CATEGORICAL ANALYSIS OF PERCEPTIONS OF GOVERNMENT POLICY IN ELECTRICITY FUEL MANAGEMENT AS AN ALTERNATIVE TO SUBSTITUTE OIL FUEL USING THE CHI-SQUARE TEST

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ABSTRACT

The scarcity and increase in world oil prices is a tough dilemma that must be responded to by the Indonesian government. In order to prevent fuel consumption from swelling, the government plans to reduce fuel subsidies. The plan certainly has many positive impacts, including savings on government finances so that they can be diverted to fund other programs that are more effective and on target. These savings are also useful in reducing the budget deficit, controlling the consumption of fuel oil, and saving non-renewable natural resources. It is appropriate for the state to think hard about switching energy to New and Renewable Energy (EBT) so that people's dependence on fossil energy consumption can be shifted. Therefore, this study aims to determine the current public perception of government policies in the management of fossil fuel energy so that they can be considered by the government in making comprehensive policy decisions. The data used in this study is primary data obtained from respondents with a population of Indonesian people and collected online through a questionnaire. The data analysis method in this study used the independence test with the chi-square test on categorical data. This study's results indicate a relationship between the level of public perception of the basic policy of managing electric fuel and the last level of education, type of work, and the area of the population.

1. INTRODUCTION

The transitional impact of the Coronavirus Disease 19 (COVID-19) pandemic is now starting to be felt in Indonesia. According to the government's official website regarding information on COVID-19, as of November 2022, there was an increase in new cases of 4,873 [1]. The pandemic has had an impact on all areas of Indonesian people's lives, both morally and materially, including in the economic sector. The pandemic has caused many companies to lay off their jobs (PHK), which has an impact on increasing the number of unemployed. The Central Statistics Agency (BPS) recorded that in February 2022, the working-age population forced to be unemployed due to the COVID-19 pandemic was around 954.6 thousand workers. The scarcity and increase in global oil prices are a tough dilemma that the government must respond to. The state is thinking hard about the energy transition to New and Renewable Energy (EBT) so that people's dependence on fossil energy consumption can be shifted [2]. Even so, the government also needs to think hard about preparing the adequacy and availability of subsidized fuel quotas until the end of this year [3], [4].

There have been several government policies taken to realize and stabilize these conditions, one of which is by increasing the price of fuel oil (BBM) [5]. Another policy that has also become a polemic in society today is the discourse on the conversion program for LPG stoves to electric stoves. In this situation, according to Trubus Rahadiansyah, a lecturer at the Faculty of Law at Trisakti University, there was no urgency in the field, and the government was considered not ready in several ways, especially in terms of infrastructure and outreach to the public. With the existence of research on Analysis of the Level of Public Perceptions of Government Policies in Managing Fossil Fuel Energy After the Increase in Fuel Prices, it is hoped that it can provide information to the wider community in general, as well as to the government in particular regarding current public perceptions regarding government policies in managing fuel-fueled energy. Fossils so that they can be taken into consideration by the government in deciding policies comprehensively and in favor of the people [6].

In order to prevent swelling in fuel consumption, the government plans to reduce fuel subsidies. The plan to reduce fuel subsidies has the potential to cause several negative impacts, such as rising subsidized fuel prices, rising prices of traded commodities and commodities classified as basic needs, decreasing people's purchasing power, potential losses due to decreased sales, and increased operational costs for commodity producers who not a community priority [7], [8]. To carry out the plan to reduce fuel subsidies, the National Development Planning Agency (BAPPENAS) provides two options. First, provide a fixed subsidy for every liter of subsidized fuel. So, subsidized fuel prices will move to follow the economic price movements. However, this option is still not appropriate when the volatility of oil prices is high [9]. The Minister of Energy and Mineral Resources, Arifin Tasrif, said his party was intensifying the program to convert fuel-to-electric motorcycles. At present, battery-based electric vehicles are a solution to problems related to rising fuel prices. The use of electric vehicles is further strengthened by the issuance of Presidential Instruction (Inpres) Number 7 of 2022 concerning the Use of Battery Electric Vehicles as Operational Service Vehicles and/or Individual Vehicles for Service of Central Government Agencies and Regional Governments.

