# Building an Accessible Digital Ecosystem for Persons with Disabilities: A Human Rights and Sustainable Development Perspective

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## Abstract

The rapid advancement of digital technology has transformed various aspects of human life, including public services, education, employment, healthcare, and access to information. While digitalization offers significant opportunities for social and economic development, it also presents challenges related to digital exclusion, particularly for persons with disabilities. Despite international and national commitments to equality and non-discrimination, many digital platforms, applications, and public services remain inaccessible, limiting the participation of persons with disabilities in the digital environment. This situation raises concerns regarding the fulfillment of fundamental human rights and the realization of inclusive and sustainable development. This study examines the importance of developing an accessible digital ecosystem for persons with disabilities from a human rights and sustainable development perspective. Using a normative legal research method, the study analyzes international human rights instruments, including the United Nations Convention on the Rights of Persons with Disabilities (CRPD), as well as relevant national legal frameworks and policy initiatives concerning digital accessibility and inclusion. The research also explores the relationship between digital accessibility, equality, participation, and the Sustainable Development Goals (SDGs), particularly the commitment to "leave no one behind." The findings demonstrate that digital accessibility is not merely a technical or technological issue but a fundamental human rights obligation. Accessible digital infrastructure enables persons with disabilities to exercise their rights to information, education, employment, political participation, and public services on an equal basis with others. Therefore, governments, technology providers, and other stakeholders must integrate accessibility principles into digital governance and technological innovation. Strengthening inclusive digital policies and accountability mechanisms is essential to ensuring that technological

advancement contributes to sustainable development while safeguarding the rights and dignity of persons with disabilities.

**Keywords:** Digital Accessibility; Persons with Disabilities; Human Rights; Digital Transformation; Sustainable Development.

# Introduction

Digital transformation is one of the most influential global phenomena in the development of human civilization in the 21st century. The rapid development of information and communication technology (ICT), high-speed internet, cloud computing, artificial intelligence, the Internet of Things (IoT), big data, blockchain, and various other digital innovations have changed the way humans interact, work, learn, obtain public services, and participate in social and political life (Nirwan & Sampurna, 2025). Digitalization is no longer understood simply as the process of converting information from analog to digital form but has developed into a structural transformation that changes governance, business models, public service systems, education mechanisms, health services, and even the pattern of relations between the state and its citizens (Eem Merani Destiana et al., 2025). In almost all countries, digital technology has become the main foundation of modern economic development because it is able to increase efficiency, productivity, transparency, and national competitiveness in facing the increasingly competitive dynamics of the global economy. Therefore, digital transformation is not only seen as a technological development alone, but also as a strategic instrument that determines the success of national development and the welfare of society (Nuryanto et al., 2020). This development has accelerated since the COVID-19 pandemic, which forced various countries to make major changes in the implementation of social, economic, and government activities. Restrictions on public mobility have driven the acceleration of digitalization in almost all sectors of life, from education through online learning, health services through telemedicine, economic transactions based on electronic commerce (e-commerce), digital payment systems, to the digitalization of government administration through various electronic-based services (e-government). In this context, access to digital technology has become a basic need that is no longer optional, but rather a primary prerequisite for every individual to be able to participate fully in community life (Fransisco, 2020). Individuals who do not have access to digital technology will experience difficulties in obtaining information, accessing public services, participating in the educational process, obtaining employment opportunities, and enjoying the various benefits of technology-based development. Thus, digitalization has created a new paradigm that access to information technology is a form of access to basic citizen rights.

At the international level, digital transformation is seen as a key factor in accelerating the achievement of the Sustainable Development Goals (SDGs). The United Nations positions digital innovation as an instrument capable of supporting improvements in the quality of education, expanding access to healthcare, strengthening effective governance, increasing economic productivity, reducing poverty, creating decent jobs,

and reducing social inequality. Various international organizations, such as the International Telecommunication Union (ITU), the United Nations Development Programme (UNDP), UNESCO, and the World Bank, also emphasize that digital technology has great potential in creating more inclusive development if designed and implemented based on the principles of equality, accessibility, and non-discrimination. In this context, digitalization is not only an economic development agenda, but also an important part of realizing human development that is oriented towards respect for human rights (Fransisco, 2020).

