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Analysis of the Digital Divide and Its Implications for Inclusive Economic Development in Indonesia in the Era of Artificial Intelligence

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ABSTRACT

Digital inequality in Indonesia has become a crucial challenge in achieving inclusive economic development in the era of Artificial Intelligence (AI). This study aims to analyze the digital divide in Indonesia and its implications for inclusive economic development within the context of AI advancement. The research employs a literature review method with a qualitative descriptive approach. The findings indicate that disparities in technological access between urban and rural areas remain significant, not only in terms of infrastructure but also in digital literacy and the capacity to utilize technology effectively. The development of AI further complicates this situation, as groups that are able to adopt AI more rapidly gain greater economic benefits, while those left behind become increasingly marginalized from digital economic opportunities. The study concludes that achieving inclusive economic development in the AI era requires comprehensive strategies, including the equitable distribution of digital infrastructure, the enhancement of digital and AI literacy, the empowerment of micro, small, and medium enterprises (MSMEs), and multi-stakeholder collaboration to create an inclusive and sustainable digital ecosystem.

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INTRODUCTION

Indonesia is currently experiencing a crucial phase in its transition toward a digital-based economy. With a large population dispersed across numerous islands, one of the country's primary challenges is ensuring equitable access to technology. Digital transformation across various sectors has progressed rapidly, as reflected in the high level of internet penetration, which reached approximately 79% in 2024 according to data from the Indonesian Internet Service Providers Association (APJII). The government has also demonstrated increasing commitment to developing an artificial intelligence (AI) ecosystem as part of its national strategy, as AI technology is projected to contribute up to USD 366 billion to Indonesia's GDP by 2030. Various innovative and impactful approaches can be leveraged to strengthen the role of AI in promoting economic inclusion (Masaguni et al., 2024). Initiatives such as the establishment of AI Centers of Excellence and the formulation of a national AI roadmap indicate Indonesia's commitment to enhancing its digital competitiveness at the global level.

Figure 1. Growth of Active Social Media Users (IDR, 2025)

The graph depicting the growth of active social media users shows a significant quantitative increase when viewed in absolute terms. Indonesia is among the countries with the highest levels of social media usage. According to the Indonesia Digital Report published in January 2025, approximately 143 million active social media users were recorded in Indonesia, representing 50.2% of the total population. However, behind this rapid growth lies a fundamental issue, namely the digital divide. Disparities in internet access between urban and rural areas remain a major challenge. Not all regions and social groups have equal opportunities to benefit from technological advancements. High internet accessibility in major cities such as Jakarta is not necessarily mirrored in eastern regions of Indonesia, including Papua and Nusa Tenggara, resulting in segments of the population being unable to fully experience the benefits of the digital economy (Zainuddin et al., 2025). Data from the

United Nations Development Programme (UNDP) indicate that in 2022, internet access in DKI Jakarta reached 84.7%, while in Papua it was only approximately 26.3%.

The digital divide can be understood as an imbalance in access to and utilization of technology within society (Laskar, 2023). According to the International Telecommunication Union (ITU), by the end of 2024, an estimated 2.6 billion people worldwide still lacked access to the internet (Heeks, 2022). Although digital technology aims to facilitate various human activities, in practice, access to and utilization of such technology remain limited to certain segments of society (Fatimah et al., 2023). This situation creates significant disparities that hinder equal opportunities for individuals to optimally utilize technology (Kovač et al., 2024). The digital divide also has a direct impact on efforts to achieve inclusive economic development (Xiao et al., 2024). When only a portion of the population has access to digital technology, economic inequality tends to widen (Méndez-Domínguez et al., 2023). On one hand, digital technology has the potential to stimulate innovation and economic growth; on the other hand, unequal access and utilization can impede the realization of inclusive and sustainable economic development (Lestari et al., 2025). Individuals who are unable to keep pace with technological advancements risk being left behind in terms of productivity, income, and employment opportunities Richiardi et al, 2025). Although mobile phone ownership contributes positively to economic growth, increased internet access does not automatically lead to improved welfare if it is not accompanied by enhanced skills and effective technology utilization (Suparta et al., 2024). This underscores that digital infrastructure alone is insufficient; communities must also be empowered to use technology productively and meaningfully (Tiwasing et al, 2022).