Previous research that is relevant to research related to the impact of overcoming the price increase in fuel prices has been carried out by [10], who examines the analysis of the impact of public changes in fuel prices on the Indonesian economy using descriptive analysis. Similar research was also conducted by [11], [12]. Still, this study examined the impact of fuel oil in every region in Indonesia after the Covid-19 pandemic. The novelty of this research is that this study analyzes the perceptions of the Indonesian people regarding the replacement of fuel oil for electricity as a more environmentally friendly energy. The method used uses the chi-square test and the contingency coefficient crammer v. There are three tables that will be used in each topic or discourse to be studied: the Contingency Table between the Last Education Level and Community Perception Level, Contingency Table between Type (Status) of Work and Level of Public Perception, Contingency Table between Place of Origin and Community Perception Level.

2. RESEARCH METHODS

2.1 Research Data and Variable

The data used in this study is in the form of primary data obtained from respondents with a population of Indonesian people and collected online through a questionnaire. The variable of consideration criteria for this research sample is based on the variables of domicile, type of work, and level of education.

2.2 Types of Research

This research is quantitative research with data collection methods using questionnaires as the main subject to produce information and data. Quantitative research is a type of research where the researcher decides what to study, formulates questions, collects data, analyzes the data using statistics, and then interprets the data. Surveys can be used to obtain personal information such as attitudes, opinions, desires, and expectations of respondents.

2.3 Data Collection Technique

This study uses the form service as a data collection technique. The sample selection technique used was purposive random sampling because the researchers determined the consideration criteria for this research sample based on the variables of domicile, type of work, and level of education. The first part of the respondent was asked to fill in identity such as name, gender, age, last education, type of job, and domicile. The sample used amounted to 100 respondents. The second part contains the frequency level of respondents' perceptions and responses regarding government policies in the management of fossil-based energy after the increase in fuel prices.

2.4 Data Analysis Technique

The data obtained were analyzed using the Independence Test (Freedom Test). This test is used to examine the relationship between two categorical variables (qualitative data). In other words, the Independence Test is a test used to examine the freedom/independence of two categorical variables. Grouping data from observations of a population does not depend on other population categories. In the independence test, a contingency table with many b rows and k columns is used. The chi-square test of independence is used to determine whether there is a significant association between two categorical variables. This is useful for identifying relationships in data and making informed decisions.

A contingency table is a data processing technique to see the relationship between categorical variables in one table. Meanwhile, the two-way contingency table is a table that records observed data involving two variables. If the variable X as a row variable consists of k categories and the Y variable as a column variable consists of s categories, then an observation data matrix of size k $\times$ s can be formed with n_{ij} denoting the observation frequency data from cells (i, j) [13].

$$N = \begin{bmatrix} n_{11} & n_{12} & \dots & n_{1s} \\ n_{21} & n_{22} & \dots & n_{2s} \\ \vdots & \vdots & \ddots & \vdots \\ n_{k1} & n_{k2} & \dots & n_{ks} \end{bmatrix}$$

The analysis technique begins by conducting a statistical analysis of categorical data to find out the characteristics regarding the level of public perception of government policies in the management of fossil fuel energy after the reduction in fuel subsidies, including the variables of last education level, type of job, and area of origin.

2.5 Research Procedure and Data Analysis

One of the stages in the research process is the data analysis stage. The data analysis stage is an important stage, where data is collected using various data collection techniques (observation, interviews, questionnaires, and other data collection techniques), processed, and presented to help researchers answer the problems being researched [14]. The procedure in this research is as follows:

1. The researcher made a questionnaire in the form of a Google form, which contained questions related to the research being carried out.
2. Distribution of questionnaires to the community by asking for prior approval for filling out the questionnaire.
3. Recapitulate data from the questionnaire results so that data processing and analysis can be carried out.
4. Perform processing and analysis of the data that has been obtained.
5. Draw conclusions or generalizations.

Then, the steps in the analysis based on the data from this study are as follows:

1. Test the validity and reliability based on answers from respondents.
2. Perform descriptive statistical interpretation of the data obtained.
3. Make a contingency table in the form of rows and columns for each variable being analyzed.
4. Count the total number of row values.
5. Calculate the total number of column values.
6. Calculate the expected frequency value for each cell
7. Calculating Chi – Square values.
8. Comparing calculated Chi – Square value with Chi – Square table $\chi^2_{\alpha(k-1)(s-1)}$
9. Make a decision with the following criteria:
   a. Failed to reject H_0 if value $\chi^2_{hitung} < \chi^2_{\alpha(k-1)(s-1)}$
   b. Reject H_0 if the value is $\chi^2_{hitung} > \chi^2_{\alpha(k-1)(s-1)}$
10. Calculate the Cramers' V contingency coefficient.