However, the development of digital technology also presents increasingly complex challenges. Rapid technological progress has not been accompanied by equal access to the benefits of digitalization. The phenomenon known as the digital divide remains a major issue in various countries, both developed and developing. The digital divide relates not only to the availability of internet infrastructure or technological devices, but also encompasses people's ability to utilize technology, digital literacy levels, affordability, the quality of digital services, and the ability of digital systems to accommodate the needs of all groups without discrimination. Consequently, digital transformation, which should be an instrument for equitable development, has the potential to widen social disparities if not accompanied by inclusive and equitable policies. (Br.Sinulingga & Nasution, 2024).

One of the most vulnerable groups to the impacts of the digital divide is people with disabilities. According to various international reports, people with disabilities still face significantly greater barriers than other groups in accessing information and communication technology. These barriers are not only caused by economic constraints or a lack of infrastructure, but also because most digital platforms have not been designed based on the principles of universal accessibility. Many websites, smartphone apps, public service systems, online education platforms, digital health services, and even banking apps still lack features that enable people with disabilities to access information independently. For example, many government websites are incompatible with screen readers for the blind, educational videos lack closed captioning or sign language for the deaf, and digital apps use complex navigation that makes them difficult for individuals with intellectual or motor disabilities to use (Poerwanti et al., 2024).

This situation demonstrates that technological progress is not always synonymous with improving the quality of life for all citizens. Conversely, if technology is developed without considering the principle of inclusivity, it can become an instrument that creates new forms of social exclusion (digital exclusion). As various public services, education, employment, health care, transportation, and government administration increasingly rely on digital platforms, people with disabilities who cannot access these systems will lose the opportunity to enjoy their rights on an equal basis with other citizens. From this perspective, digital exclusion no longer simply reflects limited use of technology, but rather a form of structural barrier that can reinforce social inequality, expand discrimination, and hinder the realization of an inclusive society (Butar, 2025).

The issue of digital accessibility is becoming increasingly important because digital technology has now become the primary medium for the implementation of

various human rights. The right to information, the right to education, the right to work, the right to health care, the right to public services, the right to participate in government, and the right to express opinions are increasingly being realized through digital systems (Prayuti, 2024). Therefore, if digital technology is inaccessible to people with disabilities, what is actually hampered is not only the use of technology, but also the implementation of various constitutional and human rights guaranteed in various national and international legal instruments. In other words, digital accessibility is a fundamental prerequisite for the realization of the principles of equality, non-discrimination, participation, and respect for human dignity. (Sudirman, 2025)

From a human rights perspective, persons with disabilities are legal subjects with equal status as all other citizens. The modern approach to disability has shifted from a medical model of disability to a rights-based approach. (Lestari, 2023) This paradigm views the primary barriers faced by persons with disabilities not as individuals' physical or mental conditions, but as social, legal, and technological environments that have not been designed inclusively. Therefore, the state has an obligation to eliminate these barriers through the establishment of regulations, the provision of accessible facilities, the development of inclusive technology, and the creation of a public service system that can accommodate the needs of all citizens without discrimination (Iskatrinah, 2019). The international community's commitment to protecting the rights of persons with disabilities has been further strengthened through the Convention on the Rights of Persons with Disabilities (CRPD) adopted by the United Nations in 2006. The Convention marks an important paradigm shift in the protection of the rights of persons with disabilities by placing accessibility as one of the basic principles in fulfilling human rights. Article 9 of the CRPD explicitly requires state parties to take appropriate steps to ensure access for persons with disabilities to the physical environment, transportation, information, communications, including information and communications technology and other digital systems. This provision shows that digital accessibility is no longer just a policy option, but a legal obligation that must be fulfilled by the state as part of respecting, protecting, and fulfilling human rights (Joko Sriwidodo, 2023).

