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Integration of artificial intelligence in development communication

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Abstract

This study aims to analyze the integration of Artificial Intelligence (AI) in development communication from the community perspective. It explores how public perception of AI-based systems such as chatbots, mobile applications, and text-to-speech platforms affects community participation and the effectiveness of development communication. Utilizing the Technology Acceptance Model (TAM), the study examines the relationship between Perceived Usefulness (PU), Perceived Ease of Use (PEOU), and Information Quality (IQ) on community engagement, which in turn influences the effectiveness of communication. A quantitative method using survey data from 400 respondents in Jakarta was employed. The data were analyzed using Structural Equation Modeling (SEM-PLS). The findings indicate that all independent variables significantly affect community participation, with information quality being the most dominant factor. Furthermore, community participation is the strongest predictor of development communication effectiveness. The results support the importance of AI not only as an informative medium but also as a participatory tool for inclusive governance.

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INTRODUCTION

The development of digital technology has encouraged governments around the world, including Indonesia, to start using Artificial Intelligence (AI) in public services (Ramadian et al., 2025). One sector experiencing significant transformation is development communication, which refers to the process of delivering information and participatory appeals regarding development programs to the public. The utilization of AI in development communication is part of broader efforts to promote the realization of good governance in public administration.

Several local governments in Indonesia have begun adopting AI technologies in their public communication systems. Regions such as DKI Jakarta, the Riau Islands (Kepri), and South Sulawesi have introduced AI-based tools, including chatbots, voice assistants,

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data-driven recommendation systems, and text-to-speech video content (KEPRI, 2023; Widodo & Permatasari, 2024). AI is believed to enhance the dissemination of information by making it faster, more personalized, and more interactive (Hohenstein et al., 2023). However, the effectiveness of AI-driven development communication remains underexplored from a scientific perspective, particularly in terms of how it is perceived by the public as the target audience.

The Jakarta Provincial Government has implemented camera-based AI systems for license plate recognition, aimed at traffic monitoring, detecting traffic violations, and optimizing local revenue (Pendapatan Asli Daerah/PAD) through vehicle taxation (Antara, 2023). Additionally, AI is utilized for air quality monitoring and for enhancing public transportation safety through facial recognition technologies installed at bus stops and MRT stations. In 2020, the Jakarta government also launched Javira, an AI-powered public service chatbot designed to facilitate citizen interaction with local government services (Kumparan, 2020).

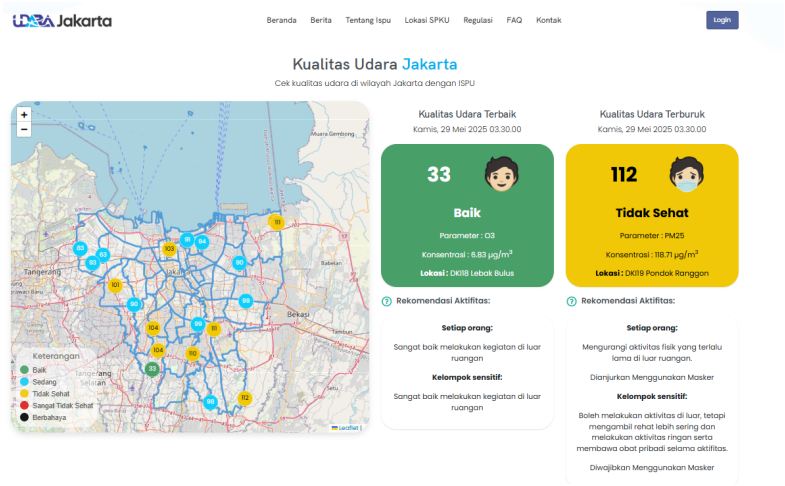

Figure 1. Implementation of AI in air quality monitoring on the website http://udara.jakarta.go.id

Beyond its use in data collection and surveillance, the Jakarta Provincial Government has incorporated public communication components powered by AI—such as integrating monitoring information into social media platforms and the official government website. This indicates that AI-based communication is not solely instrumental or administrative in nature, but also seeks to foster public understanding and participation in the city's development initiatives.

