West Science Information System and Technology
Vol. 3, No. 03, December 2025, pp. 203~210

The Role of Digital Technology in Realizing the Sustainable Development Goals (SDGs)

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Article Info

Article history:

Received December, 2025
Revised December, 2025
Accepted December, 2025

Keywords:

Digital technology, Sustainable Development Goals, SDGs achievement, Indonesia

ABSTRACT

Digital technology has increasingly become a strategic instrument in accelerating the achievement of the Sustainable Development Goals (SDGs), particularly in developing countries such as Indonesia. This study aims to examine the role of digital technology in supporting the achievement of SDGs in Indonesia using a quantitative research approach. Data were collected from 85 respondents through a structured questionnaire measured using a Likert scale. The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25, employing descriptive statistics, validity and reliability testing, and simple linear regression analysis. The results indicate that digital technology has a positive and statistically significant effect on SDG achievement, with digital technology explaining 50.7% of the variance in sustainable development outcomes. These findings suggest that increased utilization of digital platforms and systems contributes to improved economic efficiency, social inclusion, and sustainable development practices. This study provides empirical evidence on the importance of digital transformation in achieving SDGs and offers practical insights for policymakers and stakeholders to strengthen digital-based development strategies in Indonesia

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1. Introduction

The Sustainable Development Goals (SDGs), adopted by the United Nations in 2015, represent a global framework aimed at addressing complex and interrelated challenges such as poverty, inequality, environmental degradation, and inclusive economic growth. For developing countries like Indonesia, achieving the SDGs requires not only strong policy commitment but also innovative approaches that can enhance efficiency, transparency, and inclusiveness in development processes. In this context, digital technology has emerged as a strategic enabler that can accelerate progress toward sustainable development by transforming how governments, businesses, and communities interact and deliver value [1], [2].

Indonesia, as one of the largest developing economies in Southeast Asia, faces diverse development challenges, including disparities in access to education, healthcare,

financial services, and digital infrastructure across regions. At the same time, Indonesia has experienced rapid growth in digital technology adoption, characterized by the expansion of internet connectivity, mobile technology, digital platforms, and e-government initiatives [3], [4]. This digital transformation presents significant opportunities to support SDG achievement by improving service delivery, strengthening data-driven decision-making, enhancing social inclusion, and promoting sustainable economic activities [5], [6].

Digital technology plays a critical role across multiple SDG dimensions. From an economic perspective, digitalization can foster productivity, innovation, and entrepreneurship, particularly among micro, small, and medium-sized enterprises (MSMEs). Socially, digital platforms enable broader access to education, health information, and public services, contributing to reduced inequalities and improved human development outcomes. Environmentally, digital tools support monitoring, reporting, and management of natural resources, helping policymakers and stakeholders implement more sustainable practices. As such, digital technology is increasingly viewed not merely as a supporting tool, but as an integral component of sustainable development strategies.

Despite the growing recognition of the importance of digital technology, empirical evidence examining its role in achieving the Sustainable Development Goals (SDGs) in Indonesia remains limited, particularly from a quantitative perspective. Many existing studies rely on conceptual discussions, qualitative insights, or case-based analyses which, although valuable, do not sufficiently capture the measurable impact of digital technology adoption on sustainable development outcomes, and there is also a lack of micro-level empirical data that reflect stakeholders' perceptions and experiences regarding the contribution of digital technology to SDG-related objectives. Responding to this research gap, the present study analyzes the role of digital technology in achieving the SDGs in Indonesia using a quantitative research approach, with data collected from 85 respondents through a structured Likert-scale questionnaire to enable systematic assessment of digital technology utilization and its perceived contribution to SDG achievement. The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25 to ensure rigorous and reliable statistical analysis. This study is expected to contribute both academically and practically by providing empirical evidence that enriches the literature on digital transformation and sustainable development in a developing economy context, while also offering insights for policymakers, development practitioners, and other stakeholders in designing and strengthening digital-based strategies to support Indonesia's progress toward the SDGs.