   Cramer's Vcontingency coefficient is used to measure the association between two nominal scale variables in the bxk contingency table. Where b and k are more than 2 and are asymmetric (b≠k). The statistics for calculating the Cramers'V contingency coefficient test are as follows [15], [16]. The statistics for Cramer's VContingency Coefficient test are as follows.

$$V = \sqrt{\frac{\chi^2}{n.\,min(b-1,k-1)}}$$

11. Interpret research results and analysis.

3. RESULTS AND DISCUSSION

3.1 Components of the Questionnaire

The research questionnaire that has been distributed contains four main questions that serve as indicators of public perception of government policies, namely:

1. Policy on increasing the price of fuel oil (BBM)
2. Policy plan for switching gas stoves to electric stoves
3. Plans for a transition policy from motorbikes with oil fuel to electric fuel

Each component of the questionnaire consists of two answer choices with detailed scores: Disagree (0), and Agree (1). Furthermore, according to [17] the score of each component of the questionnaire is converted into a percentage score with the following formula:

$$Percentage\ Score = \frac{Total\ Score}{Maximum\ Value} \times 100$$

3.2 Characteristics of Respondents

Size Descriptive statistics are used to provide an overview or information related to research variable data. The measurements used in this study are the maximum, minimum, and average values taken by each respondent from each research variable, as shown in **Table 1.**

Table 1. Characteristics of Respondents

Variable	Mean	SE Mean	StDev	Minimum	Maximum
BBM	2.2475	0.0894	0.8990	1.0000	4.0000
Electric Stoves	2.9802	0.0808	0.8122	1.0000	4.0000
Electric Vehicles	3.0297	0.0895	0.8995	1.0000	4.0000

Then can be seen in **Figure 1**, the answers from respondents to government policies regarding rising fuel prices (BBM).
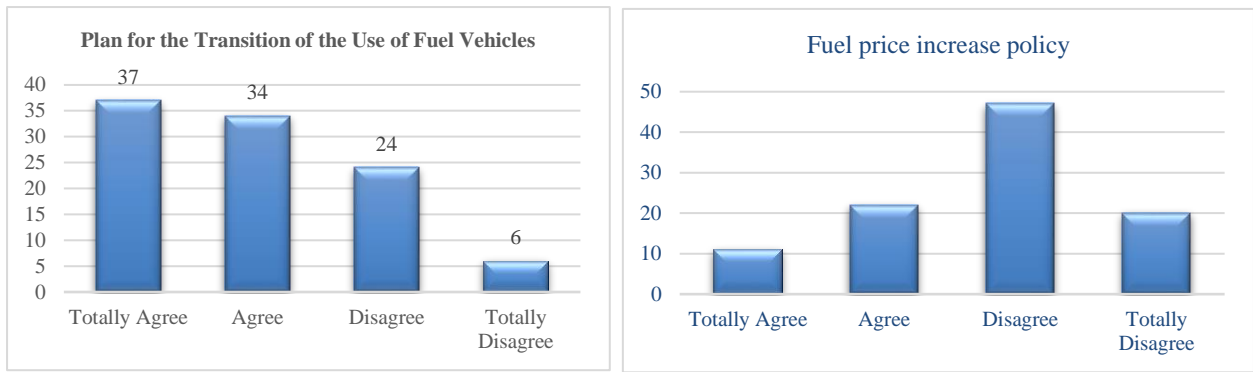
Figure 1. Respondents' Opinions

Based on **Figure 1**, it was found that a total of 47 respondents disagreed with the existence of government policies related to the increase in fuel prices. Then, as many as 37 respondents agreed with the plan to switch the use of fuel-based vehicles to electricity-based ones. Then, as shown in **Figure 2** below, in the opinion of the respondents, as many as 77% agreed that this policy could be realized.
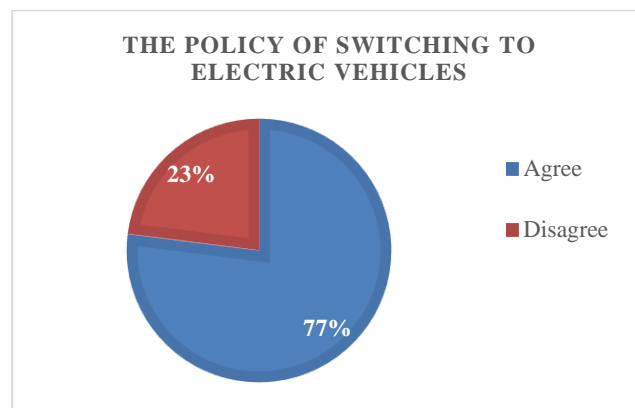

Figure 2. Circle Diagram Regarding Respondents' Opinions

3.3 Validity and Reliability Test

The validity test results for each question are shown in **Table 2** below.