The challenges of development communication in Indonesia remain substantial, particularly in relation to public perception, information literacy, and citizen engagement. The integration of Generative AI (GenAI) is transforming public sector communication, thereby necessitating a critical understanding of AI's role in enhancing communication strategies while simultaneously addressing ethical concerns and issues of public trust (Lovari & De Rosa, 2025). In the public sector, the need to involve diverse actors and stakeholders in algorithm development is crucial to ensure that public interests are prioritized. The community is a key stakeholder in development communication; therefore, the development information conveyed by the government must meet the needs of the community. (Dankloff et al., 2025; Stapleton et al., 2022) .

Zhang and Nie (2025) found that AI can enhance public engagement when combined with humane communication strategies, improving citizen-government interactions and fostering more effective and satisfying communication. (Zhang & Nie, 2025). One AI implementation by the Jakarta Provincial Government is the JAKI application, representing a Smart City initiative. However, JAKI has been perceived as less effective because integration among various regional device applications faces obstacles, thereby hindering public services (Ridwansyah et al., 2024). Therefore, it is important to measure the extent to which the utilization of AI in development communication influences public understanding, trust, and participation. This study aims to fill the research gap between AI technology use and the effectiveness of development communication through a quantitative approach based on public perception data, thus providing concrete recommendations for the development of government digital communication strategies in the era of digital transformation.

This study aims to determine the level of AI utilization in development communication by local governments, assess the effectiveness of AI-based development communication from the public's perspective, and analyze the influence of AI utilization on the effectiveness of development communication. The research is conducted among residents living in areas where local governments have implemented AI technology for development communication, specifically in DKI Jakarta. The focus of the study is on public perception of AI used to deliver public information regarding local government development programs.

LITERATURE REVIEW

Social, economic, and political changes in modern society are increasingly influenced by the rapid development of digital technology dynamics. The ongoing digital transformation requires the development of communication as a fundamental element in bridging the government and the public to create planned, inclusive, and sustainable change (Sanina et al., 2024; Sigurjonsson et al., 2024). Effective development communication can be achieved by leveraging emerging technologies and adapting to the needs of the community (Latupeirissa et al., 2024; Lubis et al., 2024).

Development Communication

Development communication functions as a strategic process to facilitate social change and sustainable development. It plays a crucial role in disseminating information, encouraging public participation, and influencing behavior change (Subedi & Karki, 2022). The advancement of information and communication technology (ICT) has transformed the landscape of development communication towards a more interactive and participatory approach. However, challenges such as the digital divide, media literacy, and unequal access to technology can hinder the effectiveness of development communication (Raihan et al., 2024).

Development communication is a process of information exchange aimed at promoting planned and sustainable social, political, and economic change. McQuail states that development communication has educational, persuasive, and participatory functions in encouraging active public involvement in development programs (McQuail, 2010). According to Kheerajit and Flor, development communication plays a primary role in information distribution in developing countries (Arianti et al., 2015). Flor emphasizes the importance of communication that is adaptive to local contexts, especially in rural and marginalized areas (Flor, 2007). This approach prioritizes the use of media and technology as tools to bridge information between the government and the community. In the context of Indonesia, development communication by local governments is often conducted through conventional media and social media. However, its effectiveness still faces challenges such as low digital literacy, uneven information infrastructure, and disparities in access.

The effectiveness of development communication can be measured through several indicators, including message clarity, source credibility, active public participation, and the media used. Rakhmat explains that communication effectiveness is determined not only by the content of the message but also by the medium and its interactivity (Rakhmat, 2009). AI

has the potential to enhance effectiveness by providing personalization, speed, and continuity in information delivery.

