

DIGITAL READINESS TYPOLOGY OF 38 PROVINCES IN INDONESIA BASED ON THE THREE PILLARS OF IMDI 2025

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Abstract

Digital transformation in Indonesia is growing rapidly along with increasing internet penetration, but equalizing digital readiness across provinces remains a challenge. This study aims to analyze the typology of digital readiness of 38 provinces in Indonesia based on the three main pillars of the 2025 Indonesian Digital Society Index (IMDI): the Infrastructure and Ecosystem Pillar, the Digital Literacy Pillar, and the Empowerment Pillar. The study uses a qualitative descriptive approach utilizing secondary data from the 2025 IMDI publication published by the Ministry of Communication and Digital (Komdigi). The analysis was conducted by mapping the achievements of each pillar, grouping digital readiness typologies, and identifying digital gap clusters between provinces. The results show that digital readiness in Indonesia remains heterogeneous. The Infrastructure and Ecosystem Pillar has the highest national achievement, while the Empowerment Pillar has the lowest achievement, indicating that digital infrastructure development has not been fully followed by productive technology utilization. Based on the classification results, provinces in Indonesia can be grouped into four typologies: Very High Digital Readiness, High Digital Readiness, Medium Digital Readiness, and Low Digital Readiness, as well as four digital divide clusters: Digital Leader, Digital Emerging, Digital Transition, and Digital Lagging. These findings indicate that digital transformation policies need to be directed not only at equitable infrastructure, but also at strengthening digital literacy, empowering communities, and developing a digital economic ecosystem according to the characteristics of each region to realize more inclusive and sustainable development.

Keywords: Digital Divide; Digital Readiness; Indonesian Digital Society Index (IMDI); Provincial Typology; Digital Transformation.

INTRODUCTION

In a world increasingly dominated by information and communication technology (ICT), the digital economy has emerged. The digital divide has come into the spotlight through several United Nations (UN) reports and has become a critical concern for organizations, policymakers, and academics from various fields (Lythreath et al., 2022). The digital divide is described as a new cause of inequality, referring to the gap between those with adequate access to ICT and those with poor or no access at all. Various factors contribute to the exclusion of some populations from the digital world: geography, income level, digital literacy, and age are among the most frequently cited causes (Herrero-

zamorano & Navío-marco, 2026). Sustainable development goals especially goal 10 regarding the reduction of inequalities is observed as one of the sustainable development goals most influenced by ICT because ICT plays a vital role in contributing to equality by enabling access to vital information and enabling citizen engagement and participation in a country's economy (Kerras et al., 2020).

The empirical results of Phu et al., (2026) show that the digital divide is negatively related to economic growth, so it is necessary to narrow the digital divide through investment in information and communication technology infrastructure, digital literacy, and institutional efficiency to achieve sustainable and inclusive growth. Research findings The research findings of Meng et al., (2026) show that the digital divide has a negative impact on the development, innovation and competitiveness of companies. Empirical findings show that confirmation, compatibility, security, perceived ease of use, and perceived usefulness have a positive impact on continuing to use digital technology (Thi et al., 2026).

To realize *a smart city* and implement digital technology, Ghasemzadeh et al., (2026) revealed that quality governance, stakeholder collaboration, policy-making processes, public participation, and user capacity building are needed to create a digitally savvy society. Other research findings reveal that the implementation of digital technology can effectively reduce financing constraints, which will reduce the digital divide in companies (Wang et al., 2025).

Indonesia's digital economy is experiencing rapid development. This is demonstrated by the continued increase in the use of digital technology across almost every corner of the country. A survey by the Indonesian Internet Service Providers Association (APJII), shown in Figure 1, indicates that internet penetration in Indonesia showed a consistent upward trend from 2016 to June 2026. Although APJII did not publish national survey results in 2021, official figures for that year are not available. Internet penetration in Indonesia reached 81.72 percent by June 2026. This continued increase in internet penetration indicates that internet access in Indonesia is expanding and that digital transformation is continuing to develop in Indonesia. This condition indicates that the internet has become an essential part of various community activities throughout Indonesia. With increasingly widespread internet access, digital transformation in Indonesia continues to experience positive developments and provides opportunities for increased productivity and digital economic growth.

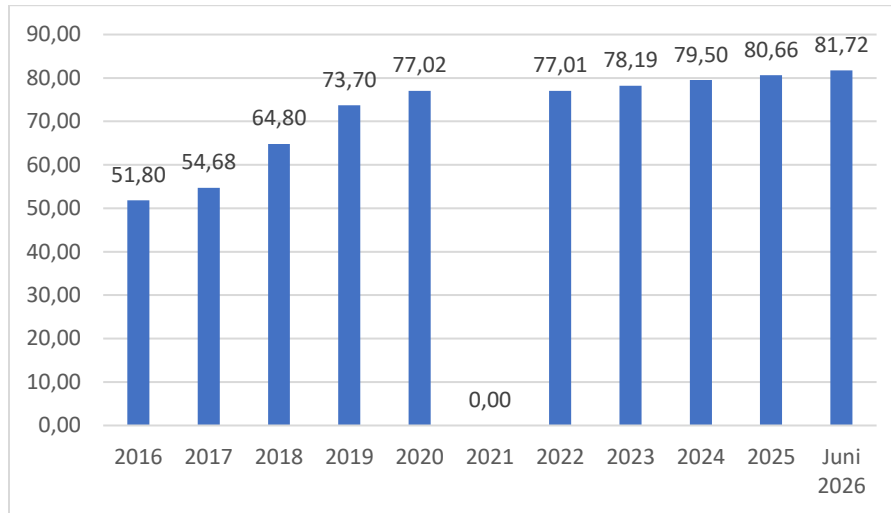


Figure 1

Development of Internet Penetration Rate in Indonesia (Percentage)

Source: APJII (2026)

The increase in internet penetration nationally does not yet reflect equal access across regions. APJII (2026) also revealed that there is still a gap in internet penetration between regions, with Java Island having the highest penetration and the Maluku-Papua region having the lowest. The increase in the number of internet users and penetration nationally does not fully reflect equitable digital access between regions. APJII data (2026) shows that internet penetration is dominated by Java (85.95 percent), Maluku and Papua only reach around 69.74 percent, and Sulawesi at 72.58 percent. This difference indicates that there is still a fairly wide digital divide between regions in Indonesia. The gap is not only related to the availability of internet infrastructure, geographic conditions, community economic capacity, and the use of digital technology in productive activities. Thus, the issue of the digital divide between provinces remains a challenge in digital economic development in Indonesia. The digital divide is the difference in access, use, and outcomes from the use of information technology (Lythreatis et al., 2022).