Table 2. Validity Test Results

No	Questions	P-Value Value	Decision
1	What is your opinion on the government's policy regarding the increase in fuel prices?	0.000	Valid
2	What do you think about the conversion of gas stoves to electric stoves?	0.000	Valid
3	What do you think about the plan to switch the use of oil-fueled vehicles (BBM) to electric vehicles?	0.000	Valid

Based on the results of the validity test in **Table 2** using an alpha of 5%. it was obtained that the P-value for the eleven questions in the questionnaire was 0.000, so it could be concluded that all of the category question items in the questionnaire were valid **[17]**. Therefore, these questions can be used in a questionnaire. The reliability test results for each answer to each question are shown in **Table 3** below:

Table 3. Reliability Test Results

No	Category	Cronbach's Alpha Value	Decision
1	Respondents' Opinions Regarding Government Policy	0.680	Reliable

Based on the reliability test results in **Table 3**. the reliability value is 0.680 which is classified as high value, so it can be concluded that the questionnaire is considered capable of disclosing information using an alpha of 5%.

3.4. Independence Chi-Square Test with Government Policy Related to Increases in Fuel Prices

The independence test is carried out using the $b \times k$ table. The variables to be compared are as follows:

a) Test of Independence between the Last Education Level and Public Perception Level.

The contingency table between Last Education Level and Public Perception Level is shown in the following **Table 4**:

Table 4. Last Education Level with Public Perception

Last Education	Level Public Perception Level		Total
	Disagree	**Agree**	
Basic Education	12	6	18
Secondary Education	41	3	44
Higher Education	20	18	38
Total	73	27	100

1) Hypothesis Testing:

   H_0: Both variables are independent

   H_1 : Both variables are not independent (dependent)

2) Test Statistics

$$\chi^2 = \sum_{i=1}^{3} \sum_{j=1}^{2} \frac{(n_{ij} - e_{ij})^2}{e_{ij}}, with\ e_{ij} = \frac{n_{i.}n_{.j}}{n_{..}}$$

   Description:

   n_{ij}: The frequency of observations in the $i - th$ row and $j - th$ column

   e_{ij} : The frequency of expectations in the $i - th$ and $j - th$ column

3) Test Criteria (Critical Area)

   H_0 rejected if $\chi^2 > \chi^2_{\alpha;\,v}$ with $\alpha = 5\%$ and $v = (3 - 1)(2 - 1) = 2$.

By using the expected frequency formula $e_{ij} = \frac{n_{i.}n_{.j}}{n_{..}}$, it can be obtained the value of the observation frequency and the expectation frequency or expectation in the $i - th$ row and $j - th$ column as follows and the test statistics for the case study above **[18]**.

Table 5. Level of Education with Public Perception

Last Education	Level Public Perception Level		Total
	Disagree	**Agree**	
Basic Education	12 (13.14)	6 (4.86)	18
Secondary Education	41 (32.12)	3 (11.88)	44
Higher Education	20 (27.74)	18 (10.26)	38
Total	73	27	100

$$\chi^2 = \sum_{i=1}^{3} \sum_{j=1}^{2} \frac{(n_{ij} - e_{ij})^2}{e_{ij}} = 17.4574$$

With a value of $\alpha = 5\% = 0.05$, $v = (b - 1)(k - 1) = 2$ and $\chi^2_{\alpha;\,v} = 5.99146$ then a decision can be obtained Reject H_0 because $\chi^2 > \chi^2_{\alpha;\,v}$, so it can be concluded that the two variables, namely, the Level

of Last Education and the Level of Public Perception, are not independent (dependent). Therefore, it can be concluded that there is a relationship between the level of public perception of government policies regarding the increase in fuel prices and the last level of education.

