



Measuring the Behavior of Traders Toward Market Relocation Policies Based on the McNemar Test

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Abstract. By employing the McNemar Test, this study aims to determine the behavior of traders. More precisely, this study measures the behavior of traders through changing/non-changing attitudes after conducting dialogue between traders and the government concerning the trader's relocation agenda. The sample of this study took the case of relocating traders from the east to the west side of the Sidoarjo Main Market. Traders affected by relocation are divided into 4: vegetable traders, non-vegetable traders, male traders, and female traders. With the basic formulation of the McNemar Test $X^2_{hit} = (|A-D|-1)^2/(A+D)$, at a 5% significance level with 1 degree of freedom, it has a value of Chi-Square Table $X^2_{table} = 3.84$. Of the 4 measurements and tests in the 4 sample groups, 1 sample group concluded that the dialogue activity was effective enough to change traders' attitudes. From 'disagree' to 'agree' or 'agree' to 'disagree'. While the other 3 sample groups concluded that dialogue activities were ineffective enough to change traders' attitudes. From 'disagree' to 'agree' or 'agree' to 'disagree'. Meanwhile, the overall measurement and testing results show similar results from the 3 sample groups, which stated that dialogue was ineffective enough to change traders' attitudes. In the end, traders moved to the new relocation area. Yet, it does not necessarily mean 'agreeing to relocate' but is more due to compulsion because several problems began to appear at the old place, mainly due to reduced quantity and quality of facilities as a carrying capacity in transactions.

Keywords: attitude · trade · dialogue · relocation · McNemar

1 Introduction

No space or time limit is the correct expression to describe the current global economic development. It must also be realized that technological and economic developments only sometimes have a positive impact. The expansion of industrial production volumes, anthropogenic increases, and environmental damage are the reasons for the impossibility of the market system functioning without causing negative externalities [1]. As part of fulfilling human needs, industrial activities will never stop. Industrial activities and the continuous use of natural resources will cause negative environmental externalities in the form of pollution and environmental damage [2]. Taking this into account, balancing

needs to be done. There are several focuses of the green economy, one of which is energy consumption which contributes significantly to the level of carbon emissions [3]. That is the current state of the world; fast, precise, and efficient. Behind Covid-19, whose presence gave birth to diverse problems, it also inspired the birth of many online methods that are particularly useful, including in transactions. However, society is also not ready to take full advantage of technology. Old ways, manual methods are still needed.

Transactions can be made without having to meet between sellers and buyers; payments can also use online media, including the latest one that is causing polemics, cryptocurrency. Even crypto trading has become a new market [4]. Crypto transactions can lower transaction costs and reduce remittance costs [5]. The development of crypto payments has the same concept in digital currency, electronic money, and digital gold [6]. Cryptocurrencies aim for diverse uses but can be made powerful investment tools [7]. One more thing to realize is that conventional payments and credit cards use more energy than bitcoin [8]. Thus, economic development, transaction development, and development of payment methods which are so fast and easy, have yet to be able to reduce the function of the market, especially in Indonesia's traditional markets.

The physical meeting between the seller and the buyer is still considered important. Location is still considered the main factor for the occurrence of transactions. The traders still adhere to the principle that strategic location is the key to successful transactions in traditional markets. Departing from such thinking, understanding the relocation of traders becomes worrying and frightening for traders. The behavior of traders in responding to relocation is important to know. Behavior can be seen from various dimensions; according to Notoatmodjo [9], behavior from a biological point of view is an activity or activity of the organism concerned. Understanding the basic concept of such behavior, then in this research, the author tries to trace the behavior of traders in response to the relocation of traders from the east to the west side of the Sidoarjo Main Market. Attitude measurement can be done by assessing a person's attitude statement. Relocation is often understood as moving industrial locations from a developed country to a developing country or from one country to another to get closer to raw materials. There are various types of relocation, from the relocation of workers, industrial relocation, and road relocation to the relocation of disaster victims and others. Of all the types of relocation, what has always been discussed is the relocation of traders. It is this relocation that is considered the most frightening for traders. Usually, in a market, a pattern has been formed that has been followed and lived and is considered comfortable for all parties, traders, and buyers. The main fear for traders following the relocation is the shadow of loss and abandonment of buyers.