In the context of the AI era, the digital divide may become increasingly complex. The emergence of AI has transformed various systems in human life, particularly within the economic sector, which is closely linked to daily activities (Pabubung, 2023). Regions or social groups that are able to adopt AI more rapidly are likely to gain greater economic benefits, while those left behind will drift further away from growth centers (Wadipalapa et al, 2024). In reality, AI holds substantial potential to support key sectors such as education, healthcare, agriculture, and micro, small, and medium enterprises (MSMEs) (Hong & Xiao, 2024). Therefore, achieving inclusive economic development requires more than merely increasing the number of digital media users; it must also be accompanied by equitable access, strengthened digital literacy, and improved human resource quality across different segments of society (Atobishi & Mansur, 2025). Low levels of digital literacy, particularly in areas with limited infrastructure, hinder the productive and safe use of technology (Anggono et al., 2025). As a result, economic potential remains unevenly utilized, further widening disparities in benefits across regions and social groups. A large proportion of internet users are still unable to leverage digital technology

productively and securely, meaning that the vast potential of the digital economy has yet to deliver equitable and sustainable benefits for all segments of society (Atobishi & Mansur, 2025). Although the Indonesian government has undertaken various efforts, such as strengthening digital infrastructure and formulating regulations to support a sustainable AI ecosystem, challenges related to equitable distribution remain a significant task for the future (Jaya et al., 2025).

Inclusive and sustainable economic development is expected to enhance Indonesia's national resilience in responding to future global challenges (Afjal, 2023). At this juncture, disparities between individuals and between countries become increasingly evident, as digitalization requires substantial investment and costly infrastructure, particularly for underdeveloped and rural regions (Rohayati & Abdillah, 2024). Given these conditions, it is essential to conduct an in-depth analysis of the digital divide in Indonesia and its implications for inclusive economic development in the era of artificial intelligence (Jaya et al., 2024). Such an analysis will not only identify the extent of the divide but also explore how policies and innovations can be directed to ensure that digital transformation delivers equitable benefits to all segments of society, leaving no one behind (Putra et al., 2024).

LITERATURE REVIEW

Digital Divide

The digital divide refers to a form of inequality arising from differences in the ability of individuals, groups, or regions to access, utilize, and benefit from information and communication technologies (ICT). This phenomenon highlights disparities in the use of digital technology to meet needs in education, economic activities, and social life. Such conditions indicate that not all segments of society are able to enjoy the benefits of technological development equally. In an era where digital technology increasingly shapes daily life, unequal access to ICT can significantly influence social mobility, economic participation, and overall quality of life.

According to Artianasari (2023), the digital divide refers to disparities in access to, utilization of, and mastery of ICT among various social groups at local, national, and global levels. These disparities are often reflected in differences between urban and rural areas, developed and developing regions, as well as between socio-economic groups. This inequality affects educational advancement, as differences in access to and use of technology can lead to unequal opportunities in obtaining information and knowledge. Students and communities with limited digital access may experience constraints in learning, innovation, and skills development, which in turn reduces their competitiveness in the labor market.

Thus, the digital divide reflects an imbalance in the distribution of digital access caused by internal factors such as digital literacy and individual technological skills as well as external factors, including uneven infrastructure development and government policies in providing ICT facilities across regions (Aziz & Hossain, 2024). Internal factors relate to individuals' capacity to understand, operate, and critically evaluate digital technologies, while external factors include the availability of internet connectivity, affordability of devices, and institutional support. When these factors interact negatively, they reinforce structural inequalities and limit digital participation among marginalized communities.

The digital divide has the potential to deepen social and economic inequality. Social groups that lack access to technology or are unable to use it effectively tend to fall behind in accessing information, education, and economic opportunities. As digital platforms increasingly dominate job recruitment, entrepreneurship, and public services, those excluded from digital systems face higher risks of social exclusion. Consequently, information technology becomes paradoxical: while it promotes progress on one hand, it may simultaneously widen social disparities if not implemented inclusively.