This study is grounded in development communication theory (McQuail, 2010) which states that communication effectiveness depends on the quality of the message, the medium, and audience reception. AI, as a new public communication medium, is believed to be capable of delivering information quickly and accurately, tailoring messages to user needs, and improving two-way interaction between the government and the public.

Artificial Intelligence (AI) in Communication Development

Artificial intelligence (AI) is a technological system designed to imitate human intelligence in analyzing, responding, and making decisions. In the context of government, AI is used to improve the efficiency of public services, detect social patterns, and provide real-time data for decision-making (Kulal et al., 2024). According to Zhang and Nie (2025), AI has begun to be utilized in the public sector as a communication agent through various forms such as: (1) government chatbots (for information services), (2) natural language processing (NLP) for public opinion analysis, (3) recommender systems for information personalization, and (4) generative AI (text-to-speech, video, automated infographic content) (Zhang & Nie, 2025).

Technology Acceptance Model

The effectiveness of information acceptance also depends on individuals' ability to receive the information, including their capacity to adopt an innovation (Rogers, 2003). In the context of AI for development communication, the public tends to adopt technology if they perceive it as useful and easy to use. Technology acceptance refers to the willingness of individuals or groups to accept and adopt technology use in daily activities, influenced by factors such as trust, comfort in use, usefulness, and other social aspects. Technology acceptance and adoption can be analyzed using the Technology Acceptance Model (TAM), which consists of Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) (Davis, 1989).

The PU model assesses the extent to which a person believes that using the technology is beneficial, while the PEOU model measures the ease of using the technology (Revilia & Irwansyah, 2020). Additionally, to evaluate public participation, the quality of the development information message delivered is essential (Haryani et al., 2024).

METHODS

This study uses a quantitative approach and statistical analysis to obtain objective insights. It analyzes the influence of AI integration on the effectiveness of development communication in Indonesia. The population of this research consists of residents of DKI Jakarta who receive development-related information from the local government through AI-based systems (e.g., chatbots, monitoring applications, interactive websites).

The sampling technique used in this study is purposive sampling, which is a form of non-random sampling. Purposive sampling is a method of selecting samples based on specific predetermined criteria; the sample is deliberately chosen to include only individuals with certain characteristics, traits, or attributes, and thus is not selected randomly (Fauzy, 2019). The sampling criteria include residents of DKI Jakarta aged over 17 years, who have experience receiving public information through government digital media (particularly those containing AI elements), and who have access to the internet or social media. The total population of DKI Jakarta residents over the age of 17 is 19.761.820. The sample size for this study consists of 400 respondents.

Technology acceptance refers to the willingness of individuals or groups to accept and adopt the use of technology in their daily activities, with influencing factors including trust, ease of use, perceived usefulness, and other social aspects. The Technology Acceptance Model (TAM), developed by Fred Davis in 1989 and cited by Zolait, explains how users accept and utilize technology based on parameters such as Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). The PU model assesses the extent to which an individual believes that using the technology is beneficial. Meanwhile, the PEOU model evaluates the degree to which the technology is perceived as easy to use. Additionally, the Attitude Toward Use (ATU) model measures an individual's attitude toward using a particular technology (Revilia & Irwansyah, 2020).

