Socio-Demographic Analysis and Comparison of Household Perception of Adoption Induction and Electrical Stoves

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Abstract. Induction stoves adopters in Indonesia are still low. Some households are not interested in adopting induction stoves due to several factors. The Indonesian government is currently trying to increase the adoption of induction stoves. In addition to induction stoves, there are now electric stoves with different heating systems. This study aims to analyse the effects of social demography on the intention to adopt electric and induction stoves and compare household perceptions of induction and electric stoves. The method used is statistical analysis. Based on the test, it was found that installed electric power and age significantly influence a household's perception of adopting electric or induction stoves. The comparison shows no significant differences between the interest in adopting electric and induction stoves. The alternative policy is to assist in increasing the intention of household electricity power and penetrate policies toward the younger generation of households.
Keywords: Socio-Demographic, Household Perception, Induction Stove

Introduction

The use of induction stoves in Indonesia is still low. Gas stoves dominate the use of household stoves. Indonesia's government has launched an induction stove program to convert and increase the adoption of induction stoves [1]. Induction stove arse considered to require a reasonably high investment cost. Besides having a high price, induction stoves require high electrical power. Not all households can use an induction stove, like in a house with 450 VA of electricity, while for 900 VA, the use of an induction stove is considered heavy. The use of induction stoves can increase the cost of electricity for each household.

Almost all events or natural occurrences are interconnected and influence each other—one with another. At one time, it can function as an influencing factor, but at other times, it can become an intermediate variable; it can even be a factor influenced by others. Demographic information states that the movement of a person from one place to another does not just happen but is influenced by several determinant factors, such as economic power, security, and others. Likewise, consumer satisfaction with a particular product is influenced by many factors or things, such as the product packaging factor, the price factor, the ease of obtaining the product, the taste factor, and so on. Several studies have shown that some social demographic variables can be predictors [2], for example, determining a predictor model of intention using demographic conditions [3]. Policymakers need to know the factors that influence the policy. Purchasing decisions are caused by one's interests and behavior as well as one's demographic conditions, for example, purchasing traditional medicine [4] and shopping online [5].

Apart from the other types of stoves, there are other types of stoves, namely electric stoves. The two stoves have different heating systems. Electric stoves utilize electrical energy to heat the elements used for cooking. Components heated on electric stoves also have various shapes and materials, such as spirals, iron, and ceramic plates. Meanwhile, induction stoves have a way of working by converting electricity into a magnetic field to produce heat. The heat source is the pan and the pot itself. Through magnetic field induction of the frying pan, the frying pan experiences heating. An analysis is conducted

to determine the appropriate policy alternative related to the influencing factors of intention to adopt induction and electric stoves. Also, knowing public perceptions regarding similar alternative products besides induction stoves [6].

Methods

The research stages include literature study, problem formulation, data collection, data processing, validation, analysis, and conclusion. The research was conducted in Purwokerto in 2022. The methods used were statistical analysis of the correlation test, the dependent sample t-test, and the Theory of Planned Behavior to determine the decision variables. The most popular correlation technique or method is Spearman's Rank correlation and Pearson's Product Moment correlation. The Rank-Spearman correlation technique is used in the observation data capacity for ordinal scale variables, while the Pearson correlation technique is for minimal interval scale variables. The Rank-Spearman correlation coefficient is a measure that describes associations or relationships between variables (factors) that substantially or theoretically support these relationships. Statistically, the magnitude will be measured through these coefficients. As is known, what is meant by an Ordinal measurement scale, is a variable data scale in the form of categorical (qualitative) variables that is more informative than just the name of the category. If the classes can be ordered precisely, we have a variable of the ordinal type. The Dependent sample t-test, often called the Paired Sample t-Test, is a statistical test that aims to compare the averages of two groups that are paired with each other [7], [8]. Paired samples can be interpreted as a sample with the same subject but experiencing two different treatments or measurements before and after treatment is carried out. The requirements for this type of test are: the data is normally distributed; the two groups of data are dependent (interrelated/paired); the kind of data used is numeric and categorical (two groups).

Result and Discussion

1.16. Socio Demographic Analisis

Demography is the study of the population and includes various things such as number, percentage increase, gender, age, occupation, health, birth rate, lifestyle, marriage, and other matters concerning the field. At the same time, socio-demographic comes from two main words: socio (the study of humans) and demography (a description of the population). Socio-demographic means a human description related to the purpose of the study, preferably on a quantitative description which can later draw a qualitative character. Sociodemographics are needed because the population and the environment interact; humans can act as subjects and objects, the number of humans will increase, and environmental conditions tend to decrease. The social demographics tested in this study are age, income, electrical power, and education. Data collection was carried out in July - August 2022. The data is in ordinal form. These four variables were tested for the effect on the intention of induction stoves and electric stoves. Testing was carried out using SPSS software.

