

Perception of Effectiveness and Attitude Towards Innovative with Intention to Support Pyrolysis Technology: A Quantitative Study in Pekalongan City

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ABSTRACT

This study aims to analyze the influence of perceived effectiveness of pyrolysis technology and individuals' innovative attitudes on the intention to support pyrolysis programs as a sustainable waste management solution in Pekalongan City, Indonesia. A quantitative research approach was employed using a structured survey method involving 50 purposively selected respondents. Data were collected through a Likert-scale questionnaire, which was tested for validity and reliability. Multiple linear regression analysis was conducted to evaluate the influence of the two independent variables—perceived effectiveness and innovative attitude—on the dependent variable, namely the intention to support pyrolysis initiatives. The findings indicate that both perceived effectiveness and innovative attitude have a significant and positive impact on support intention. These results highlight the importance of fostering positive public perceptions and openness to innovation in order to build greater community support for sustainable waste technology programs. The study offers practical implications for policymakers and program developers in enhancing public engagement strategies.

ARTICLE INFO

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Pyrolysis, perception, innovation attitude, public support

1. Introduction

The waste problem in Indonesia continues to increase along with population growth and urbanization. Based on data from the Ministry of Environment and Forestry (KLHK), Indonesia produced around 68.5 million tons of waste in 2023, and only 11.7% was recycled, while the rest was buried, burned openly, or polluted the environment (Ministry of Environment and Forestry, 2023). Waste management has become one of the main challenges of sustainable development in Indonesia. One of the cities in Indonesia that is facing waste problems is the city of Pekalongan.

The Pekalongan City Government has declared a waste emergency status since March 21 to September 21, 2025. This determination is listed on the official website of the Pekalongan City Government. This emergency status is a form of recognition that the situation has reached a critical

point. This is due to the condition of the Degayu TPA which is no longer able to accommodate the surge in daily waste volume reaching 270 tons (Pekalongan DLH, 2025). In facing this emergency, the local government and stakeholders have begun exploring alternative technologies, including pyrolysis as a more efficient and environmentally friendly waste processing method. Pyrolysis is the process of thermal decomposition of organic matter without oxygen, producing products in the form of bio-oil, gas, and char. According to Izzi et al. (2024), this technology can reduce waste volume by up to 80% and produce renewable fuels with low emissions.

However, innovative technology will not succeed if it does not get support from the community of users and direct beneficiaries. This support is highly dependent on how the community perceives the effectiveness of the technology, as well as their attitude towards innovation in the environmental field. Unfortunately, there is no adequate empirical data on the extent to which the people of Pekalongan City understand, accept, and are willing to support the implementation of pyrolysis. In fact, this social acceptance is one indicator of the success of environmental technology-based programs. If the public's perception of the effectiveness of pyrolysis is low or their attitude towards innovation is negative, then the risk of public rejection will increase, which will ultimately hinder the implementation of the technology and worsen the ongoing waste emergency.

Previous studies have focused more on the technical aspects of pyrolysis, such as energy efficiency or material characteristics (Jamilah et al., 2023; Sari et al., 2024), but have not integrated a social behavioral approach. Even the study by Agaton and Santos (2025) only covered social *acceptance factors* in a general context, without establishing a causal relationship between *technology perceptions, attitudes toward innovation, and community support intentions*. The success of pyrolysis implementation does not only depend on the readiness of technology and infrastructure, but also on social support from the community. As explained in *Theory of Planned Behavior* (Ajzen, 1991), a person's perception of the effectiveness of an action will influence his/her attitude and intention to support or reject the action. In this context, the public's perception of the effectiveness of pyrolysis becomes a crucial variable in encouraging their participation in innovative waste management programs.

Research on public perceptions of waste management innovations is still very limited, Wijaya et al. (2023) in *Journal of Business Applications and Management IPB* emphasizes that the perception, attitude, and cultural values of society greatly influence the adoption of environmentally friendly technologies, including in the waste management sector. In his research, he stated that changes in lifestyle and ecological awareness need to be built gradually through a participatory and educational approach so that environmental innovations can be widely accepted by the public.

In Indonesia itself, especially in the context of a medium-sized city such as Pekalongan, such studies have not been found specifically, thus creating an important gap in the literature. If this issue is not addressed with a comprehensive scientific approach, environmental technology policies such as pyrolysis have the potential to fail to be socially accepted. This failure can lead to budget waste, public resistance, and stagnation of waste management innovation which ultimately worsens the urban environmental crisis.