Indonesia has demonstrated its commitment to protecting the rights of persons with disabilities through the ratification of the CRPD through Law No. 19 of 2011 and the enactment of Law No. 8 of 2016 concerning Persons with Disabilities. The presence of these laws brings fundamental changes to the national legal system by shifting the approach to protecting persons with disabilities from a welfare paradigm to an equal rights paradigm. The law recognizes that persons with disabilities have equal rights to education, employment, health services, access to information, communication, information technology, public services, and political participation (Sitompul & Subroto, 2023). Furthermore, the government has also developed various digital transformation policies as part of the national development agenda towards a Digital Indonesia. However, these various normative commitments have not been fully followed by optimal implementation in the field. Many government and private digital platforms still do not meet international accessibility standards and therefore are unable to provide equal services to all groups in society.

The gap between regulation and implementation demonstrates that developing an inclusive digital ecosystem still faces various challenges, including legal, institutional, technological, and organizational culture. Many application developers do not yet understand the importance of digital accessibility standards, while oversight mechanisms for compliance by electronic system providers remain relatively limited. Furthermore, people with disabilities are often not actively involved in the design, development, or evaluation of the digital technologies they use. As a result, the various digital innovations developed fail to address the real needs of these groups. This situation demonstrates that technology development must be implemented through a participatory, collaborative, and human rights-based approach to not only produce cutting-edge innovation but also ensure justice and equality for all citizens.

## Research Method

This study uses a normative legal research method with a qualitative approach that aims to analyze the development of a digital ecosystem that is accessible to people with disabilities from the perspective of human rights and sustainable development (Sustainable Development Goals/SDGs). Normative legal research was chosen because the issues studied focus on legal norms, legal principles, international human rights instruments, and national laws and regulations that regulate the rights of people with disabilities and digital accessibility. This approach allows researchers to evaluate the conformity between applicable legal norms and the implementation of digital accessibility principles within the framework of human rights protection (Mangku & Yuliartini, 2021). Specifically, this study uses several approaches, namely the statutory approach, the conceptual approach, the human rights approach, and the comparative approach. (Sariasa et al., 2024) The statutory approach is used to examine various international and national legal instruments related to the rights of people with disabilities and digital transformation. A conceptual approach is used to analyze the concepts of digital accessibility, digital inclusion, equality, non-discrimination, and digital governance based on legal and human rights theories. A human rights approach is used to assess the state's obligations to respect, protect, and fulfill the rights of persons with disabilities in the digital space. Meanwhile, a comparative approach is used to compare international standards with national policies to identify regulatory gaps and opportunities for strengthening more inclusive digital policies. Through a combination of these approaches, this study seeks to provide a comprehensive analysis of the relationship between digital transformation, the protection of the rights of persons with disabilities, and sustainable development (Yuliartini, 2019). The object of this research is the legal and policy frameworks governing digital accessibility for persons with disabilities, both at the international and national levels. The research focuses on the analysis of legal norms related to the protection of the rights of persons with disabilities in the use of information and communication technology, including the state's obligations to provide an inclusive digital environment. This study does not use a population or sample like empirical research because the characteristics of normative legal research are oriented towards the analysis of legal documents as the object of study. Therefore, research

