

UNDP Indonesia Policy Volume

Bright Prospect, Lingering Shadows

Toward an Inclusive Digital Transformation in Indonesia



Edited by

Norimasa Shimomura and Juliaty Ansye Sopacua

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Toward an Inclusive Digital Transformation in Indonesia

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INTRODUCTION

As Indonesia continues to reap the benefits of the digital revolution, the prospect of technological advancement looms large—a promise brimming with the potential for unprecedented economic growth, social inclusion, and enhanced connectivity. From bustling urban centers to remote villages, technology can bridge gaps, improve livelihoods, and empower individuals. The rapid integration of digital innovations into daily life signifies not merely a shift in tools but a profound transformation in societal dynamics. Yet, this bright prospect is shadowed by challenges that demand urgent attention. The path toward a fully inclusive digital landscape is fraught with complexities that, if left unaddressed, could deepen existing inequalities and create new barriers to meaningful participation.

Indonesia, with its diverse population of over 280 million people, is experiencing a remarkable surge in digital transformation. The government has initiated various programs aimed at enhancing digital infrastructure (Gusman, 2024)¹, promoting e-governance (Huda and Yunas, 2016)², and expanding internet access across urban and rural areas. In recent years, the rise of digital platforms has revolutionized sectors such as education (Sundari, H.D., and Utomo, P, 2019)³, healthcare (UNDP, 2021)⁴, and commerce (InCorp, 2024)⁵, providing new opportunities for economic engagement and social interaction.

However, amidst this rapid advancement lies a stark reality: the digital divide continues to widen. Significant disparities in access to technology persist, particularly among marginalized communities, rural populations, and low-income families. According to recent studies, millions of Indonesians remain without reliable internet access or the necessary digital literacy skills to navigate an increasingly online world (Amanta, F, 2022)⁶. In Indonesia, where diversity is a hallmark of its cultural landscape, the risk of leaving marginalized communities behind becomes even more pronounced. This divide is not merely a technological issue; it intertwines with socio-economic factors, educational access, and geographical barriers, creating a complex web of exclusion that must be addressed.

Yet, the challenges of digital transformation extend beyond access. As we navigate this new digital landscape, ethical considerations and standards emerge as critical components of a responsible digital ecosystem. Issues surrounding data privacy, algorithmic bias, and digital rights are increasingly at the forefront of public discourse, calling for a framework that prioritizes fairness and accountability.

Moreover, the rise of digital platforms has the potential to amplify polarization within society. While these platforms can foster connection and community, they can also entrench divisions, fuelling misinformation and discord (Harris, E., et al, 2023)⁷. The implications of such polarization are profound, as they threaten to undermine social cohesion and mutual understanding.

In this context, the imperative for inclusivity in digital transformation becomes clear. It is not merely an ideal to strive for; it is a necessary foundation upon which the future of Indonesia's digital landscape must be built. Addressing the digital divide, establishing ethical governance, and fostering a united society in the face of polarization are vital steps toward realizing the full potential of digital transformation for all Indonesians.

1 Gusman, SW. Development of the Indonesian Government's Digital Transformation. 2024. DIJJEEMS, vol 5, no.5

2 Huda, M., Yunas, N.S. The Development of e-Government System in Indonesia. 2016. Bina Praja, vol 8, no1.

3 Sundari, H.D., Utomo, P. Five e-learning for education in Indonesia. 2019. Advance in Social Science, Education and Humanity Research, Volume 440.

4 UNDP. Indonesia launches a blueprint on digital health to expand inclusive health care coverage. 2021.

5 Incorp. Exploring the Promising Future of E-commerce in Indonesia. 2024. Viewed September 2024.

6 Amanta, F. Unpacking Indonesia Digital Accessibility. 2022. Center for Indonesia Policy Study.

7 Harris, E., Steve, R., Claire, E.R., Jay, V.B. The role of Media in Political Polarization. 2023. International Journal of Communication. Vol 17.

Inclusivity: An imperative for successful transformation

Inclusivity is not merely a desirable outcome; it is an imperative that must guide our approach to digital transformation in Indonesia. The notion of inclusivity encompasses equitable access to technology, opportunities for participation in digital economies, the ability to engage in meaningful dialogues, and everything that the digital age offers—regardless of socioeconomic status, geographic location, or educational background.

The benefits of digital transformation are profound, from enhancing economic participation to improving education and healthcare access. However, if inclusivity is overlooked, the risk is high that these advantages will accrue only to the privileged few, further entrenching existing inequalities. This exclusion can lead to social fragmentation, where segments of the population feel marginalized and disconnected from the broader societal progress.

Moreover, fostering an inclusive digital environment strengthens democratic processes and civic engagement. When individuals are given the tools and opportunities to engage with digital platforms, they can advocate for their rights, share their stories, and contribute to societal discourse. This empowerment is crucial in a country as diverse as Indonesia, where voices from various ethnic, cultural, and socio-economic backgrounds enrich the national narrative.

The ethical dimensions of digital transformation also underscore the importance of inclusivity. As technologies evolve, ethical considerations surrounding data privacy, algorithmic fairness, and digital rights must be addressed. An inclusive approach ensures that diverse perspectives are considered in the development of policies and standards, promoting accountability and transparency. This inclusivity is vital for building trust among citizens, who must feel confident that digital systems serve their interests and uphold their rights.

Finally, fostering inclusivity is essential for mitigating polarization in an increasingly digital world. The rise of social media and online platforms has the potential to amplify divisive narratives and misinformation, creating echo chambers that reinforce existing biases and deepen societal divides. An inclusive digital environment not only encourages constructive dialogue but also helps dismantle these echo chambers, bridging divides and fostering understanding among differing perspectives. Ultimately, this approach strengthens the social fabric of the nation and ensures that technology serves as a bridge rather than a barrier.

In summary, inclusivity is not just a buzzword; it is a fundamental principle that underpins the success of Indonesia's digital transformation. By addressing access disparities, empowering marginalized communities, promoting ethical practices, and countering polarization, we can create a digital landscape that reflects the true diversity and potential of the nation. This policy volume aims to explore these critical themes, emphasizing that an inclusive approach is key to unlocking a brighter digital future for all Indonesians.

Three interconnected chapters, one holistic vision for digital success

The context shaped the tenet of the chapters in this volume—focusing on the digital divide, ethics and standards, and polarization. Intricately linked, each contributes to a comprehensive understanding of inclusivity in Indonesia’s digital transformation.

Narrowing divide as a foundation

At the heart of inclusivity lies the issue of the digital divide. Access to technology and reliable internet is essential for participation in the digital economy. Without it, individuals and communities are sidelined, unable to engage with the opportunities presented by digital transformation.

Eric Sugandi’s analysis of the digital divide in Indonesia highlights significant disparities in internet usage across regions and between urban and rural areas. While acknowledging the progress made in increasing internet access, Sugandi emphasizes that notable gaps remain, which must be addressed to ensure equitable digital inclusion nationwide. Using both qualitative and quantitative methods, Sugandi identified and analyzed four types of digital divides: geographical (including urban versus rural), gender, generational, and educational.

The study found two main issues contributing to the digital divide: access to ICT and digital literacy. Geographically, western provinces have higher levels of access compared to eastern provinces, with Papua, East Nusa Tenggara, and North Maluku having the smallest percentage of internet users. Urban areas consistently show higher internet usage than rural regions, influenced significantly by socio-economic factors such as income, education, and occupation. Notably, 48% of villages still lack Basic Transceiver Stations (BTS), which are necessary for internet access. Higher-income households and individuals with advanced education are more likely to have internet access.

The digital divide varies among different age groups, with the 25-49 age group having the highest proportion of internet users. Older individuals, particularly elderly women, face difficulties in embracing digital technology, partly because internet applications and content are not user-friendly for them. The gender digital divide in Indonesia is narrowing, as the ratio between the proportions of male and female internet users to their respective gender-based populations shows a decreasing trend. Individuals with more schooling are likely to have better skills for online activities such as transactions, information searches, and job hunting.

Sugandi offers three policy recommendations: 1) invest in expanding internet infrastructure, particularly in rural areas; 2) implement digital literacy programs to empower individuals, especially women and girls; and 3) promote policies to make internet access more affordable for low-income households.

Upholding ethics and standards: Ensuring fairness and accountability

As we strive to bridge the digital divide, we must not overlook the ethical implications of digital transformation. In her article on ethics and standards, Trevi Putri underscores the need for frameworks that ensure technology serves everyone fairly and responsibly. Ethical considerations are crucial in shaping policies that govern technology use, data privacy, and algorithmic decision-making.

The article emphasizes the importance of robust data protection regulations to safeguard individuals’ personal information and prevent misuse. It also addresses algorithmic bias, which can perpetuate existing inequalities and discrimination, particularly against marginalized groups. This bias often stems from training data that reflects historical and societal prejudices, leading to outcomes that disproportionately affect certain demographics and result in unfair treatment.

Putri argues that algorithms themselves are not inherently good or evil; their ethical implications depend on how they are designed, implemented, and used. This is especially relevant in the gig economy, where algorithm-driven platforms often place workers in precarious situations without adequate protections.

Finally, the article highlights the role of digital literacy in empowering individuals to protect their data and understand their digital rights. It calls for comprehensive digital literacy programs to ensure meaningful participation in the digital transformation. Putri concludes with three policy recommendations: strengthening data privacy regulations, promoting algorithmic transparency, and fostering inclusive technology development.

Resolving polarization: Breaking barriers for a cohesive society

The third article addresses the significant threat of polarization to social cohesion in our increasingly digital society. Philips Vermonte analyses how the historical context of partisan identities, combined with the pervasive influence of digital platforms, creates a complex environment for political engagement in Indonesia.

The article highlights that Indonesia's partisan identities have deep historical roots, particularly linked to religious affiliations and socio-political movements. The divide between Muslim conservatives and non-conservatives has long shaped electoral behaviors and political alignments. Although these divisions were thought to have diminished after Indonesia's post-reformasi era, they have resurfaced strongly, notably during the 2014 and 2019 elections. The Jakarta gubernatorial election of 2016-2017 marked a peak in this polarization, driven by identity politics and campaign messages that reignited dormant ideological cleavages. Recent surveys show that while polarization persists, it manifests variably among the public. Although political polarization seems to be declining, its remnants continue to impact societal attitudes. This includes "affective polarization", characterized by distrust and animosity toward those with differing political views, which challenges constructive dialogue.

Vermonte's analysis underscores the critical role digital technologies, particularly social media, play in amplifying political polarization. These platforms enable the rapid dissemination of partisan content, reinforcing existing biases and divides. Users often engage with content that aligns with their views, creating echo chambers that deepen polarization. The prevalence of misinformation on social media misleads the public about political candidates and policies, complicating the political landscape. This digital propaganda allows groups to discredit opponents and manipulate public opinion, especially as younger generations, more exposed to digital media, see their political consciousness shaped significantly by online interactions. While this demographic is often more politically aware, their engagement can also lead to increased polarization due to the nature of digital discourse.

To address these challenges, the article recommends the following: 1) promote interfaith and intergroup dialogue: develop initiatives to foster communication and understanding among diverse religious and ethnic groups, particularly targeting younger demographics influenced by social media; 2) enhance misinformation awareness: implement public education campaigns to improve recognition of misinformation and disinformation, especially in politics, to mitigate their impact on public opinion; 3) regulate social media platforms: policymakers should consider regulations that promote transparency in political advertising and the dissemination of information on social media to counteract the effects of polarization and misinformation.

The United Nation Secretary General's roadmap for Digital Cooperation 2020⁸ envisioned eight key areas for actions: promoting digital infrastructure and connectivity, ensuring digital inclusion and strengthening digital capacity, ensuring protection of human rights and promoting security, and

8 Report of Secretary General Roadmap for Digital Cooperation. 2020. United Nations.

fostering effective digital cooperation. The report calls for collaboration and cooperation among all stakeholders, government, private sectors, civil society, international organizations, academic institutions, the technical community, and other relevant stakeholders to work together to achieve tangible results.

As Secretary General stated, “We have collective responsibility to give direction to these technologies so that we maximize benefits and curtail unintended consequences and malicious use.” (UN SG, 2020) We echo this call to action for stakeholders in Indonesia. May this volume serve as both a roadmap and a catalyst for dialogue, inspiring actions toward a more inclusive digital future for all Indonesians. The challenges we face are significant, but so too are the opportunities that lie ahead. By addressing the digital divide, promoting ethical governance, and combating polarization, we can dim the shadows and unlock the full potential of the bright prospect of digital transformation.

Let us move forward with determination and hope, united in our commitment and responsibility to ensure that the benefits of digital transformation are realized for all, illuminating a future where every Indonesian can participate, thrive, and contribute to the nation’s growth.

Norimasa Shimomura and Juliaty Ansye Sopacua



I. CLOSING THE GAP: DIGITAL DIVIDE IN INDONESIA

By Eric Alexander Sugandi

1. Introduction

Accelerated enhancements in information and communication technology (ICT) since the late 20th century have induced the rapid development of digital technology, which in turn allows the global society to embrace digital transformation. ICT can be defined as a wide range of services, applications, and technologies using various types of equipment and software (Rice, 2003), while digital technology refers to the use of electronic devices to store, generate, or process data (Pandya and Lodha, 2021).

Fitzgerald et al. (2014) define digital transformation as the use of new digital technologies such as social media, mobile technology, analytics, or embedded devices to enable major business improvements including enhanced customer experiences, streamlined operations, or new business models. According to Hinings et al. (2018), digital transformation is the combined effects of several digital innovations bringing about novel actors (and actor constellations), structures, practices, values, and beliefs that change, threaten, replace, or complement existing rules of the game within organizations, ecosystems, industries, or fields. Verhoef et al. (2022) suggest that digital transformation is the final phase of the implementation of digital technology in an organization that leads to the development of new business models¹.

Digital transformation is not confined only to the business and economic-related sectors. It also takes place in government and politics, e.g., the introductions of e-government and e-vote (to gradually replace the conventional paper-based and/or face-to-face methods), online political campaigns (as opposed to face-to-face campaigns), and public policy monitoring by the netizens (to supplement the formal monitoring function exercised by legislative bodies) in many countries. The digital transformation touches the social and cultural aspects of societies as well, as evidenced by the growing number of social media users, the replacement of paper-based newspapers with online news, and the rapid growth of the digital entertainment industry and markets.

Indonesia is a big potential market for the digital technology industry due to its big population, large-size middle-income class, and high penetration of the internet and mobile phones (Sugandi, 2022). Statistics Indonesia (Badan Pusat Statistik, BPS) reported that the percentage of the population that has accessed the internet rose from 25.9% of the total number of households in 2011 to 86.5% in 2022, while the percentage of the population that has cellular (mobile) phone rose from 39.2% to 67.9% over the same period (BPS, 2014, 2023). Indonesia has the fifth most engaged internet users in the world, after the Philippines, Brazil, Thailand, and Colombia. On average, Indonesians spend around six hours per day accessing the internet. Over 85% of internet users in Indonesia were users of social media, where WhatsApp, Facebook, and Instagram were the most popular platforms (World Bank, 2021).

¹ According to Verhoef et al. (2022), there are three phases of implementation of digital technology in an organization: (1) digitization (which is the encoding of analog information into a digital format that allows computers to store, process, and transmit the information); (2) digitalization (where digital technologies are used to alter existing business processes); and (3) digital transformation (where digital technologies cause company-wide changes that lead to the development of new business models).

The development of the digital technology industry and its market in Indonesia is strongly linked to digital transformation. Digital transformation in Indonesia was initially driven by the implementations of digital technology in the business sectors, such as the introduction of mobile and internet banking and payment services by banks and financial technology (fintech) companies. Many fintech companies offer e-commerce services, such as merchandise trading (e.g., Bukalapak, Shopee, Tokopedia, and Lazada), food purchase and delivery (e.g., GoFood and GrabFood), and passenger transport (e.g., Gojek and Grab). Over the past decade, many fintech startup companies have emerged and some of them obtained unicorn status (i.e., a startup company with a market value higher than US\$1 billion) after receiving funding injections from big investors. These companies include Tokopedia, Traveloka, Bukalapak, OVO, and JD.ID. A fintech startup company, Gojek, has become a decacorn (i.e., its market value is greater than US\$10 billion). These six fintech startups utilize big data and cloud computing technology (Abdillah, 2020).

Digital transformation also reaches out to the public sector. The Government of Indonesia (GOI) has gradually implemented e-government services for public service delivery. The Megawati Administration initiated the process by issuing Presidential Instruction (Inpres) No. 3/2003 about the National Policy and Strategy on e-Government Development to provide a legal basis for the implementation of e-government. In 2008, the Yudhoyono Administration issued Presidential Regulation (Perpres) No. 10/2008 to implement the electronic platform for custom services under the framework of Indonesia National Single Window (INSW). The Widodo administration introduced the e-government in 2014 to provide public services under one roof. President Joko Widodo expressed his intention to fully digitalize the GOI by 2025². The implementation of e-government in Indonesia is progressing and on the right track. Indonesia's score based on the UNDESA e-Government Development Index (EGDI) rose from 0.4487 in 2014 to 0.7160 in 2022, while its ranking improved from 106 (out of 193 countries in the survey) to 77 (out of 193 countries) over the same period^{3,4}.

The COVID-19 pandemic and the policy implementation of restrictions on social activities (Pemberlakuan Pembatasan Kegiatan Masyarakat, PPKM) have given impetuses to the process. The GOI, business players, academia, and other stakeholders in the country were compelled to utilize digital technology when the mobility of people and goods was restricted. For instance, the GOI introduced the PeduliLindungi application to monitor and contain the spread of the COVID-19 virus. The GOI also issued the pre-employment card (Kartu Prakerja) to provide entrepreneurial skills for workers who lost their job due to the pandemic. Many sellers and buyers, particularly in urban areas, adjusted their modes of transactions from face-to-face interactions to online and mobile transactions.

The PPKM has accelerated the market development of digital education services (EduTech) and digital health services (HealthTech). Schools and campuses changed their teaching and examination methods from face-to-face interactions to online (remote) learning. Hospitals and clinics have started offering online consultations on medical problems through the internet. Many EduTech and HealthTech startup companies have emerged. The GOI established a partnership with EduTech companies that provide courses or training (e.g., Tokopedia, Ruangguru, MauBelajarApa, Bukalapak, Pintaria, Sekolahmu, Pijar Mahir, and Sisnaker) (Sugandi, 2022).

Digital transformation, however, is not equally embraced by all of Indonesia's citizens. For instance, not all citizens have the same access to the internet and are familiar with digital applications on mobile phones. This inequality among segments of a population to use digital technology is referred to as the digital divide. The OECD defines the "digital divide" as the gap between individuals, households, businesses, and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the internet for a wide variety of activities (OECD, 2001).

2 Ming, E. L. (2022, September 26). *Is Indonesia on track to a fully Digital Government by 2025?*. GovInsider. <https://govinsider.asia/intl-en/article/is-indonesia-on-track-to-a-fully-digital-government-by-2025>

3 United Nations Department of Economic and Social Affairs (UNDESA). (2014). *United Nations e-Government Survey 2014: E-Government for the Future We Want*. New York: UNDESA. p. 208.

4 United Nations Department of Economic and Social Affairs (UNDESA). (2022). *United Nations e-Government Survey 2022: The Future of Digital Government*. p. 216.

The digital divide is an issue that needs to be addressed by the GOI and other stakeholders in Indonesia. There are digital divides among different geographies, between urban and rural areas, among age cohorts (generations), among different education levels, and between different genders. For example, there is a substantial difference in the ratios of internet users to the total population between the Eastern and Western parts of Indonesia. In 2022, for example, about 84.7% of the population aged 5 years old or above in the Special Capital Region of Jakarta (DKI Jakarta) used the internet over the past three months, but the ratio is only 26.3% in Papua. There is also a substantial difference between the number of households using the internet in urban areas (90.9% of the total number of urban households in 2022) and rural areas (80.5% of the total number of rural households). In terms of their highest education level attainment as of 2022, 21.6% of internet users in Indonesia had an elementary school education level, 19.9% had a junior high school education level, 38.7% had an upper senior high school education level, and 19.9% had a tertiary education level. In terms of gender, 63.8% of the male population aged 5 years old or above in Indonesia used the internet over the past three months in 2022, while the ratio is 63.5% for the female segment (BPS, 2023).

Although digital transformation can improve efficiency and promote economic growth, the digital divide can exacerbate inequalities in Indonesia. The World Bank reported that higher-skilled workers have benefited more than lower-skilled ones from the expansion in internet access. College or university degree holders or those with higher degrees receive the highest additional average income return from internet penetration compared to those with lower education levels. While digital transformation provides some benefits for the female population (e.g., e-commerce provides a pathway for Indonesian women to re-enter the labor market after leaving jobs due to pregnancy/maternity or domestic work), there are still gaps between the benefits enjoyed by the male and female segments of the population. Economic opportunities from digital gig jobs in Indonesia mostly benefited the “young, relatively better-educated, male, urban” segment more than other segments of the population (World Bank, 2021).

This paper will address various types of the digital divide in Indonesia: (1) geographic digital divide; (2) generational digital divide; (3) education digital divide; and (4) gender divide. This paper is a combined qualitative and quantitative study that mostly uses secondary data and information but is also complemented by in-depth interviews and discussions with several experts on digital transformation and the digital divide in Indonesia. It identifies factors that affect various types of the digital divide in Indonesia. By identifying these factors, this study seeks to find possible ways to improve the utilization of digital transformation and narrow the digital divide in Indonesia. This paper contributes to the study of the digital divide in Indonesia and provides policy recommendations for the GOI and other stakeholders in Indonesia to further close the gaps by utilizing digital transformation.

This paper proceeds as follows. Section 2 explores literature related to the digital transformation and digital divide in Indonesia, as well as in other countries. Section 3 elaborates current situation of the digital transformation and digital divide in Indonesia. Section 4 identifies digital divide problems and the factors causing them. Section 5 discusses policy and program recommendations to address the digital divide problems in Indonesia. Section 6 concludes the paper.

2. Related literature

Previous studies on digital transformation and the digital divide at global and regional levels highlight several key points. Jun, Park, and Kim (2022) found that Asia-Pacific is the most digitally divided region, with Indonesia in the middle grade category. Liu and Fan (2022) noted that the digital divide negatively impacts vulnerable groups, especially during the COVID-19 pandemic, and highlighted a widening gender digital divide in Indonesia. Sey (2021) investigated women's participation in digital-economy-related occupations in ASEAN countries and found significant gaps in access to the digital economy.

In Indonesia, the Economic Research Institute for ASEAN and East Asia (ERIA) (2023) concluded that Indonesia needs to develop a digital-friendly ecosystem to facilitate digital transformation through the following policy priorities: (1) improvement in digital connectivity; (2) prioritization of the development of the smart-phone economy; (3) liberalization of the digital economy; and (4) human skills development. Bachtiar, Berlianto, and Amelia (2023) emphasized the importance of addressing socioeconomic factors to improve internet access and suggested that policy interventions should focus on women, the poor, people living in rural areas, people working in the informal sector, the elderly, and people with disabilities.

Starlika (2022) developed a Digital Readiness Index to help policymakers address digital readiness at the provincial level. This index measures the readiness of different provinces in Indonesia to adopt and benefit from digital technologies. The index takes into account various factors such as internet penetration, digital skills, and the availability of digital infrastructure. Starlika's work emphasizes the importance of understanding regional disparities in digital readiness to formulate targeted policies that can bridge the digital divide across different provinces. Bahagijo et al. (2022) examined the role of civil society organizations in closing the gender digital divide, while Marini et al. (2019) identified factors causing the gender digital divide, including geographic, skills and education, government policy, and economic and cultural systems.

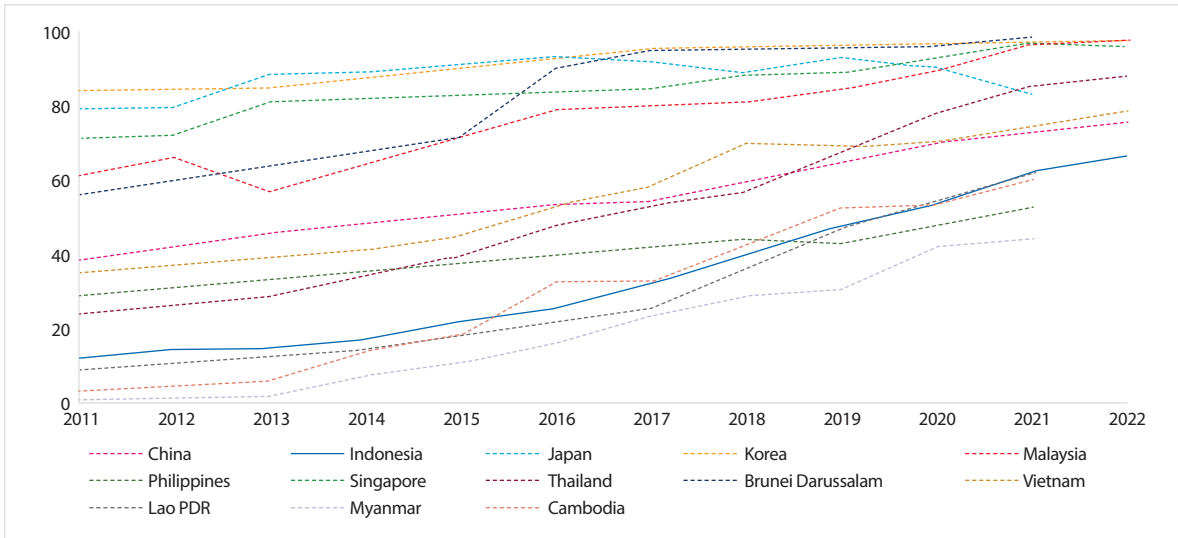
Onitsuka, Hidayat, and Wang (2018) assessed the generational digital divide in Indonesian villages and concluded that distinctive challenges for each group at multiple stages of the digital divide should be tackled with different policies. Lestari and Sunarto (2018) examined the digital divide among family members and found that patriarchal thinking contributes to unequal access. They also found that women of the Baby Boomers generation are marginalized in accessing information from the internet due to unequal power over the use of communication technology devices among family members.

Studies at the city and village levels, such as those by Oktavinaoor (2020) and Yanti and Alamsyah (2015), revealed that age and education level significantly impact digital skills and access.