Furthermore, to measure the level of relationship between the two variables, using Cramer's V, the following results are obtained:

$$V = \sqrt{\frac{\chi^2}{n.\,min(b-1, k-1)}} = 0.41782$$

Based on the results of Cramer's V, it can be interpreted that the level of relationship public perception based on the last level of education is categorized as quite strong, or in other words, the level of public perception of being influenced by the last level of education with the proportion disagreeing with the policy is 73%.

Depending on the level of public perception of the fuel price increase policy by the latest level of education is a sign that evaluation of oil-fueled energy management is still necessary.

b) Table Contingency between Profession (Type of Work) with the Level of Public Perception is shown in the following table.

Table 6. Profession with Public Perception Level

Profession (Type of Work)	Public Perception Level		Total
	Disagree	Agree	
ASN	10	11	21
Laborer/Employee/Private Employee	6	9	15
Student	26	3	29
Entrepreneur	9	6	15
Others	12	8	20
Total	63	37	100

1) Hypothesis Testing:

H_0 : Both variables are independent

H_1 : Both variables are not independent (dependent)

2) Test Statistics

$$\chi^2 = \sum_{i=1}^{5} \sum_{j=1}^{2} \frac{(n_{ij} - e_{ij})^2}{e_{ij}}, with\ e_{ij} = \frac{n_{i.}n_{.j}}{n_{..}}$$

Description:

n_{ij} : The frequency of observations in the $i-th$ row and $j-th$ column

e_{ij} : The frequency of expectations in the $i-th$ and $j-th$ column.

3) Test Criteria (Critical Area)

H_0 rejected if $\chi^2 > \chi^2_{\alpha;\,v}$ $with\ \alpha = 5\%\ and\ v = (5-1)(2-1) = 4$

By using the expected frequency formula $e_{ij} = \frac{n_{i.}n_{.j}}{n_{..}}$, it can be obtained the value of the observation frequency and the expectation frequency or expectation in the $i-th$ row and $j-th$ column as follows, and the test statistics for the case study above.

Table 7. Profession with Public Perception Level

Profession (Type of Work)	Public Perception Level		Total
	Disagree	Agree	
ASN	10 (13.23)	11 (7.77)	21
Private Laborer/Employee/Employee	6 (9.45)	9 (5, 55)	15
Student	26 (18.27)	3 (10.73)	29
Entrepreneur	9 (9.45)	6 (5.55)	15

	Disagree	Agree	Total
Others	12 (12.6)	8 (7.4)	20
Total	63	37	100

$$\chi^2 = \sum_{i=1}^{5} \sum_{j=1}^{2} \frac{(n_{ij} - e_{ij})^2}{e_{ij}} = 14.5099$$

With a value of $\alpha = 5\% = 0.05$, $v = (b-1)(k-1) = 4$ and $\chi^2_{\alpha; v} = 9.48773$ then a decision can be obtained to reject H_0 because $\chi^2 > \chi^2_{\alpha; v}$ so that it can be concluded that the two variables namely profession (type of work) and the level of public perception are not independent (dependent). Therefore, it can be concluded that there is a relationship between the level of public perception of government policies regarding the increase in fuel prices and the type of work.

Furthermore, to measure the level of relationship between the two variables, using Cramer's V, the following results are obtained:

$$V = \sqrt{\frac{\chi^2}{n. min(b-1, k-1)}} = 0.38092$$

Based on the results of *Cramer's V,* it can be interpreted that the level of relationship public perception based on the type of work is categorized as quite strong, or in other words the level of public perception of being influenced by the type of work with the proportion disagreeing with the policy is 63%. Depending on the level of public perception of the fuel price increase policy by type of work is a sign that evaluation of oil-fueled energy management is still necessary in every sector of work.

c) Table Contingency between Population Areas with the Level of Public Perception is shown in the following **Table 8**.

Table 8. Contingency Table Between Population Area and Public Perception

Population Area	Perception Level		Total
	Disagree	Agree	
Sumatra	9	7	16
Java	31	8	39
Bali and Nusa Tenggara	6	4	10
Kalimantan	5	8	13
Sulawesi	4	9	13
Papua	6	3	9
Total	61	39	100

1) Hypothesis Testing:

H_0: Both variables are independent
H_1: Both variables are not independent (dependent)

2) Test Statistics

$$\chi^2 = \sum_{i=1}^{6} \sum_{j=1}^{2} \frac{(n_{ij} - e_{ij})^2}{e_{ij}}, with\ e_{ij} = \frac{n_{i.}n_{.j}}{n_{..}}$$

Description:
n_{ij} : The frequency of observations in the $i - th$ row and $j - th$ column
e_{ij} : The frequency of expectations in the $i - th$ and $j - th$ column

3) Test Criteria (Critical Area)

H_0 rejected if $\chi^2 > \chi^2_{\alpha; v}$ with $\alpha = 5\%$ and $v = (6-1)(2-1) = 5$

By using the expected frequency formula $e_{ij} = \frac{n_{i.}n_{.j}}{n_{..}}$, it can be obtained the value of the observation frequency and the expectation frequency or expectation in the $i-th$ row and $j-th$ column as follows, and the test statistics for the case study above.