The digital divide is no longer just a matter of internet access, but has evolved into a gap in the utilization of digital technology and the resulting economic benefits. Differences in digital capabilities will hinder search, increase information asymmetry, weaken supply chain collaboration, and ultimately reduce company performance (Liu et al., 2025). Furthermore, with the current rapid development of generative AI, not everyone is able to leverage it to improve organizational competitiveness and performance in the Industry 5.0 era (Abbas et al., 2026).

The digital divide has evolved from mere differences in internet access to disparities in the ability to utilize digital technology to gain benefits. Several previous research findings

demonstrate the digital divide at various levels of analysis: the individual level, the social group level, the company level, the economic sector level, and the regional level. The digital divide occurs between regions with varying levels of internet infrastructure and digital literacy, resulting in unequal opportunities for crowdfunding. Regions with low *broadband*, limited internet access, and low digital literacy have lower funding success rates. The digital divide leads to financial exclusion for business actors and reduces opportunities for digital entrepreneurship (Davaadorj & Enkhtaivan, 2026).

The digital divide also exists at the household level, encompassing differences in access to and ability to utilize digital technology to manage investments. Households with limited digital access face higher transaction costs, asymmetric financial information, and suboptimal asset allocation. Furthermore, the COVID-19 pandemic has widened this gap (Chai et al., 2026)

The digital divide exists among Afghan migrants in Iran due to legal, social, and political restrictions on digital device ownership, internet access, physical mobility, and social media use. Although digital skills have improved during their stay in Iran, the gap remains influenced by migrants' legal status and socioeconomic conditions (Jauhiainen et al., 2022).

The results of the Indonesian Digital Society Index (IMDI) show that the level of digital readiness between provinces is still heterogeneous. Some provinces have high digital readiness due to the support of relatively better infrastructure, digital literacy, and technology utilization, while other provinces still face limitations (Komdigi, 2025). The problem of Indonesia's digital economy is more complex than simply dividing developed and underdeveloped regions. This is because Indonesia is not evenly prepared for digitalization. Many regions in Indonesia are online but they have not fully entered the digital economy (Permana, 2026). Based on these conditions, a typology of digital readiness in 38 provinces in Indonesia based on the 2025 IMDI is important to do. By grouping provinces based on their level of digital readiness, it can identify regions that have become digital leaders, regions that are transitioning to a digital society, and regions that are still experiencing digital lag. The results of this study are expected to form the basis for formulating more targeted digital transformation equitable policies, so that digital infrastructure development not only increases the number of internet users but also is able to reduce the digital gap between regions and encourage more inclusive economic development.

DIGITAL GAP CONCEPT

Digital technology has driven global development, offering transformative opportunities across various sectors (Shaengchart & Bhumpenpein, 2025). The concept of the digital divide has undergone significant transformation. The term “digital divide”

emerged in the late 1990s to describe differences in access to and use of information and communication technologies (ICTs) among individuals, social groups, and countries (Norris, 2003; Zola, 2025). The OECD (2001) defines the digital divide as inequalities in access to information and communication technologies among individuals, households, businesses, and economies. Continuous technological innovation and socioeconomic changes make the access gap a dynamic, complex, and multifaceted phenomenon. Hannan & Eynon (2025) explains that the digital divide describes differences in access, use and benefits related to digital technology which consists of three levels.

The digital divide is a multidimensional structure consisting of access gaps, usage gaps, and benefit gaps. Inequality is reflected not only in whether people can connect to digital systems, but also in whether they can effectively use digital tools and convert digital participation into real economic benefits (He & Xu, 2026). This reflects inequality in utilizing the economic and social opportunities provided by ICT and often reproduces traditional gaps in income, education, and geography (Phu et al., 2026). The digital divide is interpreted based on factors such as the accessibility of relevant content, the quality of internet connections, and the knowledge and skills of internet users (DiMaggio & Hargittai, 2001). The digital divide indicates economic inequality, reduces social interaction and hinders access to financial institutions (Li et al., 2025). The digital divide according to Gómez-Barroso et al., (2026) is a gap that excludes a portion of society that does not utilize the potential offered by information and communication technology.

Anaraky et al., (2025) synthesized three levels of digital divide into a framework ranging from not using digital technology to a gradient of digital technology use. According to the Ministry of Communication and Digital (Komdigi, 2025), the concept of the digital divide is *understood* as the inequality of the ability of communities and regions to access, have skills, utilize, and obtain benefits from digital technology. Therefore, Komdigi does not view the digital divide only as a problem of internet access, but as a multidimensional problem and must be measured comprehensively through the Indonesian Digital Society Index (IMDI).

METHOD

This research is a descriptive study with a qualitative approach that aims to describe the level of digital readiness and identify the digital gap between provinces in Indonesia based on the Indonesian Digital Society Index (IMDI) in 2025. The descriptive approach was chosen because this research is not oriented towards testing hypotheses or causal relationships between variables, but rather provides a comprehensive picture of the condition of digital readiness of each province based on indicators that have been determined by the Ministry of Communication and Digital (Komdigi). Through this approach,

a systematic interpretation of the digital gap phenomenon is carried out so that it can serve as a basis for compiling more targeted digital transformation policy recommendations.