3. Digital technology transformation and digital divide situation in Indonesia

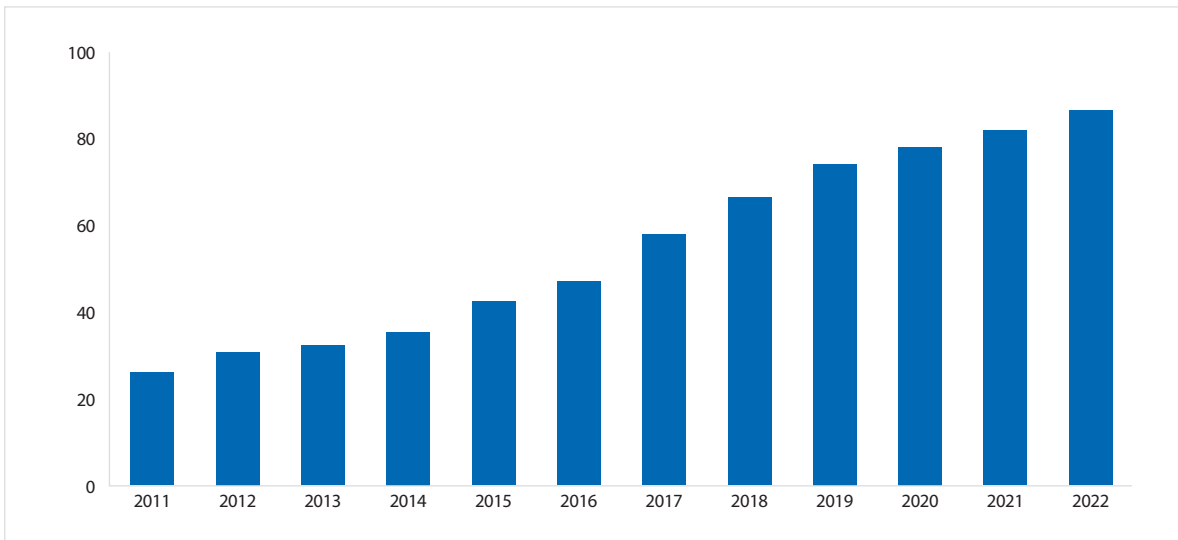
One indicator of the rapid digital transformation in Indonesia is the rapid growth of the number of internet users in the country. The number of individual internet users in Indonesia continues to increase, reaching 66% of the country’s total population in 2022. Yet, the proportion of internet users in Indonesia is relatively low compared to many other ASEAN+3 countries (Chart 1).

Chart 1. Number of individual internet users in the ASEAN-5+3 countries, 2011 – 2022 (% of population)



Source: World Bank

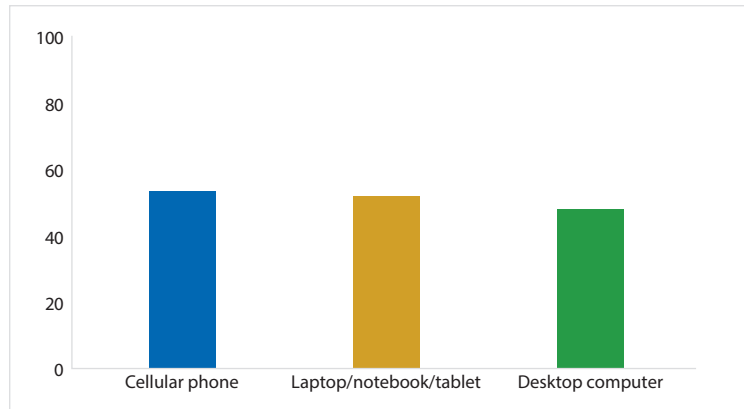
Chart 2. Internet-using households in Indonesia, 2011 – 2022 (% of total households)



Source: Statistics Indonesia (BPS)

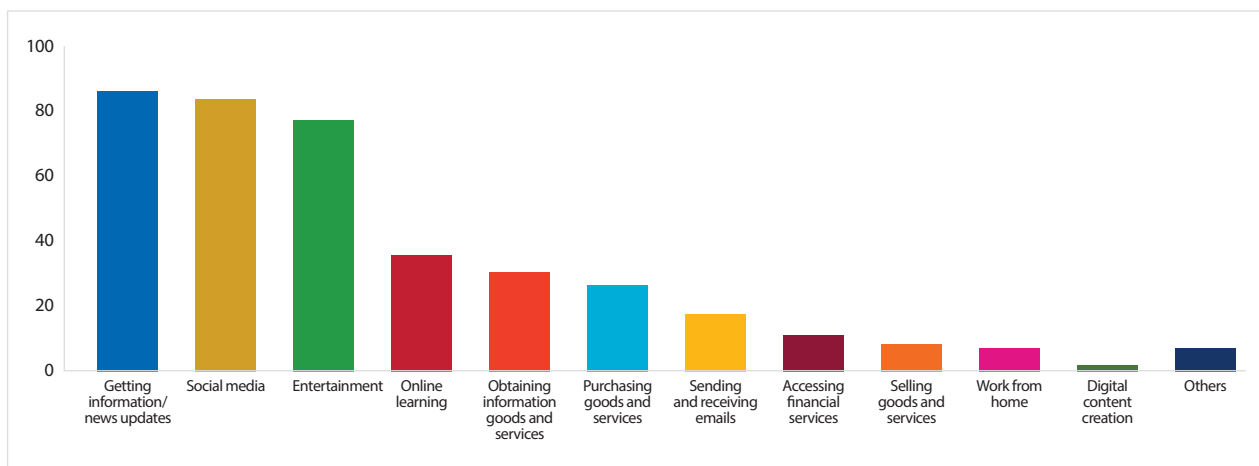
In 2022, 87% of households in Indonesia used the internet (Chart 2). Most of these households accessed the internet via mobile (cellular) phones (Chart 3), primarily for obtaining information and news updates, using social media, and enjoying entertainment (Chart 4).

Chart 3. Proportions of households using internet in Indonesia in 2022 based on device used (% of total internet-using households)



Source: Statistics Indonesia (BPS)

Chart 4. Proportions of households using internet in Indonesia in 2022 based on purpose of use (% of total internet-using households)



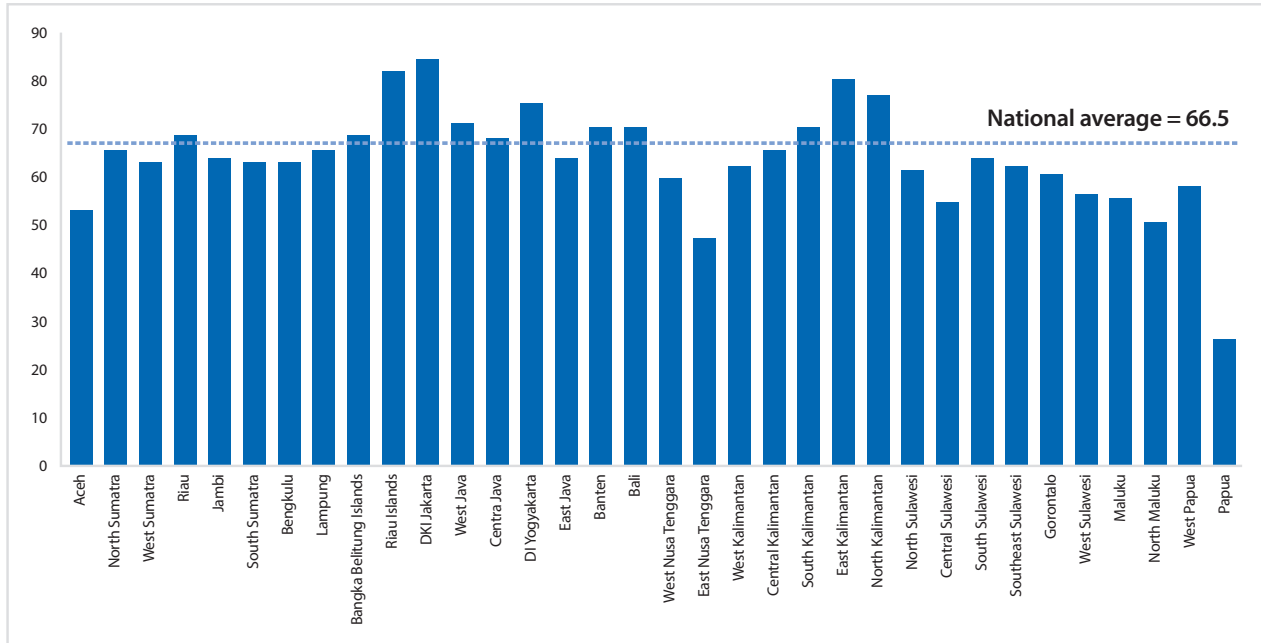
Source: Statistics Indonesia (BPS)

Although rapid digital transformation generally benefits Indonesia, various types of the digital divide need to be tackled by the GOI and the country's other stakeholders to enable the entire population segments to access and utilize digital technology to improve their life.

3.1. Geographic digital divide

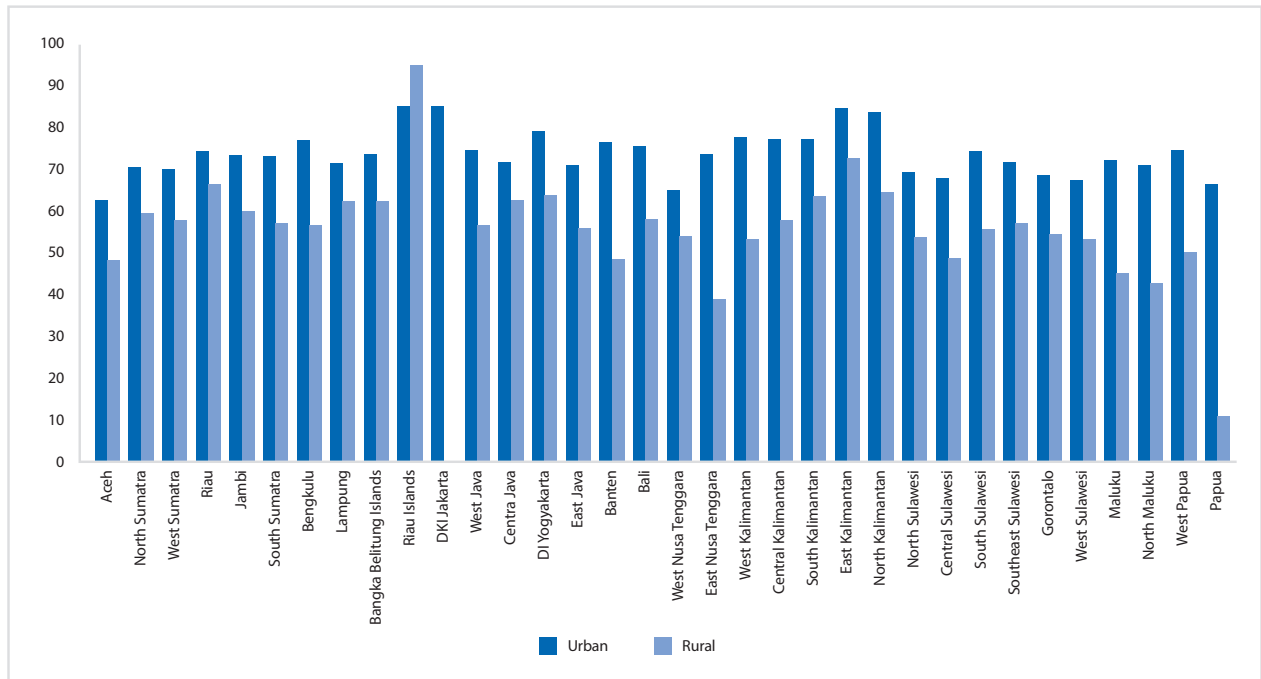
The digital divide exists across provinces in Indonesia and between urban and rural areas. Internet usage ratios vary, with higher rates in Java and Kalimantan. However, the gap is narrowing as internet use grows rapidly in provinces outside Java (Chart 5). Urban areas generally have higher internet usage ratios than rural areas, except in the Riau Islands Province, but this gap is also closing due to the rapid increase in rural internet users (Chart 6).

Chart 5. Individual internet users in Indonesia by province in 2022
(% of population aged 5+ in each province)



Source: Statistics Indonesia (BPS)

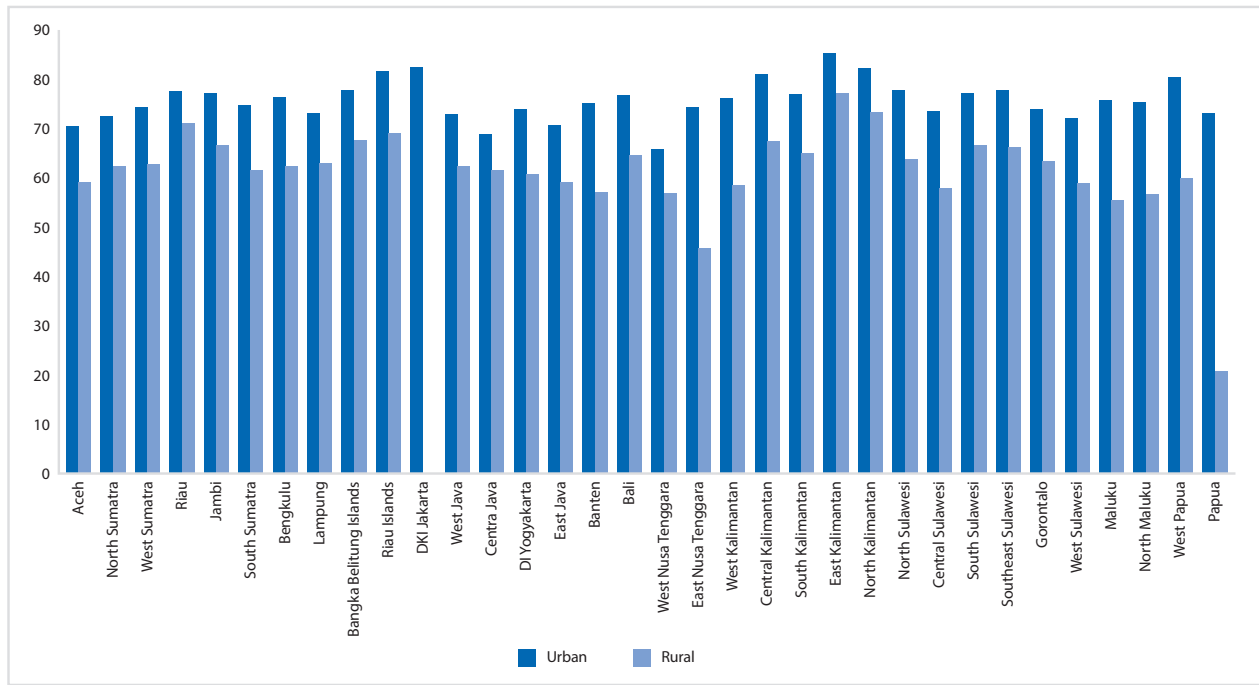
Chart 6. Individual internet users in Indonesia's urban and rural areas by province in 2022
(% of total population aged 5+ in each area)



Source: Statistics Indonesia (BPS)

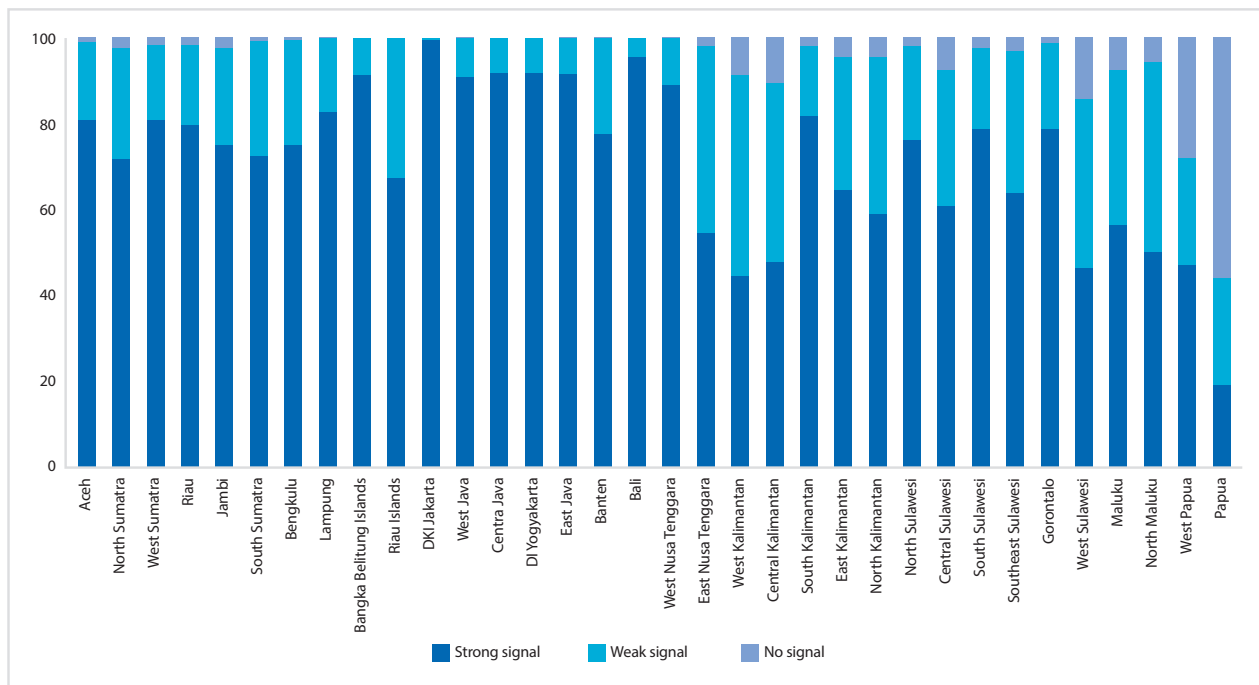
In all provinces of Indonesia, the percentage of people owning cellular phones is higher in urban areas than in rural areas (Chart 7). While most villages and wards have strong cellular phone signals, some areas still experience weak or no signal. As of 2021, many villages and wards in Papua and West Papua could not receive cellular signals (Chart 8).

Chart 7. Individuals owning cellular phones in Indonesia’s urban and rural areas by province in 2022 (% of population)



Source: Statistics Indonesia (BPS)

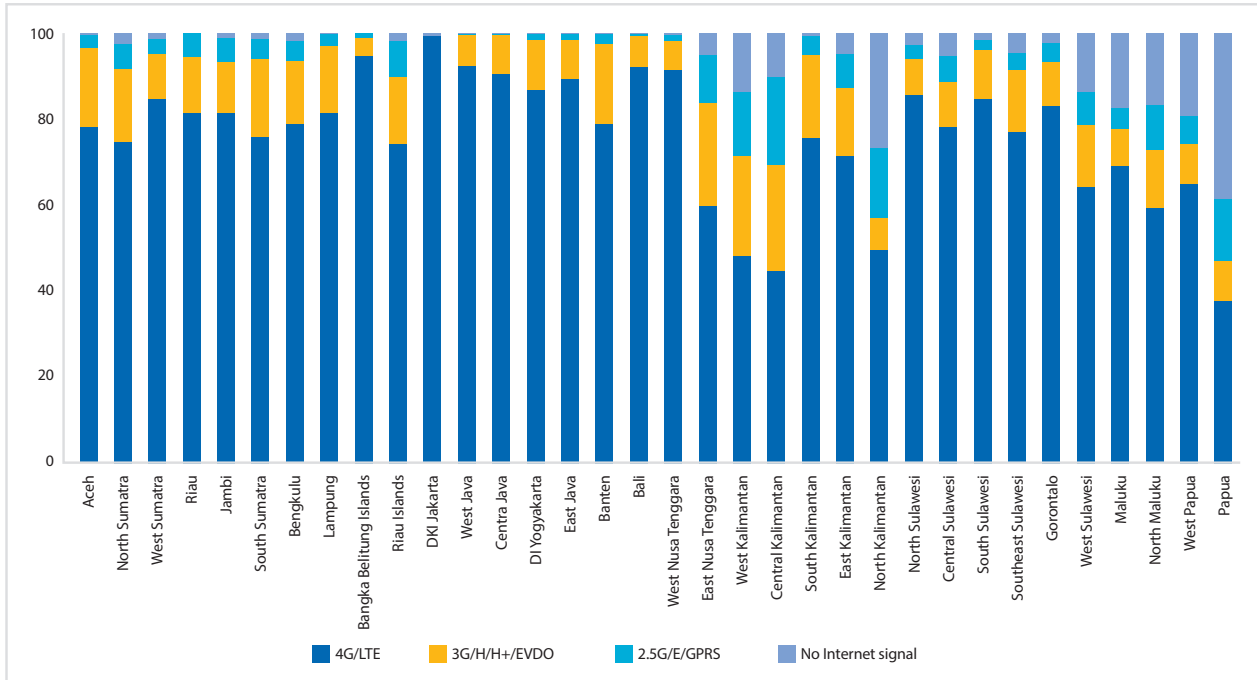
Chart 8. Proportions of villages and wards based on the strength of cellular phone signals in Indonesia by province in 2021



Source: Statistics Indonesia (BPS)

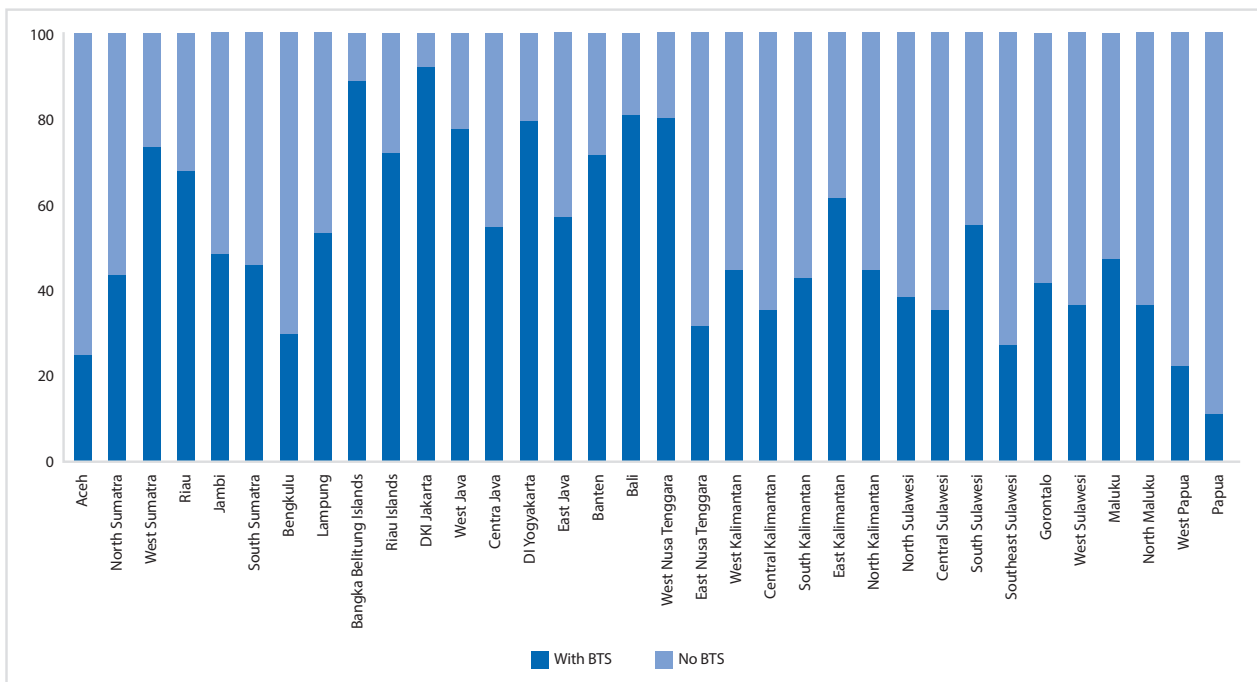
Most villages and wards in Indonesia receive 4G/LTE signals (76% in 2021). However, many still get less advanced signals like 3G (12.7%) and 2.5G (5.6%), or no internet signal at all (5.6%) (Chart 9). The 5G technology is still limited, with only a 2.5% market penetration rate as of 2021. Chart 10 displays the proportion of villages and wards with or without the presence of base transceiver station (BTS) transmitters in Indonesia’s provinces as of 2021. A BTS allows cellular phone users to access cellular phone and internet signals by wirelessly connecting their devices to telecom operator networks. There are still many villages and wards in Indonesia’s provinces that do not have BTS transmitters (48.8% of total number of villages and wards in 2021). With mountainous terrains, dense jungles, and/or long distances between villages, the presence of BTS will help cellular phone and internet users in areas outside Java to access cellular and internet signals.

Chart 9. Proportions of villages and wards based on type of internet signal in Indonesia by province in 2021



Source: Statistics Indonesia (BPS)

Chart 10. Proportions of villages and wards with or without BTS transmitter in Indonesia by province in 2021



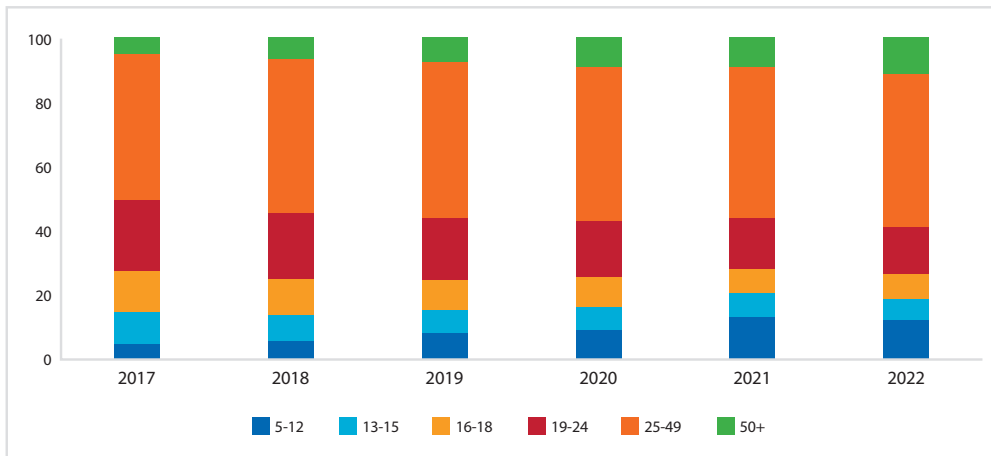
Source: Statistics Indonesia (BPS)

3.2. Generational digital divide

The digital divide exists among different age groups in Indonesia. The 25-49 age group has the highest proportion of internet users at both the national and provincial levels (Charts 11 and 12). However, the proportions of internet users aged 13-15, 16-18, 19-24, and 25-49 have gradually declined. In contrast, the shares of internet users aged 5-12 and 50+ have increased (Chart 11). These changing proportions indicate that the youngest and oldest age groups are becoming more familiar with digital technology. The Ministry of Education and Culture promotes digitalization for elementary school students by providing computer devices, internet access, learning modules, and teacher training. The increasing proportion of older internet users shows that they are learning and becoming more active in using digital technology.