Table 9. Population Area with Public Perception

| Population Area | Perception Level | | Total |
	Disagree	Agree	
Sumatra	9 (9.76)	7 (6.24)	16
Java	31 (23.79)	8 (15.21)	39
Bali and Nusa Tenggara	6 (6.1)	4 (3.9)	10
Kalimantan	5 (7.93)	8 (5.07)	13
Sulawesi	4 (7.93)	9 (5.07)	13
Papua	6 (5.49)	3 (3.51)	9
Total	61	39	100

$$\chi^2 = \sum_{i=1}^{6} \sum_{j=1}^{2} \frac{(n_{ij} - e_{ij})^2}{e_{ij}} = 13.6502$$

With a value of $\alpha = 5\% = 0.05$, $v = (b-1)(k-1) = 5$, $\chi^2_{\alpha; v} = 11.0705$, and the expected frequency < 5 is 16.67% less than 20%. Then a decision can be obtained to reject H_0 because $\chi^2 > \chi^2_{\alpha; v}$ so that a decision can be made that the two variables, namely the population area with the level of public perception, are not independent (dependent). Therefore, it can be concluded that there is a relationship between the level of public perception of government policies regarding the increase in fuel prices and the population area.

Furthermore, to measure the level of relationship between the two variables, using the contingency coefficient of *Cramer's V* the following results are obtained

$$V = \sqrt{\frac{\chi^2}{n.\,min(b-1, k-1)}} = 0.36946$$

Based on the results of the contingency coefficient of *Cramer's V* it can be interpreted that the level of relationship public perception based on population area is categorized as quite strong, or in other words the level of public perception of being influenced by population area with the proportion disagreeing with the policy is 61%. Thus, depending on the level of public perception of the policy of increasing fuel prices by population area is a sign that there is still a need to evaluate the management of oil-fueled energy in every region in Indonesia.

3.5. Independence Test Chi-Square with the Topic of Plans to Convert to Electric Vehicles

The independence test is carried out using the $b \times k$. The variables to be compared are as follows:

a) Test of independence between the Last Education Level and Public Perception Level.
The Contingency Table between the Latest Education Level and the Level of Public Perception is shown in the following table.

Table 10. Contingency Table between Last Education Level and Public Perception

| Level Last Education | Level Public Perception Level | | Total |
	Disagree	Agree	
Basic Education	7	11	18
Secondary Education	6	38	44
Higher Education	18	20	38
Total	31	69	100

1) Hypothesis Testing:

H_0 : Both variables are independent
H_1 : Both variables are not independent (dependent)

2) Test Statistics

$$\chi^2 = \sum_{i=1}^{3} \sum_{j=1}^{2} \frac{(n_{ij} - e_{ij})^2}{e_{ij}}, with\ e_{ij} = \frac{n_{i.}n_{.j}}{n_{..}}$$

Description:
n_{ij} : The frequency of observations in the $i-th$ row and $j-th$ column
e_{ij} : The frequency of expectations in the $i-th$ and $j-th$ column

3) Test Criteria (Critical Area)

H_0 rejected if $\chi^2 > \chi^2_{\alpha;\,v}$ $with\ \alpha = 5\%\ and\ v = (3-1)(2-1) = 2$.

By using the expected frequency formula $e_{ij} = \frac{n_{i.}n_{.j}}{n_{..}}$, it can be obtained the value of the observation frequency and the expectation frequency or expectation in the $i-th$ row and $j-th$ column as follows and the test statistics for the case study above.