The data used in this study is secondary data obtained from the 2025 Indonesian Digital Society Index (IMDI) publication published by the Ministry of Communication and Digital (Komdigi). To strengthen the analysis of the development of national digital transformation, this study also utilizes data from the Indonesian Internet Penetration Survey published by the Indonesian Internet Service Providers Association (APJII). These two data sources were chosen because they provide comprehensive information on the condition of digital infrastructure, digital literacy, community empowerment, and the development of internet penetration in Indonesia. The unit of analysis in this study is 38 provinces in Indonesia. The analysis was conducted on the three main pillars of the IMDI: the Infrastructure and Ecosystem Pillar, the Digital Literacy Pillar, and the Empowerment Pillar. These three pillars were chosen because they represent the main dimensions of the community's digital readiness: readiness for access to digital technology (*digital access readiness*), readiness for digital competence or ability (*digital capability readiness*), and readiness to utilize digital technology to increase economic productivity and welfare (*digital utilization readiness*).

The data analysis technique used qualitative descriptive analysis, namely by describing, comparing, and interpreting the achievements of each IMDI pillar in each province. The analysis was conducted by presenting data in the form of tables, graphs, and regional groupings to provide an overview of the level of digital readiness and variations in the digital divide between provinces. The interpretation of the analysis results was then linked to the condition of digital transformation in Indonesia and its implications for equitable digital economic development. The research analysis stages were carried out in five steps. First, identifying and collecting secondary data from the IMDI 2025 publication and supporting data regarding Indonesian internet penetration. Second, describing the development of national internet penetration as a general overview of digital transformation in Indonesia. Third, analyzing the achievements of each province in the three IMDI pillars: the Infrastructure and Ecosystem Pillar, the Digital Literacy Pillar, and the Empowerment Pillar, to identify variations in the level of digital readiness between regions. Fourth, grouping 38 provinces into four typologies of digital readiness: Very High Digital Readiness, High Digital Readiness, Medium Digital Readiness, and Low Digital Readiness, based on the characteristics of the achievements of the three IMDI pillars. Fifth, compiling digital gap clusters consisting of Digital Leaders, Digital Emerging, Digital Transition, and Digital Lagging, then interpreting the characteristics of each cluster as a basis for compiling policy recommendations for equitable digital transformation in Indonesia.

RESULTS AND DISCUSSION

Based on the IMDI 2025 publication, the digital readiness of 38 provinces can be analyzed using three main pillars that best reflect the readiness of a digital society, namely:

1. Infrastructure and Ecosystem Pillars (*digital access readiness*),
2. Pillars of Digital Literacy (*digital capability readiness*), and
3. Empowerment Pillar (*digital utilization readiness*).

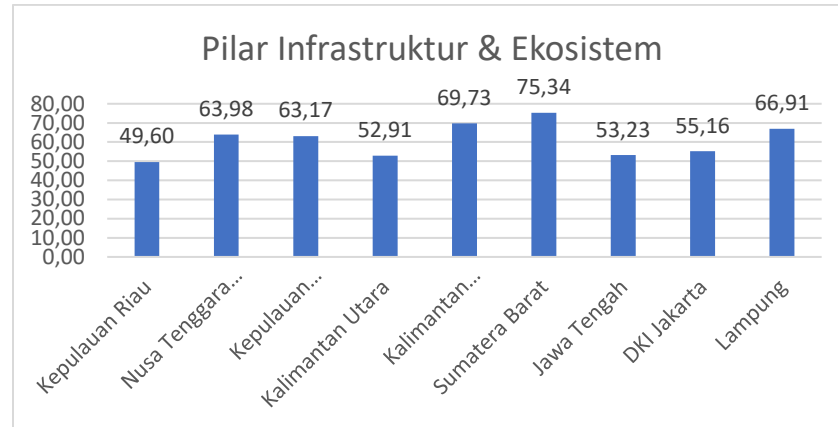
These three pillars illustrate that the digital readiness of Indonesian provinces is determined not only by the availability of digital infrastructure, but also by the community's ability to use technology and leverage it to increase economic productivity and well-being. Nationally, the Infrastructure and Ecosystem Pillar scored the highest (53.06), while the Empowerment Pillar scored the lowest (34.42). This indicates that digital infrastructure development is progressing faster than its productive use by the community.

Based on Figure 2 , it can be seen that the achievement of the Infrastructure and Ecosystem Pillar in the 10 provinces with the highest achievements shows quite large variations between provinces, indicating that there are still gaps in digital infrastructure readiness in Indonesia. DKI Jakarta recorded the highest score of 75.34 , followed by Central Kalimantan (69.73) and Lampung (66.91), reflecting the availability of telecommunications infrastructure, internet access, and a relatively more advanced digital ecosystem. Conversely, the Riau Islands obtained the lowest score of 49.60 , followed by Central Java (53.23) and North Kalimantan (52.91), indicating that strengthening digital infrastructure and ecosystems is still needed to be able to optimally support digital transformation. The differences in scores between regions indicate that digital infrastructure development in Indonesia has not been carried out evenly. This condition has the potential to affect the ability of each province to access digital services, develop innovation, and utilize technology to increase economic productivity. Therefore, equitable infrastructure development and strengthening the digital ecosystem are strategic steps to reduce the digital divide between regions and support a more inclusive digital transformation in Indonesia.