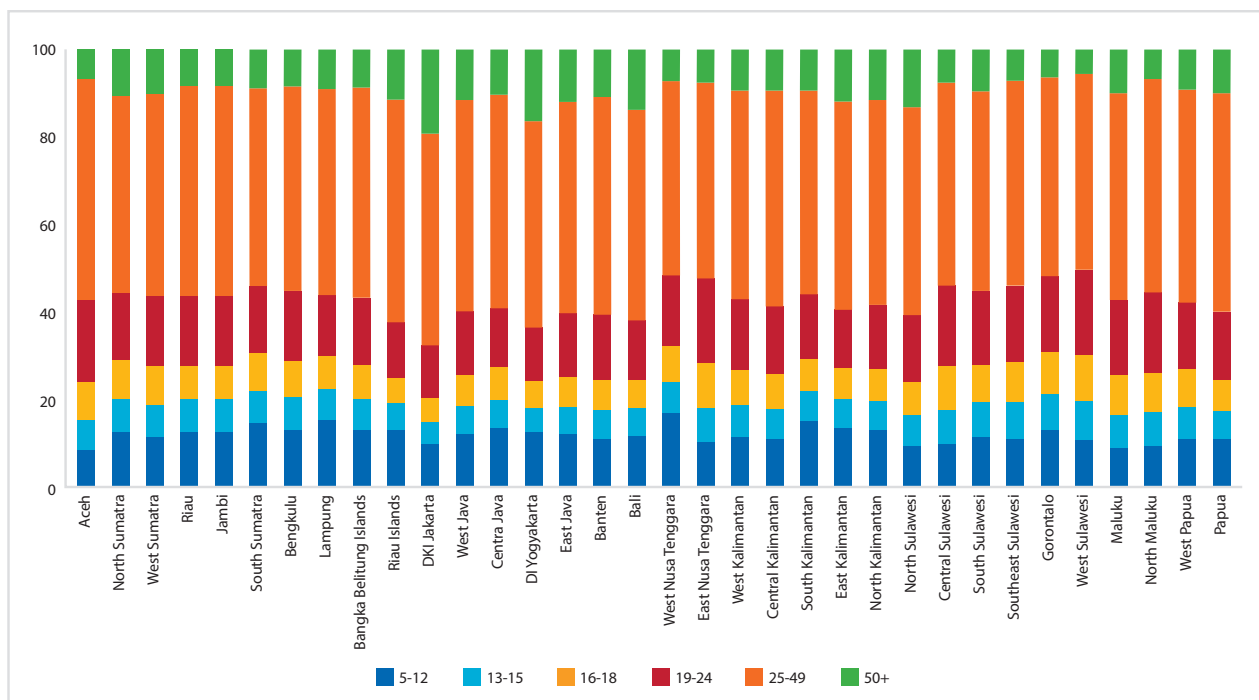
The COVID-19 pandemic and the PPKM also encouraged these age groups to use digital technology. With schools closed, elementary students had to use the internet for online studying. Meanwhile, the GOI regulation requiring the use of the PeduliLindungi application in public spaces compelled older individuals to learn to use digital technology.

Chart 11. Distribution of individual internet users in Indonesia based on age, 2017 – 2022



Source: Statistics Indonesia (BPS)

Chart 12. Distribution of individual internet users in Indonesia based on age in 2022 by province



Source: Statistics Indonesia (BPS)

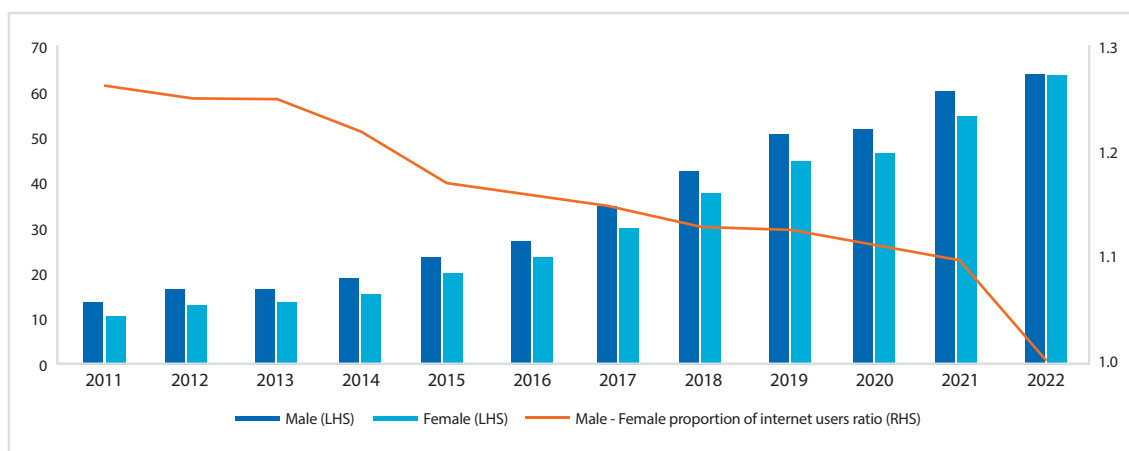
A joint survey by Katadata and the Ministry of Communication and Information in 2022 shows different internet usage habits among various age groups. Out of 10,000 respondents, 89% often or very often used the internet for short message communication, 62% for social media, 55% for streaming music, 54% for browsing, 31% for e-commerce, 22% for accessing online news, 17% for playing online games, 13% for working, 12% for online meetings, and 11% for sending emails. The survey also reveals that 56% of Generation Z (under 24 years old) spent IDR 50,000-100,000 on internet usage in 2022. This amount was also spent by 54% of Generation Y (ages 24-39), 61% of Generation X (ages 40-55), and 50% of Boomers (over 55 years old).

3.3. Gender digital divide

The proportions of male and female internet users to their respective gender-based population segments have continued to increase, while the gender digital divide in Indonesia is narrowing. The ratio between the proportions of male and female internet users to the respective gender-based population shows a decreasing trend (Chart 13).

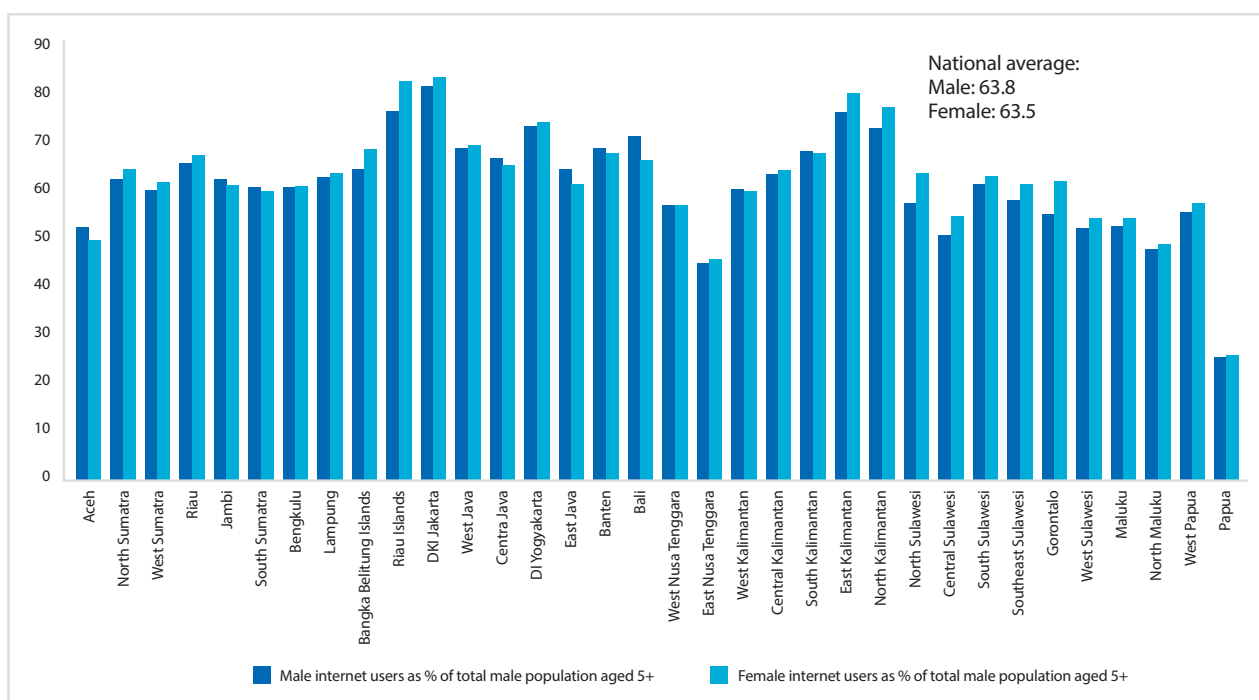
As of 2022, the proportions of female internet users to the female population were higher than the proportion of male internet users to the male population in almost all provinces. However, at the national level, the proportion was slightly higher for male internet users to the male population (63.8%) than for female internet users to the female population (63.5%). This is because the proportions of male internet users to the male population were higher than those of female internet users to the female population in some provinces with high populations, particularly Central Java and East Java (Chart 14).

Chart 13. Male and female individual internet users in Indonesia (% of gender-based population aged 5+)



Source: Statistics Indonesia (BPS)

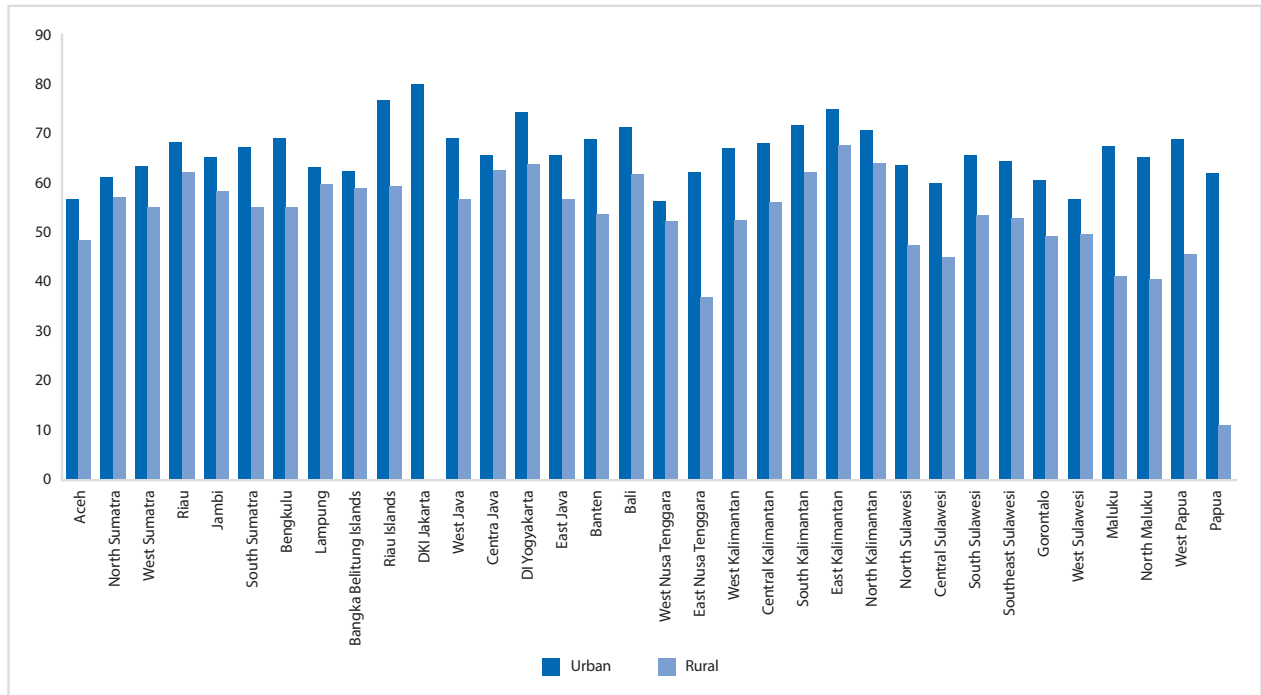
Chart 14. Male and female internet users in Indonesia in 2022 (% of gender-based population aged 5+)



Source: Statistics Indonesia (BPS)

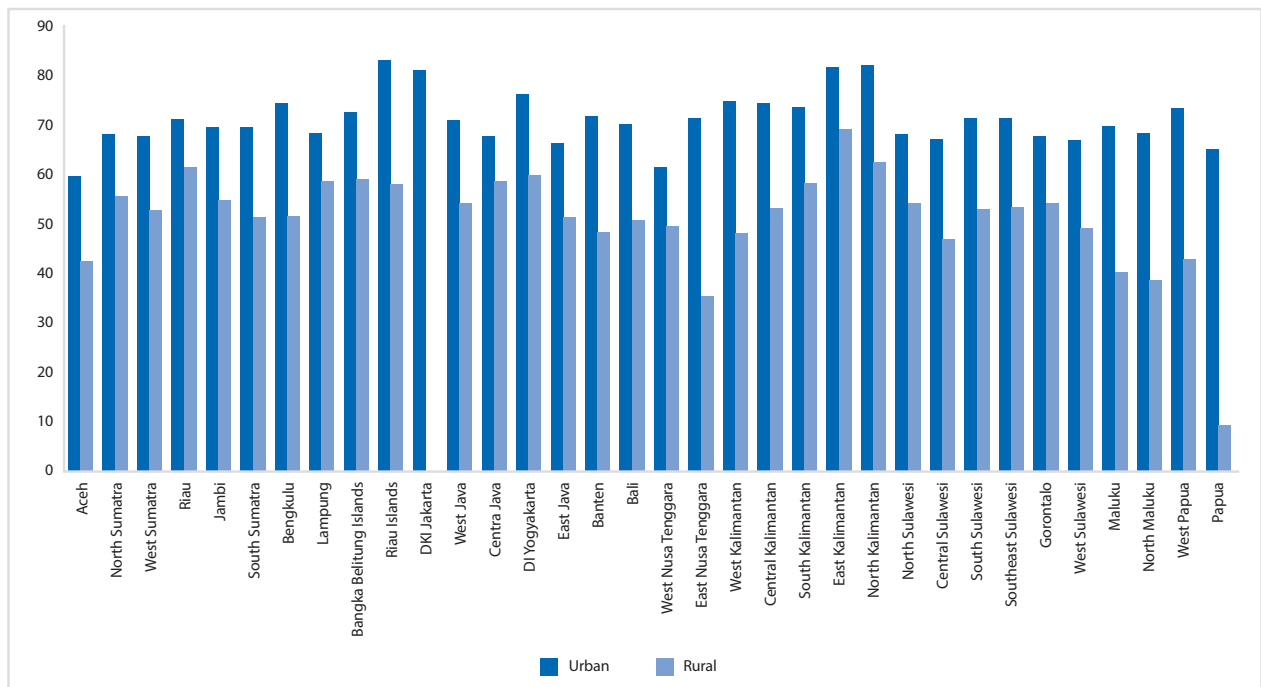
In 2022, the proportion of male internet users aged 5+ was higher in urban areas than in rural areas across all provinces in Indonesia (Chart 15). Similarly, the proportion of female internet users aged 5+ was higher in urban areas than in rural areas in all provinces (Chart 16).

Chart 15. Male urban and rural internet users in Indonesia in 2022 by province (% of male population aged 5+)



Source: Statistics Indonesia (BPS)

Chart 16. Female urban and rural internet users in Indonesia in 2022 by province (% of female population aged 5+)

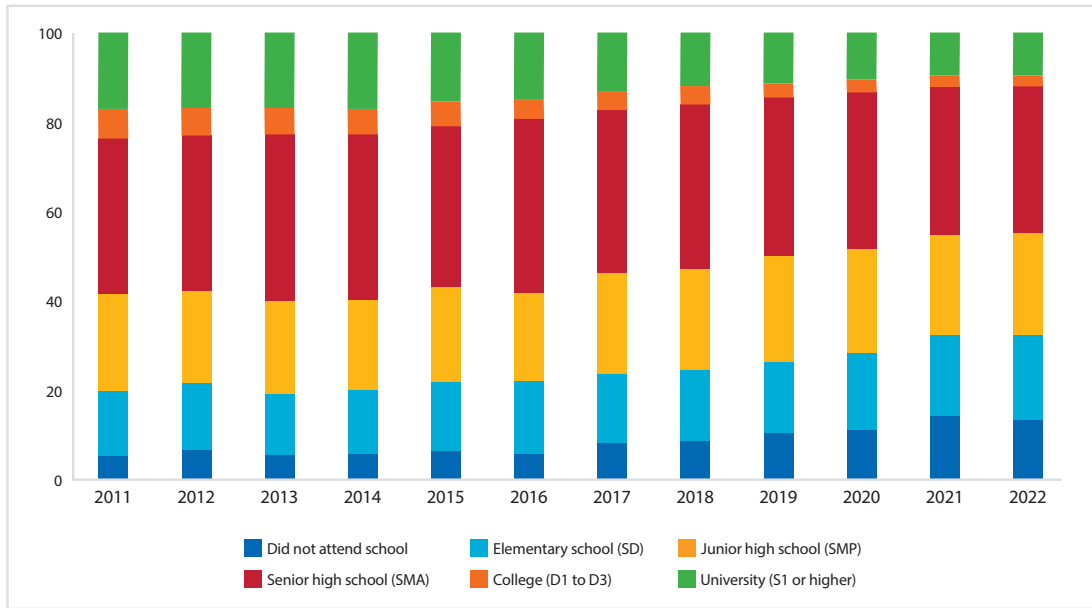


Source: Statistics Indonesia (BPS)

3.4. Education digital divide

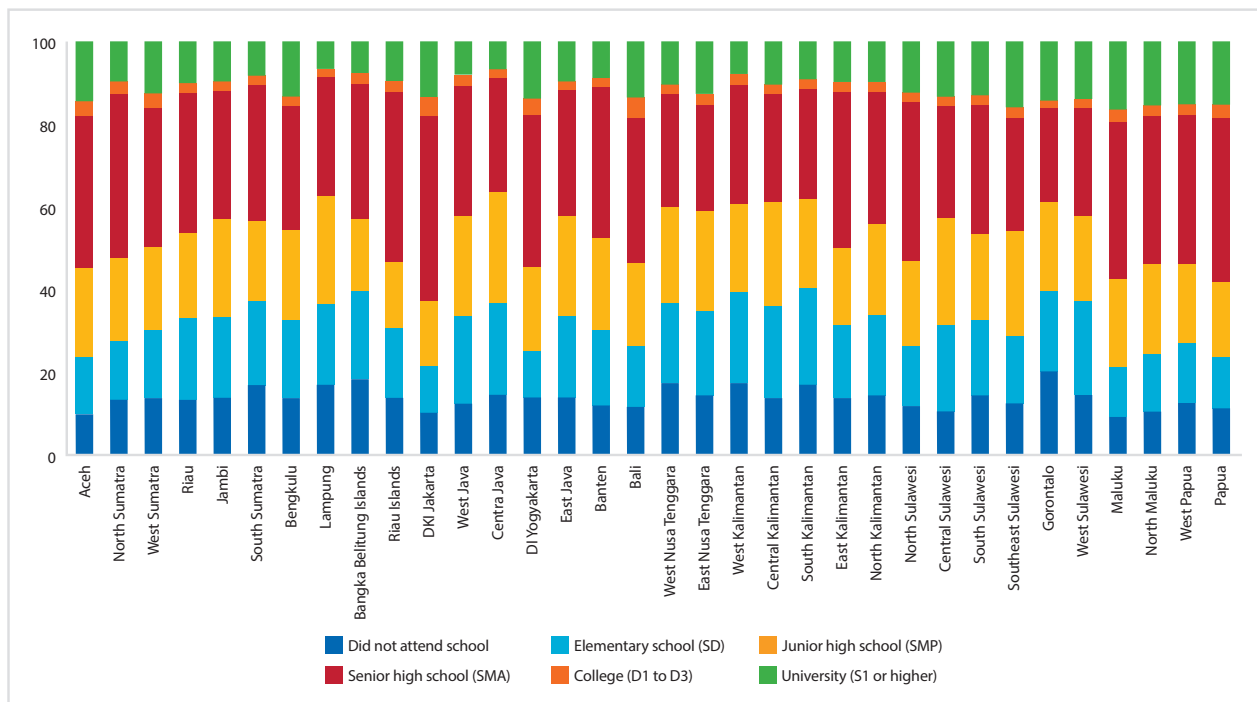
High school graduates make up the largest share of internet users in Indonesia at both the national and provincial levels (Charts 17 and 18). The composition of internet users is changing, with increasing proportions of those who have not attended school and elementary school-level users, while the proportions of college and university-educated users are decreasing (Chart 17). This trend shows that people with lower education levels are becoming more familiar with digital technology. This is partly because the GOI is actively introducing the internet to elementary school students and because digital transformation has compelled workers with low education levels, such as online service drivers, to learn digital technology for their jobs.

Chart 17. Internet users in Indonesia based on currently highest education level attained, 2011 – 2022 (% of internet users)



Source: Statistics Indonesia (BPS)

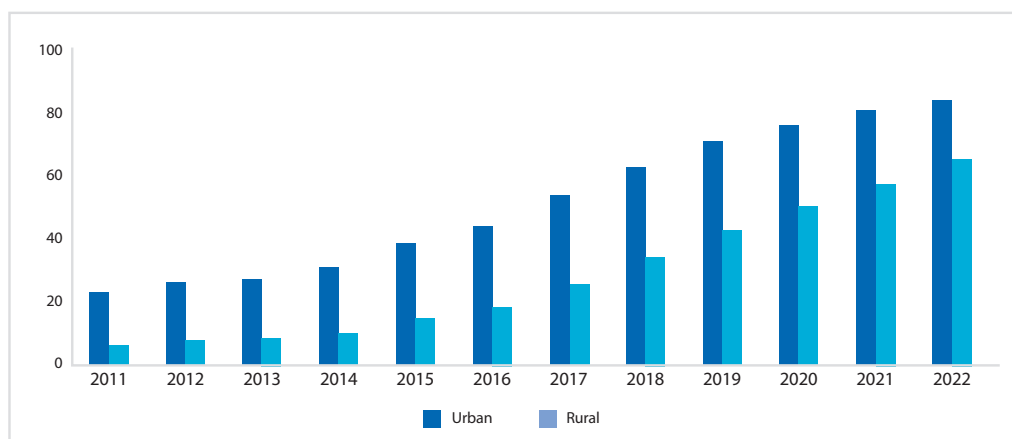
Chart 18. Internet users in Indonesia based on the current highest education level in 2022 by province (% of internet users)



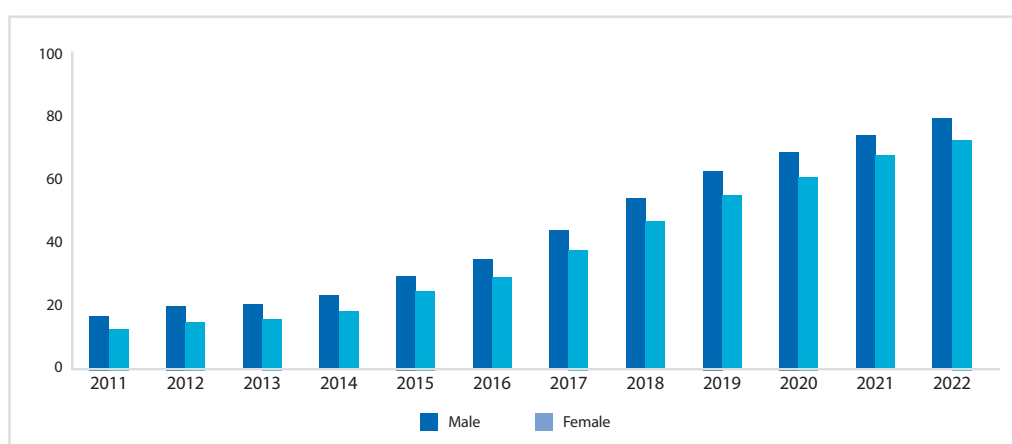
Source: Statistics Indonesia (BPS)

Within the population aged 15-59, the proportion of individuals with information technology (IT) skills⁵ has increased, both in urban and rural areas (Chart 19) and for both genders (Chart 20). Within this age group, the IT skill gaps between individuals living in urban and rural areas are narrowing. The IT skills gap between male and female individuals is also narrowing.

5 IT skills here refer to the skills to use the basic functions of IT hardware and software.

Chart 19. Individuals aged 15-59 with IT skills in Indonesia's urban and rural areas, 2011 – 2022
(% of population aged 15-59)

Source: Statistics Indonesia (BPS)

Chart 20. Male and female individuals aged 15-19 with IT skills in Indonesia, 2011 – 2022
(% of population aged 15-59)

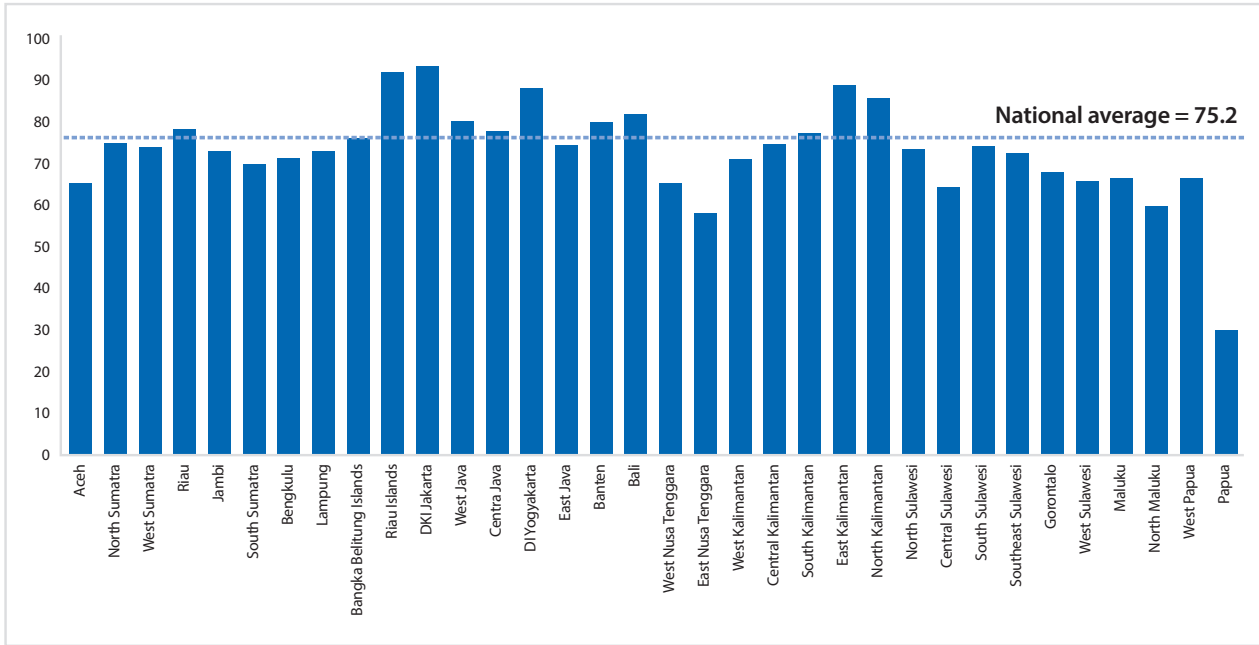
Source: Statistics Indonesia (BPS)

Provinces in the Western part of Indonesia tend to have a higher proportion of individuals with IT skills among the population aged 15-59 than provinces in the Eastern parts. In 2022, almost all provinces in Java (except East Java), Riau and Riau Islands in Sumatra, and most provinces in Kalimantan (except West and Central Kalimantan) had higher proportions than the national average (Chart 21).

However, IT skills alone are not enough to measure digital literacy. Indonesia's Ministry of Communication and Information and Katadata Insight Center have developed a comprehensive digital literacy index with four components: (i) digital skills (the ability to know, understand, and use IT hardware, software, and digital systems in daily life); (ii) digital ethics (the ability to understand and apply digital management ethics or netiquette in daily life); (iii) digital safety (the ability to protect personal data and ensure digital safety in daily life); and (iv) digital culture (the ability to understand and promote national values and cultural digitalization through information and communication technology).