Heeks (2022) argues that the digital divide does not merely describe the difference between those who have and those who lack access to technology, but also encompasses inequalities in the ability to utilize technology and to derive tangible benefits from digital use. Therefore, the issue of the digital divide extends beyond access to include dimensions of usage and outcomes. This perspective emphasizes that true digital inclusion requires not only physical access to ICT, but also meaningful engagement and the ability to translate digital use into social and economic benefits.

Addressing the digital divide requires strategic measures that go beyond ICT infrastructure development. Efforts must also focus on improving digital literacy, empowering human resources, and fostering an inclusive and sustainable digital ecosystem. Policies aimed at capacity building, community-based digital training, and affordable access are crucial in narrowing the gap. Collaborative initiatives involving government, the private sector, and society are essential to ensure that technological progress delivers equitable benefits to all segments of the population.

Inclusive Economic Development

Inclusive economic development is an approach that emphasizes equitable and sustainable economic growth, where the benefits of development are shared by all members of society without exception. This concept rejects development patterns that benefit only certain groups and stresses that genuine welfare can only be achieved when vulnerable groups such as the poor, minorities, and persons with

disabilities also benefit from economic growth (Affandi, 2022). Inclusive development therefore prioritizes social justice, equality of opportunity, and long-term sustainability alongside economic expansion.

According to Anwar (2022), the success of inclusive economic development depends on policies that accommodate the interests of all stakeholders, rather than focusing solely on elites or large corporations. The fundamental principles of this approach are participation and equitable distribution of development benefits, ensuring that every individual has equal opportunities to contribute to and benefit from economic growth. This requires active involvement of communities in decision-making processes, as well as transparent and accountable governance structures.

Inclusive economic development also emphasizes equal access to economic resources such as education, technology, capital, and employment opportunities. Access to quality education and digital technology enables individuals to improve productivity and innovation, while access to capital and decent work supports entrepreneurship and income generation. This approach goes beyond economic growth alone by prioritizing community empowerment and income distribution equity, thereby reducing poverty and social inequality.

In the Indonesian context, inclusive economic development is an integral part of achieving the Sustainable Development Goals (SDGs). The government promotes a productive and equitable economic system through initiatives such as enhancing digital literacy, strengthening micro, small, and medium enterprises (MSMEs), and expanding access to education and technology. As a result, inclusive economic development is expected not only to increase economic growth but also to ensure fair and widespread social welfare across regions and social groups.

Artificial Intelligence

Artificial Intelligence (AI) refers to a form of intelligence developed by humans and implemented in computer systems. This technology is designed to enable computers to mimic human capabilities such as thinking, learning, and autonomous decision-making (Hardiansyah, 2023). AI replicates human cognitive functions, including learning, problem-solving, reasoning, and decision-making, through information processing and algorithms designed to imitate human thought processes. The development of AI represents a significant shift in how technology interacts with human activities and organizational processes.

John McCarthy, one of the pioneers of artificial intelligence, defined AI as a field of study focused on developing and programming machines—particularly computers to perform tasks that typically require human intellectual capabilities (McCarthy, 2007). This definition underscores AI's core objective of simulating

human intelligence, while also highlighting its interdisciplinary nature, which combines computer science, mathematics, cognitive science, and engineering.

Artificial Intelligence is an advanced digital technology that enables computer systems to think, learn, and make decisions automatically based on available information (Gligorea et al., 2023). AI systems are capable of processing large volumes of data at high speed, identifying patterns, and generating insights that support more accurate and efficient decision-making. This capability has made AI a key driver of digital transformation across various sectors.

AI is not merely a tool for automation but also includes capabilities such as pattern recognition, language understanding, behavior prediction, and adaptive solution provision (Coussement et al., 2024). Consequently, AI is considered a logical progression of digital transformation, as its analytical and predictive capabilities have the potential to enhance efficiency in economic activities, education, and public services. However, the implementation of AI also raises concerns related to inequality, ethical use, and access, particularly in societies that are still facing significant digital divides.