2. Literature Review

2.1 Sustainable Development Goals (SDGs)

The Sustainable Development Goals (SDGs) were formally adopted by the United Nations in 2015 as part of the 2030 Agenda for Sustainable Development and consist of 17 interrelated goals aimed at balancing economic growth, social inclusion, and environmental sustainability, providing a comprehensive framework to address global development challenges such as poverty eradication, quality education, decent work, reduced inequalities, climate action, and strong institutions. For developing countries such as Indonesia, the SDGs function not only as a development roadmap but also as an evaluation framework for measuring national and regional development progress [1], [2]. Achieving these goals requires coordinated actions among governments, the private sector, civil society, and communities, as the SDGs place strong emphasis on inclusivity, innovation, and partnerships, acknowledging that complex development challenges cannot be addressed through conventional approaches alone. Consequently, enabling factors such as

technology, data, and innovation are increasingly recognized as critical drivers in accelerating SDG implementation, particularly in contexts characterized by limited resources and structural constraints [7], [8].

2.2 *Digital Technology and Sustainable Development*

Digital technology refers to the use of digital systems, tools, and platforms—such as the internet, mobile devices, information systems, and data analytics—to process, transmit, and utilize information efficiently, and in the context of sustainable development it is widely recognized as a transformative force capable of reshaping economic structures, social interactions, and governance mechanisms. Previous studies indicate that digitalization enhances productivity, reduces transaction costs, and enables new forms of value creation across sectors [9], [10]. From a sustainable development perspective, digital technology supports the integration of economic, social, and environmental objectives: economically, digital platforms foster entrepreneurship, innovation, and market access, particularly for micro, small, and medium-sized enterprises (MSMEs); socially, digital technologies expand access to education, healthcare, and public services, thereby strengthening human development and social inclusion; and environmentally, digital tools enable more effective monitoring, data collection, and analysis related to resource management, climate change, and environmental protection. These multidimensional contributions position digital technology as a strategic enabler of sustainable development rather than merely a standalone technical solution [11], [12].

2.3 *Digital Technology and SDG Achievement*

Digital technology refers to the use of digital systems, tools, and platforms—such as the internet, mobile devices, information systems, and data analytics—to process, transmit, and utilize information efficiently, and in the context of sustainable development it is widely recognized as a transformative force capable of reshaping economic structures, social interactions, and governance mechanisms. Previous studies indicate that digitalization enhances productivity, reduces transaction costs, and enables new forms of value creation across sectors [10], [11]. From a sustainable development perspective, digital technology supports the integration of economic, social, and environmental objectives: economically, digital platforms foster entrepreneurship, innovation, and market access, particularly for micro, small, and medium-sized enterprises (MSMEs); socially, digital technologies expand access to education, healthcare, and public services, thereby strengthening human development and social inclusion; and environmentally, digital tools enable more effective monitoring, data collection, and analysis related to resource management, climate change, and environmental protection. These multidimensional contributions position digital technology as a strategic enabler of sustainable development rather than merely a standalone technical solution [10], [12].

2.4 *Research Gap and Conceptual Framework*

Although existing studies offer valuable insights into the theoretical linkages between digital technology and sustainable development, empirical research focusing on Indonesia remains relatively limited, particularly studies employing quantitative methods based on primary data, as many prior works rely on macro-level indicators or qualitative approaches that may not fully capture individual perceptions and experiences related to digital technology use and SDG outcomes. Addressing this gap, the present study adopts a quantitative approach to examine the role of digital technology in achieving the SDGs in Indonesia by utilizing survey data collected through a Likert-scale questionnaire and analyzing it with SPSS version 25, with the aim of providing empirical

evidence on the perceived influence of digital technology on sustainable development outcomes. The findings are expected to strengthen the empirical foundation of digital sustainability research and support more robust, evidence-based policymaking in the Indonesian context.

3. Research Methods

3.1 Research Design

This study employs a quantitative research design to examine the role of digital technology in achieving the Sustainable Development Goals (SDGs) in Indonesia. A quantitative approach was selected to allow for objective measurement and statistical analysis of respondents' perceptions regarding digital technology utilization and its contribution to sustainable development. The research design is explanatory in nature, aiming to identify and analyze the relationship between digital technology and SDG achievement based on empirical data.

3.2 Population and Sample

The population of this study consists of individuals who are familiar with or have experience using digital technology in economic, social, or public service activities in Indonesia. Given the exploratory nature of the study and practical constraints, a sample of 85 respondents was selected. The sampling technique applied was purposive sampling, ensuring that respondents possessed relevant knowledge and experience related to digital technology usage. The sample size is considered adequate for preliminary quantitative analysis using statistical techniques in social science research. It allows for meaningful interpretation of trends and relationships while maintaining analytical rigor.