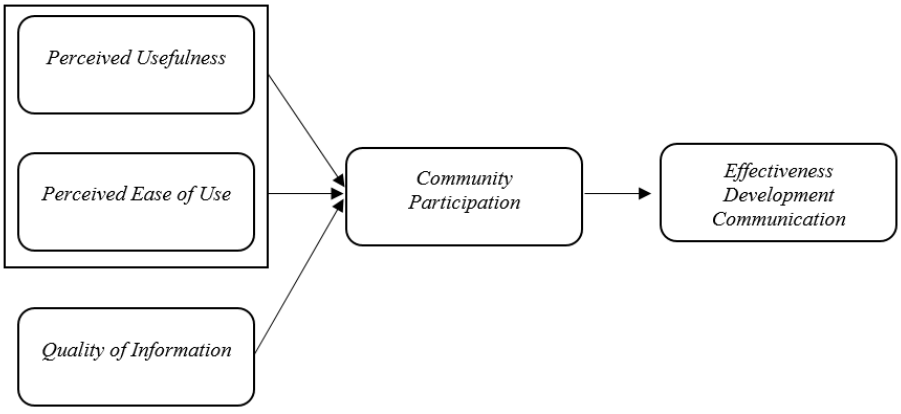

Figure 2. Analysis model

The main constructs of this study include Public Acceptance and Information Quality, with the dependent variable (Y) being the Effectiveness of Development Communication, and Community Participation serving as a mediating variable (Z). Based on this framework, the hypotheses are formulated as follows:

H1: Perceived Usefulness has a significant positive effect on Community Participation.

H2: Perceived Ease of Use has a significant positive effect on Community Participation.

H3: Quality of Information has a significant positive effect on Community Participation.

H4: Community Participation has a significant positive effect on Effectiveness of Development Communication.

H5: Perceived Usefulness, Perceived Ease of Use, and Quality of Information have a significant positive effect on Effectiveness of Development Communication.

The analytical method used in this study is Structural Equation Modeling (SEM). SEM consists of two fundamental components: the measurement model, which serves to confirm the dimensions of a construct based on its indicators, and the structural model, which establishes and explains the causal relationships among variables. The SEM process involves seven key steps (Waluyo, M. & Rachman, 2018) : 1) Developing a theoretical model, 2) Representing causal relationships using a path diagram, 3) Converting the path diagram into a series of structural equations and specifying the measurement model, 4) Selecting the input matrix type and the estimation technique for the proposed model, 5) Assessing model identification issues, 6) Conducting model evaluation, 7) Interpreting and, if necessary, modifying the model.

This study employs data analysis using SmartPLS 3.0 software. The Partial Least Squares (PLS) method is a variance-based approach to Structural Equation Modeling (SEM). It is commonly used for path analysis in behavioral studies, making it a suitable statistical technique for models involving multiple dependent and independent variables.

Table 1. Evaluation Criteria for Outer and Inner Models

Testing Model	Output	Criteria
Outer Model	*Convergent validity; Loading Factor*	> 0.70; values between 0.50–0.60 are still acceptable
	Average Variance Extracted (AVE)	>0,5
	Discriminant Validity; Cross Loading	Loading on the intended latent variable should be greater than on other constructs
	Composite reliability	>0,7
	SRMR	<0,1
Inner Model	R-*Square*	0.67 = substantial; 0.33 = moderate; 0.19 = weak

	Path Coefficients and T-Statistics	T-statistic > 1.65 (10% significance), > 1.96 (5% significance)

RESULTS AND FINDINGS

Respondent Characteristics

The data analyzed in this study were obtained through questionnaires distributed to the people of DKI Jakarta who are in the age range above 17 years. Descriptive analysis was conducted to provide a general description of the characteristics of the respondents. The following is a description of the characteristics of the respondents in this study. The research data collected through questionnaires from 400 respondents who met the criteria produced information related to respondent characteristics, which is presented in the following table:

Table 2. Respondent Characteristics

Characteristic	Frequency	Percentage
Age		
17-25 years	322	80,5
26-35 years	45	11,25
36-45 years	14	3,5
46-55 years	11	2,75
56-65 years	8	2
Gender		
Male	154	38,5
Female	246	61,5
Education		
High School	238	59,5
Diploma 3/ Bachelor	145	36,25
Masters	16	4
Doctoral	1	0,25
Region		
North Jakarta	33	8,25
West Jakarta	72	18
Central Jakarta	37	9,25
East Jakarta	43	10,75
South Jakarta	201	50,25
Seribu Islands	14	3,5

The majority of respondents are in the 17–25 age range (80.5%), which means that most of them are digital natives, individuals who were born and raised in the information technology era. This age group tends to have a high level of technology adoption and is familiar with AI-based applications, such as notifications from the JAKI application or

digital air quality monitoring. The younger generation is a strategic target in technology-based development communication, because they are more responsive to social media and digital applications as information channels.