METHODS

This study employs a literature review method to examine the phenomenon of the digital divide and its implications for inclusive economic development in Indonesia in the era of Artificial Intelligence (AI). The literature review method is chosen to enable a comprehensive understanding of existing theoretical frameworks, empirical findings, and policy discussions related to digital inequality and inclusive development. This approach allows the study to synthesize diverse perspectives and identify key debates, trends, and research gaps relevant to the Indonesian context.

The literature review process involves the systematic collection, examination, and synthesis of relevant scholarly and institutional sources. These sources include academic books, peer-reviewed journal articles, government publications, policy documents, reports from international organizations, and credible media outlets. Priority is given to recent and authoritative sources to ensure the relevance and accuracy of the analysis, particularly in light of the rapid development of digital technologies and AI. In addition, this study draws upon findings from previous empirical and theoretical research related to digital inequality and inclusive economic development at both national and global levels, allowing for comparative insights and contextualization.

The analysis is conducted using a qualitative descriptive approach, which aims to interpret and explain complex social and economic phenomena rather than to quantify relationships. This approach is employed to identify recurring patterns,

structural challenges, and emerging opportunities associated with the digital divide in Indonesia. Particular attention is given to disparities in digital access, digital literacy, and technological utilization across different regions, socioeconomic groups, and demographic categories. These disparities are examined as multidimensional issues influenced by infrastructure availability, education, income levels, institutional capacity, and policy frameworks.

Through comparative and thematic analysis, the study explores how unequal access to digital technologies influences the distribution of economic benefits and exacerbates existing social and economic inequalities. By comparing findings across different studies and policy reports, the research highlights the ways in which digital exclusion limits participation in AI-driven economic activities, such as digital entrepreneurship, innovation, and access to technology-based public services. This analysis also considers how digital inclusion can serve as a catalyst for inclusive economic development when supported by appropriate policies and institutional arrangements.

Furthermore, this research seeks to provide a comprehensive understanding of the role of public policy, institutional frameworks, and technological innovation in addressing digital disparities. By examining policy initiatives, regulatory strategies, and development programs in the context of AI-driven economic transformation, the study highlights how well-designed digital and economic policies can support more inclusive and equitable development outcomes. Issues such as digital literacy programs, infrastructure expansion, support for MSMEs, and ethical AI governance are considered as key elements in reducing the digital divide.

Ultimately, this literature-based analysis aims to contribute to academic and policy discussions by offering conceptual and practical insights into strategies for reducing the digital divide and promoting inclusive economic growth in Indonesia during the AI era. The findings are expected to inform future research and provide policy-relevant recommendations for stakeholders seeking to harness AI and digital technologies as tools for inclusive and sustainable development.

RESULT

The results of this study indicate that the digital divide in Indonesia remains substantial, particularly between urban and rural areas. Data from the Central Bureau of Statistics (BPS, 2024) show that 88.45% of households in urban areas have access to the internet, while only 62.71% of households in rural areas are connected. This considerable disparity highlights unequal access to digital technologies and demonstrates that internet penetration is still heavily concentrated in urban regions. The findings confirm that geographical location continues to be a determining factor in digital inclusion in Indonesia.

Beyond differences in access, the results reveal that the digital divide also manifests in the quality of digital infrastructure and the reliability of internet services. Rural areas and regions in Eastern Indonesia face persistent limitations in telecommunications infrastructure, including inadequate network coverage, insufficient broadband capacity, and unstable internet connections. These infrastructural constraints significantly reduce the ability of local communities to utilize information and communication technologies (ICT) effectively. As a result, digital services in education, economic activities, and public administration are not equally accessible across regions.

The findings further show that disparities in digital skills and digital literacy contribute significantly to the persistence of the digital divide. Although some rural areas have obtained basic internet access, limited digital literacy prevents many individuals from using digital tools productively. The results indicate that low levels of digital competence restrict community engagement with online learning platforms, telemedicine services, e-commerce applications, and digital financial services. This suggests that access alone is insufficient; meaningful digital participation depends heavily on users' ability to understand and utilize digital technologies.

The impact of the digital divide on inclusive economic development is also evident in the findings. Communities with limited internet access and low digital skills face significant barriers to participating in the digital economy. These barriers include restricted access to online marketplaces, digital employment opportunities, and technology-driven entrepreneurship. Consequently, the economic benefits of digital transformation tend to be concentrated among urban populations and individuals with higher levels of digital capability, while rural communities remain economically disadvantaged.