This research was conducted in Pekalongan City as a direct response to the 2025 waste emergency. A quantitative approach was taken to produce empirical data based on community perceptions and behavior, which are very much needed by local governments in formulating evidence-based policies. The theoretical contribution of this study is to strengthen the understanding

of how perceptions and attitudes shape supportive behavior towards environmental technology, especially in the context of developing cities in Indonesia.

Practically, the findings of this study will be a strategic basis for environmental services, non-governmental organizations, and pyrolysis technology business actors in developing more targeted socialization and education approaches. By considering the context of the waste emergency in Pekalongan and the need for a transition to an innovation-based waste management system, this study is very relevant and needed. The results are expected to provide new insights in combining technical and social approaches in solving waste problems sustainably in Indonesia.

2. Literature Review

Perception of Effectiveness

Perception is a cognitive process in which individuals capture, interpret, and give meaning to stimuli from their environment. According to Robbins and Judge (2015), perception is "a process by which individuals organize and interpret their sensory impressions to give meaning to their environment." In the context of social and technological perception, it is not only passive but also influenced by experience, personal values, knowledge, and social information received. Furthermore, perception is not always objective. Two individuals may experience the same situation or receive the same information, but assess and respond to it differently due to cognitive, affective, and contextual factors (Baron & Branscombe, 2012). Therefore, in social and behavioral research, perception is considered a variable that influences how individuals receive and assess external stimuli.

Perceived effectiveness refers to an individual's belief that a technology or system will produce desired outcomes efficiently. In the Technology Acceptance Model (TAM), Davis (1989) introduced two main constructs: perceived usefulness and perceived ease of use. These two constructs significantly influence attitudes toward technology use and ultimately determine the intention to accept or support the technology.

Venkatesh and Davis's (2000) study extended the TAM model by showing that perceived effectiveness has a significant impact on behavioral intentions, especially in the context of new technologies. In other words, if people perceive that pyrolysis technology is effective in reducing waste and provides tangible benefits (e.g., alternative energy or income from biochar), then they will be more likely to support or even adopt it at the household or community level. On the other hand, in the Theory of Planned Behavior (TPB), Ajzen (1991) explained that perceptions of the consequences of an action (behavioral beliefs) will shape attitudes, which then influence behavioral intentions. Therefore, perceived effectiveness not only shapes rational beliefs but also directs positive attitudes toward supporting pyrolysis technology.

Several studies support this relationship. For example, research by Lin et al. (2015) on biogas technology showed that perceived effectiveness was positively correlated with participation intention. Similar findings were also found in research on solar energy adoption (Yazdanpanah et al., 2015), where perceptions of system reliability and effectiveness influenced their intention to use it.

H1: there is a significant positive effect of the variable perceived effectiveness on support for pyrolysis programs.

Attitude

Attitude is an individual's internal predisposition to respond to an object, person, or idea in a certain way consistently, either positively or negatively. Allport (1935) called attitude "a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence

upon the individual's response to all objects and situations with which it is related." In other words, attitude is formed through experience and knowledge, and becomes the basis for determining behavior. According to Eagly and Chaiken (1993), attitude is a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor. Attitude has three main components: 1) Cognitive component: individual's beliefs or knowledge of the attitude object. 2) Affective component: feelings or emotions towards the object. 3) Conative component (behavior): tendency to act towards an object.

These three components are interrelated and form a person's behavioral tendency to respond to certain objects, including new technologies or policies. In the framework of the Theory of Planned Behavior (TPB) developed by Ajzen (1991), attitude toward a behavior is one of the three main factors that influence intention, along with subjective norms and perceived behavioral control. Attitudes are formed from evaluations of behavioral outcomes and will be positive if a person believes that the outcome of the behavior is beneficial. In the context of this study, if a person has a positive attitude toward pyrolysis technology for example, because it is considered innovative, environmentally friendly, or socially relevant then he or she is more likely to have the intention to support the technology.

Therefore, attitude becomes an important variable between perception and action (Ajzen, 1991). In TPB, attitude is the main component that influences intention. When a person has a positive attitude toward an action, then he or she is likely to have a strong intention to do it (Ajzen, 1991). A study by Chen (2020) in the context of waste management shows that positive attitudes toward green innovation are the main predictors of citizens' behavioral intentions in supporting environmental policies.