As many as 61.5% of respondents were women. Studies show that women are also active as social media users and are more involved in digital-based community activities, especially public issues such as the environment and health (An Nur & Hariyanti, 2019; Husna & Fahrimal, 2021). Development communication strategies must consider a gender-based approach, such as compiling content that is inclusive of women's information needs in an urban context.

Most respondents have at least a high school education (59.5%) and a Diploma/Bachelor's degree (36.25%), which indicates an adequate level of digital literacy to understand and respond to public communication through digital media, including AI-based platforms such as air quality dashboards or e-tilang. Good education supports critical capacity in assessing the effectiveness of development communication. Communication strategies must pay attention to the readability and accessibility of technology-based messages. AI applications or platforms such as JAKI must provide a user-friendly interface that is easy to understand by the general public, not just academics or technocrats.

Most respondents live in South Jakarta (50.25%). The distribution of respondents concentrated in South Jakarta reflects the potential for inequality in development information if AI-based media and technology are not evenly used in all regions. This is important in the context of information justice and digital access. The DKI Jakarta government can prioritize AI-based development communication strategies through channels that suit the preferences of the younger generation, such as Instagram, TikTok, or AI-based chatbots.

Path Coefficient Algorithm PLS

Structural Equation Modeling is an effective statistical method for factor analysis and path analysis. This study builds an SEM model that analyzes the Effectiveness of Development Communication by integrating Artificial Intelligence (AI), which is influenced by Community acceptance and the quality of information through community participation. The results of the analysis of running the model that has been built, this study can explore the influence of community acceptance and the quality of information using AI through community participation on the effectiveness of development communication.

Data analysis begins with building a model, in building a SEM model, criteria are needed from the PLS-SEM model evaluation to achieve good interpretation results, if in the

model that is built there are criteria that have not been met, improvements must be made to the model by deleting or eliminating indicators that do not meet the criteria. After the model is built, the next step is to test the validity and reliability of the measurement model (outer model) and then test the significance of the relationship between variables or the inner model. Based on the conceptual framework that has been prepared previously, the structural model in the study can be described as in Figure 3.