By taking the case of the relocation of traders from the east to the west at the Sidoarjo Main Market, we will see how the behavior of traders responds to this relocation. The Sidoarjo Main Market, also known as the Sidoarjo Larangan Main Market, is located on Jl. H Soenandar Priyo Soedarmo, Sidoarjo Regency, East Java 61271 [10]. The Sidoarjo Central Market is one of 16 markets managed by the Sidoarjo government. The existence of this market is quite strategic, in the middle of the city. Over time, this market continues to show its development, especially in terms of the number of transactions and, of course, the increase in the number of traders. The traders in the Sidoarjo Main Market Building relatively do not cause problems. The problems emerging in this market were not due

to security, order, comfort, or tidiness. The main problem is the overflow of merchant transactions on the east side of the Sidoarjo Main Market, which eventually causes road congestion. Through the Sidoarjo Regency Market Service as the market manager, the government has the idea to relocate traders from the east to the west side of the Sidoarjo Central Market. Since the end of 2022, this relocation idea has started to be socialized among traders. As previously suspected by the government, there will be resistance to this relocation idea. Traders have one attitude, refusing to relocate. Such attitudes and behavior of traders did not deter the district government from relocating.

The relocation area is prepared as well as possible; trade facilities are better, more comfortable, and clean. All this was done to create the interest of traders willing to relocate voluntarily. So, since December 2022, waves of rejection have occurred almost every week. Dialogue was still considered a good and appropriate tool for finding relocation solutions. Dialogue, starting from the staff level at the Market Service to the District Head, has been carried out. The traders came to government offices and officials went directly to the relocation site. Slowly but surely, the traders who refused to be relocated began to be okay. One or two traders began to enter the location area. There was also much worry among the merchants; afraid of not getting a strategic location in the relocation area, afraid because the transaction facilities on the east side have begun to be reduced or even eliminated, afraid of the emergence of new players who occupy the location area, and various other fears. If traders previously did not like the relocation plan, now, after repeated dialogues, traders are starting to be okay. Departing from such thoughts, the research using the McNemar Test tool aims to determine the extent to which dialogue can change the attitude of traders concerning the relocation of traders. The change in attitude is from like to dislike and dislike to like. The McNemar Test, known as the four-sided test, ignores the absence of a change in attitude. From likes to still likes and from dislikes to still dislikes.

2 Research Methods

According to the basic concept, McNemar Test is used to test the difference in the proportions of two interconnected populations that only have two categories [11]. Considering such an understanding, this type of test is often used to determine differences in a particular sample group's before and after proportions concerning the behavior or research target. Because the McNemar Test uses data with a nominal measurement scale, this test tool can be used to test the effectiveness of a particular treatment. McNemar Test is often referred to as a test on the rectangular frequency table because, in measurement and testing, it uses this table to find out the significance of an object being observed. The following is a McNemar quadrilateral frequency table (Table 1).

Response categories in the McNemar Test are distinguished by '+' and '-' signs, so these two marks do not indicate the nature of the research object. The changes are displayed in cell A and cell D. An object will be recorded in cell A if it changes from the response category '+' to '-'. If there is no change in the '+' response category for the observation, it will be recorded in cell B, and will be entered in cell C if there is no change in the '-' response category. H_0 in the McNemar test is expressed by the same

Table 1. McNemar Test Observation Frequency

		Post Test	
		Response Category	
Pre Test	Response Category	(-)	(+)
		A	B
	(+)	C	D
	(-)		

source: Santoso, [12]

Source: Santoso [12]

number of changes in each response with the value measurement formulation [12]

$$X^2_{hit} = (|A - D| - 1)^2 / (A + D)$$

Cells A and D are the response categories that show a change, while B and C are the response categories that show no change. This measurement uses degrees of freedom 1 for statistical calculation of X^2_{hit} . Measurements and tests in the McNemar Test can be carried out with a minimum of 5 steps; a) determining H_0 and H_1 , b) determining the level of significance, c) determining the value of the test statistic, d) critical area placement, e) decision-making based on critical areas, and f) Conclusion.