Furthermore, the results indicate that the adoption of artificial intelligence (AI) technologies in Indonesia is unevenly distributed. The use of AI-based tools and applications is largely confined to groups with adequate digital infrastructure, higher education levels, and stronger digital literacy. This concentration suggests that AI adoption currently reinforces existing inequalities rather than reducing them. Without widespread access and sufficient human capital development, AI technologies risk becoming exclusive tools that benefit only certain segments of society.

Overall, the findings demonstrate that the digital divide in Indonesia remains a major structural challenge to achieving inclusive economic development. Unequal access to infrastructure, disparities in digital literacy, and the uneven utilization of advanced technologies such as AI collectively limit broad-based participation in the

digital economy. These results underscore that digital transformation in Indonesia has not yet been experienced evenly across regions and social groups, shaping unequal outcomes in education, economic opportunity, and social participation.

DISCUSSION

The findings of this study confirm that the digital divide in Indonesia remains a persistent and structural issue, particularly between urban and rural areas. The substantial gap in internet access identified in the results aligns with previous studies that highlight unequal development of digital infrastructure across regions (Huda & Tanos, 2022; Sahabudin et al., 2022). Despite continuous efforts by the government to expand connectivity, internet access is still disproportionately concentrated in urban areas and western regions of Indonesia. This condition reinforces the argument that digital inequality in Indonesia is not merely a technological issue, but also a reflection of broader socio-economic and regional development disparities.

The discussion further indicates that limited digital infrastructure in rural and eastern regions significantly constrains the effective use of digital technologies. Inadequate network coverage, unstable connections, and insufficient supporting infrastructure reduce the potential benefits of digitalization in education, public services, and economic activities. These findings support earlier research emphasizing that infrastructure quality is as critical as access itself in determining meaningful digital inclusion. Without reliable infrastructure, digital tools cannot function optimally, resulting in limited productivity gains and reduced social impact.

In addition to infrastructural challenges, the study highlights digital literacy as a key factor intensifying the digital divide. The results demonstrate that even when internet access is available, low levels of digital skills hinder individuals from utilizing digital platforms effectively. This finding corroborates previous studies suggesting that digital inclusion requires not only physical access to technology but also cognitive and technical competencies to use it productively (Haniko et al., 2023). Insufficient digital literacy restricts engagement with online education, e-health services, e-commerce, and digital financial systems, thereby limiting opportunities for socio-economic advancement.

From the perspective of inclusive economic development, the digital divide has direct implications for inequality in income distribution and economic participation. Communities with limited digital access and skills are less able to participate in the digital economy, which increasingly dominates employment creation, entrepreneurship, and value generation. As a result, the benefits of Indonesia's rapidly growing digital economy are unevenly distributed, favoring urban populations and digitally skilled groups. This finding reinforces the argument that

digital transformation, if not accompanied by inclusive policies, may exacerbate existing socio-economic inequalities rather than reduce them (Koswara, 2024).

The discussion also reveals that the uneven adoption of artificial intelligence (AI) technologies poses new challenges to digital inclusion. While AI offers significant potential to enhance productivity and innovation, its utilization remains concentrated among groups with strong digital infrastructure and higher digital literacy. This supports previous research indicating that AI can deepen inequality when access and skills are unevenly distributed (Suhartono, 2024; Manginte & Boari, 2025). Without targeted interventions, AI risks becoming an exclusive technology that amplifies economic advantages for already privileged groups.

Moreover, the findings suggest that digital inequality may undermine broader social inclusion by limiting participation in education, public services, and civic engagement. Limited access to digital platforms reduces the ability of rural communities to benefit from e-government services, online learning opportunities, and digital public information. This condition not only affects economic outcomes but also weakens social cohesion and democratic participation, reinforcing regional and social disparities.

Overall, the discussion emphasizes that addressing the digital divide in Indonesia requires a comprehensive and integrated approach. Infrastructure expansion must be accompanied by improvements in digital literacy, equitable technology adoption, and inclusive governance. The study highlights that digital transformation and AI development can serve as powerful drivers of inclusive economic growth only if access, skills, and opportunities are distributed equitably across regions and social groups. Without such measures, digitalization risks reinforcing existing inequalities rather than fostering inclusive and sustainable development.