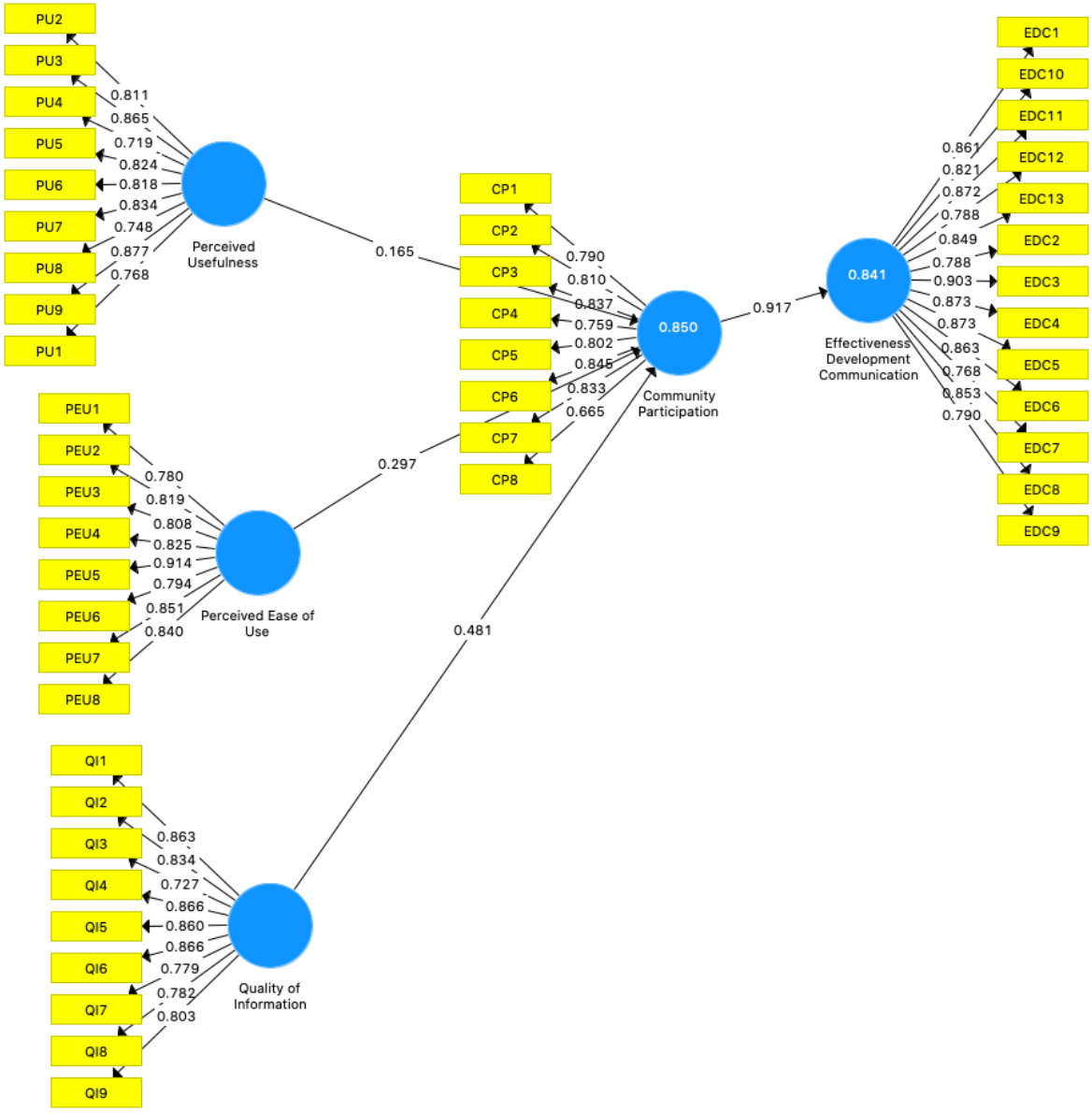

Figure 3. Path Coefficient Algorithm PLS

The parth coefficient values in the results of the PLS alogirthm in the above diagram can be summarized in the Table 3. The path coefficient values in the results of the PLS algorithm, as seen as in the table above indicate that community participation has the strongest impact on effectiveness development communication at 0,917 or 91,7%. The

loading factor values for all indicators are above 0.70, with several values ranging between 0.50 and 0.60, which are still considered acceptable. This indicates that each indicator strongly represents the latent variable it is intended to measure.

Table 3. Path Coefficient Values

	Community Participation	Effectiveness Development Communication
Community Participation		**0,917**
Perceived Ease of Use	0,297	
Perceived Usefulness	0,165	
Quality of Information	0,481	

Table 4. Results of Fornell-Larcker

	Community Participation	Effectiveness Development Communication	Perceived Ease of Use	Perceived Usefulness	Quality of Information
Community Participation	0,795				
Effectiveness Development Communication	0,917	0,840			
Perceived Ease of Use	0,901	0,925	0,830		
Perceived Usefulness	0,873	0,893	0,914	0,809	
Quality of Information	0,911	0,936	0,942	0,906	0,821

Table 5. Reliablity Analysis

	Composite Reliability	Average Variance Extracted (AVE)
Community Participation	**0,932**	**0,631**
Effectiveness Development Communication	**0,969**	**0,705**
Perceived Ease of Use	**0,946**	**0,689**
Perceived Usefulness	**0,944**	**0,654**
Quality of Information	**0,949**	**0,675**

Discriminant validity was assessed by ensuring that the loading of each indicator is higher on its intended construct than on other constructs. Based on the data obtained, there was no significant cross-loading, indicating that each indicator distinctly measures its respective construct.