materials are selected purposively based on the relevance of their substance to the research focus. The international legal instruments analyzed include the Convention on the Rights of Persons with Disabilities (CRPD), the Universal Declaration of Human Rights (UDHR), the International Covenant on Civil and Political Rights (ICCPR), the International Covenant on Economic, Social and Cultural Rights (ICESCR), the 2030 Agenda for Sustainable Development, and various international guidelines on digital accessibility, such as the Web Content Accessibility Guidelines (WCAG). At the national level, the research analyzed Law Number 19 of 2011 concerning the Ratification of the CRPD, Law Number 8 of 2016 concerning Persons with Disabilities, Law Number 39 of 1999 concerning Human Rights, Law Number 25 of 2009 concerning Public Services, Law Number 27 of 2022 concerning Personal Data Protection, as well as various regulations and policies related to digital transformation, electronic-based public services, and digital inclusion in Indonesia (Sumarna & Kadriah, 2023). In addition, the research also examines court decisions, government policy documents, international organization reports, and relevant academic literature to gain a comprehensive understanding of legal and policy developments in the field of digital accessibility. The data sources in this study consist of primary legal materials, secondary legal materials, and tertiary legal materials. Primary legal materials include various international legal instruments, conventions, treaties, national laws and regulations, and official government documents that have binding legal force. Secondary legal materials consist of scientific articles published in reputable national and international journals, books, research results, reports from international institutions such as the United Nations (UN), the World Health Organization (WHO), the International Telecommunication Union (ITU), UNESCO, the World Bank, and various other scientific publications discussing human rights, persons with disabilities, digital transformation, and sustainable development. Meanwhile, tertiary legal materials include legal dictionaries, encyclopedias, regulatory indexes, technical guidelines, and other reference sources used to clarify the legal concepts analyzed (Benuf & Azhar, 2020). Data collection techniques were conducted through library research by identifying, inventorying, classifying, and reviewing various legal documents and scientific literature relevant to the research focus. All legal materials were obtained from official sources, such as government agency websites, international organizations, regulatory databases, and reputable scientific databases, including Scopus, Web of Science, HeinOnline, ScienceDirect, SpringerLink, Taylor & Francis, Wiley Online Library, and Google Scholar. Literature selection was carried out by considering the relevance of the topic, the quality of the publication, the novelty of the references, and the academic authority of the authors so that the research results have a strong theoretical and empirical foundation. To ensure the credibility of the research, a source triangulation process was carried out, namely comparing legal provisions, doctrines, previous research results, and reports from international organizations to obtain consistency and validity of legal arguments.

Data analysis was conducted qualitatively using normative legal analysis techniques through several systematic stages. The first stage was an inventory of legal

materials, compiling all laws and regulations, international legal instruments, doctrines, and literature related to digital accessibility and the rights of persons with disabilities. The second stage was a classification of legal materials based on the hierarchy of norms, regulatory substance, and their relevance to the research focus, thus facilitating the analysis process. The third stage was legal interpretation, conducted through grammatical, systematic, teleological, and comparative interpretations to understand the meaning of legal provisions and the relationships between regulations within national and international legal systems. The fourth stage was a prescriptive analysis, evaluating the conformity of the applicable legal framework with the principles of human rights, digital accessibility, and sustainable development, while simultaneously identifying regulatory weaknesses and implementation challenges. Next, a comparative analysis was conducted by comparing international standards, particularly provisions in the CRPD and the principles of the SDGs, with national legal policies to identify normative gaps and formulate recommendations for strengthening regulations and more inclusive digital governance. The entire analysis process was directed at systematically answering the research objectives and producing legal arguments that were logical, consistent, and based on the principles of human rights protection. Thus, this research is expected to provide academic contributions in the development of legal studies on digital accessibility while producing policy recommendations that support the realization of an inclusive, equitable, and sustainable digital ecosystem for people with disabilities.

# Results and Discussions

## Digital Accessibility as a Fundamental Human Right: Legal Framework and State Obligations

An analysis of various international and national legal instruments shows that digital accessibility has undergone significant conceptual development and is now viewed as a fundamental element in protecting the human rights of persons with disabilities. The development of digital technology has transformed nearly every aspect of modern society, from education systems and health services to employment relations, economic transactions, government administration, and political and social participation (Jailani & Islam, 2025). Various activities previously conducted conventionally have now shifted to digital platforms that rely on the internet, mobile applications, cloud computing, artificial intelligence, and electronic information systems. This transformation offers various benefits in the form of increased efficiency, speed of service, transparency, and expanded access to information and public services (Barus et al., 2024). However, these benefits can only be enjoyed if all citizens have equal opportunities to access digital technology without any physical, sensory, intellectual, or social barriers. Therefore, access to digital technology can no longer be viewed as an optional supplementary facility but has evolved into a primary prerequisite for the implementation of various basic citizen rights. When education is delivered through online learning platforms, health services are delivered through telemedicine systems, government administration utilizes electronic-based services (e government), and various other public services shift to digital systems, the

ability to access these technologies becomes an integral part of fulfilling the rights to education, health, information, employment, public services, and participation in democratic life. Thus, digital accessibility has a dimension far broader than just a technical issue, because it is directly related to the ability of each individual to enjoy the fundamental rights guaranteed by national and international law.