The research findings of Herrero-Zamorano et al., (2026)revealed that the rural and urban digital divide is greatly influenced by population mobility, mobile traffic demand, network and available broadband. In line with the findings of Caragliu & Del Bo (2025), the determinants of the gap within cities at the individual level are influenced by gender, age, education level, job information, government policies and *broadband availability* . Shaengchart & Bhumpenpein (2025)also revealed the challenges of rural areas to overcome the digital divide due to the lack of people in accessing reliable internet due to limited infrastructure, high-speed broadband is needed to achieve digital inclusion. The findings of Amni et al., (2026)show that the digital divide in remote islands is not only about

infrastructure, but about connection, dignity and shared identity to later create digital inclusion.

Figure 2 Pillars of Infrastructure and Ecosystem in Indonesia



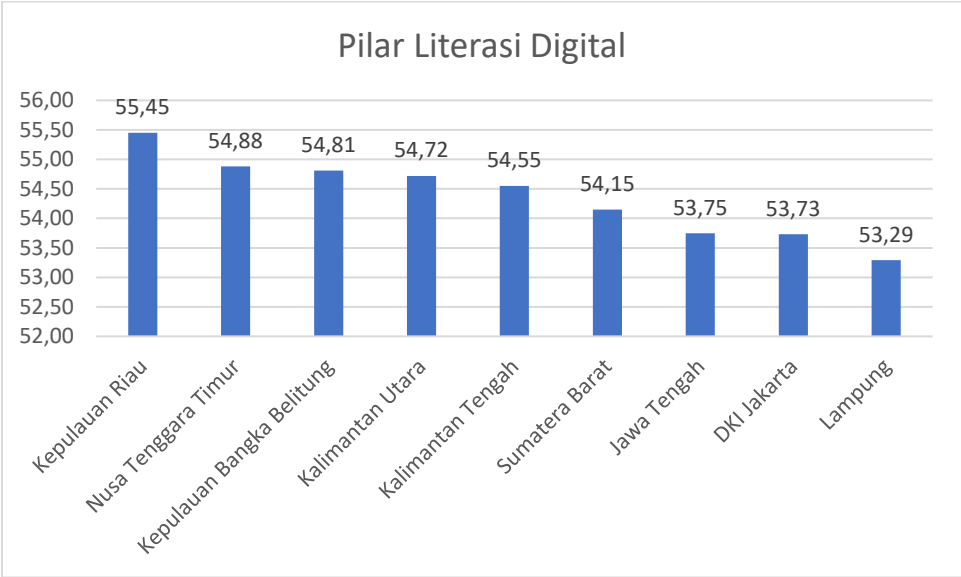
Source: IMDI (2025)

Based on Figure 3 , the achievement of the Digital Literacy Pillar in the 10 provinces with the highest achievement indicates that the community's ability to understand and utilize digital technology is relatively more evenly distributed compared to the infrastructure pillar, although there are still variations between provinces. The Riau Islands obtained the highest score of 55.45 , followed by East Nusa Tenggara (54.88), Bangka Belitung Islands (54.81), and North Kalimantan (54.72), indicating a relatively good level of community knowledge, skills, and ability to use digital technology. Meanwhile, Lampung had the lowest score of 53.29 , followed by DKI Jakarta (53.73) and Central Java (53.75). Although there are differences in scores, the range of values between regions is relatively narrow, namely around 2.16 points , thus indicating that the level of digital literacy of the community between provinces tends to be more homogeneous than the readiness of digital infrastructure. This condition indicates that efforts to improve the digital competence of the community have shown quite good results in various regions. However, increasing digital literacy needs to be accompanied by strengthening the productive use of technology in the fields of economics, education, public services, and entrepreneurship so that the digital capabilities possessed by the community can make a greater contribution to increasing competitiveness and regional economic growth.

Caragliu & Del Bo (2025)revealed that the digital divide occurs due to uneven spatial distribution between urban and rural areas. The findings of this study are in line with the findings of Kong et al., (2026)that the digital divide occurs in cities due to low internet infrastructure, weak economic resilience, and unequal access to cellular infrastructure within the city. Heinz et al., (2026) revealed that inequalities in analog and digital learning

environments require designs that are sensitive to students' abilities in the digital learning process. Serrecchia (2024) revealed that the level of internet penetration in a region is distinguished by higher income levels to adopt technology more quickly. This is in line with the findings of Wongmith (2025) that advances in digital technology create more channels for citizens to access government services, but there are gaps in accessibility and utilization of services due to unequal benefits across the population.

Figure 3 Pillars of Digital Literacy in Indonesia



Source: IMDI (2025)

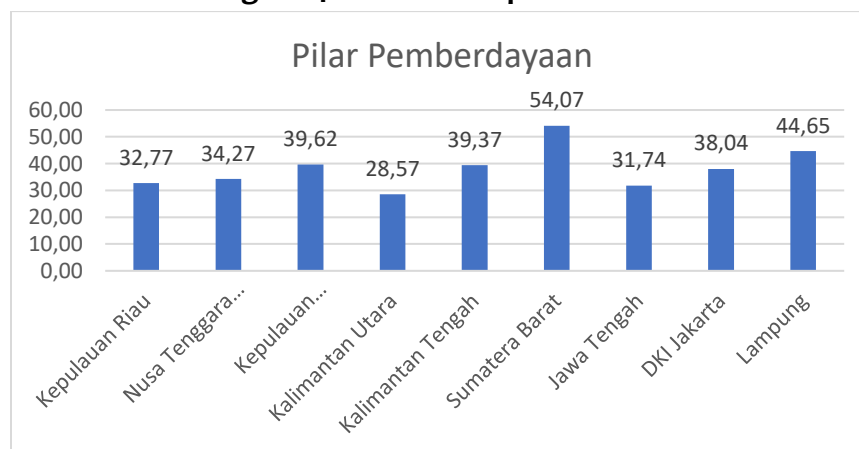
Based on Figure 4 , the Empowerment Pillar in the 10 provinces with the highest achievements shows greater variation than the Digital Literacy Pillar and the Infrastructure and Ecosystem Pillar. West Sumatra recorded the highest score of 54.07 , followed by Lampung (44.65), Central Kalimantan (39.37), Bangka Belitung Islands (39.62), and DKI Jakarta (38.04). Meanwhile, East Nusa Tenggara obtained a score of 34.27 , Riau Islands (32.77), Central Java (31.74), and North Kalimantan had the lowest score among the ten provinces, namely 28.57 . The fairly wide difference in scores, namely around 25.50 points between the highest and lowest scores, indicates that the community's ability to utilize digital technology to increase productivity, economic activity, entrepreneurship, and welfare has not developed evenly.