Based on the basic concept of the McNemar Test, the author then tries to measure the behavior of traders toward market relocation. In almost all markets, the market relocation policy is frightening for traders, including traders at the Sidoarjo Main Market, East Java. The most recent market relocation at the Sidoarjo Main Market was moving all traders to the east side. In the observation of the Regional Government of Sidoarjo Regency, the presence of traders on the east side is felt to be full and disrupting traffic. A better, more comfortable, beautiful, clean, and safe relocation area has been prepared, namely on the west side of the Sidoarjo Main Market Building. Socialization through circulars and announcements has been carried out several times since December 2022. Traders continue to resist and reject it through various forms of banners, demos, messages through the media, and others. Dialogue with the government has also been carried out several times. It turns out that the government continues to prepare the west side relocation area as well as possible and is gradually reducing the facilities on the east side. Slowly but surely, entering the end of February 2023, it turns out that almost all traders have been successfully relocated to the west side.

Considering some of these findings, this study tries to look further at the behavior of traders in addressing this market relocation. For measurement purposes in this McNemar Test, 4 sample groups were made vegetable traders, non-vegetable traders, male traders, and female traders.

As part of a non-parametric test, the McNemar Test is used to test for differences or changes in the proportions of two interconnected populations with two categories. This test group may also be referred to as a distribution-free test whose hypothesis can be arranged as follows.

H_0 : the probability of changing to ‘like’ and ‘dislike’ is the same ($PA = PD$).

H_1 : the probability of changing to ‘like’ and ‘dislike’ is not the same ($PA \neq PD$).

Following the McNemar Test formulation as shown previously, the X^2_{hit} values found are then compared with the Chi-Square Table values obtained which in this study will be carried out at a 5% significance level with degrees of freedom 1. If the X^2_{hit} value $< X^2_{table}$, then H_0 fails to be rejected, which means there is sufficient evidence to state that there is no significant difference between the attitude proportions of traders before and after the dialogue. In other words, it can be said that dialogue activities are not effective enough to change the attitude of traders affected by market relocation. Conversely, if the X^2_{hit} value $> X^2_{table}$, then H_0 is rejected, which means there is sufficient evidence to state that there is indeed a real difference between the proportions of traders' attitudes before and after the dialogue. In other words, it can be said that dialogue activities are effective enough to change the attitude of traders affected by market relocation. In addition to general measurements, a simulation will also be carried out to carry out measurements per sample group.

3 Results and Discussions

Measurements and tests will be carried out per sample group. Table 2 below shows the frequency of observations for the sample group of vegetable traders.

According to the basic formulation of the McNemar Test, the measurement of the X^2_{hit} value is carried out with $X^2_{hit} = (IA-DI-1)2/(A + D)$, which means that it can be written $X^2_{hit} = (10-7-1)2/(0 + 7)$, so that the value of $X^2_{hit} = 5.143$. At the 5% significance level with 1 degree of freedom, the Chi-Square table value = 3.84. Understanding the magnitude of this value, the value of X^2_{hit} is greater than X^2_{table} . So $X^2_{hit} = 5.143 < X^2_{table} = 3.840$, then H_0 can be rejected, which means that there is sufficient evidence to state that there is a real difference between the proportion of attitudes of the vegetable traders before and after the dialogue. In other words, it can be said that dialogue activities are quite effective in changing the attitude of vegetable traders affected by the market relocation. Subsequent measurements were carried out on the non-vegetable traders' group, whose tabulation is presented in Table 3.