The research findings show that the recognition of digital accessibility as a fundamental right has a strong normative basis in various international legal instruments, particularly the Convention on the Rights of Persons with Disabilities (CRPD). Based on an analysis of Article 9 of the CRPD, states parties have a legal obligation to take effective measures to ensure access for persons with disabilities to the physical environment, transportation, information, communications, including information and communications technology, and various other digital systems. This provision not only emphasizes the state's obligation to eliminate physical barriers but also requires states to ensure that information technology developments are designed based on the principle of universal accessibility and can be utilized by all citizens without discrimination. This principle is reinforced by various fundamental principles in the CRPD, namely respect for inherent dignity, non-discrimination, equality of opportunity, full and effective participation in community life, and social inclusion. Thus, digital accessibility is not merely a social policy but is an international legal obligation that must be fulfilled by every state as part of respecting human rights. At the national level, Indonesia has demonstrated its commitment through the ratification of the CRPD with Law Number 19 of 2011 and the enactment of Law Number 8 of 2016 concerning Persons with Disabilities. Both regulations provide a strong legal basis for recognizing the rights of persons with disabilities to obtain access to information technology, communication, education, employment, public services, and various other digital services on an equal basis with other citizens. The paradigm shift from a charity -based approach to a human right- based approach shows that persons with disabilities are no longer viewed as objects of protection, but as legal subjects who have constitutional rights that must be fulfilled by the state.

However, the results of the normative analysis also indicate that the implementation of these various legal provisions still faces quite complex challenges. While various national regulations have recognized the importance of digital accessibility as part of protecting the rights of persons with disabilities, these regulations are still general in nature and are not fully supported by operational norms governing technical standards for digital accessibility, oversight mechanisms, compliance indicators, or law enforcement systems for electronic system providers who ignore accessibility principles. To date, there is no national regulation that comprehensively requires all government websites, public service applications, educational platforms, digital health services, or private sector applications to meet international standards such as the Web Content Accessibility Guidelines (WCAG). Furthermore, inter-agency coordination in the implementation of inclusive digital policies is still not optimal. National digital transformation policies are focused more on accelerating the digitization of public services, increasing technology investment, and developing the digital economy, while

protecting the rights of persons with disabilities is often not a top priority in policy planning and evaluation processes. As a result, various digital platforms are still found to be incompatible with assistive technology, do not provide alternative text, do not support screen readers, do not have closed captioning features, or use interfaces that are difficult for persons with disabilities to operate. This condition shows that there is a quite real gap between the normative commitments that have been stipulated in laws and regulations and actual implementation in the field.

These findings indicate that digital accessibility must be understood as an integral part of fulfilling human rights, not simply a matter of information technology development. From a human rights-based approach, the state has three primary obligations: to respect, to protect, and to fulfill human rights, including the rights of persons with disabilities to access digital technology. The obligation to respect requires the state to refrain from creating policies that hinder access to digital services by persons with disabilities. The obligation to protect requires the state to monitor the private sector to prevent discriminatory practices in the implementation of electronic systems. Meanwhile, the obligation to fulfill requires the state to take legislative, administrative, budgetary, and public policy measures to ensure an inclusive and accessible digital environment for all. In this context, the state's failure to provide accessible digital services not only reflects weaknesses in technology governance but can also be categorized as a form of indirect discrimination, a situation where a policy that appears to apply universally actually has a detrimental impact on a particular group. When access to education, healthcare, employment, or public services is only available through inaccessible digital platforms, people with disabilities are significantly deprived of the opportunity to enjoy these rights on an equal basis with other citizens.