This indicates that the success of infrastructure development and increased digital literacy has not been fully accompanied by optimal use of digital technology in various economic sectors. Thus, the Empowerment Pillar remains a major challenge in Indonesia's digital transformation. Therefore, government policies need to focus not only on equitable access and improving digital competency, but also on strengthening the digital economy

ecosystem, developing digital-based MSMEs, increasing the adoption of digital financial services, and empowering communities so that digital technology can provide added value to productivity and economic growth across all provinces.

The findings of Anaraky et al., (2025) explain the digital divide that occurs at all levels, both internet users and non-users, influenced by socio-demographic factors. In line with the findings of Wongmith (2025) age, education, geographic location, broadband mobile technology affect the use of digital services. The internal digital divide occurs in Italy due to the presence of potential imitators and innovators, imitator regions with higher incomes adopt technology faster (Serrecchia, 2024) . The findings of Zhu & Li (2025) revealed that residents who do not use the internet, rarely use the internet, or consider the internet less important, tend to be less interested in purchasing commercial insurance and the digital divide has a negative impact on the number and proportion of commercial insurance purchases.

Figure 4 Pillars of Empowerment



Source: IMDI (2025)

Digital Readiness Typology of 38 Provinces in Indonesia Based on IMDI

Based on the results of the Indonesian Digital Society Index (IMDI) grouping, the digital readiness levels of 38 provinces in Indonesia can be classified into four typologies: Very High Digital Readiness, High Digital Readiness, Medium Digital Readiness, and Low Digital Readiness. This grouping provides an overview of the variation in digital readiness levels between provinces, influenced by the condition of digital infrastructure, community digital literacy, and the ability to utilize digital technology to support economic and social activities. This typology shows that digital transformation in Indonesia is still taking place unevenly, reflecting the existence of a digital divide between regions.

Typology I – Very High Digital Readiness

The first group comprises provinces with the highest level of digital readiness, consisting of Jakarta, West Java, Yogyakarta, Central Java, and the Bangka Belitung Islands. Provinces in this group have a relatively widespread internet network, supported by

adequate telecommunications infrastructure and a developed digital ecosystem. Furthermore, the community's digital literacy rate is relatively high, enabling the use of digital technology to become part of daily activities, including in education, government, business, and digital financial services. Another characteristic of this group is the balance of achievements across three main pillars: Infrastructure and Ecosystem, Digital Literacy, and Empowerment. This demonstrates that digital infrastructure development has been accompanied by the community's ability to utilize technology productively. Thus, digital transformation not only improves connectivity but also drives innovation, productivity, and regional economic competitiveness.

Typology II – High Digital Readiness

The second typology consists of the Riau Islands, Lampung, Bali, Jambi, South Kalimantan, East Kalimantan, North Kalimantan, and West Sumatra. Provinces in this group have relatively good digital infrastructure and a growing level of digital literacy. The use of digital technology in various sectors is also starting to increase, particularly in economic activities, public services, and digital communications. However, the achievement of the Empowerment Pillar in this group is still below that of the Infrastructure Pillar and the Digital Literacy Pillar. This condition indicates that the availability of infrastructure and the ability to use technology have not been fully followed by optimal use of digital technology to increase economic productivity, business innovation, and digital economic development. Therefore, the main challenge for this group is to strengthen the use of digital technology so that it can provide greater added value to regional economic development.

Typology III – Intermediate Digital Readiness

The group with the largest number of provinces falls within the Medium Digital Readiness typology, which includes Aceh, North Sumatra, Riau, South Sumatra, Bengkulu, West Kalimantan, Central Kalimantan, South Sulawesi, Central Sulawesi, West Sulawesi, Gorontalo, West Nusa Tenggara, and East Nusa Tenggara. In general, provinces in this group have a fairly well-developed digital infrastructure, and their communities have acquired basic digital technology skills. However, the use of digital technology to support productive economic activities remains relatively limited. Digital technology is used more for communication and social activities than for increasing business productivity, innovation, or developing the digital economy. This situation indicates that investment in digital infrastructure development has not fully translated into increased digital productivity for the community. Therefore, improving advanced digital literacy, strengthening the capacity of business actors, and expanding the digital economy ecosystem are policy priorities for this group of provinces.

Typology IV – Low Digital Readiness

The final typology represents a group of provinces with relatively low levels of digital readiness, consisting of Highland Papua, South Papua, West Papua, Central Papua, Papua,

North Maluku, Maluku, and Southeast Sulawesi. This group still faces various limitations across almost all dimensions of digital readiness. Access to internet networks and telecommunications infrastructure remains unequal, while the level of digital literacy among the public is relatively low compared to provinces in other groups.

Furthermore, the use of digital technology in business, education, public services, and digital financial services has not yet developed optimally. This situation means that the benefits of digital transformation have not yet been fully realized by the public, resulting in a relatively larger digital divide compared to other regions in Indonesia. Therefore, this group of provinces requires policy priorities in the form of accelerating digital infrastructure development, improving the quality of human resources through digital literacy, and strengthening technology-based community empowerment programs to narrow the inter-regional digital divide.