Behavior is described by the method of plan behavior theory which consists of Intention (INT), attitude to ward behavior (ATT), Perceive Behavior Control (PBC) [9], and Subjective Norm (SN). These variables will be tested for the relationship and influence on the main variable intention. The number of samples in this study is 110 households in Purwokerto. Gas stove users dominate the respondents. Figure 4 shows the age of the respondents dominated by the age of 40-50 years, as much as 43%, shown in Figure 2. The majority of 50% of respondents' income is less than IDR 2,000,000, - shown in Figure 3. Figure 1 shows the electric power used by 51% of the respondent is 900 VA. Figure 2 shows that the level of education is dominated by high school graduates, equivalent to 55%.

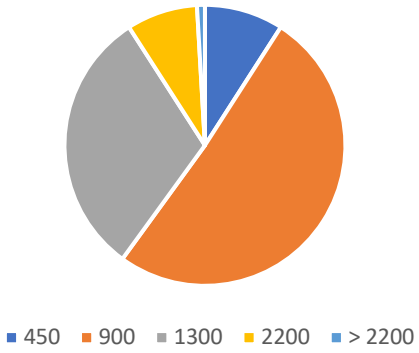

Figure 1. Electrical Power Used

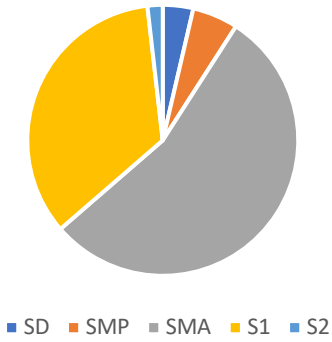

Figure 2. Education

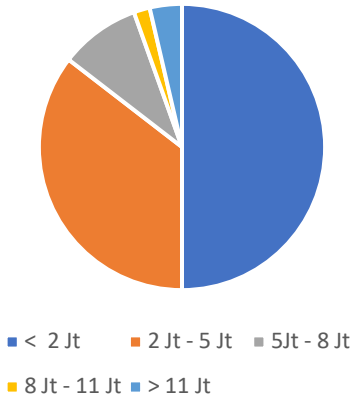

Figure 3. Income

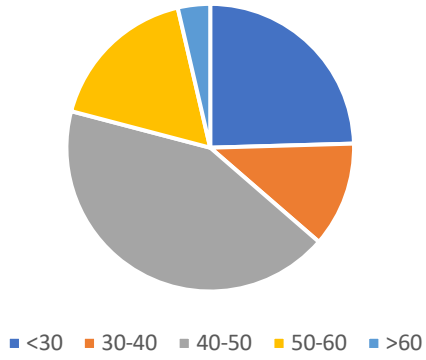

Figure 4. Age

Tests were carried out using the Spearman correlation test for ordinal data. Testing the hypothesis with the dependent t-test method, that is, if the sig value <0.05, it can be concluded by rejecting Ho, accepting H1, namely that there is a correlation between one variable and the other variables. If the sig value > 0.05, it can be concluded by rejecting H1 and accepting Ho; that is, there is no correlation between variables. In SPSS, for testing the hypothesis on Spearman's rank correlation, it can be seen from the output results above with the Sig (2-tailed) value. The variable that affects the intensity of the electric stove is electrical power. Meanwhile, age, income, and education do not significantly influence the intention to adopt electric stoves. Variables that affect the intention of induction stoves are age and electrical power. In contrast, income and education do not significantly influence the intention of induction stoves.

Table 1. Social Demographic Correlation to Intention

		Age	Income	Electrical_ power	Education	Intention_E S	Intention_I S
Age	Correlation Coefficient	1.000	.143	-.068	-.236*	-.074	-.201*
	Sig. (2-tailed)	.	.137	.478	.013	.445	.035
	N	110	110	110	110	110	110
Income	Correlation Coefficient	.143	1.00	.335**	.041	.074	.011
	Sig. (2-tailed)	.137	.	.000	.671	.444	.907

		Age	Income	Electrical_ power	Education	Intention_E S	Intention_I S
	N	110	110	110	110	110	110
Electrical_ power	Correlation Coefficient	-.068	.335**	1.000	.257**	.211*	.198*
	Sig. (2-tailed)	.478	.000	.	.007	.027	.039
	N	110	110	110	110	110	110
Education	Correlation Coefficient	-.236*	.041	.257**	1.000	.019	.085
	Sig. (2-tailed)	.013	.671	.007	.	.844	.375
	N	110	110	110	110	110	110
Intention_ ES	Correlation Coefficient	-.074	.074	.211*	.019	1.000	.583**
	Sig. (2-tailed)	.445	.444	.027	.844	.	.000
	N	110	110	110	110	110	110
Intention_I S	Correlation Coefficient	-.201*	.011	.198*	.085	.583**	1.000
	Sig. (2-tailed)	.035	.907	.039	.375	.000	.
	N	110	110	110	110	110	110