The results of this study also expand on previous studies, which generally viewed digital accessibility as a technical issue in software development, information systems engineering, and user interface design. This research demonstrates that the root of the problem lies in the suboptimal implementation of the state's constitutional obligations to guarantee the protection of human rights in the era of digital transformation. Therefore, digital accessibility cannot be resolved solely through technological innovation; it requires legal policy reform, regulatory harmonization, and strengthening of state accountability mechanisms. This perspective provides a new contribution to the development of legal studies because it positions digital technology as an instrument for fulfilling citizens' constitutional rights. Therefore, every digital transformation policy must be evaluated based on the extent to which it is able to guarantee equal access, eliminate discrimination, and strengthen respect for human dignity. The success of digitalization cannot be measured solely by increasing bureaucratic efficiency, the number of digital service users, or the growth of the digital economy, but must also be measured by the level of protection of the rights of vulnerable groups who have traditionally faced obstacles in accessing technology. From the perspective of human rights legal theory, digital accessibility is a concrete manifestation of the principles of equality before the law and substantive equality. Formal equality, which merely provides equal treatment to all citizens, does not always achieve justice for vulnerable groups.

Conversely, the concept of substantive equality requires affirmative action and the provision of reasonable accommodation so that every individual has a truly equal opportunity to enjoy their rights. In the context of digital transformation, this principle demands that all information technology be designed based on the concept of universal design, namely designs that can be used by everyone without requiring special modifications. Therefore, the development of government websites, public service applications, online education systems, digital health services, banking applications, and even e-commerce platforms must integrate accessibility features from the planning, development, implementation, and evaluation stages. This approach not only benefits people with disabilities but also improves the overall quality of digital services by creating systems that are more user-friendly, accessible, and inclusive for all levels of society.

Overall, the findings of this study indicate a significant gap between the normative commitments established through various legal instruments and the implementation of digital policies at the national level. This situation indicates the need for more comprehensive policy reforms by harmonizing all regulations regarding digital transformation with regulations regarding the protection of the rights of persons with disabilities. Furthermore, the government needs to establish national standards for digital accessibility, referring to the Web Content Accessibility Guidelines (WCAG) as the minimum standard for all electronic system providers, both government and private. Strengthening oversight mechanisms, digital accessibility audits, compliance certification, and imposing administrative sanctions for violations of accessibility standards are also important steps to ensure the effective implementation of regulations. Furthermore, increasing the capacity of human resources, particularly software developers, information system designers, and digital public service providers, must be part of the national digital transformation strategy. Furthermore, organizations for persons with disabilities need to be actively involved in every stage of policy formulation, technology development, and digital service evaluation to ensure the principle of "Nothing About Us Without Us" is truly implemented. Thus, developing an inclusive digital ecosystem is not only the government's responsibility, but also a shared responsibility of all stakeholders in realizing a digital society that is just, respects human rights, and is in line with the principles of sustainable development.

## Strengthening an Inclusive Digital Ecosystem to Achieve Sustainable Development Goals

The research results show that the development of an accessible digital ecosystem is closely linked to the achievement of the Sustainable Development Goals (SDGs). Analysis of the 2030 Agenda shows that digital transformation is no longer viewed solely as an instrument of technological modernization, but rather as one of the main pillars in realizing inclusive, equitable, and sustainable development. The main principle of the SDGs, namely "leave no one behind", emphasizes that every development policy must be designed to ensure that all groups in society receive equal benefits without discrimination, including people with disabilities (Barus et al., 2024). In this context, digital accessibility is an important prerequisite for people with disabilities to participate fully in social,

economic, political, and cultural life. As public services, education, employment, health services, and economic activities become increasingly digitalized, the ability to access digital technology becomes an integral part of fulfilling the basic rights of citizens. Therefore, the development of an inclusive digital ecosystem is an important strategy in realizing people-centered development, as emphasized in the 2030 Agenda (Chairunnisa & Sulistio, 2025). This study shows that digital accessibility directly contributes to the achievement of various SDGs, particularly Goal 4 (Quality Education) through the provision of inclusive digital education, Goal 8 (Decent Work and Economic Growth) through increasing access to digital based employment opportunities, Goal 9 (Industry, Innovation and Infrastructure) through the development of user-friendly digital infrastructure, Goal 10 (Reduced Inequalities) through reducing the gap in access to technology, and Goal 16 (Peace, Justice and Strong Institutions) through the provision of digital public services that are transparent, accountable, and accessible to all citizens. Thus, the results of the study show that digital accessibility does not only support one particular development goal but is a cross -cutting issue that determines the successful implementation of the entire sustainable development agenda (Firda Laila Syahda et al., 2024).