Overall, the digital readiness typology shows that a province's level of digital readiness is determined not only by the availability of digital infrastructure, but also by the community's ability to utilize technology productively to support economic activity and improve well-being. The higher a region's level of digital readiness, the greater its opportunities for developing innovation, increasing productivity, expanding digital financial inclusion, and strengthening its economic competitiveness. Conversely, provinces with low levels of digital readiness still face challenges in achieving the economic benefits of digital transformation. Therefore, digital transformation policies in Indonesia need to be designed in a differentiated manner according to the characteristics of each typology, so that government interventions focus not only on infrastructure development but also on increasing digital literacy, empowering communities, and strengthening the digital economy ecosystem in each region.

Table 1. Digital Readiness Typology based on 3 Pillars

Typology	Characteristics
I. Very High Digital Readiness	High infrastructure, high literacy, high empowerment
II. High Digital Readiness	Good infrastructure, good literacy, empowerment is starting to develop
III. Intermediate Digital Readiness	Infrastructure is sufficient, literacy is sufficient, empowerment is still low
IV. Low Digital Readiness	The three pillars are still relatively low

Source: Komdigi (2025)

The results of the IMDI 2025 survey show that digital readiness across provinces in Indonesia remains heterogeneous. Some provinces have achieved high levels of digital

readiness, supported by relatively balanced infrastructure, literacy, and technology utilization. However, the majority of provinces are still in the transition stage, with relatively good digital access and infrastructure but not yet accompanied by productive technology utilization. On the other hand, several provinces in eastern Indonesia still face limitations in these three pillars, making the digital divide a major challenge to regional development. These findings indicate that digital transformation policies need to shift from a focus on infrastructure development to strengthening digital literacy and community empowerment so that technology can have a greater impact on productivity, financial inclusion, and regional economic growth.

Digital Divide Cluster

Based on the IMDI 2025 score grouping, provinces in Indonesia can be classified into four digital divide clusters: *Digital Leader* , *Digital Emerging* , *Digital Transition* , and *Digital Lagging* . The *Digital Leader* cluster is dominated by provinces with centers of economic activity and high levels of urbanization, while the *Digital Lagging* cluster is mostly located in eastern Indonesia. Meanwhile, the majority of provinces are in the *Digital Emerging* and *Digital Transition* clusters , indicating that digital transformation has progressed but has not been fully followed by optimal technology utilization. This pattern indicates that the digital divide in Indonesia is not only related to infrastructure availability but also reflects differences in community capacity in utilizing digital technology for economic activities and public services. This finding supports the need for digital policies that are differentiated according to the characteristics of regional clusters , rather than a uniform approach for all provinces.

Based on Table 2, 7 provinces are included in the digital leader cluster, 11 provinces are included in the digital emerging cluster, 12 provinces are included in the digital transition cluster, and 8 provinces are included in the digital lagging cluster. This indicates that most provinces fall into the digital emerging and digital transition clusters due to differences in infrastructure availability, community capacity, and perceived benefits of implementing digital technology.

Table 2 Digital Divide Clusters in Indonesia for the 2025 Period

Cluster	Number of Provinces	Percent
<i>Digital Leader</i>	7	18.4
<i>Digital Emerging</i>	11	28.9
<i>Digital Transition</i>	12	31.6
<i>Digital Lagging</i>	8	21.1

Source: IMDI (2025)

Based on the IMDI scores of 38 provinces, four digital readiness clusters are shown in Table 3 below.

Table 3 Digital Readiness Clusters

Cluster	IMDI Range	Characteristics	Province
Cluster I – Digital Leader	≥ 50	Digital readiness is very high, becoming the center of digital transformation	DKI Jakarta, Bangka Belitung Islands, West Java, Central Java, DI Yogyakarta, Riau Islands, Lampung
Cluster II – Digital Emerging	45–49.99	Infrastructure and literacy are relatively good, but digital utilization is still developing	West Sumatra, East Java, North Kalimantan, Bali, Banten, South Kalimantan, Central Kalimantan, East Kalimantan, Jambi, West Kalimantan, South Sumatra
Cluster III – Digital Transition	40–44.99	Digital readiness is moderate, still requires strengthening access and utilization of technology	NTB, Riau, NTT, South Sulawesi, Central Sulawesi, West Sulawesi, Gorontalo, North Sumatra, North Sulawesi, Aceh, Bengkulu, Southwest Papua
Cluster IV – Digital Lagging	< 40	High digital divide, requires affirmative intervention	Maluku, Southeast Sulawesi, North Maluku, West Papua, Papua, Central Papua, South Papua, Mountainous Papua

Source: IMDI (2025)

Cluster I – Digital Leader

Cluster I is dominated by provinces on the island of Java and several provinces with high economic activity. Its main characteristics are: an IMDI score above the national average (44.53); relatively complete digital infrastructure; improved public digital literacy; and a developed digital ecosystem that supports digital economic activity. This region has the potential to become a driving force for the national digital economy.

Cluster II – Digital Emerging

Provinces in this cluster already have a strong digital foundation, but their use of technology to boost productivity and innovation still has room for improvement. This group is an ideal target for policies to strengthen the digital economy, empower digital MSMEs, and expand digital financial services.

Cluster III – Digital Transition

This cluster demonstrates the transition to a digital society. Basic infrastructure is becoming available, but the quality of digital literacy and technology utilization are uneven. Policy interventions should focus on: improving digital literacy; expanding digital public services;

strengthening the digital MSME ecosystem; and increasing access to digital financial services.

Cluster IV – Digital Lagging

This group represents the region with the largest digital divide. Most provinces are located in Eastern Indonesia, where geographic challenges impact infrastructure development and access to digital services. Policy priorities include: accelerating telecommunications network development; improving the quality of education and digital literacy; expanding digital financial inclusion; and strengthening digital-based government services.