Another factor that strengthens this relationship is environmental awareness and concern. In the analysis of Bamberg and Möser (2007), it was found that individuals who have pro-environmental attitudes tend to be more open and supportive of green technology. In the case of pyrolysis, individuals who are aware of the impact of waste on the environment will more easily form a positive attitude towards technology-based waste management innovations. In a local context such as Pekalongan, where waste is a major issue, attitudes towards innovation are also influenced by access to technological information, support from policymakers, and socio-economic factors (Zhao et al., 2012). Therefore, an educational and participatory approach in introducing pyrolysis technology is important to form a supportive attitude.

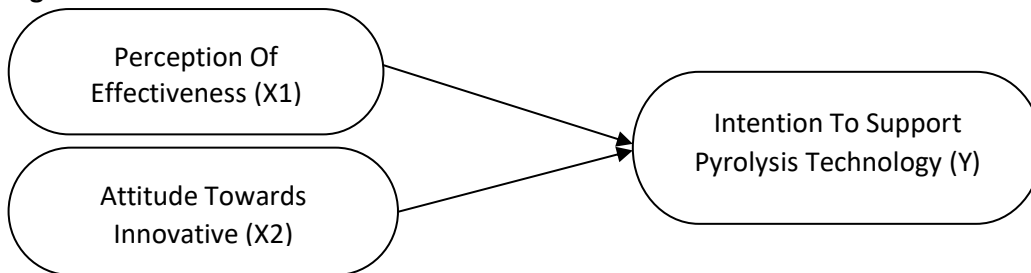
H2: there is a significant positive influence of the attitude variable towards innovation on support for the pyrolysis program.

Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB)

The integration of the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB) produces a more comprehensive theoretical framework to explain the intention to support pyrolysis technology. In TAM, the variables perceived usefulness and perceived ease of use play an important role in shaping attitudes toward technology, where individual perceptions of the benefits and ease of use of technology will influence positive attitudes that ultimately drive the intention to support it (Davis, 1989). Meanwhile, TPB adds social dimensions and behavioral control through the constructs of subjective norm and perceived behavioral control, which explains how social pressure and perceptions of control over behavior contribute to a person's intention (Ajzen, 1991). Thus, attitudes formed from perceived effectiveness (TAM), plus social influence and perceptual control

(TPB), together form a framework that explains the intention to support environmentally friendly technologies such as pyrolysis.

Figure 1. Research Model



3. Method, Data, and Analysis

This type of research is descriptive quantitative research, data collection in this study uses a survey method using a questionnaire filled out by respondents. Where the object of this study is the people of Pekalongan City aged over 20 years and representing each sub-district of Pekalongan City. The sampling technique in this study uses the method Accidental Sampling of as many as 54 respondents consisting of 2 people per sub-district where there are 27 sub-districts in Pekalongan. The data collection technique used a questionnaire with a likert scale. The main instrument used to obtain data was arranged systematically containing several questions given to respondents who met the validity and reliability requirements. The analysis technique used in this study is the multiple linear regression analysis method to determine the significant relationship between three variables, namely X1, X2 with Y.

Table 1. Operational definition of variables

No	Variable	Definition	Indicators
1	Perceived Effectiveness (X1)	An individual's belief regarding the usefulness, ease of use, and success of a technology in achieving desired outcomes (Davis, 1989; Venkatesh & Davis, 2000).	<ul style="list-style-type: none"> - Perception of flexibility - Perception of ease of interaction - Perception of ease of use - Perception of ease of learning
2	Attitude Toward Innovation (X2)	An individual's tendency to be open to, explore, and support the development and implementation of new ideas or technologies (Rogers, 2003; Ajzen, 1991).	<ul style="list-style-type: none"> - Exploring ideas (Idea Exploration) - Generating ideas (Idea Generation) - Seeking support for ideas (Idea Championing) - Implementing ideas (Idea Implementation)
3	Intention to Support Technology (Y)	An individual's behavioral tendency to participate in or approve the implementation of a particular technology in their environment (Ajzen, 1991; Bamberg & Möser, 2007)	<ul style="list-style-type: none"> - User attitude - Perceived usefulness - Perceived ease of use capability

This study uses data processing tools using Statistical Package for the Social Sciences (SPSS) version 26. The data analysis used is 1) descriptive statistics, 2) classical assumption test, 3) multiple linear regression analysis, 4) model feasibility test, 5) hypothesis test, 6) coefficient of determination.