On the other hand, this study also found that the development of an inclusive digital ecosystem still faces various multidimensional structural barriers. These barriers stem not only from technological aspects, but also from regulatory weaknesses, institutional capacity, resource availability, and low stakeholder awareness of the importance of digital accessibility (Halik et al., 2025). One major challenge is the uneven implementation of digital accessibility standards across various electronic platforms, both government-run and private-sector. Many websites, public service applications, online learning platforms, and digital health services do not meet universal design principles and are not yet compatible with assistive technologies, such as screen readers, speech recognition devices, alternative navigation devices, or closed captioning features for people with sensory disabilities. Furthermore, limited access to affordable assistive devices prevents some people with disabilities from optimally utilizing digital services. This study also identified low digital literacy as a significant inhibiting factor. Many people with disabilities have not received adequate opportunities to improve their skills in using digital technology due to limited inclusive training programs. On the other hand, application developers, electronic system administrators, and public service providers still have limited understanding of international digital accessibility standards, so accessibility aspects are often only considered after the system is complete. Another equally important obstacle is the suboptimal coordination between government agencies in integrating disability issues into national digital transformation policies. Various digital policies are still implemented sectorally, thus not yet resulting in an integrated governance system. Furthermore, this study found the absence of a national evaluation mechanism that specifically measures the level of compliance of electronic system administrators with digital accessibility principles. This condition results in the implementation of various existing regulations not being able to be effectively monitored and unable to produce significant changes in the practice of digital service delivery.

The research findings demonstrate that sustainable development is inseparable from inclusive digital development. In the digital era, access to information technology has become a key determinant of access to education, employment, healthcare, public services, and even opportunities to participate in democratic life. Therefore, digitalization that focuses solely on economic efficiency and accelerating technological innovation has the potential to create new forms of social exclusion if vulnerable groups, including people with disabilities, do not have equal access to these technologies. The sustainable development paradigm requires that all development benefits be enjoyed by every individual without discrimination. Therefore, the success of digital transformation cannot be measured solely by quantitative indicators, such as the number of internet users, increased technology investment, digital economic growth, or the number of electronic-based public services. These indicators need to be complemented by measures that reflect the quality of inclusive digital development, such as the level of accessibility of digital platforms, the availability of assistive technology, the level of participation of people with disabilities in the digital ecosystem, and the ability of digital systems to accommodate the needs of all groups in society. This approach demonstrates a paradigm shift from technology - driven digital development to human -centered digital development.

This study offers a new perspective by integrating human rights and sustainable development frameworks into the analysis of digital accessibility. Most previous studies have tended to discuss digital accessibility from the perspective of information technology, software engineering, or user interface design, focusing primarily on improving the technical aspects of electronic systems. This study demonstrates that this approach is inadequate to address the complexity of the issues faced by people with disabilities. Digital accessibility is inherently a multidimensional issue involving legal aspects, public policy, governance, social development, and human rights protection. Therefore, this study positions digital accessibility as a strategic instrument in realizing inclusive, equitable, and respectful development. This approach broadens the concept of digital transformation by positioning people with disabilities as subjects of development who have the right to fully participate in the digital society. Thus, the success of digital transformation is no longer measured solely by the level of technology adoption or the development of the digital economy, but also by its ability to ensure equal access, eliminate discrimination, increase social participation, and strengthen the protection of the rights of vulnerable groups in accordance with the principle of leave no one behind.