CONCLUSION

The digital divide in Indonesia remains a significant challenge in achieving inclusive economic development in the era of Artificial Intelligence. Although internet penetration reached 79% in 2024 and the number of active social media users exceeded 143 million, these aggregate figures tend to mask persistent structural inequalities in digital access. Disparities between urban and rural areas remain substantial, indicating that digital development has not progressed evenly across regions. Data show that 88.45% of households in urban areas have access to the internet, while only 62.71% of rural households are connected. This gap reflects not only unequal availability of digital infrastructure but also broader socioeconomic differences that shape individuals' capacity to access and benefit from digital technologies.

Beyond infrastructure limitations, the digital divide in Indonesia is also influenced by variations in digital literacy, educational attainment, and technological skills. Rural communities and lower-income groups often face challenges in effectively utilizing digital tools due to limited training opportunities, lower levels of formal education, and restricted exposure to digital innovation. As a result, access alone does not automatically translate into meaningful digital participation. The ability to use digital technologies productively—particularly for economic activities—remains uneven, reinforcing existing patterns of inequality between regions and social groups.

The digital divide has a direct and significant impact on inclusive economic development. Communities with limited access to digital technologies face difficulties in participating in e-commerce, accessing digital financial services, and engaging in technology-based employment opportunities. These limitations restrict their ability to integrate into the digital economy, reduce income-generating opportunities, and weaken local economic resilience. Consequently, economic disparities between digitally connected and digitally excluded communities continue to widen, undermining efforts to promote equitable and inclusive growth.

The rapid development and adoption of Artificial Intelligence further intensify these challenges. AI technologies are increasingly shaping productivity, innovation, and competitiveness across sectors such as manufacturing, finance, education, and public services. Regions and social groups that are able to adopt AI technologies more quickly—due to better infrastructure, higher digital skills, and stronger institutional support—are more likely to capture greater economic benefits. Conversely, communities that lack access to digital technologies and AI-related skills risk becoming increasingly marginalized from emerging centers of economic growth, thereby reinforcing a new form of digital and economic stratification.

The analysis of this relationship demonstrates that while AI holds substantial potential to enhance economic productivity and efficiency, its benefits are not automatically inclusive. Without equitable access to digital infrastructure and targeted improvements in digital and AI literacy, AI-driven development risks deepening existing social and economic inequalities. This highlights the importance of viewing AI not merely as a technological innovation, but as a socio-economic transformation that requires inclusive governance and policy interventions.

To achieve inclusive economic development in the AI era, comprehensive and coordinated strategies are required. These include: (1) the equitable expansion of digital infrastructure across all regions, particularly in underserved rural and remote areas; (2) the enhancement of digital and AI literacy for the broader population through education, training, and capacity-building programs; (3) the empowerment

of micro, small, and medium enterprises (MSMEs) to adopt digital technologies and AI-based solutions in order to improve productivity and market access; and (4) strengthened collaboration among government, the private sector, and educational institutions to build an inclusive, adaptive, and sustainable digital ecosystem.

This study emphasizes that inclusive economic development cannot be achieved solely by increasing the number of digital users or expanding internet penetration rates. Digital transformation must be accompanied by equitable access, strengthened digital and AI literacy, and improved human capital across all segments of society. Without inclusive policies, effective institutional coordination, and consistent implementation, digital transformation and AI adoption may instead exacerbate existing economic inequalities rather than reduce them. Therefore, addressing the digital divide remains a critical prerequisite for ensuring that AI-driven economic growth contributes to inclusive and sustainable development in Indonesia.

REFERENCES

Afjal, M. (2023). Bridging the financial divide: a bibliometric analysis on the role of digital financial services within FinTech in enhancing financial inclusion and economic development. Humanities and Social Sciences Communications, 10, 1-27. https://doi.org/10.1057/s41599-023-02086-y.