4. Result and Discussion

Respondent Characteristics Based on Gender

Table 2. Respondent gender data

Gender	Number	Percentage
Man	9	16,7%
Female	45	83,3%
Total	54	100%

Source: Output SPSS processed by researchers, 2025

Based on the table above, it shows that the majority of respondents in this study were female, which was 45 people or 83.3% of the total 54 respondents. Meanwhile, male respondents numbered 9 people or 16.7%. This is because women in Pekalongan City are more active in social and environmental activities, so they are easier to reach and willing to be involved in research on pyrolysis technology.

Respondent Characteristics Based on Age

Table 3. Respondent age data

Age	Number	Percentage
21-30 Years	18	33,3%
31-40 Years	18	33,3%
41-50 Years	18	33,3%
Total	54	100%

Source: Output SPSS processed by researchers, 2025

Based on the table above, it can be seen that the respondents in this study have an even age distribution, with each age group of 21-30 years, 31-40 years, and 41-50 years totaling 18 people or 33.3% of the total 54 respondents. This is because at that age, namely 21 to 50 years, is a productive age range that generally already has awareness and interest in environmental issues and new technologies such as pyrolysis, so they are more responsive and willing to participate in this study.

Respondent Characteristics Based on Last Education

Table 4. Respondent's last education data

Education	Number	Percentage
High School/Vocational School	43	79,6%
Diploma 3	2	3,7%
Bachelor	9	16,7%
Total	54	100%

Source: Output SPSS processed by researchers, 2025

Based on the table above, it can be seen that the majority of respondents have a high school/vocational high school education, which is 43 people or 79.6% of the total 54 respondents. Meanwhile, respondents with D3 education numbered 2 people (3.7%) and S1 numbered 9 people (16.7%). This is because the group with a secondary education background is the largest part of the demographic structure of the productive age community in Pekalongan City, and is easier to reach in conducting field surveys. In addition, the level of secondary education also reflects a group that is quite exposed to basic information about environmental issues, but is still relevant to be studied regarding the level of acceptance of technological innovations such as pyrolysis.

Respondent Characteristics Based on Occupation

Table 5. Respondents' occupation data

Job	Amount	Percentage
Housewife	8	14,8%
Private Employees	19	35,2%
Entrepreneur	5	9,3%
Civil Servants	11	20,4%
Others	11	20,4%
Total	54	100%

Source: Output SPSS processed by researchers, 2025

Based on the table above, it can be seen that the majority of respondents work as private employees, which is 19 people or 35.2% of the total 54 respondents. Followed by civil servants and other categories, each of which is 11 people (20.4%), housewives as many as 8 people (14.8%), and entrepreneurs as many as 5 people (9.3%). This is because private employees tend to be more common in the productive age population in urban areas such as Pekalongan City, and have wider access to information on environmental issues and technological innovation, including pyrolysis technology.

Validity Test Results

Table 6. Test the validity of each variable

Item Variable	Item	R Calculate	R Table	Description
Perception of Effectiveness (X1)	X1 Question 1	0,666	0,267	Valid
	X1 Question 2	0,740	0,267	Valid
	X1 Question 3	0,827	0,267	Valid
	X1 Question 4	0,774	0,267	Valid
	X1 Question 5	0,688	0,267	Valid
	X1 Question 6	0,758	0,267	Valid
Attitude Towards Innovation (X2)	X2 Question 1	0,647	0,267	Valid
	X2 Question 2	0,633	0,267	Valid
	X2 Question 3	0,678	0,267	Valid
	X2 Question 4	0,703	0,267	Valid
	X2 Question 5	0,808	0,267	Valid
	X2 Question 6	0,821	0,267	Valid
	X2 Question 7	0,769	0,267	Valid
	X2 Question 8	0,624	0,267	Valid
Intention to Support Technology (Y)	Y Question 1	0,790	0,267	Valid
	Y Question 2	0,686	0,267	Valid
	Y Question 3	0,841	0,267	Valid
	Y Question 4	0,780	0,267	Valid
	Y Question 5	0,829	0,267	Valid
	Y Question 6	0,819	0,267	Valid

Source: Output SPSS processed by researchers, 2025

Based on the table above, it shows that the validity test of the research instrument with each statement obtained a calculated r value > r table with a significance value < 0.05. So, all statements in the questionnaire are declared valid.