Table 11. Statistical Test of Last Education with Public Perception

Last Education	Level Public Perception Level		Total
	Disagree	**Agree**	
Basic Education	7 (5.58)	11 (12.42)	18
Secondary Education	6 (13.64)	38 (30.36)	44
Higher Education	18 (11.78)	20 (26.22)	38
Total	31	69	100

$$\chi^2 = \sum_{i=1}^{3} \sum_{j=1}^{2} \frac{(n_{ij} - e_{ij})^2}{e_{ij}} = 11.4854$$

With a value of $\alpha = 5\% = 0.05$, $v = (b-1)(k-1) = 2$ and $\chi^2_{\alpha;\,v} = 5.99146$, then a decision can be obtained to reject H_0 because $\chi^2 > \chi^2_{\alpha;\,v}$, so it can be concluded that the two variables, namely, the Level of Last Education and the Level of Public Perception, are not mutually independent (dependent). Therefore, it can be concluded that there is a relationship between the level of public perception of government policies regarding the switch to electric vehicles with the last level of education.

Furthermore, to measure the level of relationship between the two variables, using the contingency coefficient of *Cramer's V* the following results are obtained

$$V = \sqrt{\frac{\chi^2}{n.\,min(b-1, k-1)}} = 0.3389$$

Based on the results of the contingency coefficient of Cramer's V it can be interpreted that the level of relationship public perception based on the last level of education is categorized as quite strong, or in other words the level of public perception of being influenced by the last level of education with the proportion agreeing with the policy is 69%.

Depending on the level of public perception of the policy of switching to electric vehicles with the last level of education, it is a recommendation to the government that the policy of managing oil-fueled energy into vehicles with electric-based energy needs to be realized.

b) Test of Independence between Profession (Type of Work) and Level of Public Perception.

The contingency table between professions (type of work) and the level of public perception is shown in the following table:

Table 12. Contingency table between professions and the level of public perception

Profession (Type of work)	Level of public perception		Total
	Disagree	Agree	
ASN	7	14	21
Private Laborer/Employee/Employee	7	8	15
Student	8	21	29
Entrepreneur	9	6	15
Others	2	18	20
Total	33	67	100

1) Hypothesis Testing:

H_0 : Both variables are independent
H_1 : Both variables are not independent (dependent)

2) Test Statistics

$$\chi^2 = \sum_{i=1}^{5} \sum_{j=1}^{2} \frac{(n_{ij} - e_{ij})^2}{e_{ij}}, with \ e_{ij} = \frac{n_i.n_{.j}}{n_{..}}$$

Description:
n_{ij} : The frequency of observations in the $i - th$ row and $j - th$ column
e_{ij} : The frequency of expectations in the $i - th$ and $j - th$ column

3) Test Criteria (Critical Area)

H_0 rejected if $\chi^2 > \chi^2_{\alpha; v}$ with $\alpha = 5\%$ and $v = (5 - 1)(2 - 1) = 4$.

By using the expected frequency formula $e_{ij} = \frac{n_i.n_{.j}}{n_{..}}$, it can be obtained the value of the observation frequency and the expectation frequency or expectation in the $i - th$ row and $j - th$ column as follows and the test statistics for the case study above.

Table 13. Value of Frequency Expectations Type of Profession with Public Perceptions

Profession (Type of Work)	Level of Public Perception		Total
	Disagree	Agree	
ASN	7 (6.93)	14 (14.07)	21
Laborer/Employee/Private Employee	7 (4.95)	8 (10.05)	15
Student	8 (9.57)	21 (19.43)	29
Entrepreneur	9 (4.95)	6 (10.05)	15
Others	2 (6.6)	18 (!3.4)	20
Total	33	67	100

$$\chi^2 = \sum_{i=1}^{5} \sum_{j=1}^{2} \frac{(n_{ij} - e_{ij})^2}{e_{ij}} = 11.3835$$

With a value of $\alpha = 5\% = 0.05$, $v = (b - 1)(k - 1) = 4$ and $\chi^2_{\alpha; v} = 9.48773$ then a decision can be obtained to reject H_0 because $\chi^2 < \chi^2_{\alpha; v}$ so that a decision can be made that the two variables namely Profession (Type of Work) with the Level of Public Perception are not mutually independent (dependent). Therefore, it can be concluded that there is a relationship between the level of public perception of government policies regarding the switch to electric vehicles with the level of type of work

Furthermore, to measure the level of relationship between the two variables, using *Cramer's V* the following results are obtained

$$V = \sqrt{\frac{\chi^2}{n.\,min(b-1,k-1)}} = 0.3374$$

Based on the results of *Cramer's V* it can be interpreted that the level of relationship public perception based on the level of type of work is categorized as quite strong, or in other words the level of public perception of being influenced by the type of work with the proportion agreeing with the policy is 67%.