All constructs demonstrated high composite reliability, indicating that the indicators within each construct consistently measure the intended concept. The Average Variance Extracted (AVE) values for all constructs were estimated to be above 0.50, suggesting that more than 50% of the variance in the indicators is explained by their respective latent constructs. The R^2 values indicate the predictive strength of the model. In this study: R^2 for community participation = 0.850 (categorized as strong), and R^2 for Effectiveness of Development Communication = 0.841 (categorized as strong). This means that 85% of the variance in community participation can be explained by Perceived Usefulness (PU), Perceived Ease of Use (PEOU), and Quality of Information (QI), while 84.1% of the variance in the effectiveness of development communication can be explained by community participation. Path Coefficient and T Statistics, which is presented in the following table:

Table 6. Path Coefficient and T Statistics

Path Relationship	Coefficient	T Statistic	Description
Perceived Usefulness → Community Participation	2.466	>1.96	Significant
Perceived Ease of Use → Community Participation	4.046	>1.96	Significant
Quality Information → Community Participation	6.863	>1.96	Significant
Community Participation → Effectiveness of Development Communication	74.780	>>1.96	Highly Significant

The table above presents the results of significance testing for the relationships among variables using path coefficients and T-statistics. The general criterion used to determine statistical significance is a T-value greater than 1.96 at a 5% significance level ($\alpha = 0.05$). All tested path relationships show statistically and substantively significant results. These findings indicate that perceptions of usefulness and ease of use, as well as the quality of information, play important roles in enhancing community participation. Furthermore, community participation has a highly significant impact on the effectiveness of development communication.

The test results indicate that Perceived Usefulness (PU) has a positive and significant effect on community participation (coefficient = 0.165; T = 2.466), **H1 is accepted**. This

means that the more people perceive AI technology in development communication as beneficial, the more likely they are to participate. This finding reinforces the core assumption of the Technology Acceptance Model (TAM) by Davis (1989), which posits that perceived usefulness is a key driver in user adoption behavior. In this context, residents of Jakarta who find that features such as government chatbots (e.g., Javira) or the JAKI application help them understand development programs more quickly and in a personalized manner are more inclined to engage actively. Furthermore, Zhang & Nie (2025) found that civic engagement significantly increases when AI is perceived to enhance the effectiveness of two-way communication between government and citizens.

This concludes the importance of perceived usefulness in encouraging public participation in digital public services. The study confirms that public perception of the benefits of AI technology in development communication can increase their participation. The government needs to ensure that the technology used actually provides benefits that are felt by the community to encourage more active participation.

Perceived Ease of Use (PEOU) also shows a significant positive effect on community participation (coefficient = 0.297; T = 4.046), **H2 is accepted**. This suggests that AI systems that are easy to access and operate increase the public's intention to use and respond to government communication platforms. This finding is consistent with Fianna & Irwansyah (2020), who emphasized that usability features—such as simple navigation or fast chatbot responses—are crucial determinants of citizen interaction with digital public services. Amid the challenges of digital literacy, user-friendly interfaces and accessible language become vital in transforming AI from merely an information tool into an entry point for civic engagement.

The challenge of digital literacy in Indonesia is still a barrier to technology adoption. Therefore, user-friendly interfaces, accessible language, and fast chatbot responses are crucial elements in encouraging public participation through AI-based government communication platforms. By ensuring that the technology used is easy to access and operate, the government can increase public involvement in development programs. This study confirms that the perception of ease of use of AI technology in government communication plays an important role in increasing public participation. The government must focus on the design and implementation of user-friendly technology to encourage wider public involvement.