3.3 Data Collection Technique

Primary data were collected through a structured questionnaire distributed directly to respondents, which was designed to capture perceptions of digital technology adoption and its role in supporting SDG-related outcomes, with all items measured using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) to allow respondents to indicate the intensity of their agreement with each statement. The questionnaire was divided into two main sections, where the first section collected general demographic information of the respondents, and the second section focused on the key research variables, namely digital technology utilization and its perceived contribution to the achievement of sustainable development goals.

3.4 Research Variables and Measurement

This study involves one independent variable and one dependent variable, where the independent variable is Digital Technology, reflecting the extent to which digital tools and platforms are utilized to support economic, social, and governance activities, with indicators including accessibility of digital technology, ease of use, effectiveness, and support for information sharing. The dependent variable is Sustainable Development Goals (SDGs) Achievement, which represents respondents' perceptions of how digital technology contributes to economic growth, social inclusion, and environmental sustainability, with indicators adapted to capture key SDG dimensions relevant to the Indonesian context. Each indicator was operationalized into several statement items measured on a Likert scale to ensure the consistency and reliability of respondents' answers.

3.5 Validity and Reliability Testing

To ensure the quality of the research instrument, validity and reliability tests were conducted, with validity assessed using Pearson's correlation coefficient by correlating each item with the total score of its respective variable, where items with correlation coefficients exceeding the critical value were deemed valid. Reliability was evaluated using Cronbach's Alpha to measure the internal consistency of the items, with a value greater

than 0.70 indicating that the instrument is reliable and appropriate for further statistical analysis.

3.6 Data Analysis Technique

Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) version 25 and involved several stages, including descriptive statistical analysis to summarize respondents' characteristics and the distribution of research variables, as well as inferential statistical analysis to test the proposed hypotheses. The inferential analysis employed regression analysis to examine the effect of digital technology on the achievement of the Sustainable Development Goals (SDGs), with the level of significance set at 5 percent (α = 0.05), such that results with a probability value below 0.05 were considered statistically significant.

4. Results and Discussion

4.1 Descriptive Statistics

Descriptive analysis was performed to understand respondents' perceptions of Digital Technology and SDG Achievement. Table 1 presents the mean and standard deviation values for each variable.

Table 1. Descriptive Statistics of Research Variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Digital Technology	85	2.80	5.00	4.12	0.54
SDG Achievement	85	2.75	5.00	4.05	0.57

Source: Author (2025)

Table 1 presents the descriptive statistics of the main research variables, namely Digital Technology and SDG Achievement, based on responses from 85 respondents, showing that the Digital Technology variable has a relatively high mean score of 4.12 on a five-point Likert scale, with values ranging from 2.80 to 5.00 and a standard deviation of 0.54, which indicates that respondents generally perceive a high level of digital technology utilization and view digital tools and platforms as widely accessible, easy to use, and effective in supporting economic, social, and governance-related activities, with fairly consistent perceptions across individuals. Similarly, the SDG Achievement variable also demonstrates a high mean score of 4.05, with a minimum value of 2.75, a maximum of 5.00, and a standard deviation of 0.57, suggesting that respondents largely agree on the positive contribution of digital technology to the achievement of the Sustainable Development Goals, particularly in relation to economic growth, social inclusion, and environmental sustainability. The close proximity of the mean values between the two variables indicates a parallel perception pattern, where higher levels of digital technology adoption are associated with stronger perceptions of SDG achievement, and overall, these descriptive results provide an initial indication that digital technology is perceived not merely as a supporting tool but as a meaningful enabler of sustainable development outcomes in the Indonesian context, thereby justifying further inferential analysis to examine the strength and significance of this relationship.

4.2 Validity and Reliability Testing

The validity of the research instrument was assessed using the Pearson Product–Moment Correlation, and the results show that all item correlation values exceeded the critical r-table value of 0.213 (n = 85, α = 0.05), indicating that all questionnaire items are valid, with r-count values ranging from 0.512 to 0.781 for the Digital Technology items (DT1–DT6) and from 0.534 to 0.804 for the SDG Achievement items

(SDG1–SDG6). Reliability testing was then conducted using Cronbach's Alpha, which produced values of 0.821 for the Digital Technology variable and 0.846 for the SDG Achievement variable, both exceeding the minimum reliability standard of 0.70. These results confirm that the research instrument demonstrates strong internal consistency and is therefore reliable and suitable for further statistical analysis.