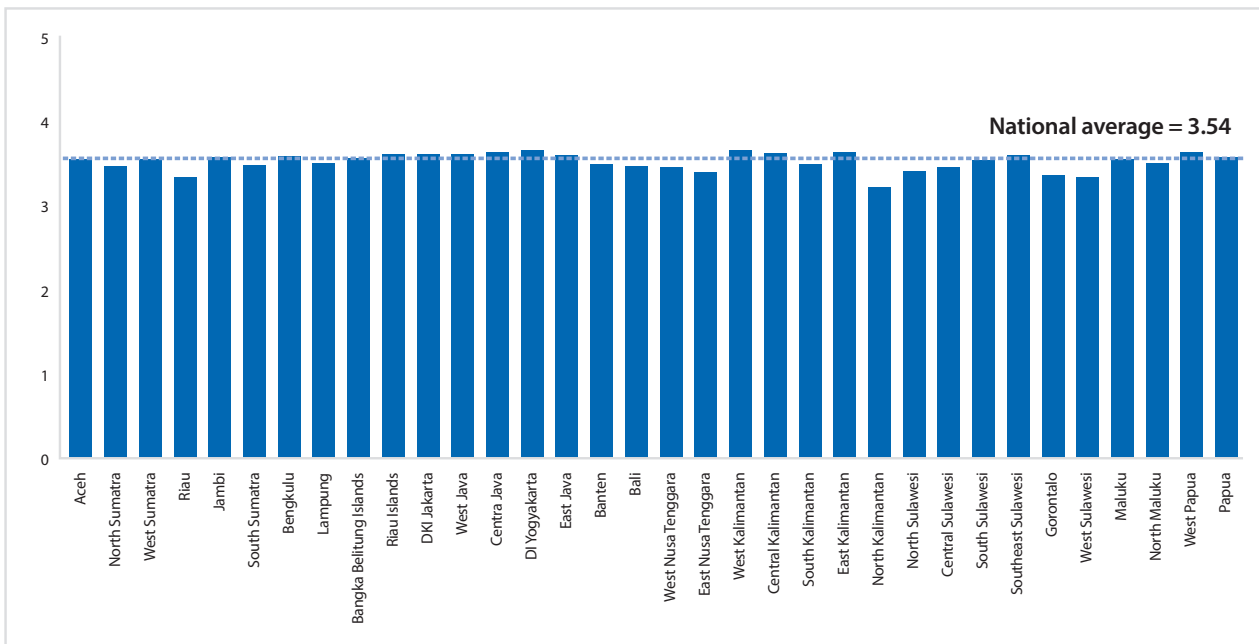
The joint survey by the Ministry of Communication and Information and Katadata Insight Center shows that the digital literacy indexes (DLI) for almost all provinces in Indonesia were not too far from the national DLI in 2022, except for some provinces (e.g., Riau and North Kalimantan provinces) (Chart 22). The survey surprisingly shows that Papua and West Papua provinces that have a low proportion of individuals with IT skills had a DLI above the national average; further studies are needed to investigate and explain these anomalies.

Chart 21. Individuals aged 15-59 with IT skills in Indonesia's provinces in 2022 (% of population aged 15-59)



Source: Statistics Indonesia (BPS)

Chart 22. Digital literacy index (DLI) of individuals aged 13-70 in Indonesia's provinces in 2022



Source: Ministry of Communication and Information, Katadata Insight Center

4. Issues on digital transformation and digital divide in Indonesia

This study uses both quantitative and qualitative methods to identify issues on digital transformation and the digital divide in Indonesia. In the qualitative part, this study uses literature surveys, in-depth interviews, and discussions (including a policy dialogue event) with experts and policymakers on this topic. As for the quantitative part, this study uses econometrics models to investigate general factors affecting the digital transformation and digital divide in Indonesia using annual data that spans from 2011 to 2021.

4.1. Results from the qualitative study

The study finds that the main issues with the digital divide in Indonesia are related to access to ICT and digital literacy. There are two key issues with the geographical divide: (i) disparity in the availability and quality of physical ICT infrastructure needed for digital transformation (e.g., between the Western and Eastern parts of Indonesia; between urban and rural areas) and (ii) disparity in the quality of ICT services needed for digital transformation (e.g., internet and mobile phone services). Financing is the main constraint to providing ICT infrastructure and services in Indonesia. According to Indonesia's Association of Telecommunication Network Providers (APJATEL), the investment cost of fixed broadband is around Rp. 200 million (US\$ 13,500) per kilometer. The government cannot provide all the ICT infrastructure needed to cover all areas in Indonesia due to its limited budget, and many private investors are not interested in investing in less profitable rural and remote areas.

The generational digital divide in Indonesia is mainly due to older individuals' ability to embrace digital technology, particularly digital literacy. Many internet applications and content are not user-friendly for the elderly. For example, many older people had difficulty using the PeduliLindungi application during the PPKM, including downloading and registering their names. However, the proportion of internet users aged 50+ is increasing, driven by both the aging of the 24-49 age group and the learning process of the older generation to use digital technology.

Regarding the gender digital divide, key issues include women having less access to information technology and lower digital literacy than men. According to Tan (2021), elderly women, women living in rural areas, and low-educated women are the most disadvantaged by the digital divide. Studies by Smeru Research Institute (2022), Lestari and Sunarto (2018), and Suwana and Lily (2017) found that patriarchal structures in families and societies limit women's access to the internet compared to men. The Digital Literacy Status Survey 2022 by the Ministry of Information and Telecommunication and Katadata Insight Center shows that Indonesian women's digital literacy index (3.52) is lower than men's (3.56).

The education digital divide in Indonesia has two main issues. First, students in rural and remote areas lack access to digital technology, especially the internet. This issue is closely related to the geographical divide. The PPKM during the COVID-19 pandemic widened the digital divide between students in rural/remote areas and those in urban areas (UNICEF, 2021). Second, students in rural and remote areas have lower digital skills and knowledge compared to students in urban areas.

4.2. Results from the quantitative study

This study uses a panel data econometrics model to examine factors affecting digital transformation in Indonesia's 34 provinces (Model 1). The dependent variable is the proportion of individual internet users to the total population in each province, used as a proxy for digital transformation at the provincial level. The independent variables are: (i) the time dummy variable; (ii) the proportion of villages and wards with BTS to total villages and wards in each province; (iii) per capita real gross regional domestic products (GRDP) in each province; (iv) the average years of schooling of the population in each province; and (v) PPKM dummy variable (1 for the period with PPKM; 0 otherwise). Annual data for all variables is obtained from the Statistics Indonesia (BPS).

To check the robustness of the regression results, two different estimation methods are used: (1) the estimated generalized least squares (EGLS); and (2) the two-stage least squares (2SLS). Table 1 displays the regression results. The results are evaluated at the 5% significance level and interpreted based on the ceteris paribus assumption. All independent variables are significant in both regression methods, except the average years of schooling, which is significant in the 2SLS estimation but not in the EGLS estimation.

Table 1. Factors Affecting Digital Transformation in Indonesia (Model 1)
(Standard errors are in brackets)

	EGLS	2SLS
Constant	-30.925 (21.490)	-31.049 (2.991*)
Time dummy	2.907 (0.373*)	3.157 (0.234*)
Proportion of villages and wards with BTS	0.319 (0.098*)	0.214 (0.017*)
Per capita real GRDP	0.307 (0.069*)	0.080 (0.012*)
Average years of schooling	2.003 (2.772)	3.283 (0.392*)
PPKM dummy	8.416 (0.753*)	12.189 (2.106*)
Fixed effect (cross section)	Yes	Yes
Weights (cross section)	Yes	Yes
Number of observations	367	335
R-squared	0.9616	0.9061
Adjusted R-squared	0.9572	0.9046
F-statistics	216.2742*	696.3137*

Note: * significant at 5% significance level. Source: Author's calculation

The time dummy variable is statistically significant and has a positive coefficient, indicating that the proportion of internet users in Indonesia has increased over time, confirming digital transformation. The positive coefficient for the proportion of villages and wards with BTS transmitters suggests that more BTS transmitters lead to higher internet usage, as they expand cellular network coverage and improve signal quality. The positive coefficient for per capita real GRDP means that higher income levels increase internet usage, as people can afford internet devices and services. The PPKM also increased internet usage, as more people used the internet for online purchases, payments, and distance learning during mobility restrictions.

The average years of schooling measure education levels beyond just school completion. The 2SLS regression result shows a positive coefficient, indicating that higher average years of schooling increase internet usage. Individuals with more schooling likely have better skills for online activities like transactions, information searches, and job hunting.

In summary, regression results from Model 1 show that the number of BTS transmitters, per capita income, average years of schooling, and PPKM all positively impact digital transformation in Indonesia.

This study uses a panel data econometrics model to investigate the digital divide between urban and rural areas in Indonesia's 33 provinces (Model 2). DKI Jakarta is excluded because it has no rural areas. The dependent variable is the urban-rural digital ratio, defined as the ratio of internet users in urban areas to those in rural areas. The independent variables are: (i) the time dummy variable; (ii) the ratio of urban-to-rural BTS proportions; (iii) urban-to-rural expenditure ratio; (iv) urban-to-rural years of schooling ratio; and (v) the PPKM dummy variable.

The study uses EGLS and 2SLS regressions to estimate Model 2. Table 2 shows the regression results, evaluated at the 5% significance level using the ceteris paribus assumption.

The time dummy variable is statistically significant and has a negative coefficient, indicating that the urban-rural digital divide is narrowing over time. The presence of BTS transmitters does not significantly affect the urban-rural digital divide, as shown by both the EGLS and 2SLS estimation results. The massive development of BTS transmitters by telecommunication operators and the government has helped more people in rural areas access cellular phone and internet signals, making the BTS variable insignificant as a determinant of the urban-rural digital divide.

The urban-to-rural expenditure ratio and the urban-to-rural average years of schooling ratio are statistically significant and have a positive coefficient in both the EGLS and 2SLS estimations. The wider the difference in economic wealth and years of schooling between the urban and rural populations, the wider the urban-to-rural digital divide will be

Table 2. Factors Affecting Urban-Rural Digital Divide in Indonesia (Model 2)
(Standard errors are in brackets)

	EGLS	2SLS
Constant	-1,011.819 (190.939*)	-1,395.357 (277.466*)
Time dummy	-24.174 (1.344*)	-23.311 (1.980*)
Ratio of urban-to-rural BTS proportions	0.035 (0.132)	0.114 (0.210)
Urban-to-rural expenditure ratio	5.115 (0.468*)	6.019 (0.946*)
Urban-to-rural years of schooling ratio	5.237 (1.295*)	6.882 (1.866*)
PPKM dummy	25.730 (5.468*)	38.714 (11.529*)
Fixed effect (cross section)	Yes	Yes
Weights (cross section)	Yes	Yes
Number of observations	359	327
R-squared	0.9194	0.9061
Adjusted R-squared	0.9101	0.8941
F-statistics	98.9268*	75.0047*

Note: * significant at 5% significance level. Source: Author's calculation.

The PPKM variable is important and has a positive effect in both the EGLS and 2SLS estimations. While PPKM increased the number of people using the internet, it also made the digital divide between urban and rural areas bigger. People in urban areas used the internet more than those in rural areas during PPKM.

From the results of Model 2, it can be seen that the growing economic wealth gap, the increasing average years of schooling gap, and PPKM all contribute to widening the digital divide between urban and rural populations.

This study uses a panel data econometrics model to examine factors affecting the gender digital divide in Indonesia's 34 provinces (Model 3). The dependent variable is the gender digital ratio, which compares the proportion of male internet users to the total male population and the proportion of female internet users to the total female population in each province. The independent variables are: (i) time dummy variable; (ii) sex ratio (the ratio of males to females in each province); (iii) gender years of schooling ratio (the average years of schooling for males compared to females in each province); (iv) gender expenditure ratio (the annual expenditure of males compared to females in each province); and (v) gender empowerment index, GPI (which measures women's involvement in economic and political decisions). Model 3 uses the gender expenditure ratio as a proxy for economic wealth because there is no publicly available data on gender-based income.

This study uses the EGLS and 2SLS methods to estimate Model 3 and compare the results to check their reliability. Table 3 shows the regression results, which are evaluated at a 5% significance level and interpreted based on the assumption that all other factors remain constant.

The time dummy variable is significant and has a negative coefficient, indicating that the gender digital divide in Indonesia is narrowing over time. Meanwhile, the sex ratio variable is significant and has a positive coefficient, suggesting that the larger the male population compared to the female population, the wider the gender digital divide will be.

Table 3. Factors Affecting Gender Digital Divide in Indonesia (Model 3)
(Standard errors are in brackets)

	EGLS	2SLS
Constant	-87.803 (36.999*)	-173.749 (56.759*)
Time dummy	-0.931 (0.129*)	-1.220 (0.299*)
Sex ratio	0.965 (0.325*)	1.580 (0.521*)
Gender expenditure ratio	0.003 (0.031)	0.004 (0.060)
Gender years of schooling ratio	0.965 (0.151*)	1.064 (0.315*)
Gender empowerment index	-0.021 (0.070)	0.173 (0.100)
PPKM dummy	1.511 (0.618*)	2.438 (1.257)
Fixed effect (cross section)	Yes	Yes
Weights (cross section)	Yes	Yes
Number of observations	370	337
R-squared	0.8969	0.8878
Adjusted R-squared	0.8847	0.8731
F-statistics	73.6171*	56.3990*

Note: * significant at 5% significance level. Source: Author's calculation

The gender expenditure ratio is not statistically significant in both the EGLS and 2SLS estimations. This means that the difference in spending between men and women does not significantly impact the gender digital divide in Indonesia's provinces. It suggests that internet use by men and women is not determined by their economic wealth.

However, the gender years of schooling ratio is statistically significant and has a positive effect in both estimations. This means that an increase in the gender schooling ratio widens the gender digital divide. The digital divide between men and women in Indonesia's provinces increases when the gap between the average years of schooling for men and women widens.

This study uses the GPI to represent the power structure within families and societies, assuming that a higher GPI means a less patriarchal structure with women having more power in economic and political decisions. The regression results show that the GPI is not statistically significant in both the EGLS and 2SLS estimations. Although some previous studies suggest that a patriarchal power structure prevents women from having equal access to digital technology, this study finds that it is not a significant factor in the gender digital divide.

The PPKM dummy variable is significant in the EGLS estimation but not in the 2SLS estimation. The positive coefficient in the EGLS estimation implies that PPKM widened the gender digital divide.

From the regression results of Model 3, it can be inferred that the increasing gap in average years of schooling and PPKM widen the gender digital divide, while the gender empowerment index and the wealth gap do not have a significant impact on the gender gap in Indonesia.

4.3. Comparison between qualitative and quantitative results

The results from both qualitative and quantitative studies are generally consistent. They show that the proportion of people using digital technology is increasing, the digital divide between urban and rural areas is narrowing, the gender digital divide is narrowing, an increase in ICT infrastructure availability raises the proportion of people using digital technology in Indonesia, and an improvement in people's welfare increases internet usage.

However, there are some inconsistencies between the qualitative and quantitative results. For example, previous qualitative studies generally find that economic disparity widens the gender digital divide. However, our quantitative study shows that economic inequality does not significantly impact the gender digital divide. Some previous studies, such as those by the Smeru Research Institute (2022), Lestaria and Sunarto (2018), and Suwana and Lily (2017), suggest that the patriarchal structure in families and societies hinders women from accessing digital technology. However, our quantitative result shows that the patriarchal structure does not significantly impact the gender digital divide.

These inconsistencies might be caused by differences in methodology, such as sampling technique (non-random sampling in qualitative studies versus random sampling in quantitative studies), sample size (qualitative studies tend to have a small number of samples while quantitative studies use a large number of samples), and the selection of variables and proxy variables.

5. Policy and program recommendations to narrow the digital divide

Having identified problems related to and factors affecting the four types of the digital divide, this study recommends the following policies and/or programs for the GOI and other stakeholders to narrow the digital divide in Indonesia.

1) Geographic digital divide

Developing ICT infrastructure in rural and remote areas, especially in Eastern Indonesia, is essential to reduce the geographical divide. The Government of Indonesia (GOI) can support this by partnering with the private sector to strengthen the existing 4G network and expand the 5G network and satellite-based high-speed internet access. The GOI can also establish national cloud data centers and simplify regulations for submarine internet cable installation. To finance these projects, the GOI can use various financing models to build ICT infrastructure and services in Indonesia.

(i) Public-private partnership

Public-private partnership (PPP) is a way for the government to use private sector resources and expertise to build and manage public infrastructure and services (World Bank). While there are some completed and ongoing ICT infrastructure PPP projects in Indonesia, more are needed in rural and remote areas. For example, a PPP project in Sawyatami Village, Keerom Regency of Papua Province, involved building 4G base transceiver stations (BTS) and was completed in 2021. This project included BAKTI (an agency of the Ministry of Communication and Information responsible for ICT infrastructure in remote areas), the Jayapura Regency government, and two private companies, PT Infrastruktur Bisnis Sejahtera (IBS) and ZTE Corporation.

(ii) Blended finance

Blended finance uses public or philanthropic funds to attract private sector investment in sustainable development. The main feature of blended finance is the catalytic fund, which reduces project risks to make them more appealing to investors. Although blended finance is still new in Indonesia, it can be used to develop ICT infrastructure in the near future.

(iii) Crowdfunding

Crowdfunding is a way to raise money for projects and businesses by collecting small amounts of money from many people through online platforms. Community crowdfunding can be used to buy

micro BTS, which helps rural and remote areas access cellular and internet signals. Micro BTS can cost as little as \$1,500 and has been used by community networks in countries like Brazil, Colombia, Indonesia, Mexico, and the Democratic Republic of Congo.

(iv) Infrastructure bonds

Infrastructure bonds are debt securities issued by the government, private sector, or other entities to finance infrastructure projects. In Indonesia, state-owned companies like PT Sarana Multi Infrastruktur (PT SMI) and private companies regularly issue these bonds for projects, including ICT infrastructure. As global financial markets focus more on Environmental, Social, and Governance (ESG) issues, some Indonesian companies have issued ESG-based bonds. For example, PT SMI issues infrastructure green bonds and green Sukuk, while PT Tower Bersama Infrastruktur issues infrastructure sustainable bonds.

(iv) Corporate social responsibility (CSR) fund

Indonesia's Law No. 40/2007 (along with Law No. 11/2020 and Law No. 6/2003) requires limited liability companies (PT) to take responsibility for local communities and the environment where they operate. Many companies in Indonesia use CSR funds to comply with this regulation. The Government of Indonesia (GOI) and local governments can use these CSR funds to build ICT infrastructure or buy micro BTS for rural and remote areas.

To make the most of existing ICT infrastructure in rural and remote areas, the GOI and local governments can set up "tech corners" ("Pojok Teknologi" or "Potek") at every ward or village office. People in these areas can access the internet at these Poteks, which can also provide training and technical assistance on digital technology. The ward or village office can provide a room with a computer and internet access for the Potek. Academic institutions can partner with the ward or village government to run the Potek by sending students as interns, counting the internship as academic credits. The Ministry of Women Empowerment and Child Protection has noted that people in many villages in Indonesia already use shared internet access from the village head's office. Establishing Potek nationwide would formalize this existing practice.

2) Generational digital divide

To reduce the generational digital divide, digital content providers and application makers should create elderly-friendly applications with better protection against cyber crimes. This is especially important for GOI programs like e-tax, digital health, and electronic passport applications. They can use Design Thinking Principles to make user-friendly products by using simple and clear language, and local languages in some areas.

The GOI and other stakeholders, such as academia, development agencies, and NGOs, can also launch digital education campaigns for the elderly, especially in rural and remote areas. Academic institutions can involve students in these campaigns and count their participation as an internship for academic credit.

3) Gender digital divide

To close the gender digital divide, the GOI can strengthen its partnerships with various religious and social organizations, NGOs, development agencies, and academia to introduce digital technology for all genders.

Digital content providers and application makers can help to narrow the gap by developing more inclusive digital content and applications. For instance, mobile and internet content related to women-owned MSME businesses, financial planning, healthcare, and rights awareness. The GOI and other stakeholders can also create websites specific for women to exchange knowledge on various issues

that can be accessed by anyone looking for references for their activities. The GOI and content providers and application makers should also improve private data protection for internet users, particularly for women, who are more susceptible to online abuse.

4) Education digital divide

To narrow the education digital divide between students in rural/remote areas and urban areas, the GOI can take several measures. These include introducing digital technology as part of the curriculum and extracurricular activities in all schools, partnering with Universitas Terbuka (Indonesia's Open University), other universities, and EdTech companies to offer digital technology courses, and digitizing the Kejar Paket A, B, and C programs to help school dropouts and those with low education levels earn equivalent certificates and improve their digital literacy.

To optimize the benefits of digital transformation, the GOI can collaborate with tech companies for scholarships and talent programs, provide training for MSMEs, and run campaigns to increase awareness about data protection and cybersecurity.

Additionally, it is recommended that the GOI develop a Digital Inclusion Index at national and sub-national levels to track the digital divide, measure progress, and identify areas for intervention periodically.

6. Conclusions

This study finds that digital transformation in Indonesia is ongoing, with more people embracing digital technology. The geographic, generational, gender, and education digital divides in Indonesia have generally been narrowing over the past decade, except during the PPKM period of the COVID-19 pandemic. However, there is still room to further narrow these divides and improve the use of digital technology in Indonesia. Joint efforts by the government, private sector, NGOs, academia, multilateral organizations, donors, and other stakeholders are needed to achieve this.

To make effective policies and programs to narrow the digital divide, the GOI and other stakeholders must consider the interconnections among the four types of digital divides and the differences in demographic, economic, social, and cultural aspects across regions in Indonesia.

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Appendix 1

List of Indonesia's Provinces in the Study

- | | | |
|----------------------------|------------------------|------------------------|
| 1. Aceh | 13. Central Java | 25. North Sulawesi |
| 2. North Sumatra | 14. DI Yogyakarta | 26. Central Sulawesi |
| 3. West Sumatra | 15. East Java | 27. South Sulawesi |
| 4. Riau | 16. Banten | 28. Southeast Sulawesi |
| 5. Jambi | 17. Bali | 29. Gorontalo |
| 6. South Sumatra | 18. West Nusa Tenggara | 30. West Sulawesi |
| 7. Bengkulu | 19. East Nusa Tenggara | 31. Maluku |
| 8. Lampung | 20. West Kalimantan | 32. North Maluku |
| 9. Bangka Belitung Islands | 21. Central Kalimantan | 33. West Papua |
| 10. Riau Islands | 22. South Kalimantan | 34. Papua |
| 11. DKI Jakarta | 23. East Kalimantan | |
| 12. West Java | 24. North Kalimantan | |

Appendix 2

List of Variables, Data, and Data Sources for Econometrics Models

Model 1

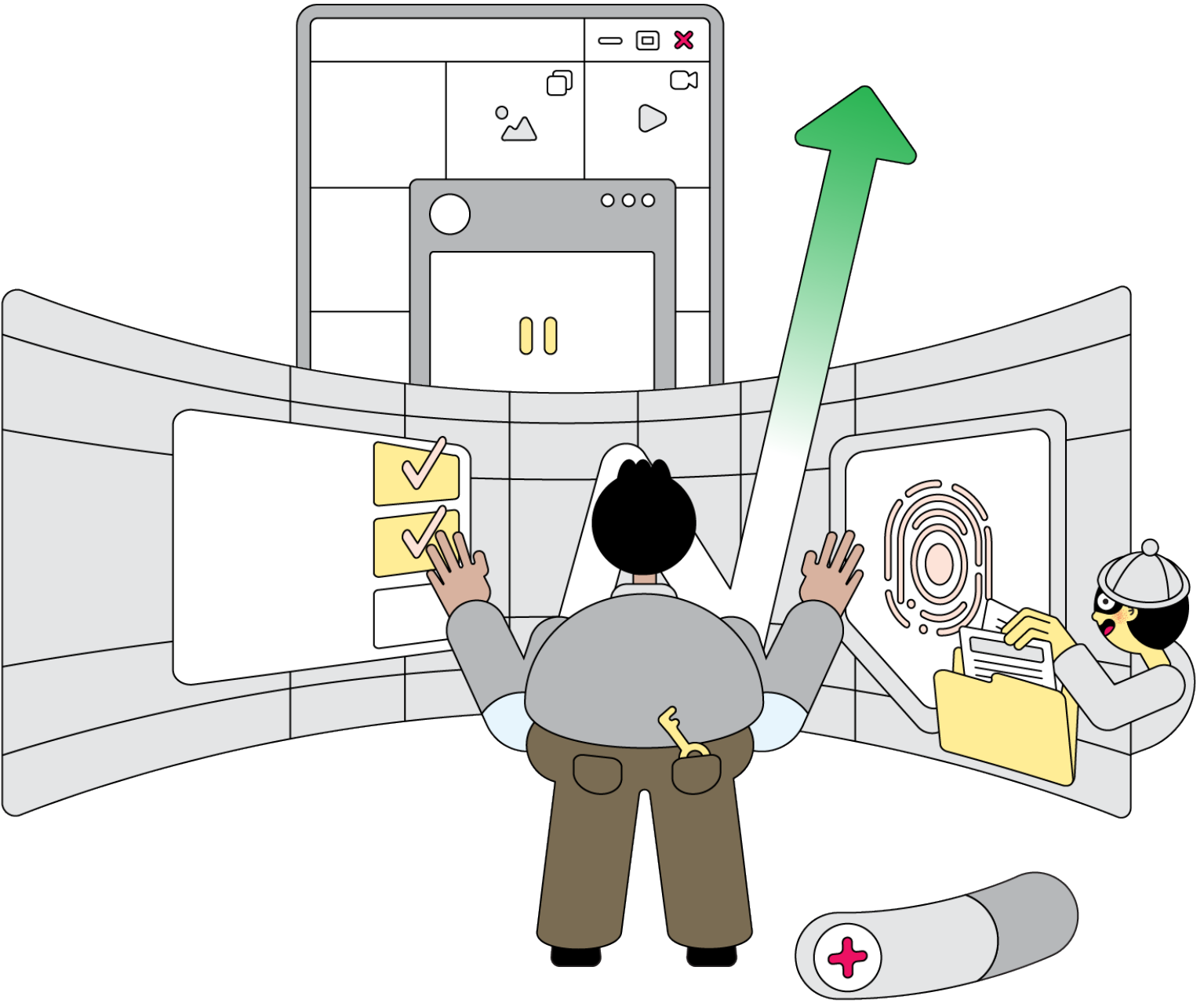
Variable	Data	Data Source
Proportion of individual internet users to the total population each province	<ul style="list-style-type: none"> Proportion of individual internet users to the total population aged 5+ each province 	Statistics Indonesia (BPS)
Time dummy	<ul style="list-style-type: none"> Dummy variable ($t = 1, 2, \dots, 21$) 	Author
Proportion of villages and wards with BTS	<ul style="list-style-type: none"> Number of villages and wards with BTS in each province Number of villages and wards without BTS in each province 	Statistics Indonesia (BPS) Statistics Indonesia (BPS)
Real per capita GDP	<ul style="list-style-type: none"> Real per capita GDP 	Statistics Indonesia (BPS)
Average years of schooling	<ul style="list-style-type: none"> Average years of schooling for male population aged 15+ in urban and rural areas Average years of schooling for female population aged 15+ in urban and rural areas 	Statistics Indonesia (BPS) Statistics Indonesia (BPS)
PPKM dummy	<ul style="list-style-type: none"> Dummy variable (1 = period with PPKM; 0 = otherwise) 	Author

Model 2

Variable	Data	Data Source
Ratio between the proportion of internet users of the population in urban areas to the proportion of internet users of the population in rural areas	<ul style="list-style-type: none"> • Proportion of internet users of the population aged 5+ in urban areas • Proportion of internet users of the population aged 5+ in rural areas 	<p>Statistics Indonesia (BPS)</p> <p>Statistics Indonesia (BPS)</p>
Time dummy	<ul style="list-style-type: none"> • Dummy variable ($t = 1, 2, \dots, 21$) 	Author
Ratio of urban-to-rural BTS proportions	<ul style="list-style-type: none"> • Number of wards with BTS in urban areas in each province • Number of wards without BTS in urban areas in each province • Number of villages with BTS in rural areas in each province • Number of villages without BTS in rural areas in each province 	<p>Statistics Indonesia (BPS)</p> <p>Statistics Indonesia (BPS)</p> <p>Statistics Indonesia (BPS)</p> <p>Statistics Indonesia (BPS)</p>
Urban-to-rural expenditure ratio	<ul style="list-style-type: none"> • Per capita expenditure of male population in urban areas in each province • Per capita expenditure of female population in urban areas in each province • Per capita expenditure of male population in rural areas in each province • Per capita expenditure of female population in rural areas in each province 	<p>Statistics Indonesia (BPS)</p> <p>Statistics Indonesia (BPS)</p> <p>Statistics Indonesia (BPS)</p> <p>Statistics Indonesia (BPS)</p>
Urban-to-rural years of schooling ratio	<ul style="list-style-type: none"> • Average years of schooling for male population aged 15+ in urban areas • Average years of schooling for female population aged 15+ in urban areas • Average years of schooling for male population aged 15+ in rural areas • Average years of schooling for female population aged 15+ in rural areas 	<p>Statistics Indonesia (BPS)</p> <p>Statistics Indonesia (BPS)</p> <p>Statistics Indonesia (BPS)</p> <p>Statistics Indonesia (BPS)</p>
PPKM dummy	<ul style="list-style-type: none"> • Dummy variable (1 = period with PPKM; 0 = otherwise) 	Author

Model 3

Variable	Data	Data Source
Ratio between the proportion of male internet users to total male population and the proportion of female internet users	<ul style="list-style-type: none"> • Proportion of male internet users to total male population aged 5+ • Proportion of female internet users to total female population aged 5+ 	<p>Statistics Indonesia (BPS)</p> <p>Statistics Indonesia (BPS)</p>
Time dummy	<ul style="list-style-type: none"> • Dummy variable ($t = 1, 2, \dots, 21$) 	Author
Sex ratio	<ul style="list-style-type: none"> • Sex ratio of population in urban and rural areas in each province 	Statistics Indonesia (BPS)
Gender expenditure ratio	<ul style="list-style-type: none"> • Per capita expenditure of male population in urban and rural areas in each province • Per capita expenditure of female population in urban and rural areas in each province 	<p>Statistics Indonesia (BPS)</p> <p>Statistics Indonesia (BPS)</p>
Gender years of schooling ratio	<ul style="list-style-type: none"> • Average years of schooling for male population in urban and rural areas aged 15+ • Average years of schooling for female population in urban and rural areas aged 15+ 	<p>Statistics Indonesia (BPS)</p> <p>Statistics Indonesia (BPS)</p>
Gender empowerment index	<ul style="list-style-type: none"> • Gender empowerment index in each province 	Statistics Indonesia (BPS)
PPKM dummy	<ul style="list-style-type: none"> • Dummy variable (1 = period with PPKM; 0 = otherwise) 	Author



II.