X^2_{hit} value measurement is done by following the understanding $X^2_{hit} = (IA-DI-1)2/(A + D)$, becomes $X^2_{hit} = (11-3-1)2/(1 + 3)$, so X^2_{hit} value = 0.250. At the 5% significance level with 1 degree of freedom, the Chi-Square table value = 3.84. Understanding the magnitude of this value, the value of X^2_{hit} is of course smaller than X^2_{table} . So $X^2_{hit} = 0.250 < X^2_{table} = 3.840$ then H_0 failed to be rejected which means there is sufficient evidence to state that there is no real difference between the attitude proportions of non-vegetable traders before and after the dialogue. In other words, it can be said that dialogue activities are ineffective enough to change the attitude of non-vegetable

Table 2. Frequency of observations for the sample group of vegetable traders

		after dialogue	
		do not like	like
before dialogue	like	A=0	B=6
	do not like	C=7	D=7

Table 3. Frequency of observations for the sample group of non-vegetable traders

		After dialogue	
		Do not like	like
Before dialogue	Like	A=1	B=2
	Do not like	C=6	D=3

traders affected by the market relocation. In the same way, further tests were carried out for the group of male traders whose identification of the frequency of observations was shown in Table 4.

The measurement results for the male and female group samples turned out to have the same findings (Table 5). With a value of $X^2_{hit} = 3,200$ obtained through $X^2_{hit} = (IA-DI-1)2/(A + D)$, which can be written $X^2_{hit} = (10-5I-1)2/(0 + 5)$, then at the level 5% real with 1 degree of freedom, Table value of Chi-Square = 3.84. Understanding the magnitude of this value, the value of X^2_{hit} is smaller than X^2_{table} . So $X^2_{hit} = 3.200 < X^2_{table} = 3.840$ which means H_0 failed to be rejected which means there is sufficient evidence to state that there is no real difference between the proportion of women traffickers before and after the dialogue. In other words, it can be said that dialogue activities are ineffective enough to change the attitude of women traders affected by market relocation. The entire measurement was carried out for several sample groups, which will then be carried out if the measurements are carried out in the aggregate, which means they are carried out together as a whole. The presentation of the identification is in Table 6.

According to the basic formulation of the McNemar Test, the measurement of the X^2_{hit} value is carried out with $X^2_{hit} = (IA-DI-1)2/(A + D)$, which means that it can be written $X^2_{hit} = (11-10I-1)2/(1 + 10)$, so that the value of $X^2_{hit} = 1.456$. At the 5% significance level with 1 degree of freedom, the Chi-Square table value = 3.84. Understanding the magnitude of this value, the value of X^2_{hit} is of course smaller than

Table 4. Frequency of observations for the sample group of male traders

		After dialogue	
		Do not like	like
Before dialogue	like	A=0	B=3
	Do not like	C=8	D=5

Table 5. Frequency of observations for the sample group of female traders

		After dialogue	
		Do not like	like
Before dialogue	like	A=0	B=3
	Do not like	C=5	D=5

Table 6. Frequency of observations for the sample group of traders affected by the relocation

		After dialogue	
		Do not like	like
before dialogue	like	A=1	B=6
	Do not like	C=14	D=10

X^2_{table} . So $X^2_{hit} = 1.456 < X^2_{table} = 3.840$ then H_0 failed to be rejected which means there is sufficient evidence to state that there is no real difference between the attitude proportions of traders before and after the dialogue. In other words, it can be said that dialogue activities are ineffective enough to change the attitude of traders affected by market relocation.

4 Conclusion

From this research based on McNemar Test, it can finally be understood that from four times of measurement and testing in four sample groups, it turns out that 1 sample group concluded that dialogue activity is effective enough to change the attitude of traders, either from ‘disagree’ to ‘agree’ or from ‘agree’ to ‘disagree’. While the other 3 sample groups said that dialogue activities were not effective enough to change traders’ attitudes, either from ‘disagree’ to ‘agree’ or from ‘agree’ to ‘disagree’. Traders eventually did move to occupy the new relocation area. This does not necessarily mean ‘agreeing to relocate’ but is more due to compulsion because several problems began to appear at the old place, mainly due to reduced quantity and quality of facilities as a carrying capacity in transactions.

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