4.3 Regression Analysis

A simple linear regression analysis was performed to examine the effect of digital technology on SDG achievement.

Table 2. Regression Analysis Results

Model	B	Std. Error	Beta	t-value	Sig.
(Constant)	1.245	0.432	—	2.882	0.005
Digital Technology	0.678	0.083	0.712	8.157	0.000

Source: Author (2025)

Table 2 presents the results of the regression analysis examining the effect of Digital Technology on SDG Achievement. The regression coefficient for Digital Technology is positive and statistically significant ($B = 0.678$; $\beta = 0.712$; $t = 8.157$; $p < 0.001$), indicating that digital technology has a strong and positive influence on the achievement of the Sustainable Development Goals. This finding implies that increased utilization of digital technology is associated with substantial improvements in perceived SDG achievement, supporting the assumption that digital tools and platforms play a critical role in advancing economic, social, and environmental development outcomes. The standardized beta coefficient of 0.712 further confirms that Digital Technology is a dominant predictor of SDG Achievement in the model, while the statistically significant constant term ($B = 1.245$; $t = 2.882$; $p = 0.005$) suggests the presence of a baseline level of SDG achievement that may be shaped by other structural or policy-related factors beyond digital technology.

The regression equation can be expressed as SDG Achievement = 1.245 + 0.678 (Digital Technology), and the significance value ($p = 0.000 < 0.05$) confirms that digital technology has a positive and statistically significant effect on SDG achievement in Indonesia. The model demonstrates strong explanatory power, as reflected by an R value of 0.712 and an R^2 value of 0.507, indicating that 50.7% of the variance in SDG achievement can be explained by digital technology, while the remaining 49.3% is attributable to other factors not included in the model.

4.4 Discussion

The empirical findings demonstrate that digital technology plays a significant and positive role in achieving the Sustainable Development Goals in Indonesia, as reflected in the high mean scores which indicate strong respondent agreement on the importance of digital tools in supporting sustainable development initiatives. The regression results further confirm that increased adoption and utilization of digital technology significantly enhance perceived SDG achievement, suggesting that digital platforms, information systems, and technology-driven services contribute meaningfully to improvements in economic productivity, expanded access to social services, and strengthened support for environmental sustainability. From an economic perspective, digital technology facilitates efficiency, innovation, and market expansion, particularly for micro, small, and medium-sized enterprises, while socially it improves access to education, healthcare information, and public services, aligning closely with SDG targets related to reduced inequalities and improved quality of life [9], [10], [12].

The relatively high explanatory power of the model (R^2 = 50.7%) underscores the strategic importance of digital technology within Indonesia's sustainable development agenda, while also indicating that nearly half of the variation in SDG achievement is influenced by other factors such as institutional capacity, policy effectiveness, infrastructure quality, and levels of digital literacy. This finding highlights the necessity of integrated development strategies that combine technological advancement with human and institutional development. Overall, the study provides robust quantitative evidence that digital technology serves as a key driver of sustainable development in Indonesia, emphasizing that strengthening digital infrastructure, enhancing digital literacy, and ensuring inclusive access to technology are essential steps for maximizing its contribution to the achievement of the SDGs.

5. Conclusion

This study concludes that digital technology plays a significant and positive role in supporting the achievement of the Sustainable Development Goals in Indonesia, as evidenced by quantitative analysis of data from 85 respondents showing that higher levels of digital technology utilization are associated with improved sustainable development outcomes. Digital technology contributes to SDG achievement by enhancing economic productivity, expanding access to social services, and supporting more effective and sustainable development practices, while also accounting for a substantial proportion of the variation in SDG achievement, which highlights its strategic importance in Indonesia's development agenda. However, the findings indicate that digital transformation must be accompanied by supportive policies, improved digital infrastructure, and enhanced digital literacy to ensure inclusive and equitable benefits across society. Overall, the study emphasizes that digital technology is not merely a complementary tool but a key driver of sustainable development, and that its effective integration into national development strategies is essential for accelerating Indonesia's progress toward the SDGs.

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