892		0,195	Valid
Customer Value			0,744	0,600	Reliable
Z.1.1	Response Time	0.691		0,195	Valid
Z.1.2	Product Variations	0,606		0,195	Valid
Z.1.3	Product Availability	0,694		0,195	Valid
Z.1.4	Consumer Experience	0,520		0,195	Valid
Z.1.5	Time to market	0,694		0,195	Valid
Z.1.6	Order Feasibility	0,643		0,195	Valid
Z.1.7	Returns	0,565		0,195	Valid
Cost			0,716	0,600	Reliable
Z.2.1	Inventory	0,621		0,195	Valid
Z.2.2	Facility	0,676		0,195	Valid

Z.2.3	Transportation	0,819		0,195	Valid
Z.2.4	Information	0,819		0,195	Valid

Source: Data copied from SPSS output results, 2023

4.1.2 Classical Assumption Test

a) Normality Test

The normality test is performed to test whether a regression model, an independent variable and a dependent variable or both have normal or abnormal distributions. In the data normality test can be done using the Kolmogorov-Smirnov Sample test, namely provided that if the significance value is above 5% or 0.05, the data has a normal distribution. From table 4, it is known that the statistical test value is a normality test > 0.05 so that the data is normally distributed.

Table 4. Summary of Normality Test and Multicollinearity Test

No	Variable	Test Statistic	Tolerance	VIF Value
1	X to Z1	0.436	1.000	1.000
2	X to Z2	0.165	1.000	1.000
3	X to Y	0.650	1.000	1.000
4	Z1 to Y	0.524	1.000	1.000
5	Z2 to Y	0.235	1.000	1.000
6	X, Z1 to Y	0.160	.585	1.683
7	X, Z2 to Y	0.380	.687	1.365

Source: Data processed, 2023

b) Multicollinearity Test

The multicollinearity test aims to determine whether the regression model found a correlation between independent variables or independent variables. From the results of the SPSS test in table 4, it shows that: a) *the tolerance* value > 0.10, then it means that there is no multicollinearity between variables; b) VIF value < 10.00, then it means that there is no multicollinearity between variables.

c) Heteroscedasticity Test with Scatterplot

The heteroscedasticity test aims to test whether in a regression model there is variance discomfort from residuals in one observation to another.

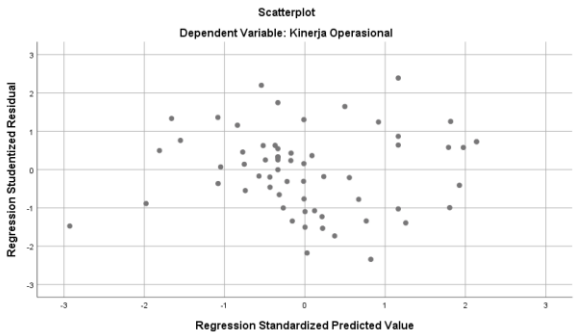

Figure 2. *Scatterplot*
Source: Data processed, 2023

From the results *of scatterplots* using SPSS as in figure 2 and figure 3 it can be concluded that the data tested does not experience heteroskedasticity because the data points spread above and below or around the number 0, the points did not concentrate just above or below only and the spread of data points did not form a special pattern.

4.1.3 Hypothesis Test

a) T-Test

This test is performed by comparing the t-count with the t-table or by looking at the significance column on each t-count. From the SPSS output in table 5, it can be concluded that there is a significant influence between variables.

Table 4 Online transaction on Customer Value

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	17.426	1.665		10.464	.000
	X	.701	.110	.540	6.348	.000
	R square	0,291				

Source: Result of the SPSS test

From the results of the regression test between the Online Transaction variability and Z1 as shown in table 4 above, it is known that the Online Transaction variable has a significant effect on Z1, this is proved by a significance value of 0.00 which is smaller than 0.05. From the results of the same test, a simple regression line equation was obtained from this study as follows: Z1 = 17,426 + 0.701X. The equation shows that the value of the Online Transaction coefficient is 0.701 which means that if the Online Transaction increases by 1 point, the Consumer Value (Z1) will increase by 0.701 points. The results of the same table show the value of R square (R2) in the study of 0.291 or equal to 29.1%.

Table 5 Regression Testing of Online Transaction to Cost

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.626	1.217		6.268	.000
	OT (X)	.533	.081	.555	6.608	.000
	R square	0,308				

From the results of the regression test between the Online Transaction and Cost variability as shown in table 5 above, it is known that the Online Transaction variable has a significant effect on Cost, this is proved by a significance value of 0.00 which is smaller than 0.05. From the same test results, a simple regression line equation was obtained from this study as follows: Z2 = 7.626 + 0.533X. The equation shows that the value of the Online Transaction coefficient is 0.533 which means that if the Online Transaction increases by 1 point, the Cost will increase by 0.533 points. The results of the same table show the value of R square (R2) in the study of 0.308 or equal to 30.8%.

Simultaneous tests conducted to determine the effect of Online Transaction variables, Z1 variables and Cost Variables on Supply Chain Design Decision variables showed that the sequential significance value of Online Transactions was 0.003, Consumer Value was 0.000 and Cost was 0.000. From these three variables it can be seen that simultaneously all variables are significant because they have a significance value greater than 0.05.