DIGITAL RIGHTS AND ETHICS IN INDONESIA: TRENDS, PRINCIPLES AND PRACTICES

By Treviliana Eka Putri

In 2023, the news of Geoffrey Hinton, nicknamed “the Godfather of AI”, leaving his career at Google, has sparked many concerns surrounding the development of AI. In his interview with the New York Times (2023), he warned about the danger of technology, especially in creating false images, texts, and news. Not long before that, in 2022, Blake Lemoine, the engineer who worked for Google, also claimed that the technology he was working on, has achieved sentience—which could lead to a problem where humans might lose their control over the machines (Tiku, 2022). The vast development of AI has indeed brought more debates and discussions about technology development and its impact on human life.

In Indonesia, the development of digital technology has also brought many discussions and debates on how we regulate the vast development of this sector, especially as the country has set its Digital Transformation roadmap for 2021-2024 (KOMINFO, 2021) (ANTARA, 2022). The roadmap lays out five strategic directions which include: (1) the development of inclusive, safe, and reliable digital connectivity, (2) an open and integrated digital government institution, (3) transformation from a consumer nation to a technology producer, (4) harmonization of regulation and increase in funding innovations, and (5) bolstering the nation’s digital capability to strengthen geostrategic competitiveness.

As the country advances technologically, it is essential to consider the well-being of its citizens, particularly since inclusive digital development is a top priority. A fundamental requirement for upholding personal rights is the protection of personal data and privacy. Indonesia has recently joined the ranks of nations recognizing the importance of data protection by enacting its own legislation, inspired by the General Data Protection Regulation (GDPR). After much anticipation, the Personal Data Protection Law was passed in September 2022 (Kristianti, 2021), marking a significant milestone in the country’s efforts to safeguard personal information. This new law is expected to establish a vital legal framework for data protection in Indonesia, addressing the urgent need for enhanced privacy measures. One of the motivations behind enacting the Personal Data Protection Law stems from the alarming rise in data breaches that have plagued the nation in recent years. From 2021 to 2022 alone, more than 20 major corporations and government institutions in Indonesia fell victim to these breaches, resulting in the unauthorized circulation of personal data of a substantial portion of the population (Tempo.co, 2022; Novianti dan Prastya, 2021). This sobering statistic underscores the urgent necessity for comprehensive data protection regulations to mitigate the risks associated with data breaches and safeguard the privacy of individuals. Hence, the enactment of the Personal Data Protection Law in Indonesia is a significant step toward rectifying these issues and establishing a robust data protection framework.

The discussion about personal data and privacy also can not be detached from the machine and system that processes and executes the commands. Algorithms or simply defined as a set of commands or procedures that are followed by the system to perform a task (International Institute in Geneva, n.d.) are often mentioned in discussions about data utilization, as they are frequently used in modern digital technology across various disciplines and applications. The debate on whether algorithms are inherently good or evil has evolved into an ongoing and endless conversation. The influence and ethical implications of algorithms are determined by how they are created, implemented, and used.

While algorithms might offer several benefits and efficiency, there are some challenges associated with their use.

Outside of data and the machine, we must also take into account the importance of skilled human resources in adapting to the advancement of these technologies. It is important to recognize that barriers to meaningful participation in the digital space extend beyond technical issues; social and cultural factors also play a significant role. These influences can be deeply ingrained and often operate invisibly, hindering individuals' engagement in the digital realm (Cheshmehzangi, 2022). Hence, this makes digital inclusion and digital divide or digital inequality as inseparable issues. In guiding the discussion relating to digital inclusion, this section will use the definition of digital inclusion by the UN Tech Envoy, which defines it as "equitable, meaningful, and safe access to use, lead, and design of digital technologies, services, and associated opportunities for everyone, everywhere" (UN Tech Envoy). Drawing from the definition above, inclusivity within the digital realm has also stretched wider beyond the utilization of the technology from the user's side (the utilization) but also how the technology was made, established, and presented (lead and design).

One of the simplest but most cited examples of issues with digital inclusivity is gender bias against women. While women also make up a significant portion of global internet users, there is a tendency of gender bias. For example, the search engine company which is criticized for having a tendency to give suggestions to a masculine pronoun in specific jobs rather than the other (McQuate, 2022). Furthermore, In Southeast Asia, Indonesia has the lowest proportion of women working in the tech industry (22%) compared to other countries such as Thailand (42%), the Philippines (35%), and Singapore (41%) (Chew, 2023). It has shown how Indonesia is still lagging behind in the region, despite the government's campaign on the Indonesia 4.0 and inclusive digital transformation.

The barriers that some specific groups still have to face have shown that despite having access to the technology and the literacy to use it, individuals may still face difficulties in reaping the benefits of the available technology.

Drawing on the these background, this article proposes to discuss two main questions:

1. Looking at the current trends on personalisation of technology and services, what are the existing standards, especially relating to personal data protection?
2. How have algorithms been utilized in today's digital technologies? How well-aware are users about it? What has been done by regulators to ensure transparency and fairness of the systems?

This article is divided into two main sections: (1) Personal Data Protection and Privacy, (2) Algorithms, Ethics, and Its Impacts. For each section general trends, challenges and development will be discussed, followed with proposed recommendations.

Indonesia's personal data protection regulation: General context

Indonesia's House of Representatives passed the Personal Data Protection Bill (PDP Bill) on September 20, 2022, marking a significant milestone toward its enactment as law. The next step was obtaining Presidential assent, which occurred on October 17, 2022, officially bringing the law into force. Before the PDP Bill, Indonesia lacked a comprehensive law specifically addressing personal data protection. Instead, relevant provisions were scattered across more than 30 different laws and regulations. The initial draft of the PDP Law was made available for public feedback on January 28, 2020. The PDP Law underwent several revisions through consultations and amendments from January 2020 to September 2022. The near-final draft was released on September 5, 2022, followed by the final draft on September 20, 2022.

The PDP Law establishes obligations for personal data processing and grants rights to individuals, aligning it with international data protection laws. Many vital elements, such as the definitions of

covered data and entities, lawful grounds for the processing, obligations for data controllers, accountability measures, and controller-processor relationships, bear similarities to laws worldwide, notably the EU's General Data Protection Regulation (GDPR). However, the PDP Law also incorporates unique provisions tailored to the Indonesian context. One distinctive feature is its broad extraterritorial scope, allowing the law to apply to organizations whose processing activities have legal consequences in Indonesia or involve Indonesian citizens residing outside the country. The scope of the PDP Law encompasses individuals, public bodies, and international organizations that engage in personal data processing or perform legal acts within the jurisdiction of Indonesia (Article 2). The term "persons" includes both natural individuals and corporate entities, while "public bodies" refers to organizations that carry out essential administrative functions and receive funding from state budgetary agencies. Non-governmental organizations (NGOs) may also fall under the category of public bodies if they receive state funds, either partially or entirely. International organizations are recognized as subjects of international law and possess the ability to enter into international agreements. This principle establishes that all entities operating within Indonesia are responsible for managing Indonesian data, regardless of the physical location of the data. Therefore, legal obligations are tied to the data itself rather than its geographic origin. As per the law, individuals acting as data processors, including those involved in home-based businesses or e-commerce activities, may be considered as controllers of personal data. Consequently, they bear legal accountability for such data under the provisions outlined in the PDP Law.

Furthermore, the PDP Law grants exemptions to the financial services sector, imposes stricter requirements on data controllers with extensive record-keeping obligations, and includes specific provisions concerning the use of facial recognition technologies. The law explicitly recognizes special categories of data, referred to as "specific personal data," encompassing children's and personal financial data. In cases of specific data subject requests, organizations are required to respond within 72 hours.

Data privacy challenges in Indonesia

In today's increasingly interconnected and data-driven world, the importance of data protection cannot be overstated. With the exponential growth of digital technologies and the proliferation of personal information being collected and processed, ensuring the privacy and security of individuals' data has become a critical concern. Data protection regulations and mechanisms have been implemented worldwide to address these concerns, aiming to strike a balance between the benefits of data utilization and the rights of individuals.

One issue that may arise is the lack of clarity in existing data protection regulations. Indonesian PDP Law suffers from vague and imprecise language, making it difficult for organizations and individuals to understand their rights and obligations (Wahyuni, 2022). Ambiguous terms and unclear definitions may lead to confusion and inconsistent interpretations, hindering effective compliance and implementation. To address this, regulation should provide explicit guidance and well-defined definitions, leaving no room for uncertainty. This will enable all stakeholders to navigate the requirements with clarity and confidence. One of the examples regarding this is the need for more clarity on Article 25 of the PDP Law which deals with the special processing of children's personal data. However, further details are needed regarding implementing the best interest of the child principle, age limits for consent, and specific processing methods. References include EU GDPR (Article 8), UN Convention on the Rights of the Child, and UN General Comment No. 25 (2021) on children's rights in the digital environment.

Another challenge related to the need for more clarity is the absence of derivative regulations that provide clear guidelines to ensure that The Personal Data Protection Law (PDP Law) has included administrative sanctions for violations of several provisions. Some of these include violations of the principles of personal data processing, consent of data subjects, privacy impact assessments, and obligations of data controllers and other processors. There are four types of administrative sanctions specified in this law: written warnings, temporary suspension of personal data processing activities, deletion and destruction of personal data, and administrative fines. These administrative sanctions will be imposed by an institution established by and accountable to the President, the Data

Protection Authority (DPA), as mandated by the law (Tisnadisastra & Mokoginta, 2023). Nevertheless, as of this writing, the institution has not yet been established. There are concerns regarding the authority (Nugroho & Syarief, 2023) and independence (Widiatedja & Mishra, 2023) of the institution that is responsible for setting these administrative sanctions in cases of violations in personal data processing by data controllers and processors. There were debates whether this institution should be established and led by a government body, that is the Ministry of Communication and Informatics or an independent one, as urged by many NGOs and activists (TIFA Foundation, 2022).

Furthermore, the rapid advancement of technology and the proliferation of data collection practices have outpaced the ability of traditional data protection mechanisms to keep up. The sheer volume and complexity of data being generated and processed pose significant challenges for individuals to understand and control how their information is used. Additionally, corporations' monetization of personal data further complicates data protection dynamics, as the interests of individuals and those of profit-driven entities often diverge. One of the examples is the rapid utilization of healthcare application since the COVID-19 pandemic. There have been reports of data leaking in health applications in Indonesia. The first example is an alleged data leak on the Ministry of Health's, Indonesia Health Alert Card or eHAC, application before it was integrated with the PeduliLindungi apps. In another example, the Social Security Administrator for Health (BPJS Kesehatan) faced a data breach in May 2021, with as many as 279 million Indonesian population data reportedly compromised and sold on hacker sites. The released data contains demographic information for Indonesian Military (TNI) and National Police (Polri) members. The information being sold includes complete name, identity card (KTP), phone number, email, and address (CNN, 2021).

Another important issue is the need for more nuance in data protection regulations. Data is a complex and multifaceted subject, encompassing various types of information, processing activities, and contexts. However, the existing regulation takes a one-size-fits-all approach, imposing the same rules and requirements across all industries and situations. This lack of nuance can result in unnecessary burdens for organizations dealing with low-risk data while failing to address higher-risk activities adequately (Shelest, 2022). To rectify this, a more nuanced approach is necessary, considering different levels of risk, sensitivity, and industry-specific considerations. This will lead to more effective and balanced data protection regulations catering to various sectors' diverse needs. Following the enacted Law of Personal Data Protection, the Indonesian government is expected to establish derivative regulations that will address these issues.

The third issue revolves around the colonial approach to data protection standards. Historically, data protection frameworks have often been influenced predominantly by the practices and standards of a few dominant global players. This approach perpetuates power imbalances, as regulations developed primarily by influential countries may not adequately reflect other nations' cultural, social, and economic contexts. One of the examples on the Western mainstreaming of data regulation is reflected in a study conducted by Mannion (2020) who raises the issue about GDPR's extraterritorial reach which concerns data imperialism. The extraterritorial reach means that it allows the EU to impose its own standards of data privacy on African countries without considering their unique social values and economic circumstances. The impact of the GDPR's strict compliance requirements on African countries highlights the disparities between regions in terms of data protection capabilities and resources, potentially placing African nations at a disadvantage when engaging in digital trade with the EU. These challenges call for a more nuanced and inclusive approach that considers African countries' specific needs and realities, enabling them to develop their own data protection frameworks that align with their cultural, social, and economic contexts. This concern might echo the situation in Indonesia as well as a developing country. While efforts in upholding data privacy rights globally demonstrate a commitment to safeguarding citizens' privacy, this move can also be viewed as an endeavor to exert control over other nations (Coleman, 2018). The prevailing belief in Western countries' superiority in data regulation further adds to the complexity of the issue.

The intention may be rooted in privacy protection, some may interpret it as an attempt to dominate and subjugate other countries. The perception that Western countries possess more advanced capabilities and superior standards in data regulation persists, exacerbating the power imbalance between nations. This issue becomes particularly pressing when considering that less-developed countries may struggle to assert compliance with their regulations in relation to more developed nations. It raises concerns about the fairness and equity of the enforcement process, as well as the potential marginalization of countries with different cultural, social, and economic contexts.

Algorithms, ethics, and its impacts

Algorithms have increasingly been utilized in many decision-making systems in various sectors such as finance, business, health, and education. While it might be beneficial and also present new opportunities for platforms and businesses, it might also comprise challenges if the technology itself is not used wisely in the interest of the individuals as the subject of the product. This section will lay out concerns and challenges related to the use of algorithms behind many technologies.

1. Social media: Sea of information and echo chamber

Access to information is an integral part of digital rights. However, more importantly, there is an urgent need for trusted, reliable, and credible information. Access to reliable information will foster a better quality of public debates and communication, which are essential for a democracy. Nevertheless, it is seen that there have been signs of deterioration of open and respectful public debates. One of the significant causes is a deepening and more expansive social and political polarization among citizens. The increase in social and political polarization cannot be detached from the quality of information that is exposed to the citizen, whether in the online or offline realm.

The algorithm makes it much easier to discover information provided by search engines such as Google, Bing, and Yahoo. Search engines, often known as search services, allow users to search the contents of pages and files on the World Wide Web. Search engines utilize algorithms to give relevant search results depending on user requests, where it considers keywords relevancy, popularity, user location, and other criteria to give accurate results (Adisa, 2023).

Nevertheless, these conveniences come at a cost. The vast amount of data individuals can access often leads to feelings of overwhelm. It is essential for people to be able to browse, filter, and evaluate the trustworthiness of information on their own. A notable example of this issue arose during the COVID-19 pandemic, when information—both accurate and misleading—spread rapidly across the internet. This phenomenon, known as an “infodemic,” fueled public fear and undermined the ability of health authorities to effectively manage the outbreak.

Social media and search engine algorithms can indeed influence one’s worldview and also political ideas. Suppose the person does not wish to hunt for extra information or double-check and accepts what the algorithm offers, she or he will be easily carried away by the political currents provided by the algorithm (Dutton, et. al., 2017). Unfortunately, reckless use of social media as a political instrument may exacerbate differences between political groupings and, worse, may accentuate narrow-mindedness in society. To some extent, it is acceptable to say that social media algorithms contribute to Indonesian society’s rising political division (Ramadhiansyah, 2017).

In Indonesian politics, social media is seen as a tool that is important for political candidates to gain support. It is important for these candidates to be able to create political campaigns and contents that can attract the audience’s interactions. Although it is difficult to quantify and convert individuals’ engagements into number of votes, social media is seen as one of the key areas where candidates try to earn people’s votes. For example, during the Indonesian presidential election in 2024, all the three

presidential candidates had created and curated their social media persona to appeal to the young voters (Tarigan, 2024). Echo chambers, assisted by algorithms embedded in social media, provide supporters only with biased information, with hashtags that perpetuate the communication patterns. As a result, voters may have left with information and contents that are in line with their pre-existing assumption about the candidates.

An online environment that encourages educated, varied, and constructive debate while limiting the negative impacts of echo chambers and the sea of information is critical, as digital democracy will only work effectively when the citizens are well-informed and have the ability to sort all kinds of information that they received through their digital interactions.

2. E-commerce and dark pattern

Algorithms play a crucial role in e-commerce by giving personalized recommendations to the customers. By analyzing user data, such as browsing history, purchase behavior, and demographic information, the application is able to recommend relevant products, provide personalized offers, and create customized product suggestions. E-commerce applications use techniques like natural language processing, machine learning, and ranking algorithms to give accurate and quick search results, boosting the user's ability to discover desired items. Later, it drives recommendation systems, which promote items, services, or information based on user preferences and behavior. In this way, the machine that runs by these specific algorithms may assist consumers in finding new items, enhance cross-selling and upselling opportunities, and improve the shopping experience by providing individualized product suggestions.

On the other hand, artificial intelligence (AI) and algorithms may be used to detect and prevent fraudulent actions in e-commerce, such as payment fraud, account hijacking, or bogus reviews. These algorithms examine trends, anomalies, and user behavior to detect potential fraudulent actions and reduce risks, guaranteeing a safe and trustworthy environment for buyers and sellers.

Algorithms play a significant part in targeted advertising and marketing initiatives. Individuals likely to be interested in certain items or services can be sent tailored adverts via algorithms. Businesses may target particular client groups with customized marketing campaigns, individualized discounts, and suitable product suggestions. They evaluate user data, surfing behavior, and demographic information to serve targeted and relevant adverts. These personalized advertisements enhance the shopping experience, increase consumer engagement, and drive sales.

As a result, personalization provided by algorithms in e-commerce brings us to "dark patterns". Dark pattern is a term commonly used by the web collectively to describe a user interface that exploits users into doing something that they would not normally do. It is a coercive and manipulative design technique used by web designers when some sort of action is needed from a user—typically to begin the processing of personal data (Leiser, et. al., 2020).

In the Indonesian context, there were 12 types of dark patterns employed by e-commerce platforms, including hidden costs, disguised advertisements, misdirection, privacy zuckering, and others (Wahyuningtyas, 2021). The study also discovered that the majority of respondents were unaware of the use of dark patterns in e-commerce platforms. Although a lot of consumer complaints reported to the National Consumer Protection Agency (BPKN) about e-commerce and social commerce were about non-delivery, payment failure, or misleading advertisement.

The use of dark patterns in business could be considered a violation to fair business conduct because it is deliberately intended to mislead, deceive, and persuade consumers into making unintended and possibly harmful choices (Karagoel and Robert, 2021). Although some argue that the use of dark patterns could be helpful for consumers, it may benefit businesses more than it does the consumers

and could perpetuate power imbalance between businesses and consumers. Dark patterns in business might be deemed a violation of fair business practices since it is intentionally designed to mislead, deceive, and convince consumers to make unanticipated and perhaps damaging decisions (Karagoel and Robert, 2021).

Recognizing and avoiding dark patterns is vital for e-commerce businesses to build trust, maintain consumer satisfaction, and promote ethical practices. By focusing on transparent algorithms and user-centric design of products, businesses can foster positive interactions, promote informed decision-making, and create a more trustworthy and sustainable e-commerce environment. Algorithms should be implemented in a transparent way to users. Users should know how algorithms are used, what data is collected, and how it impacts their experience and choices.

3. Education and ethics

Algorithms are important in education because they help with different elements of teaching, learning, and administrative activities. Artificial Intelligence has the potential to improve education significantly. Here are some examples of how algorithms are used in education:

- **Detection of plagiarism:** Algorithms are used to detect plagiarism in student submissions. Plagiarism detection algorithms compare student work to a database of sources to uncover similarities and probable cases of academic dishonesty.
- **Scheduling and administrative tasks:** Algorithms can help educational institutions optimize scheduling, course assignments, and resource allocation. To design efficient and balanced schedules, these algorithms consider various criteria, such as student preferences, resource availability, and limits.
- **Language learning and translation:** AI-powered language learning platforms and translation tools can help students overcome language hurdles. Language practice, pronunciation feedback, and real-time translations may all be provided by AI algorithms, enhancing communication and learning between languages.
- **Content creation and personalized recommendations:** AI may help with educational content creation, such as providing quizzes, exercises, and interactive learning materials. Students can also be recommended suitable learning resources by AI algorithms based on their particular requirements and interests.

However, there are also possible problems and negative consequences that must be addressed. AI presents ethical quandaries in schooling. There are disagreements, for example, over the acceptable use of AI in making high-stakes choices like college admissions or student assessments. Transparency, accountability, and adherence to ethical norms are required to guarantee that AI systems conform to ethical standards while respecting students' rights and dignity. Furthermore, here are some thoughts on the potential drawbacks of AI in education:

- **Equity and access:** Using artificial intelligence in education may worsen existing disparities. For example, should AI-powered tools and services be utilized, these technologies might be limited to schools with adequate finance capacities to build the infrastructures, which may result in a digital divide.
- **Human contact loss:** Overreliance on AI technologies may reduce the relevance of human contact in education. While artificial intelligence can give individualized training and assistance, it cannot replace the advantages of face-to-face interactions with professors, mentors, and peers. AI can potentially disrupt traditional teaching roles and redefine the function of educators. While algorithms can help to assist and improve educational processes, it is critical to keep the human aspect in education. Algorithms should be viewed as aids to instructors and students rather than as a replacement for the vital function of human educators in giving advice, mentorship, and emotional support. That is why it is critical to strike a balance between AI-driven learning and human participation.

- **Limited creativity and critical thinking:** Personalized learning experiences, adaptive assessments, and targeted interventions may all be provided via algorithms. Personalization must be balanced with student development and promote critical thinking, creativity, and social skills. They may not fully promote the development of creativity, critical thinking, and problem-solving abilities, all of which are essential for comprehensive education. It is critical to strike a balance between the use of AI and the development of broader cognitive capacities and encourage human-centered talents that are critical for future success.
- **Dependence on technology:** Automation powered by algorithms has the potential to cause job displacement in specific industries, impacting employment rates and producing social difficulties. These examples demonstrate how algorithms are used in a wide range of sectors and applications today, enabling innovation, automation, and intelligent decision-making. While artificial intelligence may help teachers in various ways, such as offering insights or automating administrative duties, there is worry about job displacement or deprofessionalization. It is critical to ensure that instructors can interact with AI systems and adapt to changing responsibilities.

While algorithms provide various educational benefits, it is critical to examine the ethical consequences, such as privacy, data security, and algorithmic prejudice. Algorithms must be used in a transparent and responsible manner, with continual monitoring and review. Careful planning, ethical considerations, and continuing review are required to mitigate these possible negative outcomes. It is critical that educational algorithms improve learning experiences, promote fairness, and place a premium on student well-being. In addition, multiple stakeholders, such as students, teachers, parents, legislators, and specialists, must be included in the creation and implementation of educational algorithms. This collaborative approach can guarantee that ethical concerns are addressed and that the potential benefits of algorithms in education are realized while protecting the well-being and rights of all students.

4. Algorithm's dominance in the gig economy

In recent years, there has been a growing gig economy in Indonesia. defined as a business model that utilizes digital platforms in a short-term contract, offering individual autonomy over their work time and place (Barzilay & Ben-David, 2017). In Indonesia, the growth of the gig economy can be highlighted with the emergence of many ride-hailing applications in the country such as Uber, Gojek, and Grab. Despite the claims of its economic contribution to the country, this sector has also been highly criticized for the unfair treatment to its workers.