Based on the analysis, this study identifies several strategies that need to be implemented to strengthen the development of an inclusive and sustainable digital ecosystem. First, the government needs to harmonize all regulations related to digital transformation with various regulations concerning the protection of the rights of persons with disabilities so that the principle of accessibility becomes a mandatory legal requirement in all electronic system development. This harmonization is crucial to eliminate overlapping policies and ensure that the entire national digital agenda is aligned with human rights principles. Second, it is necessary to develop and implement national standards for digital accessibility that refer to the Web Content Accessibility Guidelines (WCAG), a widely recognized international standard. These standards must be

consistently applied to all government websites, public service applications, digital education platforms, e-health services, and private sector applications to create uniform quality of inclusive digital services. Third, it is necessary to establish an independent mechanism for auditing, certification, and monitoring digital accessibility as an instrument to ensure compliance of electronic system providers with established standards. Fourth, the government, together with universities, the technology industry, and professional organizations, needs to increase human resource capacity through training on universal design, inclusive design, and the use of assistive technology so that accessibility aspects become an integral part of the technology development process from the planning stage. Fifth, organizations for people with disabilities must be meaningfully involved in all stages of policy development, technology development, implementation, and evaluation of digital services. This participation embodies the principle of "Nothing About Us Without Us", which emphasizes that all policies related to people with disabilities must be formulated with their active involvement as rights holders, not merely as beneficiaries.

The main contribution of this research lies in the development of a conceptual model that positions digital accessibility as the intersection of human rights protection, good digital governance, and sustainable development. This conceptual model emphasizes that the success of digital transformation cannot be solely assessed in terms of technological innovation, public service efficiency, or increased economic competitiveness. It must also be evaluated based on the ability of the legal system, public policy, and governance to ensure equal access, inclusive participation, accountability, and respect for the dignity of every individual. With this approach, digital accessibility is positioned as a primary indicator of the quality of digital democracy and a measure of a state's success in fulfilling its constitutional obligation to respect, protect, and fulfill human rights. Therefore, the development of an inclusive digital ecosystem is not only a policy choice, but also a legal obligation and moral responsibility of the state that stems from the constitution, the Convention on the Rights of Persons with Disabilities (CRPD), and global commitments in the 2030 Agenda. Ultimately, truly inclusive digital development will produce a society that is not only more technologically advanced, but also more just, equal, participatory, and sustainable, so that digital transformation truly becomes an instrument to improve the quality of life of all citizens without leaving anyone behind.

## Conclusion

This study concludes that digital accessibility is an integral part of fulfilling human rights and a key prerequisite for realizing inclusive, sustainable development. In the era of digital transformation, access to information and communication technology is no longer merely a technical necessity but has become the primary means for people to obtain education, employment, health care, public services, information, and participate in social and political life. Therefore, providing accessible digital services for people with disabilities is a legal obligation of the state as mandated by the Convention on the

Rights of Persons with Disabilities (CRPD), the 2030 Agenda, and various national laws and regulations.

The research results show that Indonesia has a legal basis that recognizes the rights of persons with disabilities to digital accessibility. However, its implementation still faces various challenges, such as the lack of comprehensive digital accessibility standards, weak oversight mechanisms, suboptimal harmonization of digital transformation policies with disability policies, and limited application of universal design principles in electronic system development. These conditions indicate a gap between normative commitments and implementation on the ground, potentially hindering the fulfillment of the rights of persons with disabilities.

The primary contribution of this research lies in integrating human rights and sustainable development perspectives into the analysis of digital accessibility. This research emphasizes that digital accessibility is not merely a technical issue in technology development, but rather a legal and policy instrument to ensure equality, non-discrimination, and the full participation of persons with disabilities in the digital society. Therefore, the success of digital transformation must be measured not only by technological innovation or digital economic growth, but also by its ability to ensure equal access for all citizens.

Based on these findings, this study recommends strengthening regulations on digital accessibility through harmonization of national policies with international standards, the implementation of the Web Content Accessibility Guidelines (WCAG) as a national standard, the establishment of digital accessibility audit and monitoring mechanisms, and increasing the capacity of technology developers to apply universal design principles. Furthermore, meaningful involvement of organizations for people with disabilities in the policymaking and technology development process needs to be part of inclusive digital governance.

Future research is recommended to combine a normative approach with empirical research to evaluate the implementation of digital accessibility across various public services and digital platforms in Indonesia. This approach is expected to yield more comprehensive policy recommendations to support the creation of an inclusive, equitable, and sustainable digital ecosystem, in accordance with the principle of "leave no one behind".

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## Competing Interest

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