The results of the IMDI 2025 indicate that digital transformation in Indonesia is still occurring unevenly across provinces. The national score of 44.53 is in the "sufficient" category, but there is a score gap of 25.86 points between the highest-performing province, DKI Jakarta (56.97), and the lowest, Papua Highlands (31.11). This pattern indicates a persistent digital divide, particularly between western and eastern Indonesia. Provinces with relatively high levels of digitalization are generally centers of economic activity and have more developed digital infrastructure and ecosystems, while some provinces in the eastern region still face limited access, literacy, and utilization of digital technology. This situation indicates that equitable digital transformation remains a significant challenge in supporting more inclusive regional economic development. Collaboration between the central government, regional governments, and the private sector is crucial to ensure that all regions of Indonesia can experience the benefits of inclusive and sustainable digital transformation (Chiquitita, 2025).

CONCLUSION

The results of the IMDI 2025 survey show that digital readiness across provinces in Indonesia remains heterogeneous. Some provinces have achieved high levels of digital readiness, supported by relatively balanced infrastructure, literacy, and technology utilization. However, the majority of provinces are still in the transition stage, with relatively good digital access and infrastructure but not yet accompanied by productive technology utilization. On the other hand, several provinces in eastern Indonesia still face limitations in these three pillars, making the digital divide a major challenge to regional development. These findings indicate that digital transformation policies need to shift from a focus on infrastructure development to strengthening digital literacy and community empowerment so that technology can have a greater impact on productivity, financial inclusion, and regional economic growth.

SUGGESTION

Based on the research findings, the government needs to direct digital transformation policies in a more focused manner, tailored to the characteristics of each

province's digital readiness. For provinces in the Digital Lagging and Digital Transition categories, policy priorities should be directed at equitable telecommunications infrastructure development, improving the quality of internet access, and strengthening public digital literacy. Meanwhile, for provinces already in the Digital Leader and Digital Emerging categories, policies need to focus on enhancing the Empowerment Pillar through the development of digital-based MSMEs, expanding digital financial services, strengthening innovation, and improving the digital skills of the workforce so that digital technology can provide added value to regional productivity and economic growth. Furthermore, stronger synergy is needed between the central government, local governments, the business world, universities, and the community in building an inclusive digital ecosystem. Further research is recommended to combine IMDI data with economic indicators, such as GRDP, financial inclusion, poverty, and the HDI, so that the relationship between digital readiness and regional economic development can be analyzed more comprehensively.

BIBLIOGRAPHY

- Abbas, J., Dabi, M., & Stojcic, N. (2026). Digital divide in industry 5.0 : Role of generative AI knowledge bases and intellectual capital in organizational resilience performance under territorial proximity. *Technovation*, 149(July 2025). <https://doi.org/10.1016/j.technovation.2025.103357>
- Amni, C., Sa'adah, N., & Nur, M. (2026). Bridging the digital divide in remote Islands: Exploring literacy, culture, and community identity in Pulau Breueh, Indonesia. *Social Sciences and Humanities Open*, 13(January), 102495. <https://doi.org/10.1016/j.ssaho.2026.102495>
- Anaraky, R. G., Alsoubai, A., Hanebutt, R. A., Nov, O., & Wisniewski, P. J. (2025). Reframing the digital divide: From barriers of internet non-use to gradients of use — Case study of a Southern U.S. city. *Technology in Society*, 83(June), 102983. <https://doi.org/10.1016/j.techsoc.2025.102983>
- APJII. (2026). *Survei Internet APJII 2026 Sebaran Penetrasi Pengguna Internet Tahun 2026*. Survei.Apji.or.Id. <https://survei.apjii.or.id/>
- Caragliu, A., & Del Bo, C. F. (2025). Regional institutions and the urban digital divide. *Papers in Regional Science*, 104(6), 100118. <https://doi.org/10.1016/j.pirs.2025.100118>
- Chai, S., Chen, Y., & Yoong, K. (2026). Digital divide and household portfolio investment efficiency : Evidence from China. *Emerging Markets Review*, 70(November 2025), 101407. <https://doi.org/10.1016/j.ememar.2025.101407>
- Chiquitita, M. (2025). *Daftar Provinsi Paling Melek Digital di RI: Siapa Lawan Jakarta?* Cnbc Indonesia. <https://www.cnbcindonesia.com/research/20250528150629-128-637020/daftar-provinsi-paling-melek-digital-di-ri-siapa-lawan-jakarta>
- Davaadorj, Z., & Enkhtaivan, B. (2026). Digital divide and crowdfunding. *Finance Research Letters*, 106(June), 110285. <https://doi.org/10.1016/j.frl.2026.110285>
- DiMaggio, P., & Hargittai, E. (2001). From the ' Digital Divide ' to ' Digital Inequality ': Studying