Based on the Indonesia's Fairwork Report (2021), many gig economy platforms in Indonesia exert overwhelming control over their driver-partners using algorithmic mechanisms within their platform and applications. For example, the "gamification" of applications which shape drivers' behavior in carrying out their tasks. The term "gamification" is used to illustrate the use of ratings, competitions, and bonuses to incentivise drivers. However, overtime, the algorithms or the "rule of the game" are designed to make it harder for the workers to get their bonuses and incentives. As a result, workers need to work for long hours and become over-exhausted to "win the game". This issue is very concerning as there have been cases of deaths among online taxi drivers due to exhaustion-related causes (Mustaqim, 2023).

Furthermore, the report found that companies can temporarily suspend or permanently remove workers from the platform based on algorithmic decisions, such as customer ratings or the number of jobs declined. Although mechanisms are in place to prevent wrongful suspensions, evidence suggests that platforms often favor customers, putting workers at a disadvantage. Algorithmic decision-making used to manage workers in the gig economy raises concerns about the excessive control platforms have over their driver-partners, particularly in the ride-hailing industry. Workers must accept decisions made by the application without fully understanding how those decisions are reached, and they lack the ability to negotiate the "rules of the game," despite their role as driver-partners. This situation highlights the necessity for workers to assert their rights within the system to secure fair and meaningful

work and compensation. As this sector continues to grow, it is crucial to examine the challenges posed by algorithmic decision-making and its implications for workers.

Understanding digital rights and ethics toward inclusive digital transformation

An inclusive digital transformation is important to ensure that the new technology and the digital environment do not further exacerbate the existing inequalities. Thus, it is important to establish a human-centric digital transformation, where human rights are respected and ethics are well established. The objective is to achieve meaningful participation of every citizen, regardless of ethnicity, gender, age, and religion in the digital transformation. This section highlighted the important aspects of digital inclusion that are concerned with the fulfillment of individuals' rights and touched upon ethical issues: (1) data protection, (2) digital literacy, and (3) gender mainstreaming. It is understood that there are structural barriers that may influence how individuals can have access to technology. Several variables can come into play, such as race, economic status, education level, gender, etc. In addition, these variables can also play simultaneously and exacerbate one another.

Importance of digital literacy to understand digital rights and ethics

Digital literacy plays an important role as people need to be empowered to also be able to protect their data (Soheil et al, 2022). The ability to protect does not only come from the understanding on how to use the technology, but also understanding what are their rights and responsibilities in using it. Digital literacy is defined as the ability of users to access, manage, understand, integrate, communicate, evaluate, and create information safely and appropriately through digital technologies for employment, decent jobs, and entrepreneurship (Law et al., 2018). By having basic skills and capacity in digital literacy, individuals can have knowledge and access to utilizing the technology. However, having the knowledge is not a guarantee in ensuring that everyone will be able to take advantage of the development of the internet and digital technology, let alone have the knowledge to participate in it. This means that the competencies required do not only involve the ICT capacities but also the capacity to consume and understand media and new information. Promoting and fostering digital literacy will equip citizens to demand the fulfillment of their digital rights and also allow them to use the technology ethically. A literate individual will be able to exercise their rights, and should there be a case of violations, avail themselves of remedies. They will also be able to participate and establish a healthy digital interaction that respects each other's privacy and promotes positive values in online interaction.

Ensuring meaningful participation through data protection regulation and ethical algorithm

Data as an important part of individuals' identity holds a significant importance to be protected. States should respect individuals' rights to privacy and data protection and must refrain from violating it (OHCHR, 2024). A better data protection regulation will arguably increase citizens' trust toward the government, which allows them to be more confident in participating in the digital transformation. On the other hand, for private sectors, the regulation will allow them to have more clarity on the business processes and practice and gain consumers' trust. Secure and trustworthy data protection serves as a pinnacle of trustworthy governance, and vice versa.

As illustrated in this article, algorithm dominance has brought several negative social consequences. These unethical practices within digital technologies may also hinder meaningful digital participation. For example, the imbalance of rights and responsibilities between platform companies and their driver-partners may result in hesitancy to take this new model of economy. The utilization of dark

patterns may cause individuals' reluctance to use social commerce. It is seen that, if these practices continue to persist, they could affect citizens' trust and willingness to participate meaningfully in the digital domain. This could, in turn, result in a lack of inclusivity in this sector.

Mainstreaming gender equality in technology

The issues regarding gender bias also can not be overstated. Gender bias in the utilization of technology, especially in the design of the algorithms is among pertinent ethical issues within technology design. One of the most cited examples is the systemic social biases in the internet search algorithms, illustrated in the labor market scenarios where it is found that the search engine only perpetuates the classic gender prototypes about one's occupation (Vlasceanu & Amodio, 2022). A study conducted by a team from the University of Washington in 2022 finds out that although most search engine companies have promised to fix this problem, the gender bias is still there (McQuate, 2022). The study investigated four major search engine websites like Google, Baidu, Naver, and Yandex and found out that this problem occurred in all four, regardless of the geographical boundaries in which the search engines are mostly used at. Another problematic issue regarding gender bias in the development of digital technology is the use of feminine voice as the default for many mainstream voice-assistant technologies and service-robot, while on the other hand, male voices are used for tasks that involve teaching and instructing (Manasi et.al., 2023). This practice has only exacerbated gender discrimination against women. This situation calls for a better ethical measure in the development of digital technology to address the problems of gender inequality and discrimination.

The phenomenon can arguably be attributed to the lack of female representation in technology design. Women's participation in the technology sector, particularly in AI, has been significantly underrepresented (Bahous, 2023). This is concerning, as the design of algorithms may reflect the interests of a limited number of men, potentially overlooking the adverse effects of technology on women. Several factors contribute to this situation, including women's limited access to education and training opportunities, prevailing social norms and gender biases, and the lack of gender diversity in leadership roles (Nurmalasari, 2023). Income gap in this sector is also often mentioned as one of the challenges. This should not come as a surprise since in Indonesia, based on the 2021 data, it is found that female professionals and technicians in tech companies experienced about a 33.5% income gap against their male counterparts (Taufik, 2023). Globally, according to the Korn Ferry Global Gender Pay Index, women make on average 16.1% less than men (Korn Ferry, 2019). As a result, this sector have been daunted with casual misogyny practice, causing a high number of women leaving the job (Bahous, 2023). In return, we are witnessing and utilizing the technology that embeds gender bias and inequality.

In order to alleviate these issues, it is important to promote affirmative action and active efforts from the government and the private companies to be able to support diversity among the workers and close gender parity within the sector.

Policy recommendations

Discussions about digital rights and ethics are often intertwined. In the two issues addressed above, both rights and ethical considerations are present. While these matters are highly relevant in today's digital landscape, it is evident that more actionable policies are needed to address them. Collaboration among various stakeholders is essential. Although the government, as the policymaker, plays a significant role, it requires input and cooperation from industry, civil society organizations, and academia. Additionally, media and civil society organizations are crucial in amplifying these issues.

1. Data protection and privacy

The passage of the PDP law in 2022 represents a significant advancement in data processing activities in Indonesia. However, the government still has much work to do. It is important to recognize that preventing data breaches and violations of privacy requires more than just existing legislation. Educating citizens about data literacy is crucial for mitigating these issues, as it empowers individuals to understand their data rights and responsibilities. Civil society organizations and academics can contribute by raising public awareness through advocacy campaigns, including workshops, public dialogues, and publications. Additionally, the government must ensure the security of data processed within the public sector to build public trust and encourage meaningful citizen participation in the digital realm.

2. Algorithmic transparency

Platforms should strive to be transparent about their algorithms and give users more control and understanding of how their content is curated and personalized. On the other hand, users should have clear and explicit control over their data and be provided with meaningful choices. Algorithm transparency is crucial especially to avoid algorithmic dominance that has become a problem in the gig economy where workers' income and distribution of orders heavily depend on the work of the algorithms. In this case, workers' associations can use their voice to appeal for any unfair treatments and policies that affect their work and income. Nevertheless, this urges collaboration and support from various sectors. As business entities strive for profits and efficiency, the government must step in to ensure that the technology being used is not exploiting the workers and also the customers.

There have been several efforts and calls being made by civil society organizations and workers' associations to be able to find a solution to this issue. The multifaceted nature of digital technology calls for collaboration from various sectors and government bodies. For example, in the case of ride-hailing digital platforms, there is a need to establish clearer regulations and tasks among at least three ministries; the Ministry of Manpower, Ministry of Communication and Informatics, and also the Ministry of Transportation. Since the rights and responsibilities of the driver-partner still remain unclear under the current law, it is important to facilitate a dialogue and discussion to be able to find the middle ground between platforms and its partners.

Individuals should be empowered to have skills to critically evaluate information, recognize bias, and navigate themselves in the digital society and platforms. By having these capacities, they will understand their digital rights and participate in the digital realm in an ethical manner. Empowerment programs can be done through early education institutions (for example: embedding digital literacy as part of school curriculum), government programs (for example the current government program of digital literacy with "Indonesia Makin Cakap Digital"), and community-led initiatives across cities and provinces. This is to ensure that every individual, irrespective of their gender, age group, and background can develop their digital skills. Development agencies may also work together with the government to empower citizens due to the importance of digital literacy and education among the Indonesian population by designing trainings or workshops in the region with low digital literacy levels, for example.

As technology progresses, there will always be newer and more advanced knowledge that will be available to the public. Not only the basic digital literacy, the country may as well develop many new tech talents by improving more advanced digital skill sets through training and high-level education programs. This program can be tailored with collaboration with education and vocational institutes as well as local technology industries. Encouraging more women participation in Science, Technology, Engineering, and Mathematics (STEM) education is also equally important in ensuring the establishment of a more diverse and inclusive digital transformation.

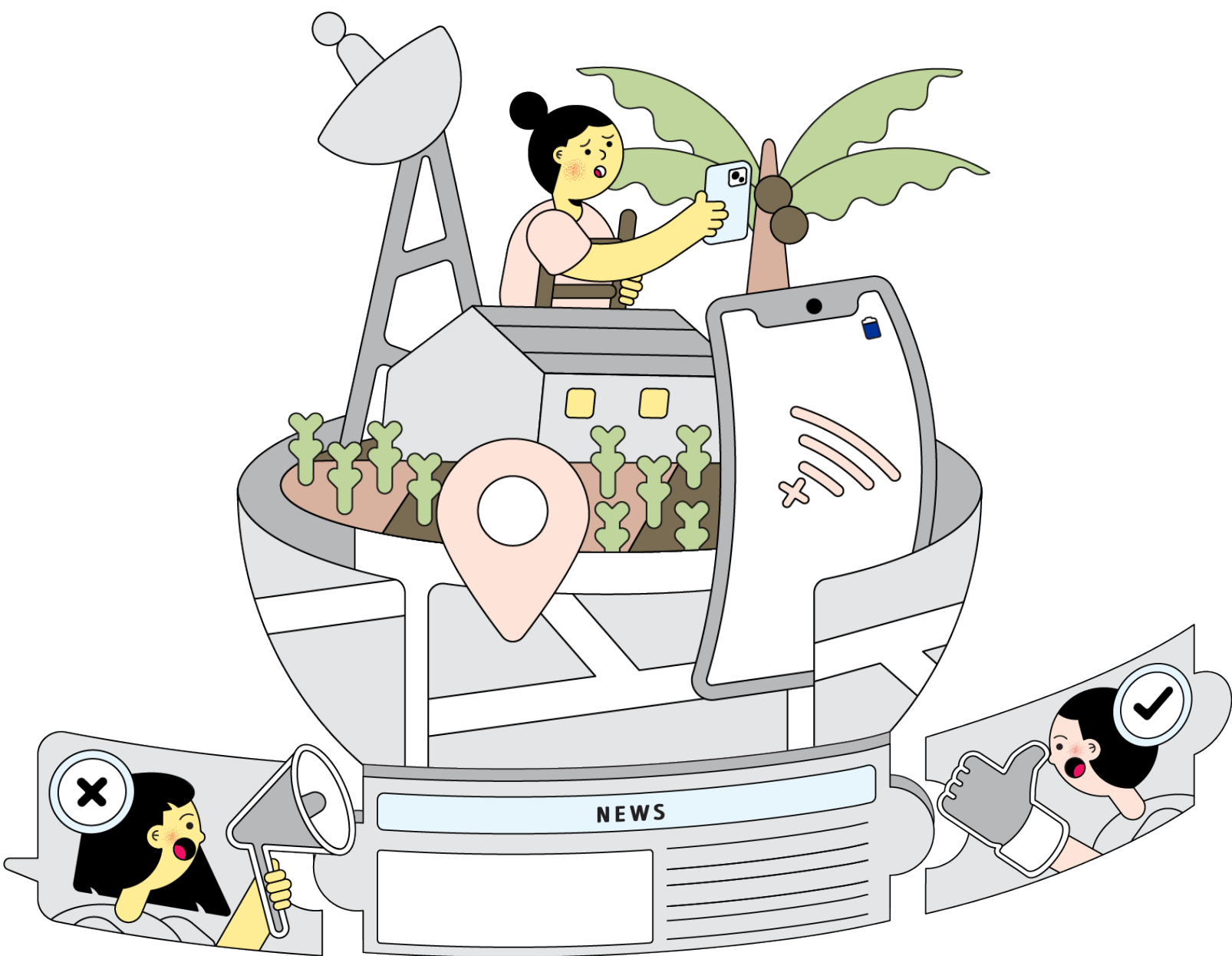
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III. WISDOM OF THE CROWD OR WICKEDNESS OF THE CROWD?: POLARIZATION, MIS/DISINFORMATION, AND SOCIAL MEDIA IN INDONESIA

By Philips Vermonte

Indonesia experienced unprecedented political polarization during its 2014 and 2019 presidential election. This polarization began with a sharp division in support for the two presidential candidates in 2014, Joko Widodo and Prabowo Subianto, and reached its peak in 2016-2017 during the Jakarta gubernatorial election.

The sources of this political discord have been largely attributed to divisions between Muslim conservative and non-conservative electorates. Historically, such partisan identities have been deeply rooted and are considered key features in understanding Indonesian politics. Although they were once thought to have diminished in post-*reformasi*, they have recently reemerged and even intensified within a new context.

However, concerns that the same level of polarization would occur in the 2024 presidential election might be a bit exaggerated. Recent research indicates that polarization appears to be decreasing.¹ As much as Indonesia experiences political polarization, it may be more prevalent at the elite level than among the public at large. The kind of animosity between supporters of different parties, as seen in the United States (Iyengar et al., 2019), does not appear to be present in Indonesia. Scholars also caution that to the extent the public holds divisions, these occur on specific issues such as public attitudes toward ethnic Chinese and Muslim minorities (Soderborg & Muhtadi, 2023). This is exemplified in a survey conducted by the Indonesian Survey Institute, as highlighted in the excerpt from Fealy et al. (2022) below.² A large part of this report will deal with the state of this societal polarization and, primarily, its visible causes and consequences in political and non-political spheres.

Based on the “feeling thermometer” measure, respondents unexpectedly demonstrated “warm” feelings toward mainstream Muslim organizations such as *Nahdlatul Ulama* and *Muhammadiyah*, but exhibited “cold” attitudes toward the already banned Muslim conservative group HTI (*Hizbut Tahrir Indonesia*), as well as toward minorities like Ahmadi and Shia (Figure 1). The followers of the now-inactive Islamic liberal networks are in the lowest position. These four Muslim minorities are also the ones most likely to be rejected if they were to become neighbors of the respondents (Figure 2).

1 Source: <https://www.newmandala.org/indonesias-polarisation-isnt-dead-just-resting/>

2 Source: <https://www.newmandala.org/counter-polarisation-and-political-expediency/>

Figure 1. Feeling thermometer for persons and groups

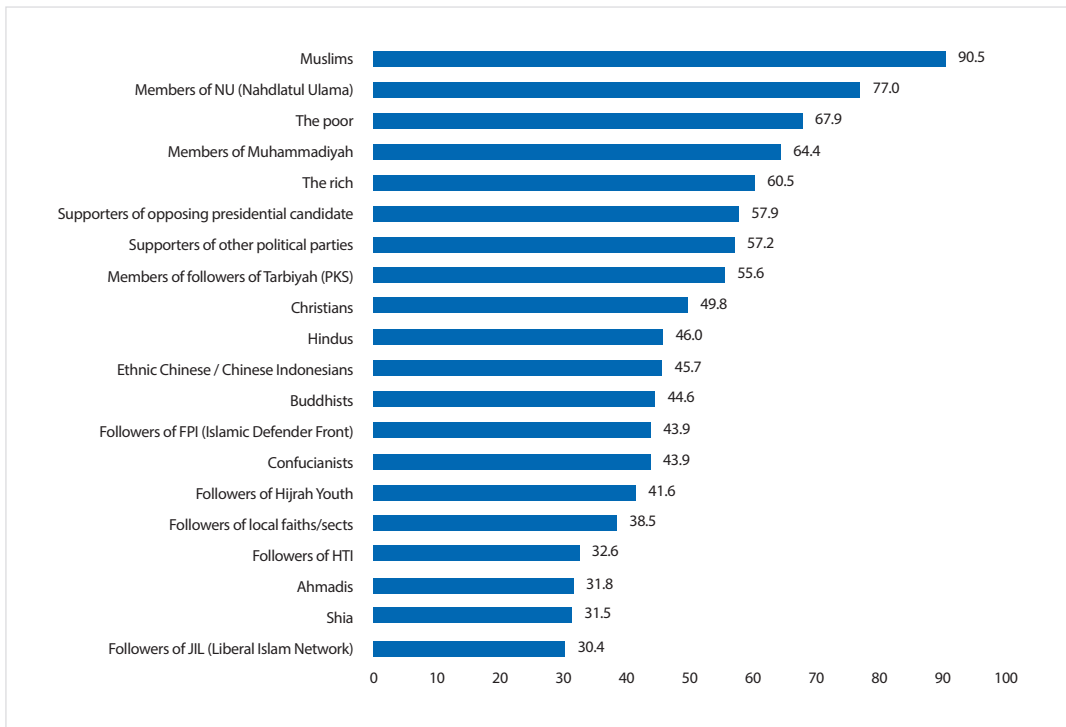
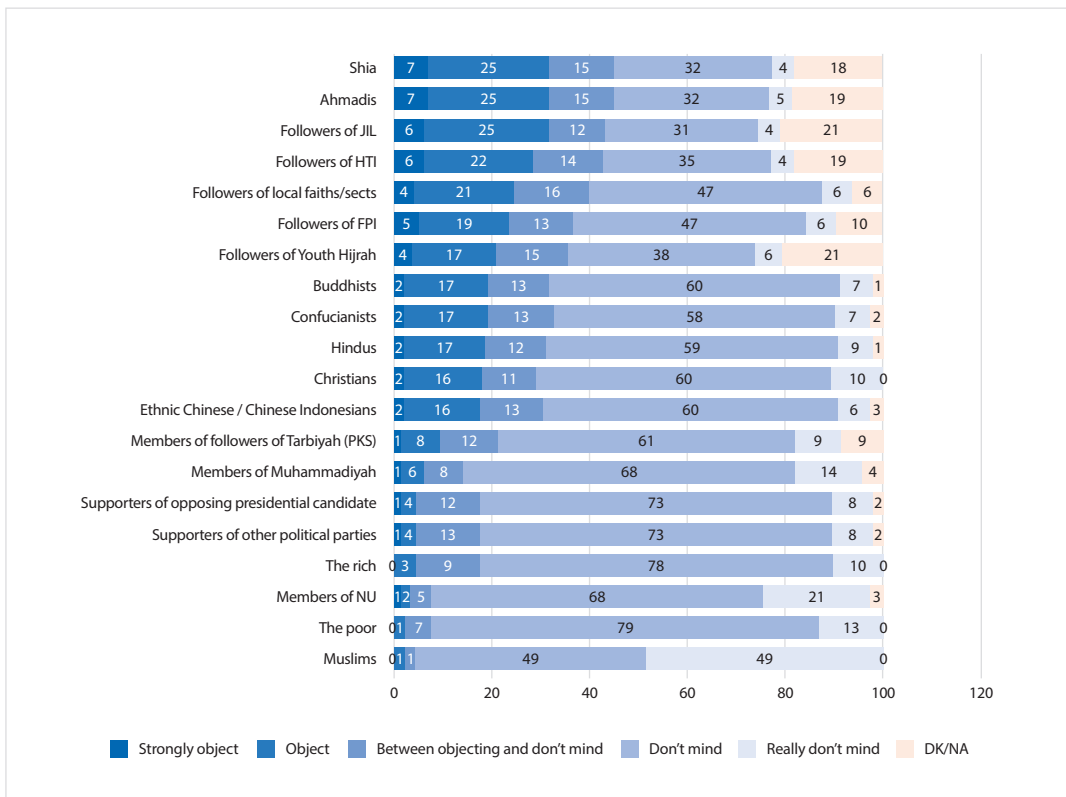


Figure 2. Feeling objection for being neighbors with...



We can further attest this with the latest survey conducted by CSIS in September 2023. Although the survey was not specifically designed to address questions on polarization, it contains several relevant questions that shed light on this issue, which I will utilize much in this report. When people were asked whether they are comfortable living next to someone of a different religion or belief, a striking 67 percent stated they were “somewhat uncomfortable”, and 15 percent said they were “very uncomfortable”. Only 18 percent expressed comfort. It is widely understood that responses to sensitive questions like this are prone to a desirability bias, making it the actual number of respondents who are uncomfortable might be even higher than this already high response rate.

Figure 3. Living as neighbors with people who have a different religion/belief?

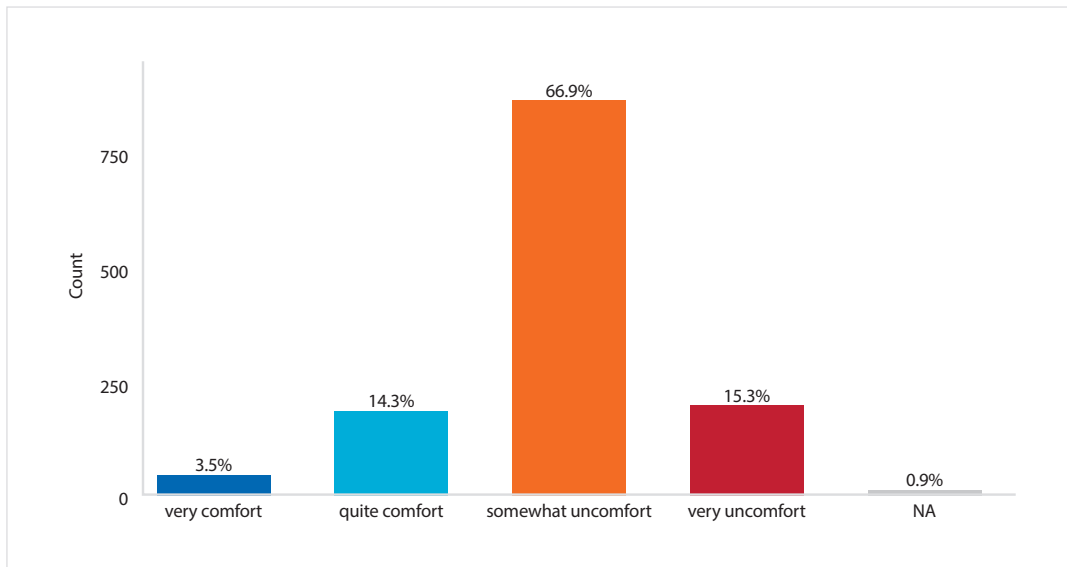
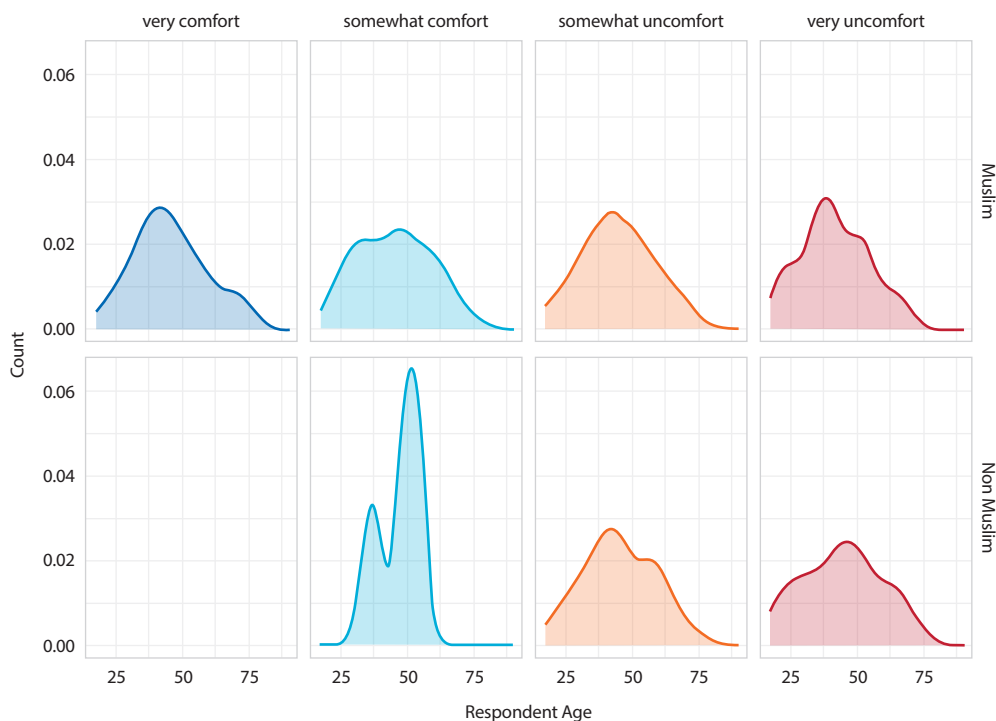


Figure 4. Comfort levels living with different religion/belief neighbors by age



One might wonder whether this conservative tendency would be more pronounced among Muslim respondents. Nearly 90 percent of Indonesians are Muslim, and there have been many incidents related to polarization and tolerance involving the Muslim community. It turns out that this attitude is seemingly shared among adherents of all religions (Figure 4). In fact, none of the non-Muslim respondents stated they were “very comfortable” living next to people of a different religion. The most tolerant non-Muslims seem to be those aged above 50. Interestingly, those who stated they were “uncomfortable” appear to be somewhat skewed toward people in the 30 – 40 year age range. This applies to both Muslim and non-Muslim respondents. Demographically, these people are still young, have high exposure to the internet and social media, but are relatively more politically conscious compared to Gen Z. This indicates a potential generational shift in religious tolerance attitudes, possibly influenced by digital media. Additionally, the findings suggest that efforts to promote interfaith harmony may need to be targeted differently across various age groups, acknowledging the distinct influences shaping their perspectives.

Polarization itself stems from an overgrowth of partisan identity. A certain degree of partisanship is normal, and even desirable for democracy to work. The extent to which individuals feel attached to certain parties, for instance, can become a potent force behind party support and party institutionalization.

For some observers, strong identity sorting is a catalyst for other desired outcomes, such as electoral and political stability.