Table 6 Regression Testing of X, Z1, and Z2 on Y

Model		Coef. Reg.	Beta	t-count	Sig.	Zero-order	The contribution of each variable to R Square
1	(Constant)	3.117		2.216	.029		
	Online transactions (X)	.110	.201	3.075	.003	.503	0.201 X 0.503 = 0,103
	Customer Value (Z1)	.349	.385	3.796	.000	.632	0.385 X 0.632 = 0,243
	Cost (Z2)	.355	.422	3.133	.000	.606	0.422 X 0.606 = 0,256
R square							0,602

Source: result of the SPSS test

b) Path Analysis Test

This test is used to examine whether there is a direct influence exerted by the independent variable on the dependent variable and test the indirect influence exerted by the independent variable through the mediation variable on the dependent variable. From the data in figure 4 it can be seen that: a) Online Transactions have a significant direct effect on Consumer Value by a path coefficient of 0.555 and a partial determination coefficient of 0.291; b) Online Transactions have a significant direct effect on Cost with a path coefficient of 0.540 and a determination coefficient of 0.308; c) Direct Online Transactions significantly to Supply Chain Design Decisions with a path coefficient of 0.201 and a partial determination coefficient of 0.103; d) Consumer Value has a significant direct effect on Supply Chain Design Decisions with a path coefficient of 0.422 and a partial determination coefficient of 0.220; e) Cost has a significant direct effect on Supply Chain Design Decisions with a path coefficient of 0.385 and a partial determination coefficient of 0.256. f) the indirect influence of Online Transactions through Consumer Value on Supply Chain Design Decisions with a path coefficient of 0.234 obtained from the multiplication between the coefficient of the online transaction path to Customer Value and the path coefficient from consumer value to supply chain design decisions, the multiplication result obtained is greater than the path coefficient from online transactions to supply chain design decisions of 0.201, This means that the indirect influence of online transactions to supply chain design decisions through consumer value is of significant value; g) indirect influence of Online Transactions through Cost on Supply Chain Design Decisions has a path coefficient of 0.207 obtained from the multiplication between the path coefficient of the online transaction to Customer Value and the path coefficient from consumer value to supply chain design decisions, the multiplication result obtained is greater than the path coefficient from online transactions to supply chain design decisions which is 0.201, This means that the indirect influence of online transactions to supply chain design decisions through costs is also significant;

4.2 DISCUSSION

Online Transactions have a significant effect on Consumer Value. This research is supported by the research of Dr. V. Dheenadhayalan And Shanmuga Priya Ph.D. (2019) in their paper titled The Impact Of Online Sales On Customer Service which states the rise of online sales has affected both customer service and costs in supply chains. Online Transactions have a significant effect on Cost. This research is supported by the research of Chnar Abdullah Rashid in her research The Impact of Online Shopping in Boosting Sales and Cost Reduction in Commercial Companies which states that *online shopping or social media has impact on boosting sales, profits, and costs reduction.*

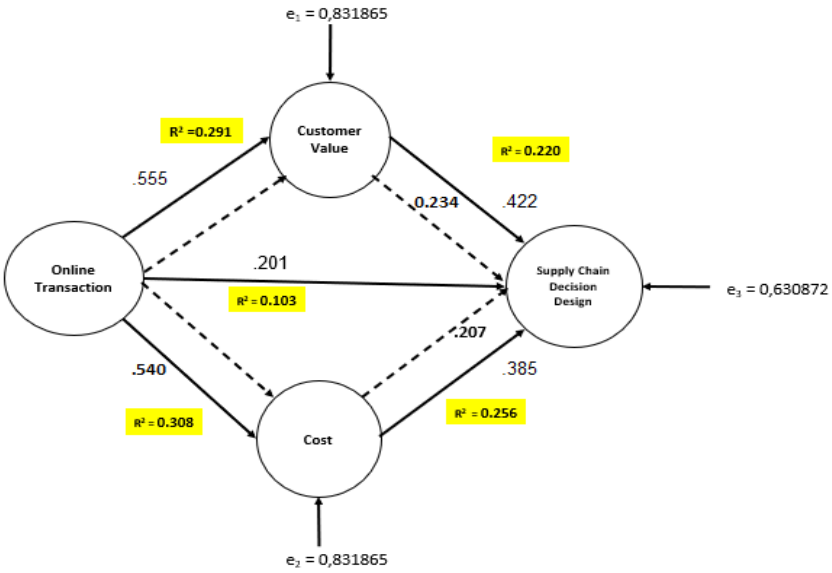

Figure 4. Test Path Analysis
Source: Data is a summary result of the SPSS test

Online Transactions have a significant influence on Supply Chain Design Decisions. This research is supported by research by Shreya Tiwari (2023) in a paper entitled Impact Of E-Commerce On Supply Chain Management which states that supply chains' physical, informational, and financial flows can be impacted by e-commerce. This means that Online Transactions have a significant influence on Supply Chain Design Decisions.

Consumer Value has a significant influence on Supply Chain Design Decisions. This research is supported by Fatiha Outini Naoui's (2014) research in a paper entitled Customer Service in Supply Chain Management which states that human motivation and intellectual capital management are critical success factors in the Alpha Supply Change Management.

Cost has a significant effect on Supply Chain Design Decisions. This research is in accordance with the results of research by Eleonora Bottani and Roberto Montanari (2019) which states that costs outcomes could provide useful insights and suggestions to optimise supply chain design.

5. CONCLUSION

Base on the result and discussion we conclude that;

1. Online Transactions have a significant direct effect on Consumer Value by a path coefficient of 0.555 and a partial determination coefficient of 0.291;
2. The indirect influence of Online Transactions through Consumer Value on Supply Chain Design Decisions has a significant value.
3. Online Transactions has a significant impact through Cost on Supply Chain Design Decisions

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