Depending on the level of public perception of the policy of switching to electric vehicles with the type of work, this is a recommendation to the government that the policy of managing oil-fueled energy into vehicles with electricity-based energy needs to be realized.

c) Test of Independence between Population Areas and Public Perception Levels The contingency table between population areas and public perception levels is shown in the following table.

Table 14. Contingency Table between Population Areas and Level of Public Perceptions of Switching to Electric Vehicles

Population Area	Level of Public Perception		Total
	Disagree	Agree	
Sumatra	4	12	16
Java	21	18	39
Bali and Nusa Tenggara	2	8	10
Kalimantan	9	4	13
Sulawesi	3	10	13
Papua	3	6	9
Total	42	58	100

1) Hypothesis Testing:

H_0 : Both variables are independent
H_1 : Both variables are not independent (dependent)

2) Test Statistics

$$\chi^2 = \sum_{i=1}^{6}\sum_{j=1}^{2}\frac{(n_{ij}-e_{ij})^2}{e_{ij}}, with\ e_{ij} = \frac{n_{i.}n_{.j}}{n_{..}}$$

Description:
n_{ij} : The frequency of observations in the $i-th$ row and $j-th$ column
e_{ij} : The frequency of expectations in the $i-th$ and $j-th$ column

3) Test Criteria (Critical Area)

H_0 is rejected if $\chi^2 > \chi^2_{\alpha;\,v}$ with $\alpha = 5\%$ and $v = (6-1)(2-1) = 5$.

By using the expected frequency formula $e_{ij} = \frac{n_{i.}n_{.j}}{n_{..}}$, it can be obtained the value of the observation frequency and the expectation frequency or expectation in the $i-th$ row and $j-th$ column as follows and the test statistics for the case study above.

Table 15. Value of Expectations Frequency of Population Area with Level of Public Perception of Discourse on Electric Vehicles

Population Area	Level of Public Perception		Total
	Disagree	Agree	
Sumatra	4 (6.72)	12 (9.28)	16
Java	21 (16.38)	18 (22, 62)	39
Bali and Nusa Tenggara	2 (4.2)	8 (5.8)	10
Kalimantan	9 (5.46)	4 (7.54)	13
Sulawesi	3 (5.46)	10 (7.54)	13
Papua	3 (3.78)	6 (5.22)	9
Total	42	58	100

$$\chi^2 = \sum_{i=1}^{6} \sum_{j=1}^{2} \frac{(n_{ij} - e_{ij})^2}{e_{ij}} = 12,2774$$

With a value of $\alpha = 5\% = 0.05$, $v = (b-1)(k-1) = 5$ and $\chi^2_{\alpha; v} = 11.0705$ then the decision can be obtained Reject H_0 because $\chi^2 < \chi^2_{\alpha; v}$ so that it can be concluded that the two variables, namely the Population Area with the Level of Public Perception are mutually independent (independent). Therefore, it can be concluded that there is a relationship between the level of public perception of government policies regarding the transition to electric vehicles and the population area.

Furthermore, to measure the level of relationship between the two variables, using *C*ramer's V following results are obtained

$$V = \sqrt{\frac{\chi^2}{n. min(b-1, k-1)}} = 0.35039$$

Based on the results of Cramer's V, it can be interpreted that the level of relationship Public perception based on population area is categorized as quite strong, or in other words the level of public perception of being influenced by the type of work with the proportion agreeing with the policy is 58%.

Depending on the level of public perception of the policy of switching to electric vehicles with a population area is a recommendation to the government that the policy of managing oil-fueled energy into vehicles with electricity-based energy needs to be realized.

4. CONCLUSIONS

This paper investigated the current public perception of government policies in the management of fossil fuel energy. Based on the results of this research, it can be concluded several things as follows. Based on the Chi-square test of independence with a significance level of 5%, it shows that the level of public perception of the fuel price increase policy depends on the latest level of education, type of work, and population area, which is a sign that evaluation of oil-fired energy management in each region is still necessary, and sector in Indonesia. Depending on the level of public perception of the policy of the plan to switch to an electric stove in a population area without involving the last variable of education and type of work can be a recommendation to the government to realize the policy. Depending on the level of public perception of the policy of switching to electric vehicles with the latest level of education, type of work, and population area, it can be a recommendation to the government that the policy of managing oil-fueled energy into vehicles with energy electricity needs to be realized.

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