But one of the concerns in this normality is if partisan identities undergo an abrupt change and increase in a short period of time. Sudden changes always disrupt the stability of the system, its values, and the status quo. This is exactly what happened in the Jakarta gubernatorial election and in the 2014 and 2019 presidential elections, when the dormant ideological cleavages were reactivated through campaign messages, slogans, and the prevalent use of political identity. These sudden shifts can lead to heightened tensions and a polarized public, posing a challenge to “normal” democratic processes.

Affective polarization and its consequences

Polarization now indeed tends to be lower than five years ago, as confirmed by a *Kompas* survey³ and recent research. This decline is partly due to what is termed as “counter polarization” that took place after the 2019 election.⁴ Chief among these is the inclusion of Prabowo Subianto in then-president Jokowi’s cabinet. Additionally, parties such as PAN and Golkar, which previously opposed Jokowi, eventually joined the government. This is not to mention the strong measures taken by the government in banning major opposition groups like HTI and FPI. Unlike in the previous two elections, the 2024 presidential election featured three candidates, thereby minimizing the binary differences when only two candidates competed as occurred in the past.

Nonetheless, despite being dissipated, what is perhaps less appreciated are the lasting consequences of political polarization. Polarization may subside, but some residues of it can still be seen, especially in people’s attitudes and behaviors toward both partisan and non-partisan issues.

These attitudes and behaviors can best be understood in conjunction with what scholars have termed “affective polarization”. This refers to the animosity felt toward groups with differing political views. Feelings such as suspicion, distrust, and belittling of individuals or groups holding different political views are examples of affective polarization. Unlike ideological polarization, which tends to be more permanent and stems from preceding historical cleavages, affective polarization is man-made and more context sensitive. It poses a challenge to democratic processes, as it undermines the ability for constructive dialogue and consensus-building among diverse groups.

The high exposure to partisan media is considered to strengthen affective polarization (Lelkes et al., 2017). In order to fit in with their in-group in both personal and professional relationships, people also need to adopt certain attitudes to conform to similar viewpoints (Hogg, 2001). While the effect of partisan social media messages to augment this trend remains inconclusive, the growing homogeneity of both online and offline networks might be playing a role in deepening affective polarization (Iyengar et al., 2019). As individuals with different political views become more segregated in their daily and virtual interactions, they tend to be exposed predominantly to opinions that echo their own, potentially intensifying the divide.

One way to understand the consequences of polarization is by analyzing how well people recognize a set of information that is intentionally designed to mislead. This information is commonly shared on social media and is often used to amplify messages with a political motive. The growing field of digital propaganda uses many different terms to emphasize the importance of its theory, such as misinformation, disinformation, hoax, and false information – all pointing to the plethora of information that is not accurate and can potentially be misinterpreted by many. In the political sphere, these messages were used to discredit political opponents while unwaveringly supporting another candidate. In the field of public policy, message amplification strategies were employed to make people one-sidedly support or reject certain policies.

3 Source: <https://nasional.kompas.com/read/2023/07/11/05344661/survei-litbang-kompas-publik-khawatir-polarisasi-terulang-pada-pemilu-2024>

4 Source: <https://www.newmandala.org/counter-polarisation-and-political-expediency/>

To test whether the consequences of polarization can truly be identified at the societal level, this report constructs what can be termed as “disinformation awareness scores”, an index that comprises the sum score over several variables related to context-specific disinformation. We need to differentiate between “election-related” and “non-election-related disinformation”. The test begins by describing the descriptive findings of each index, then proceeds by explaining the most relevant predictors in explaining variations related to people’s knowledge of disinformation. The discussion then concludes by explaining what must be done to minimize the effects of disinformation and what the findings tell us about the state of polarization in Indonesia.

Figure 5. Disinformation awareness scores (election-related)

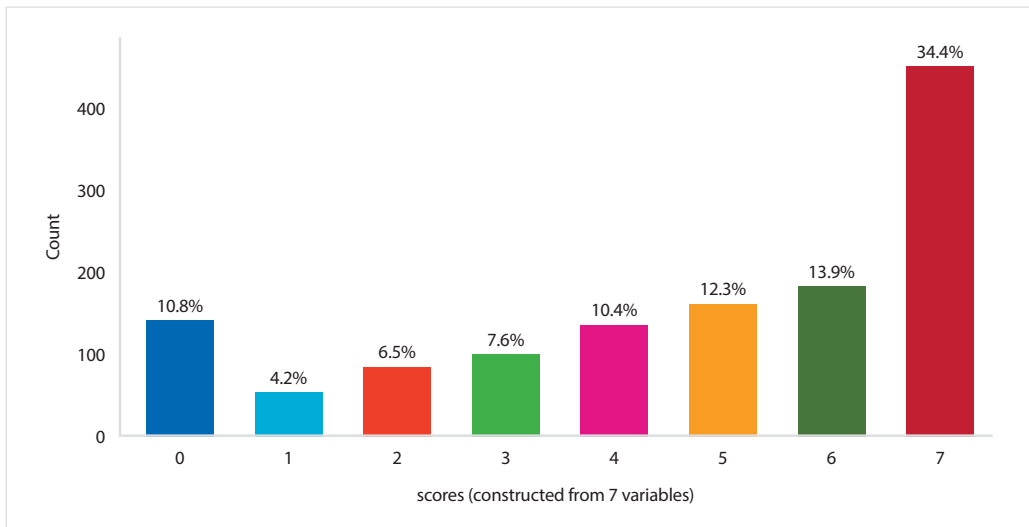
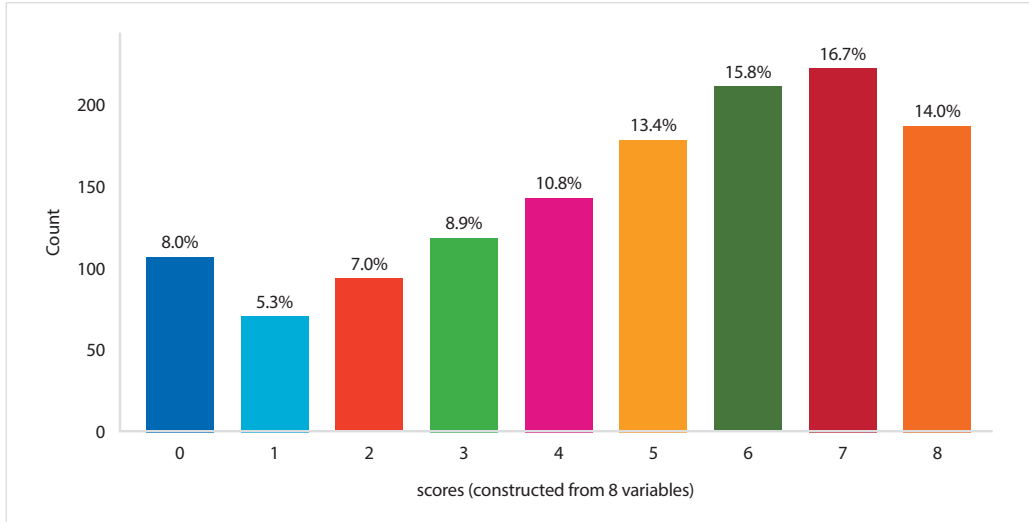


Figure 6. Disinformation awareness scores (non election-related)



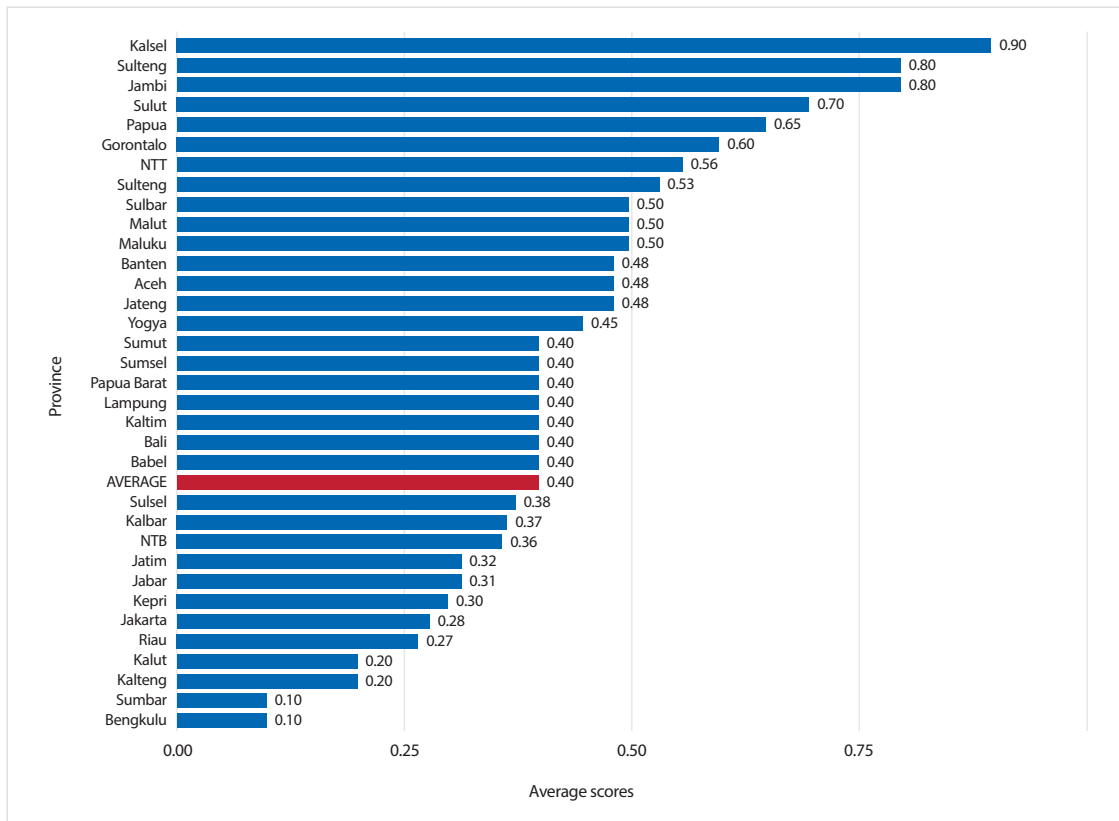
Relevant information here includes rumors that Chinese workers were given Indonesian national identity card (KTP) to support certain presidential candidates, the postponement of the 2024 election due to lack of government funding, claims that COVID-19 is a man-made mass-killing weapon, and conspiracies about reviving the already dissolved Indonesian Communist Party (PKI) – these are examples of false information that have been widely circulated in the last three years. The full list of variables that construct our indices is available in the appendix.

The election-related index shows that most Indonesians can distinguish between true and false information. The higher the score, the better, where 7 denotes “perfect awareness”, meaning the respondent correctly answered all seven questions, and 1 denotes “least awareness” on the issue. A score of zero implies that the respondent did not have any correct answers. It is found that 34.4 percent of respondents achieved a perfect score on this issue, and only 10.8 percent received a score of zero.

If we take 4 as the cutoff point, about 61 percent of respondents have relatively adequate knowledge regarding election disinformation, and the rest can be considered a “vulnerable” group. The mean score for this index is 4.67.

Responses related to non-election disinformation show more dispersed results. This index was constructed from 8 variables, where higher scores indicate better performance. Only 14 percent of respondents managed to answer all questions perfectly, and 8 percent failed to answer any question correctly. Again, if we take 4 as the cutoff point, we find that around 60 percent have good knowledge about non-election disinformation. The mean score for this non-election group is 4.79.

Figure 7. Believe in false information by province



Then the two indices are combined to obtain the overall scores of people’s awareness. Subsequently the scores based on provinces are disaggregated. Several interesting patterns emerged from this observation (Figure 7). First, the average scores for all provinces are around 40 percent, which is close to the two indices mentioned above. Only 11 provinces reach at least 50 percent cutoff whereas 23 provinces were well below this point. Second, the top ten provinces with the highest “believe in false information” are those outside Java. The least scores for the Javanese provinces are Banten (ranked 12), followed by Central Java, Yogyakarta, East Java, West Java, and Jakarta, respectively. Third, the top three and the bottom four shared an extreme range to each other. South Kalimantan, Southeast Sulawesi, and Jambi are among the most susceptible provinces due to their high beliefs on the veracity of false information, whereas North Kalimantan, Central Kalimantan, West Sumatera, and Bengkulu were the least likely provinces for such beliefs. The survey was conducted nationally with the sample taken randomly and proportional to the size of population in each province.

What do these overall scores reveal about the vulnerability of the general population to issues like hoax, false information, misinformation, etc which are closely related to affective polarization? In the context of the 2024 election, an average score of 40 percent implies that nearly 82 million out of 204 million voters could be considered “easy targets” for digital propaganda. This number is more than sufficient to secure the candidate’s victory, to help the party surpass the parliamentary threshold, and most disturbingly to incentivize the elite to use computational propaganda techniques as the campaign season begins. These findings illustrate that, despite a perceptible decrease in polarization,

its ramifications are still evident in both electoral and non-electoral issues. This trend highlights the ongoing challenges in the nexus between digitalization and politics and the need for strategies to enhance information literacy among the electorate.

False information, age, and gender

This study is interested in understanding how this level of awareness of disinformation varies by age and gender. We will also examine how the scores differ between the Java and non-Java regions. Conventional understanding suggests that the younger generation, having better digital skills, might have a relatively higher awareness of false information compared to the older generation. It is also assumed that the Javanese regions have a higher level of digital awareness compared to non-Java regions.

Figure 8. Age and misinformation awareness (election-related)

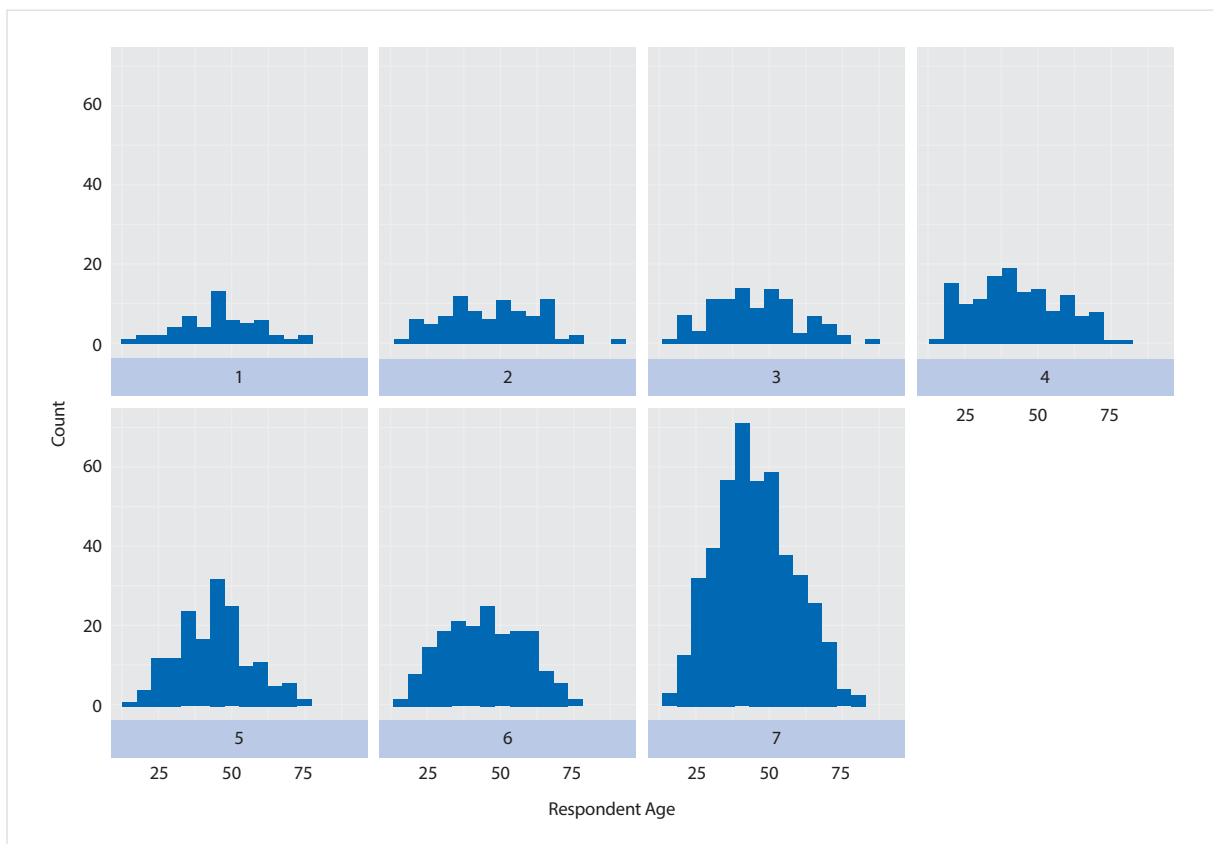
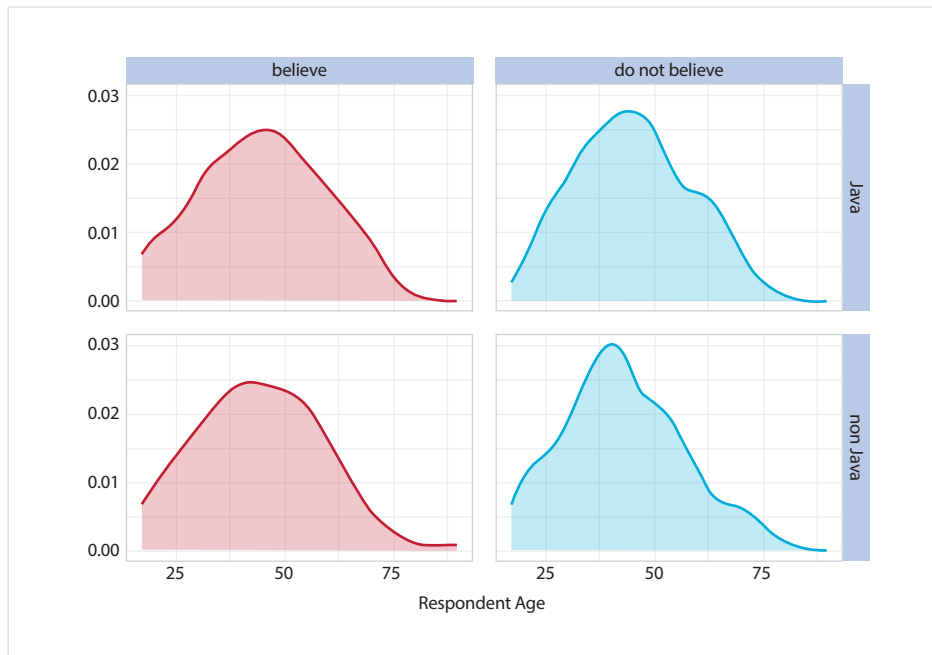


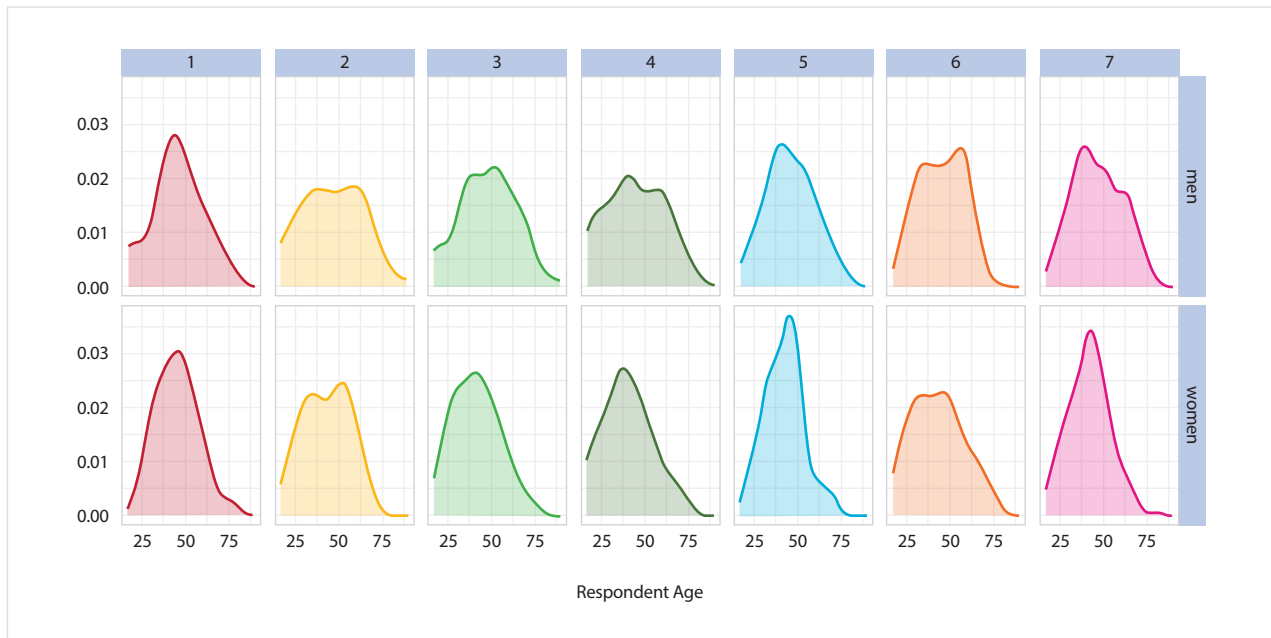
Figure 8 indicates that the level of knowledge regarding disinformation with scores ranging from 1 to 4 is relatively equally shared across all age brackets. This study did not find any significant differences between the low (1) to moderate (4) levels. In contrast, the highest level of knowledge tends to be dominated by the age group of 30 – 40. This skewness is also applicable to those scoring 5. The graph shows a left-skewed normal distribution, reflecting the younger population of Indonesia today. The overall count of those with high levels of awareness (5 to 7) is also larger compared to those with low awareness.

Figure 9. Believe in 'vote rigging' for certain parties or candidates

This study also examined how the public would respond if the question pertained to a specific case, instead of constructing it into a single index. The question asked was related to “vote rigging”, inquiring whether the respondents believe there is fraud involved in inflating the vote counts to benefit a particular candidate or party (*Apakah Anda percaya dengan pertanyaan berikut ini: “Ada penggelembungan jumlah pemilih untuk menguntungkan calon atau partai tertentu.”*).

The results show that those who do not believe in vote rigging have a slightly higher count compared to those who do. This applies to voters in both Java and non-Java. In the non-Javanese provinces, the higher level of awareness is found among those aged 30 – 40 years, whereas Java shows a more evenly distributed age range. No significant demographic age differences were found among those who believe in vote rigging.

Lastly, this study is interested in understanding the variations in knowledge across age groups based on gender. The Y-axis inquiries about election-related disinformation, which is an index composed of 7 variables. Several interesting patterns emerged. First, although the absolute count of 7 is the largest (see Figure 5), when broken down into awareness groups, the highest count for men is 1, while the highest count for women is 5. Additionally, the number of counts scoring 7 for women is higher compared to the same score for men. This indicates that, on average, women tend to be better at navigating false information than men. Secondly, all groups exhibit a normal distribution model across the board. The most astute voters in both genders once again come from the age bracket of 30 – 40, often termed as “Gen Y”, whereas “Gen Z” turns out to be the least knowledgeable across all groups.

Figure 10. Disinformation awareness (election-related) based on age and sex

What do these overall patterns tell us about vulnerability to affective polarization in Indonesia? We can do simple observations. According to the Statistics Indonesia (BPS), the population of Indonesia in 2022 is 275,773,774.⁵ The population aged 20 – 29 is about 45 million, almost equal to the population aged 30 – 39, which is around 43 million. Since this survey can be generalized to the population, the lower scores from Gen Z indicate a systematic difference in terms of knowledge about false information compared to Gen Y. The low scores of Gen Z are likely not reflecting random chance, but rather a significant difference from Gen Y. This means that Gen Z falls into a risk group that is vulnerable to being influenced by partisan issues. Their ability to distinguish partisan messages is on par with the group aged 60 and above. Gen Y are among the most knowledgeable in this issue, significantly higher compared to Gen X and the so-called baby boomers. These facts are applicable both for voters in Java and outside Java. Lastly, our findings also indicate that men are more susceptible to exposure to false information than women.

The mentality problems, political literacy, and inner circles: The three predictors

Finally, we reach the section where factors that explain the variation in the population's understanding of disinformation and how it contributes to polarization can be identified. Several conceptual explanations are necessary. First, it is possible that the mental model a person possesses is related to their tendency to absorb and process information. Research in political psychology mentions the role of knowledge and cultural antecedents in predisposing an individual's attitudes toward their general evaluation of something: the extent to which one sees an object as good or bad, positive or negative (Tormala & Rucker, 2018). At the cognitive level, this type of information processing is categorized as elementary stage. In such processes, individuals typically engage in activities like retrieving data from memory, scanning through lists in memory, and comparing simple symbols, among others (Simon, 1979). The applications of this mental model are numerous and not limited to political psychology research, but extend to market research, the behavior of toddlers and children, and to the field of public health.

Secondly, at a higher cognitive level, people's general evaluation of something can also be influenced by their ability to perform more complex tasks such as problem-solving, concept attainment, and comparing and synthesizing different ideas and concepts. In the study of children, for instance, children

5 Source: <https://sensus.bps.go.id/topik/tabular/sp2022/188/1/0>

do not naturally “check their work”, and they often don’t know how to do something before they are taught (Cromley, 2023; Comings et al., 2021). In adult learning, the “know how and know why” process can be facilitated by having habits that demonstrate the learning process. A common example is the habit of reading. People with good reading comprehension tend to monitor their own understanding of something, often without being consciously aware of it (Comings et al., 2021).

Thirdly, aside from familial ties, our tendencies, biases, and prejudices possibly arise from our daily interactions with friends and those who can be considered as part of our close circles. These include coworkers, neighbors, and even members of the same hobby or professional organizations. But to make them relevant for our purpose in understanding the consequences of polarization, interactions within these close circles need to consider the extent to which they are relevant to the issue. If the intensity of discussions among close circles is largely related to political and religious issues, for example, this tends to reinforce the partisan similarities among them (Mason & Wronski, 2018).