- Internet Use as Penetration Increases. *Princeton Center for Arts and Cultural Policy Studies, Working Paper*, 15(15).
http://webuse.umd.edu/webshop/resources/Dimaggio_Digital_Divide.pdf
http://www.maximise-ict.co.uk/WP15_DiMaggioHargittai.pdf
- Ghasemzadeh, B., Rasoulzadeh, S., Hartley, K., Bababeimorad, B., & Rahnamayiezekavat, P. (2026). Social challenges in smart cities : a scoping review and framework for policy action. *Technology in Society*, 84(October 2025), 103130.
<https://doi.org/10.1016/j.techsoc.2025.103130>
- Gómez-Barroso, J. L., Marbán-Flores, R., Rodríguez-Sánchez, A., & Miragaya-Casillas, C. (2026). Revisiting the digital divide in Europe — The profile of those on the wrong side of the divide. *Telecommunications Policy*, 50(5).
<https://doi.org/10.1016/j.telpol.2026.103206>
- Hannan, B., & Eynon, R. (2025). Widening the Digital Divide: The mediating role of Intelligent Tutoring Systems in the relationship between rurality, socioeducational advantage, and mathematics learning outcomes. *Computers and Education*, 233(December 2024), 105312. <https://doi.org/10.1016/j.compedu.2025.105312>
- He, M., & Xu, Y. (2026). Digital Inclusive Finance, the Digital Divide, and Rural Household Income. *Finance Research Letters*. <https://doi.org/10.1016/j.frl.2026.110555>
- Heinz, J., Neuberger, F., Eras, L., & Hauck-thum, U. (2026). Bridging the digital divide ? Effects of analog and digital reading interventions in German elementary schools. *Learning and Instruction*, 103(December 2025), 102324.
<https://doi.org/10.1016/j.learninstruc.2026.102324>
- Herrero-zamorano, M. T., & Navío-marco, J. (2026). *When defines where : how rural digital divide , customers' mobility and usage patterns have shaped mobile infrastructures*. 50(March). <https://doi.org/10.1016/j.telpol.2026.103205>
- Herrero-Zamorano, M. T., Navío-Marco, J., Bujidos-Casado, M., & Mendieta-Aragón, A. (2026). When defines where: how rural digital divide, customers' mobility and usage patterns have shaped mobile infrastructures. *Telecommunications Policy*, 50(5).
<https://doi.org/10.1016/j.telpol.2026.103205>
- Jauhiainen, J. S., Eyvazlu, D., Junnila, J., & Virnes, A. (2022). Digital divides , the Internet and social media uses among Afghans in Iran. *Technology in Society*, 70(December 2021), 102057. <https://doi.org/10.1016/j.techsoc.2022.102057>
- Kerras, H., Sánchez-Navarro, J. L., López-Becerra, E. I., & de-Miguel Gómez, M. D. (2020). The impact of the gender digital divide on sustainable development: Comparative analysis between the european union and the maghreb. *Sustainability (Switzerland)*, 12(8), 1–30.
<https://doi.org/10.3390/SU12083347>
- Komdigi. (2025). *Indeks Masyarakat Digital Indonesia 2025*.
- Kong, S., Hua, Z., & Yu, Y. (2026). Bridging the digital divide for resilient cities: Lessons from Chinese prefectures. *Habitat International*, 171(October 2025), 103776.
<https://doi.org/10.1016/j.habitatint.2026.103776>
- Li, Z., Zhi, C., Li, Q., & Qin, H. (2025). The impact of the digital divide on household wealth accumulation. *Finance Research Letters*, 85(PB), 107934.
<https://doi.org/10.1016/j.frl.2025.107934>

- Liu, Z., Zhuang, Y., & Ding, Y. (2025). How does the digital divide affect Chinese firms' cross-border M & A? *Journal of Asian Economics*, 101(November), 1–16.
- Lythreathis, S., Kumar, S., & El-kassar, A. (2022). The digital divide: A review and future research agenda. *Technological Forecasting & Social Change*, 175(April 2021), 121359. <https://doi.org/10.1016/j.techfore.2021.121359>
- Meng, C., Yu, X., Luo, J., & Jiang, Z. (2026). How does the digital divide between enterprises and customers affect enterprise performance? *Journal of Innovation & Knowledge*, 13(June 2025), 100914. <https://doi.org/10.1016/j.jik.2025.100914>
- Norris, P. (2003). Digital Divide: Civic Engagement, Information Poverty, and the Internet Worldwide. *Canadian Journal of Communication*, 21(1), 120–123. <https://doi.org/10.22230/cjc.2003v28n1a135>
- OECD. (2001). Understanding the Digital Divide. In *OECD Digital Economy Papers* (No. 49). <https://doi.org/10.1787/236405667766>
- Permana, E. (2026). Tidak Semua Provinsi Siap Masuk Ekonomi Digital. Indonesiana. <https://www.indonesiana.id/read/192347/tidak-semua-provinsi-siap-masuk-ekonomi-digital>
- Phu, L. H., Thao, L. P., Thuy, B. T., & Thao, N. H. (2026). The association between digital divide and economic growth: Evidence from 81 developing countries. *Social Sciences & Humanities Open*, 13(January), 102959. <https://doi.org/10.1016/j.ssaho.2026.102959>
- Serrecchia, M. (2024). Analysis of Internet development and internal digital divide by using the “.it” domain names as an indicator: Evidence from Italy. *Telecommunications Policy*, 48(10), 102870. <https://doi.org/10.1016/j.telpol.2024.102870>
- Shaengchart, Y., & Bhumpenpein, N. (2025). Bridging the digital divide in rural Thailand: Understanding potential factors influencing Starlink's satellite internet adoption. *Social Sciences and Humanities Open*, 11(February), 101355. <https://doi.org/10.1016/j.ssaho.2025.101355>
- Thi, N., Giang, P., Thi, L., Nhung, H., Binh, N., & Duy, P. (2026). Continuous digital transformation intention of small and medium enterprises (SMEs): New perspectives on the moderating role of innovation and IT knowledge. *Social Sciences & Humanities Open*, 14(12), 103153. <https://doi.org/10.1016/j.ssaho.2026.103153>
- Wang, K., Sun, K., Li, Y., & Xie, Q. (2025). Can digital technology break the financing dilemma of innovative SMEs? Based on the perspective of enterprise innovation. *Technological Forecasting & Social Change*, 214(November 2022), 124030. <https://doi.org/10.1016/j.techfore.2025.124030>
- Wongmith, N. (2025). Addressing the digital divide: A study on the predictors of government E-service utilization in Thailand. *Telecommunications Policy*, 49(9). <https://doi.org/10.1016/j.telpol.2025.103014>
- Zhu, Y., & Li, Q. (2025). Impact of the three digital divides on residents' commercial insurance purchase behavior: An empirical study based in China. *Research in International Business and Finance*, 76(February), 102853. <https://doi.org/10.1016/j.ribaf.2025.102853>
- Zola, C. (2025). Unravelling digital divides in the Emilia-Romagna region through the poset approach. *Telecommunications Policy*, 49(5), 102958. <https://doi.org/10.1016/j.telpol.2025.102958>