Reliability Test Results

Table 7. Reliability test of each variable

Variable	Cronbach Alpha	Standard Alpha	Description
Perception of Effectiveness	0,879	0,60	Reliable
Attitude Towards Innovative	0,833	0,60	Reliable
Intention to Support Technology	0,859	0,60	Reliable

Source: Output SPSS processed by researchers, 2025

Based on the table above, it shows that the obtained values cronbach $\alpha > 0.60$ then the respondents' answers for each variable can be used in research and can be said to be reliable.

Classical Assumption Test

Normality Test Results

Table 8. Normality test results

	Unstandardized Residual	Standart	Description
Asymp. Sig. (2-tailed)	0.200 ^{c,d}	0,05	Normal

Source: Output SPSS processed by researchers, 2025

Based on the results in the table above, it shows that the significance value is $0.200 > 0.05$, which means it has a normal distribution.

Multicollinearity Test Results

Table 9. Multicollinearity test results

Variable	Tolerance	VIF
Perception of Effectiveness	0,319	3,131
Attitude Towards Innovative	0,319	3,131

Source: Output SPSS processed by researchers, 2025

Based on the table above, it shows that the limit tolerance on each variable is more than 0.10 or > 0.10 and the VIF limit is < 10.00 , then it can be concluded that there is no multicollinearity among the independent variables.

Heteroscedasticity Test Results

Table 10. Glejser test results

Variable	Signifikance	Standard
Perception of Effectiveness	0,193	0,05
Attitude Towards Innovative	0,789	0,05

Sumber: Output SPSS processed by researchers, 2025

From the table above, the results of the Glejser test show that the sig. the value of each variable is greater than 0.05 ($p > 0.05$). So overall it can be concluded that there is no heteroscedasticity problem.

Model Feasibility Test Results

Table 11. Model feasibility test results

Model	F	Signifikance	Description
Regression	40,692	0.005 ^b	Suitable

Source: Output SPSS processed by researchers, 2025

Based on the table above, the F test results produce an F value of 40.692 with a significance value of 0.005. This significance value is smaller than 0.05, therefore it shows that the regression model in this study is suitable for use in hypothesis testing.

Multiple Linear Regression Analysis Results

Table 12. Results of multiple linear regression analysis

Variable	B	Std. Error	Description
(Constant)	4,350	2,283	Positive
Perception of Effectiveness	0,409	0,150	Positive
Attitude Towards Innovative	0,312	0,120	Positive

Source: Output SPSS processed by researchers, 2025

$$Y = \alpha + \beta X_1 + \beta X_2 + \epsilon \quad (1)$$

$$Y = 4,350 + 0,409 + 0,312 + e$$

$\alpha = 4,350$ is the constant value of the regression equation which has a positive value, meaning that if the Perception of Effectiveness and Attitude Towards Innovation is equal to zero (0), then the Intention to Support Technology will increase 4,350.

$\beta_1 = 0,409$ shows a significant positive effect if the Perception of Effectiveness increases by 1% then the Intention to Support Technology will increase by 0,409.

$\beta_2 = 0,312$ shows a significant positive effect if the Attitude Towards Innovative increases by 1% then the Intention to Support Technology will increase by 0,312.

t-Test Results (Partial)

Table 13. Results of the t-test (partial)

Variable	T	Sig.	Discription
Perception of Effectiveness	2,729	0,009	Significant
Attitude Towards Innovative	2,608	0,012	Significant

Source: Output SPSS processed by researchers, 2025

Hypothesis test of the education variable Perception of Effectiveness (X1) on the Intention to Support Technology (Y) through the calculation results that have been obtained that the level of significance <0.05 ($0.009 < 0.05$). This shows that the Perception of Effectiveness variable has a significant effect on the Intention to Support Pyrolysis Technology. So H_0 is rejected and H_1 is accepted.

Hypothesis test of Attitude Towards Innovative variable (X2) on Intention to Support Technology (Y) through calculation result that has been obtained that the significance level <0.05 ($0.012 < 0.05$). This shows that Attitude Towards Innovative variable has significant influence on Intention to Support Pyrolysis Technology. So H_0 is rejected and H_1 is accepted.

Results of the Determination Coefficient (R²) Test

Table 14. Results of the determination coefficient test (R²)

R	R Square	Adjusted R Square	Percentage Remainder	Description
.784a	0,615	0,600	60%	40% Fairly Strong

Source: Output SPSS processed by researchers, 2025

Based on the table above, the values obtained are adjusted *r square* of 0.600, which shows that the Intention to Support Pyrolysis Technology is influenced by Perception of Effectiveness and Attitude Towards Innovativeness by 60%, while the remaining 40% is influenced by other variables not examined in this study.