Anggono, B., Wahanisa, R., A.P, A., & Adiyatma, S. (2025). Interrogating the Legal Foundations of Digital Transformation: Balancing Economic Growth and Social Welfare in the Era of Disruption. Volksgeist: Jurnal Ilmu Hukum dan Konstitusi. https://doi.org/10.24090/volksgeist.v8i1.12211.

ANTARA News. (2025). *Govt seeks to reduce digital divide by bolstering telecom networks*. https://en.antaranews.com/news/339994/govt-seeks-to-reduce-digital-divide-by-bolstering-telecom-networks

APJII. (2024). *APJII: Jumlah pengguna internet Indonesia tembus 221 juta orang*. https://apjii.or.id/berita/d/apjii-jumlah-pengguna-internet-indonesia-tembus-221-juta-orang

Atobishi, T., & Mansur, H. (2025). Bridging Digital Divides: Validating Government ICT Investments Accelerating Sustainable Development Goals. Sustainability. https://doi.org/10.3390/su17052191.

Aziz, A., & Hossain, T. (2024). Digital Access, Resources, and Literacy: Mapping the Digital Divide and ICT Learning Challenges among Undergraduate Students in Bangladesh. Asiascape: Digital Asia. https://doi.org/10.1163/22142312-bja10064.

Coussement, K., Abedin, M., Kraus, M., Maldonado, S., & Topuz, K. (2024). Explainable AI for enhanced decision-making. Decis. Support Syst., 184, 114276. https://doi.org/10.1016/j.dss.2024.114276.

Fatimah, S., Sriningsih, S., Pascayanti, Y., & Yusuf, F. (2023). Digital divide solutions and public service policy implementation in Indonesia after the COVID-19 pandemic. *Journal of Economics, Finance and Management Studies, 6*(8). https://doi.org/10.47191/jefms/v6-i8-30

Gligorea, I., Cioca, M., Oancea, R., Gorski, A., Gorski, H., & Tudorache, P. (2023). Adaptive Learning Using Artificial Intelligence in e-Learning: A Literature Review. Education Sciences. https://doi.org/10.3390/educsci13121216.

Hakam, L. I., Ahman, E., Disman, D., Mulyadi, H., & Hakam, D. F. (2023). Exploring trends in innovation within digital economy research: A scientometric analysis. Economies, 11(11), 269. https://doi.org/10.3390/economies11110269

Haniko, P., Sappaile, B. I., Gani, I. M., Sitopu, J. W., Junaidi, A., Sofyan, & Cahyono. (2023). Menjembatani kesenjangan digital: Memberikan akses ke teknologi, pelatihan, dukungan, dan peluang untuk inklusi digital. *Jurnal Pengabdian West Science,* 2(50). https://doi.org/10.58812/jpws.v2i5.371

Hardiansyah, Z. (2023). Artificial intelligence: Pengertian, jenis, contoh, serta kelebihan dan kekurangannya. *Kompas*. https://tekno.kompas.com/read/2023/11/23/16150017/artificial-intelligence

Heeks, R. (2022). Digital inequality beyond the digital divide: Conceptualizing adverse digital incorporation in the global South. *Information Technology for Development, 28*(4), 688–704. https://doi.org/10.1080/02681102.2022.2045861

Hong, Z., & Xiao, K. (2024). Digital economy structuring for sustainable development: the role of blockchain and artificial intelligence in improving supply chain and reducing negative environmental impacts. Scientific Reports, 14. https://doi.org/10.1038/s41598-024-53760-3.

Huda, N., & Tanos, K. (2022). *Kebijakan inovasi dan ekonomi digital: Sebuah diskusi sederhana*. INDEF.

International Telecommunication Union. (2024). *Global internet use continues to rise but disparities remain*.

Jaya, I., Pahlevi, S., Susenna, A., Agustina, L., Kusumasari, D., Sukma, Y., Hernikawati, D., Rahmi, A., Pravitasari, A., & Kristiani, F. (2024). Framework for Monitoring the Spatiotemporal Distribution and Clustering of the Digital Society Index of Indonesia. Sustainability. https://doi.org/10.3390/su162411258.