Information quality exhibits the strongest influence on community participation (coefficient = 0.481; T = 6.863), **H3 is accepted**. This indicates that the clarity, accuracy, and relevance of messages delivered via AI technologies play a pivotal role in shaping public involvement. Previous research by Haryani et al. (2024) supports this finding, noting that development communication supported by high-quality information fosters public trust and a sense of ownership in government programs. In Jakarta's context, where digital information overload is a risk, credible and accurate messaging becomes a key differentiator that determines citizen response.

Research by (Zhang & Nie, 2025) confirmed that AI-modified interactions significantly improved dimensions of communication between citizens and government, including satisfaction, clarity, and trust. This study shows that AI can improve the quality of communication by delivering clearer and more responsive information, thus strengthening people's trust in government institutions. The findings emphasize the importance of information quality in AI-based communication to encourage citizen participation. The government needs to ensure that messages delivered through AI technology are not only easily accessible, but also clear, accurate, and relevant to people's needs. AI can serve as an effective tool in strengthening development communication and increasing.

Community participation proves to be the most dominant predictor of effective development communication (coefficient = 0.917; T = 74.780), **H4 is accepted**. This means that the success of development communication relies heavily on the degree of public participation, whether in absorbing information, providing feedback, or engaging in program implementation. In line with McQuail (2010), the effectiveness of communication depends not only on message content but also on the interaction between sender and receiver. In this regard, AI acts as a facilitative medium, but it is public participation that ultimately drives effective development communication outcomes.

The DKI Jakarta government launched the JAKI application as part of the Jakarta Smart City initiative. Through the JakLapor feature, citizens can report various city problems such as damaged roads, accumulated garbage, or outdated street lights. These reports are directly connected to government systems for follow-up, enabling a faster and more transparent response to community complaints. Another example, to increase participation in development planning, the DKI Jakarta Provincial Government provides an Aspiration Channel and e-Musrenbang platform. Through this channel, citizens can provide input and proposals related to the Rencana Pembangunan Jangka Menengah Daerah (RPJMD) online,

ensuring that the voice of the community also colors the direction of the city's development policies.

Community participation in DKI Jakarta is not only limited to receiving information, but also includes providing input, reporting problems, and direct involvement in the implementation of development programs. By utilizing available technology and communication, the people of Jakarta can play an active role in shaping a better and more sustainable city.

The indirect influence of the three independent variables on the effectiveness of development communication, mediated by community participation, is collectively significant, **H5 is accepted**. These findings highlight that perceived usefulness, ease of use, and information quality will only have an optimal impact when they succeed in encouraging active public involvement. This aligns with Flor's (2007) assertion that successful development communication is not merely about disseminating information but also about mobilizing collective action through adaptive and participatory communication strategies. Therefore, AI should not be designed merely as an informative tool, but as a participatory medium that empowers citizens in the development process.

This study proved that community participation is a key factor in the effectiveness of AI-based development communication. The findings show that perceived usefulness, perceived ease of use, and information quality of AI technology significantly influence community participation, which ultimately determines the success of development communication. To be able to achieve effective development communication, the government needs to ensure that the AI technology used is easily accessible, provides quality information, and encourages active community participation. An adaptive and participatory communication approach will be more effective in encouraging community engagement and achieving sustainable development goals.

CONCLUSION

This study concludes that the acceptance of AI technology, through perceived usefulness and ease of use, along with the quality of information, significantly influences community participation in development communication. Furthermore, community participation serves as a key factor in enhancing the overall effectiveness of development communication initiatives. These findings align with the research objectives of understanding the role of AI in facilitating public engagement and improving

communication outcomes in a government context. For future research, it is recommended to explore additional factors such as digital literacy, trust in government, and socio-cultural influences that may affect AI adoption and community engagement. Practically, government agencies should prioritize designing AI communication tools that are user-friendly, provide high-quality information, and actively encourage two-way interaction to foster meaningful community participation and support sustainable development goals.

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