Discussion

The Influence of Perceived Effectiveness on Intention to Support Pyrolysis Technology

Based on the calculation results in the t-test table, a significance value of $0.009 < \alpha 0.05$ was obtained, which indicates that there is a positive and significant influence of the Perception of Effectiveness variable on the Intention to Support Pyrolysis Technology. This means that the higher the level of product innovation felt by the community, the higher the Intention to Support Pyrolysis Technology felt by the people of Pekalongan City.

These results support the theory of Davis (1989) in Technology Acceptance Model (TAM), which explains that perceived usefulness plays an important role in shaping a person's attitude and intention to accept new technology. When people feel that pyrolysis technology is effective in reducing the negative impacts of waste and increasing the efficiency of waste management, they are more open to actively supporting its implementation.

Perceptions of effectiveness also contribute to forming behavioral intentions, as explained in Theory of Planned Behavior (Ajzen, 1991), where belief in the positive results of an action can increase a person's intention to carry out the action. In this context, pyrolysis technology is perceived as an innovative, efficient, and sustainable solution, thus encouraging the people of Pekalongan City to support its implementation.

Thus, it can be concluded that positive perceptions of the effectiveness of pyrolysis technology are a key factor in increasing the intention of community support for the technology. This result is also in line with previous studies conducted by Chen et al. (2023), Sari and Afifah (2023) and Vorobeva et al. (2022) which found that perceptions of effectiveness have a significant effect on the Intention to Support Pyrolysis Technology.

The Influence of Attitude Towards Innovativeness on Intention to Support Pyrolysis Technology

Based on the calculation results in the t-test table, a significance value of $0.009 < \alpha 0.05$ was obtained, which indicates that there is a positive and significant influence of the Attitude Towards Innovative variable on the Intention to Support Pyrolysis Technology. This means that the higher the level of Attitude Towards Innovative felt by the community, the higher the Intention to Support Pyrolysis Technology felt by the people of Pekalongan City.

This result is in line with the theory of Rogers (2003) in *Diffusion of Innovations Theory*, which states that individuals who have a positive attitude towards innovation tend to be more receptive and supportive of new technologies. Attitudes towards innovation reflect openness to change, interest in cutting-edge technology, and a willingness to try new solutions to problems, such as waste management through pyrolysis technology.

In addition, the Planned Behavior theory (Ajzen, 1991) also explains that a positive attitude towards an action will strengthen a person's intention to do it. In this context, people who value innovation see pyrolysis technology as a form of progress and a modern solution to environmental problems, so they are more motivated to provide support.

Thus, it can be concluded that the more positive the public's attitude towards innovation, the more likely they are to support the use of pyrolysis technology. This finding is in line with previous studies by Carvalho & Vilaça (2024) and Irfan et al. (2023), which showed that attitudes towards

innovation significantly influence individuals' intentions to accept and support environmentally friendly technologies.

5. Conclusion and Suggestion

Based on the data obtained from the results of the analysis test that has been carried out previously, it can be concluded that Perception of Effectiveness has a positive and significant effect on the Intention to Support Pyrolysis Technology in the Pekalongan City community. Attitude Towards Innovativeness also has a positive and significant effect on the Intention to Support Pyrolysis Technology in the Pekalongan City community. Meanwhile, Digital Trust in technology-based management systems also provides a positive and significant contribution in increasing the Intention to Support Pyrolysis Technology.

The results of this study indicate that the higher the public's perception of the effectiveness and innovativeness of pyrolysis technology, and the stronger their trust in the digital system used, the greater the intention to support and accept the technology. Therefore, it is important for local governments, industry players, and pyrolysis technology developers to increase public understanding through education that targets the effectiveness of technology, builds an innovative image, and ensures transparency and security in the digital system used.

Although this study has shown significant results, it has limitations in terms of the scope of the region and the relatively limited number of respondents in Pekalongan City. To broaden the generalizability of the findings, it is recommended that further research be conducted with a wider geographical scope and involve a more diverse variety of demographic characteristics. Future research can also consider adding other variables, such as Technological Literacy or Social Norms, to gain a more comprehensive understanding of the factors that influence people's intentions to support the adoption of environmentally friendly technologies such as pyrolysis.

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