Koswara, A. (2024). Digitalisasi ekonomi di pedesaan: Mengkaji kesenjangan infrastruktur digital di Indonesia. *Jurnal Al Azhar Indonesia Seri Ilmu Sosial,* 5(3), 180–187. https://doi.org/10.36722/jaiss.v5i3.3407

Kovač, N., Żmija, K., Roy, J., Kusa, R., & Duda, J. (2024). Digital divide and digitalization in Europe: A bibliometric analysis. Equilibrium. Quarterly Journal of Economics and Economic Policy. https://doi.org/10.24136/eq.2899.

Laskar, M. (2023). Examining the emergence of digital society and the digital divide in India: A comparative evaluation between urban and rural areas. Frontiers in Sociology, 8. https://doi.org/10.3389/fsoc.2023.1145221.

Lestari, N. P., & Hasjiandito, A. (2025). Pengaruh kesenjangan akses dan keterampilan teknologi informasi terhadap eksistensi digital guru PAUD di era AI. *Jurnal Murhum, 6*(1), 33–44. https://doi.org/10.37985/murhum.v6i2.1420

Manginte, S. Y., & Boari, Y. (2025). Dampak adopsi AI terhadap produktivitas dan transformasi ekonomi generasi Z di Indonesia. *Warmadewa Economic Development Journal, 9*(1), 65–75. https://doi.org/10.22225/wedj.8.1.2025.38-55

McCarthy, J. (2007). *What is artificial intelligence?* Stanford University. http://jmc.stanford.edu/articles/whatisai/whatisai.pdf

Méndez-Domínguez, P., Muñoz, D., Díez, E., & De Mesa, J. (2023). Digital inclusion for social inclusion. Case study on digital literacy. Frontiers in Communication. https://doi.org/10.3389/fcomm.2023.1191995.

Putra, F., Suhardjanto, D., Trinugroho, I., & Arifin, T. (2024). Overcoming Barriers to Inclusion: The Role of Financial Literacy and Digital Divide in Expanding Financial Access in Indonesia. Journal of Ecohumanism. https://doi.org/10.62754/joe.v3i8.5608.

Richiardi, M., Westhoff, L., Astarita, C., Ernst, E., Fenwick, C., Khabirpour, N., & Pelizzari, L. (2025). The impact of a decade of digital transformation on employment, wages, and inequality in the EU: a "conveyor belt" hypothesis. Socio-Economic Review. https://doi.org/10.1093/ser/mwaf011.

Rohayati, Y., & Abdillah, A. (2024). Digital Transformation for Era Society 5.0 and Resilience: Urgent Issues from Indonesia. Societies. https://doi.org/10.3390/soc14120266.

Suparta, W., Dwi, M., & Wahyudi, H. (2024). The Negative Relationship between Intrnet Access and Economic Growth: Evidence from the Indonesian. Journal of Ecohumanism. https://doi.org/10.62754/joe.v3i7.4359.

Tiwasing, P., Clark, B., & Gkartzios, M. (2022). How can rural businesses thrive in the digital economy? A UK perspective. Heliyon, 8. https://doi.org/10.1016/j.heliyon.2022.e10745.

Wadipalapa, R., Katharina, R., Nainggolan, P., Aminah, S., Apriani, T., Ma'rifah, D., & Anisah, A. (2024). An Ambitious Artificial Intelligence Policy in a Decentralised Governance System: Evidence From Indonesia. Journal of Current Southeast Asian Affairs, 43, 65 - 93. https://doi.org/10.1177/18681034231226393.

World Bank. (2021). *Digital economy for Indonesia*. World Bank Group.

World Economic Forum. (2022). *Global digital transformation initiative*. https://www.weforum.org

Xiao, A., Xu, Z., Škare, M., Qin, Y., & Wang, X. (2024). Bridging the digital divide: the impact of technological innovation on income inequality and human interactions. Humanities and Social Sciences Communications, 11, 1-18. https://doi.org/10.1057/s41599-024-03307-8.

Zainuddin, Sari, M., & Puspita, A. (2025). Analisis dampak ekonomi digital terhadap masyarakat dan pertumbuhan ekonomi di Indonesia. *Jurnal Penelitian Ekonomi Pembangunan, 1*(2). https://doi.org/10.71094/joeder.v1i2.112