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 1 shows the correlation between variables. The age variable negatively affects the intention to adopt an induction stoves ; the younger the community, the higher the level of intention. The Electrical power variable positively influences the intention to adopt induction stoves and electric stoves; namely, the higher the electrical power, the higher the level of intention. Meanwhile, income and education do not affect intention significantly.

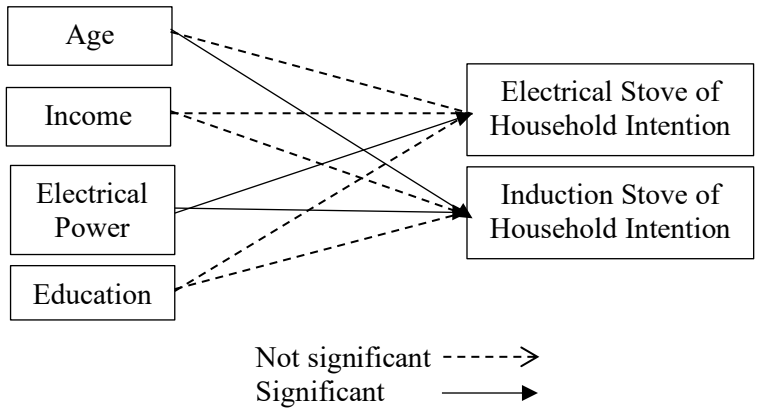

Figure 5. Correlation of Socio-Demographic and Intention

1.17. Comparison of household perception of Induction and Electrical Stoves

The average comparison uses the paired dependence t-test method. Comparisons were made to determine whether there are differences between induction and electric stoves in the same sample/ respondent households. Electric and induction stoves have different heating systems. Tests were carried out on the perception of public interest in the two products. The perception of public interest is described by the theory of planned behavior (TPB) method. TPB explains that intention is influenced by PBC, ATT, and SN [10].
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1.17.1. Table 2. Pared Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	INT_IS	2.9818	110	1.05563	.10065
	INT_ES	2.9227	110	1.02757	.09797
Pair 2	PBC_IS	3.1136	110	.99231	.09461
	PBC_ES	3.0727	110	.97170	.09265
Pair 3	ATT_IS	3.1227	110	1.06914	.10194
	ATT_ES	3.0409	110	.92650	.08834
Pair 4	SN_IS	2.9909	110	.92365	.08807
	SN_ES	2.9364	110	.93629	.08927

1.17.2.

1.17.3.

1.17.4.

1.17.5.

1.17.6. Table 3. Pared Samples Test

		t	df	Sig. (2-tailed)
Pair 1	INT_IS - INT_ES	.686	109	.494
Pair 2	PBC_IS - PBC_ES	.431	109	.667
Pair 3	ATT_IS - ATT_ES	.834	109	.406

		t	df	Sig. (2-tailed)
Pair 4	SN_IS - SN_ES	.839	109	.403

Based on the results of the dependent t-test, it was found that there was no difference between the intention of induction stoves and electric stoves. The sig (2-tailed) value in table 3 is more significant than 0.05, meaning there is no difference between the two variables. Likewise, attitudes towards ward behavior and subjective norms of induction and electric stoves do not significantly differ from the perceived behavior control variables. It can be interpreted as the public perception of the two products being the same. Although in terms of price and product efficiency testing, the two products are different [6]. So that in providing choices to the public, the government can provide induction or electric stoves. Innovation is needed for induction stoves that can be an intermediate product between gas and induction stoves.

Conclusion

Social demography is a variable that can differentiate between individuals and others. Each variable and its characteristics can influence people's behavior. This study tested social demographic variables, including age, education, income, and electrical power. Using the Spearman correlation test shows that age and electrical power variables affect a person's intention to adopt an electric stove or induction stoves. Meanwhile, education and income do not significantly affect the intention to adopt an electric or induction stove. Electric stoves and induction cooktops do not differ substantially based on people's perceptions. Household perceptions are described through intention, perceived behavior control, attitude toward ward behavior, and subjective norms. This study focuses on analyzing socio-demographic factors; the factors in this study can be developed according to the silent-believing household. Model, so it is necessary to develop a dynamic model to find policies that are more responsive to time

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