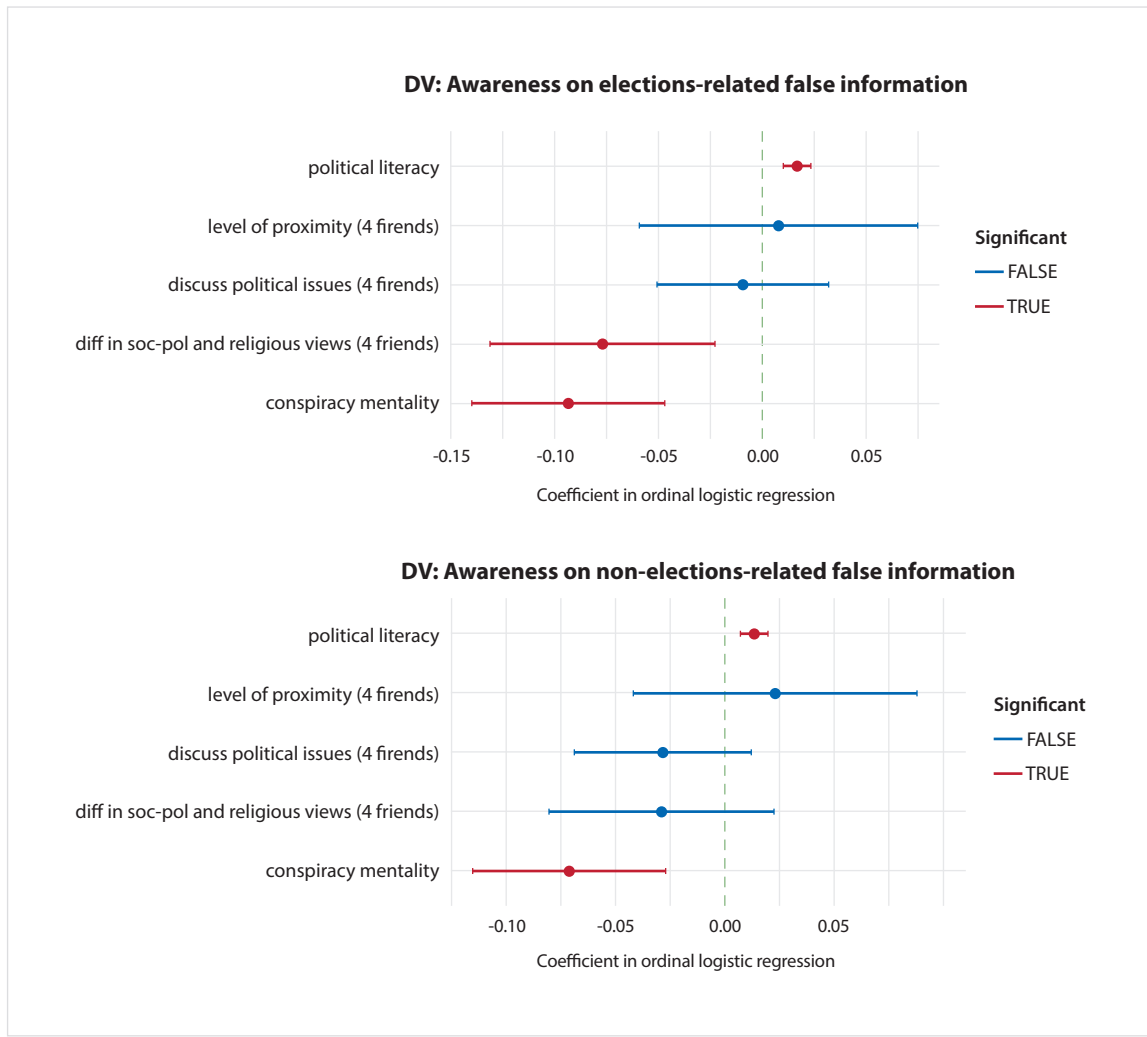
Armed with these insights, this study is testing the role of what can be called “conspiracy mentality”, political literacy, and the level of proximity with the four closest circles outside of families in influencing an individual’s ability to distinguish false information. We hypothesize that only political literacy has a positive relationship in distinguishing false information, while the other two variables will decrease a person’s ability to differentiate false information.

The conspiracy mentality is a constructed variable comprising five different questions about non-electoral conspiracy theories, COVID-19, and hoaxes that have been prevalent in Indonesia over the last five years. On the other hand, political literacy is an index derived from seven questions related to the general political and civic knowledge in post-reform Indonesia. The full lists of questions are in the appendix. All responses from these two indices use an ordinal response or Likert scale. For the variable “proximity with the four friends”, each respondent was asked to self-report the names of their four closest friends, followed by questions about how close they are personally. Subsequently, the respondents were asked how often they discuss current political issues with their inner circles and how different their political and religious views are.

This study’s results utilize an ordinal logistic regression, and the findings are interpreted in terms of odds ratios. The three main independent variables are conceptually and empirically not correlated with each other, allowing the study to rule out potential multicollinearity in our statistical analysis. The full results can be seen in the appendix.

The study found that all main predictors are consistent with the expected hypotheses. For election-related disinformation, the results indicate that political literacy has a small but significant relationship with awareness of disinformation. A one-unit increase in political literacy results in an individual having 2 percent higher odds of having better awareness of false information (exponentiated coefficient of odds ratio = 1.02, thus $1.02 - 1 = 0.02$). The other two significant predictors are the conspiracy mentality and the frequency with which respondents differ in terms of religious and political views with their close circles. For the former, each unit increase in conspiracy mentality leads to a 9 percent decrease in awareness of false information. Similarly, having fewer differences (or more similarities) in political and religious views also appears to reduce the odds by 8 percent. The results remain unchanged when we control for other covariates such as age, education, gender, level of expenditure, and Java vs. non-Java, indicating the statistical significance of the three predictors in explaining our dependent variable. Interestingly, the Javanese regions tend to be more vulnerable to election-related disinformation. Living in Java increases the likelihood of encountering fake news by a significant 40 percent compared to non-Javanese regions.

Figure 11. Relationship between DV and IVs



The results for non-election-related disinformation show somewhat different outcomes. The significant effect of having similar political and religious views disappears in this model. This suggests that the similarity in political and religious views only has a robust effect on people’s attitudes in election-related contexts. The other two main predictors still have a significant effect on the dependent variable. Better political literacy marginally increases the odds by 1 percent for people to distinguish false information, whereas a conspiracy mentality significantly reduces the ability by 7 percent. Like the previous model, the effects of both variables remain when we include other controls in the model, suggesting that the effects of our predictors are not due to random chance (see appendix).

What do these results tell us about the state of disinformation and other consequences of the seemingly reduced polarization? The fact that the highest coefficient is for conspiracy mentality suggests that the issue of disinformation and low political literacy in Indonesia is perhaps more of a cultural matter rather than a cognitive one. The role of culture, traditional values, and ingrained habits still runs deep and influences how people perceive controversial information. Individuals have their own mental predispositions, which may also affect the way they absorb information related to both political and non-political matters.

Furthermore, this study also found that similarities in political and religious views tend to reinforce partisanship only in electoral issues. In non-electoral issues, the effect of this similarity disappears. This shows that in political matters, Indonesians are likely to be more comfortable getting along with those in their in-group only. This is not a unique phenomenon, as similar patterns are also found in other countries. This poses a challenge for constructive cross-cutting dialogue and mutual understanding, which involves considerable interactions across different social-political and religious viewpoints. Lastly, we often heard about the importance of political literacy in mitigating polarization and divisiveness in society. It turns out that this literacy has only a negligible effect. This does not mean that literacy is unimportant, rather the effect of political knowledge is not as significant as people might expect.

Endnote: The role of tech companies and social media platforms

This closing section offers some thoughts on mitigating affective polarization and reducing people's susceptibility to false information, with the focus on the role of tech and social media firms.

As noted in the previous parts of this paper, polarization may be exacerbated as exposure to partisan media increases. It undermines the ability of the society to engage in constructive dialogue and consensus-building among diverse groups. Especially when individuals with different political views become more segregated in their daily and virtual interactions. This research has also found that among the three predictors of polarization, people's knowledge of misinformation is the most crucial one. This finding suggests that there are two elements of heightened polarization. The first, as has been discussed throughout the paper, is the elements at the individual level situation including age, gender, and the place/region where the individuals are living. The second is the element that is more on the supply-side that refers to how mis/disinformation is produced, either systematically or non-systematically, and being widely circulated.

In this regard, one may want to think about the role of technology (tech for short) companies and/or social media platforms in combating misinformation and disinformation that go through the platforms they are creating. Partisan views are massively circulated through various social media platforms which include, categorically, misinformation and disinformation. Therefore, tech and social media companies are parts of the stakeholders that have equal responsibilities with other stakeholders including the government and society. Tech and social media companies are important players in combating the many consequences of misinformation and disinformation societies across the globe, not only in Indonesia, have to bear.

There are, however, several challenges that we face in hoping for the tech/social media companies to be the sole actor that bear all the responsibilities. For one, they initially described themselves as merely "platforms" not "publishers" which suggests that if they do have responsibilities, it might be the indirect ones. Thus, the main responsibilities lie in someone else's hand, including the users or the members of societies themselves. This has changed a little bit after the alleged Russian interference in the US presidential election in 2016 that triggered demands for the companies to be more proactive in removing malicious political contents that contain misinformation/disinformation that run through their platforms.

However, even with such polarization that was exacerbated through social media in 2016, Congress has been more or less reluctant to regulate the responsibilities of tech companies given the concern of maintaining freedom of speech. Therefore, to confront the issue of misinformation/disinformation requires continued discussions that should involve a wide spectrum of perspectives, from the philosophical and moral point of views to the practical ones, as the ideas of mis/disinformation and freedom of speech are also dynamic and evolving.

Nevertheless, given the pressures from the governments and societies, tech companies have taken several steps to combat the disastrous effects of mis/disinformation. They have established content moderation mechanisms both by using human and machine content moderators. Tens of thousands of human content moderators have been recruited. At the same time, they have been developing and increasing the use of technology, in particular, Artificial Intelligence (AI) to increase the capacity to detect mis/disinformation that surpasses regular human accuracy. Google, Facebook/Meta are racing with time to develop technology and algorithms to identify, filter, and eventually remove contents they deem to be toxic (Etzioni, 2019).

The supposedly increased capacity of both human and machine content moderators employed by tech/social media companies may still not be able to match the rate at which mis/disinformation is produced and circulated over hundreds of million users. Indeed, the internet and social media that were once dubbed as providing the space for "wisdom of the crowd" to emerge have to compete with the "wickedness of the crowd".

Given such difficulties, governments, elite groups within society, and tech companies alike have been accused of being half-heartedly serious in tackling the problems of misinformation and disinformation. Governments and elites may take advantage of disinformation to maintain their grip on power. Social media platforms, on the other hand, may also benefit from “click-driven” digital advertising revenues generated by mis/disinformation that go viral (Krisetya and Aini, 2024).

Assuming that all stakeholders are affected more negatively, than positive, by the spread of false information, tech firms and social media platforms are important in mitigating the negative effects. First, increase the responsiveness and capability for content moderation. Newer technology, such as Artificial Intelligence, may also be useful in performing the necessary task. Second, increase transparency. Algorithms employed by social media platforms need to be subject to transparency. It may also relate to transparency of how digital advertising is accepted and run, who pays and how much.

On the issue of election campaigns, the transparency in accepting donations and how it is spent during a campaign is very important in maintaining election integrity. An election always involves different stages where each stage is prone to, and responsible for, conflict and polarization. Therefore, it requires all stakeholders -- including the government, election body, the parliament, political parties, candidates, voters, tech companies -- to understand that clean, transparent, and democratic election process is of major importance to avoid the incidents, and disastrous impact, of mis/disinformation. The making of election regulations therefore must address the issue and include the widest multistakeholders participation possible so that it becomes the interests of all.

This research has also indicated that counter-polarization plays an important role in the reduced phenomenon of polarization in Indonesia. Among other things, the inclusion of Prabowo Subianto, who had been the major challenger of former president Joko Widodo in the 2014 and 2019 elections during which polarization within the society was rising, can be identified as the major factor responsible for the declining phenomenon. Indonesia has seen this phenomenon before where difficult power struggle and dynamic surrounding the early years of post-Reformasi era did not result in much polarized electorates.

One of the reason was the elite-driven negotiation that involved all major political leaders -- the opposition figure Amien Rais who was also the leader of Muhammadiyah as an influential Muslim mass-organization, Abdurrahman Wahid the leader of Nahdlatul Ulama the largest Muslim mass-organization, Akbar Tanjung the leader of Golkar that was still the strongest political party, General Wiranto the chief of the Indonesian Armed Forces, who met at Ciganjur to discuss and agree on contemporary power-sharing. This kind of elite consociational power-sharing is probably useful in a fragmented society (Arendt Lijphart, 2006) in a short term. However, political scientists have warned that elite-driven political settlement is probably not always be a preferable option as cases have shown that it might lead to a promiscuous power-sharing that is detrimental to the democratic political development as it does not provide a space for a healthy opposition that is necessary for a functioning democratic system (Dan Slater, 2018).

Having said the above, while elite-agreement might be an important factor for the declining of the negative effect of heated political competition by reducing the production and spread of mis/disinformation, we indeed need to find ways to tackle the problems at the core, i.e the platform as the supply-side and the users/society.

Therefore, third, there is a continuing need to identify the role of tech firms and social media platforms in the realm of regulations. The government across the globe differs in how they place the responsibilities of tech companies and social media platforms “as intermediaries between information producers and citizens”. In Germany, the government places high burden on the tech firms and social media platforms to take down content deemed malicious immediately if it notifies them. India also enacted a similar law that requires tech companies to remove contents even without human reviews (Krisetya et al, 2024).

Finally, digital literacy is at the forefront of efforts to combat mis/disinformation. Tech companies and social media platforms, together with other stakeholders, must continuously conduct public education through various means so that citizens become less vulnerable to misinformation and disinformation. Conspiracy mentality as one of the factors that contributes to the spread of mis/disinformation as discussed in this paper calls for more understanding of the psychological element that needs to be tackled.

Studies on the so-called “Russian propaganda” utilizing social media that was believed to interfere in the 2016 US presidential election have identified the reason why it was effective. It involves “the firehose of falsehood” that refers to the intensity, frequent, rapid, continuous, and repetitive production and spread of information that confuse and overwhelm the audience. Literature in psychology suggests, “When information volume is low, recipients tend to favor experts, but when information volume is high, recipients tend to favor information from other users.” (Paul and Matthews, 2016) This certainly calls for the need for more high-quality contents in the social media platforms in order at least to match the amount of low-quality contents that contain mis/disinformation that occupy most of the internet space especially during election times. Therefore, to reiterate, digital literacy is the responsibility of everybody: tech companies, the government, users, civil society that includes experts, academic/intellectual, non-governmental organizations, and also the media.

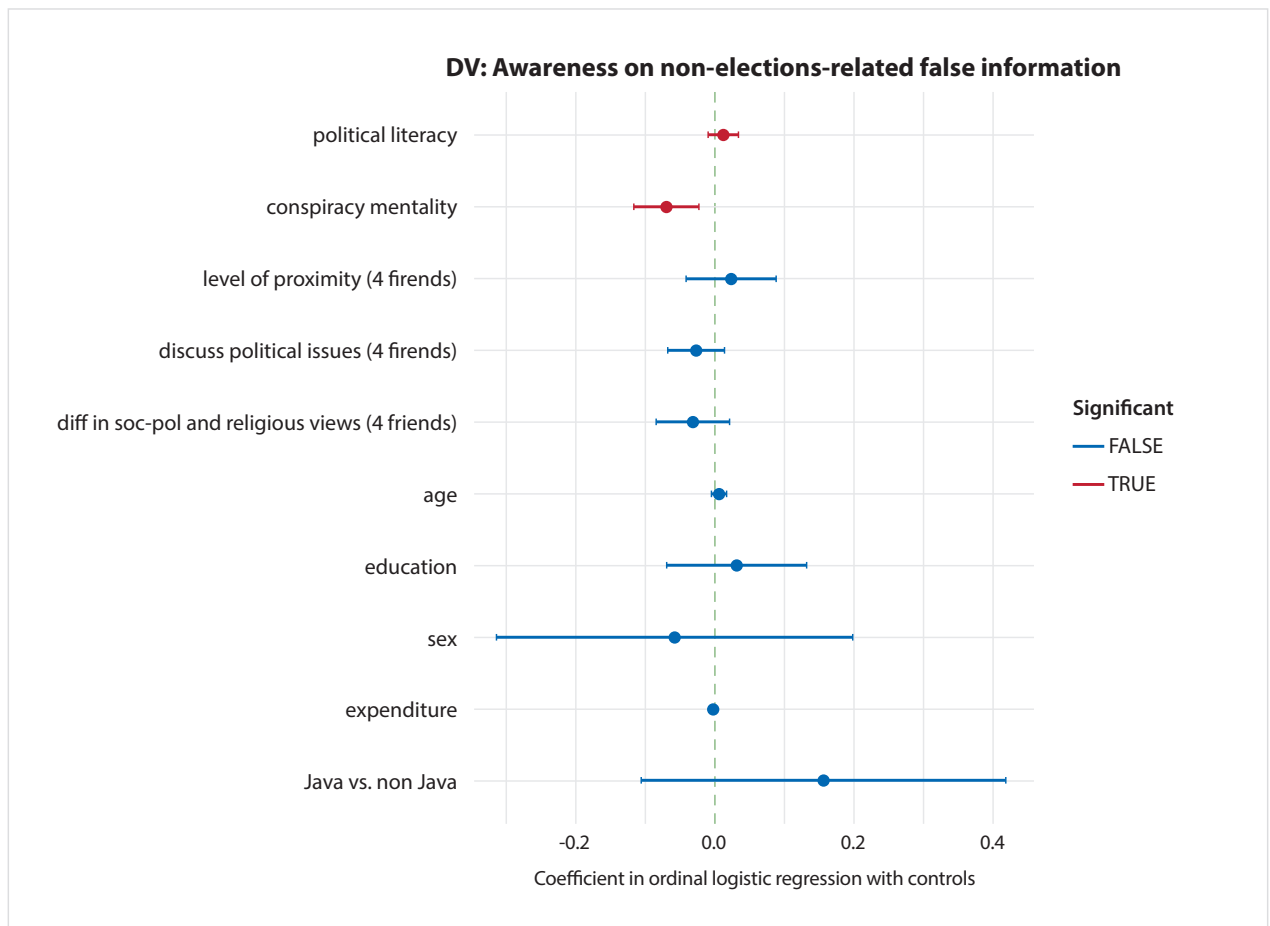
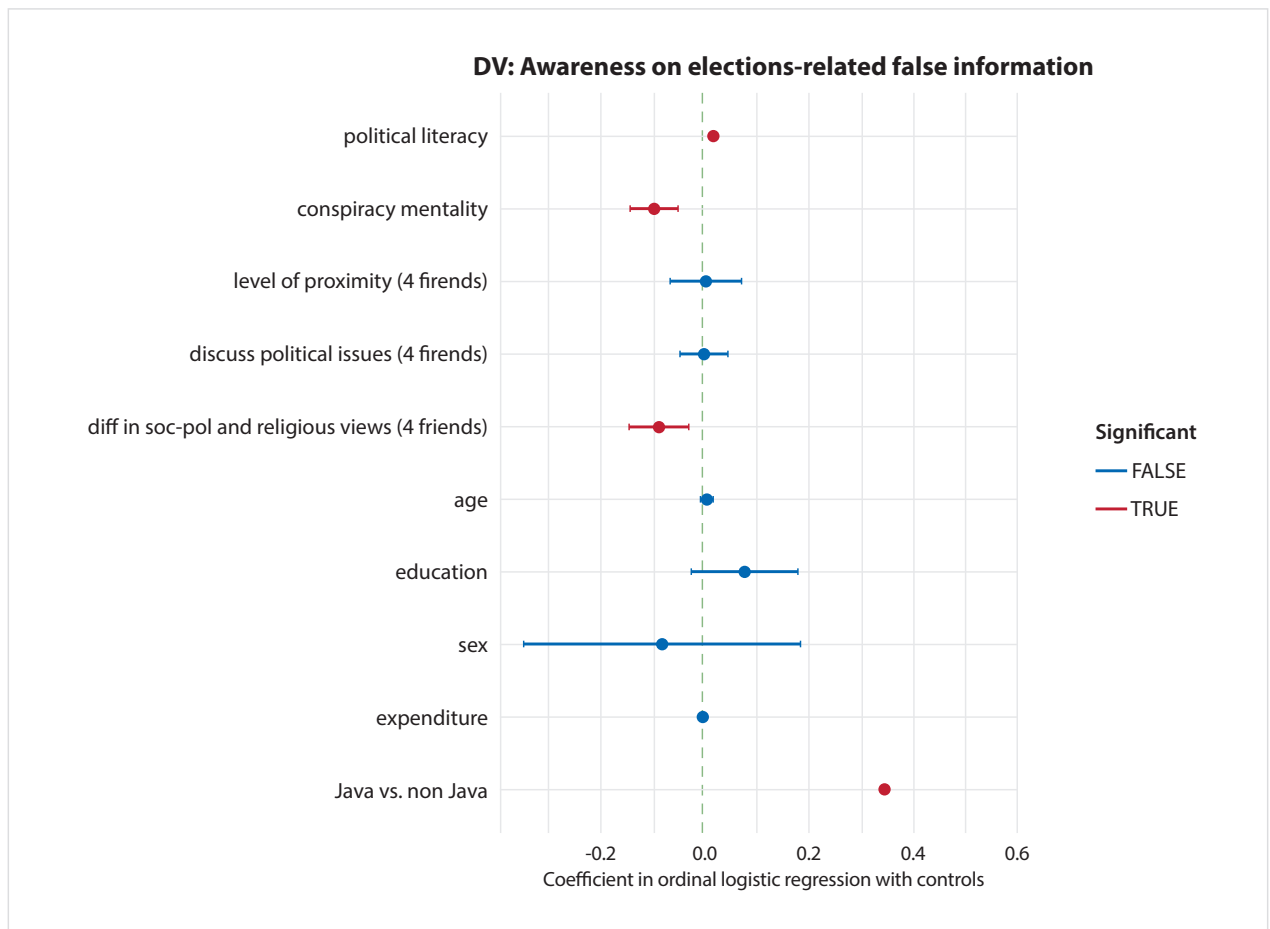
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Appendix

Table 1. Ordinal logistic regression

	Dependent variable:			
	Election-related Disinformation		Non-election-related Disinformation	
	(1)	(2)	(3)	(4)
political literacy	0.017*** (0.004)	0.016*** (0.004)	0.014*** (0.003)	0.013*** (0.004)
conspiracy mentality	-0.093*** (0.024)	-0.097*** (0.024)	-0.071*** (0.023)	-0.069*** (0.024)
proximity 4 friends	0.008 (0.034)	0.003 (0.034)	0.023 (0.033)	0.024 (0.034)
discuss political issues 4 friends	-0.009 (0.021)	-0.001 (0.022)	-0.029 (0.021)	-0.026 (0.022)
diff in politico-religious views 4 friends	-0.077*** (0.028)	-0.086*** (0.028)	-0.029 (0.026)	-0.031 (0.027)
age		0.005 (0.005)		0.006 (0.005)
education		0.077 (0.053)		0.032 (0.051)
sex		-0.080 (0.135)		-0.056 (0.131)
expenditure		-0.002 (0.002)		-0.002 (0.002)
Java vs non-Java		0.346** (0.139)		0.157 (0.135)
Observations	775	771	775	771
Log Likelihood	-1,343.114	-1,330.369	-1,541.493	-1,531.278
Note:	*p<0.1; **p<0.05; ***p<0.01			



Political literacy

P7. Saya akan membacakan beberapa pertanyaan terkait negara kita. Mohon menjawab pertanyaan-pertanyaan berikut semampu Anda. Bila Anda tidak tahu, silakan jawab tidak tahu.

7a. Lembaga negara apa yang memiliki kewenangan dalam menguji Undang-Undang terhadap Undang-Undang Dasar?

- | | |
|------------------------|-----------------------------------|
| 1. Mahkamah Konstitusi | 4. Kementerian Hukum dan HAM |
| 2. Mahkamah Agung | 5. Dewan Perwakilan Rakyat (DPR) |
| 3. Kejaksaan Agung | 88. Tidak tahu (JANGAN DIBACAKAN) |

7b. Pasca reformasi 1998 hingga saat ini, sudah berapa kali UUD 1945 mengalami amendemen atau perubahan?

- | | |
|---------------|-----------------------------------|
| 1. Empat kali | 4. Tiga kali |
| 2. Satu kali | 5. Lima kali |
| 3. Dua kali | 88. Tidak tahu (JANGAN DIBACAKAN) |

7c. Lembaga negara apa yang bersama DPR merupakan bagian dari MPR?

- | | |
|-----------------------------------|-----------------------------------|
| 1. Dewan Perwakilan Daerah | 4. Mahkamah Konstitusi |
| 2. Dewan Perwakilan Rakyat Daerah | 5. Kejaksaan Agung |
| 3. Mahkamah Agung | 88. Tidak tahu (JANGAN DIBACAKAN) |

7d. Siapa nama Wakil Presiden saat ini?

- | | |
|------------------|----------------------------------|
| 1. Ma'ruf Amin | 4. Prabowo Subianto |
| 2. Try Sutrisno | 5. Jusuf Kalla |
| 3. Puan Maharani | 6. Tidak tahu (JANGAN DIBACAKAN) |

7e. Berasal dari partai politik apa Presiden Joko Widodo?

- | | |
|---------------------------------------|----------------------------------|
| 1. PDI Perjuangan | 4. Partai Kebangkitan Bangsa |
| 2. Gerakan Indonesian Raya (Gerindra) | 5. Partai Demokrat |
| 3. Golongan Karya (Golkar) | 6. Tidak tahu (JANGAN DIBACAKAN) |

7f. Pada tanggal berapa akan diselenggarakan Pemilu Presiden dan Pemilu Legislatif tahun 2024?

- | | |
|---------------------|-----------------------------------|
| 1. 14 Februari 2024 | 4. 14 April 2024 |
| 2. 14 Januari 2024 | 5. 15 Mei 2024 |
| 3. 14 Maret 2024 | 88. Tidak tahu (JANGAN DIBACAKAN) |

7g. Berapa tahunkah masa jabatan Presiden Indonesia sesuai Undang-Undang Dasar?

- | | |
|-------------|-----------------------------------|
| 1. 20 tahun | 4. 5 tahun |
| 2. 15 tahun | 5. 4 tahun |
| 3. 10 tahun | 88. Tidak tahu (JANGAN DIBACAKAN) |

Election-related disinformation

No	Informasi	Informasi Salah	Informasi Benar	Tidak tahu [JANGAN DIBACAKAN]
1	Surat suara sudah dicoblos dan sudah diketahui siapa yang akan menang pemilu.	1	2	88
2	Tenaga kerja asing dari China sengaja didatangkan untuk memenangkan calon tertentu.	1	2	88
3	Ada usaha membagikan KTP palsu secara besar-besaran untuk memenangkan calon atau partai tertentu.	1	2	88
4	Anggota KPU (Komisi Pemilihan Umum) dan KPPS (penyelenggara pemilu tingkat TPS) sengaja dipilih orang-orang yang berpihak ke salah satu calon / partai.	1	2	88
5	Ada penggelembungan jumlah pemilih untuk menguntungkan calon atau partai tertentu.	1	2	88
6	Akan ada pencurian surat suara untuk memenangkan calon atau partai tertentu.	1	2	88
7	Pemilu 2024 akan ditunda karena keterbatasan anggaran pemerintah.	1	2	88

Non-election related disinformation

No	Informasi	Informasi Salah	Informasi Benar	Tidak tahu [JANGAN DIBACAKAN]
1	Dalam vaksin Covid-19 ditanam <i>chip</i> atau alat pelacak yang dapat memantau pergerakan orang yang divaksin.	1	2	88
2	Covid-19 adalah senjata buatan pembunuh massal.	1	2	88
3	Menteri Agama mengganti logo Halal yang sebelumnya menggunakan huruf Arab menjadi gambar Wayang.	1	2	88
4	Pemerintah mewajibkan penceramah agama untuk disertifikasi.	1	2	88
5	Pengesahan UU Tindak Pidana Kekerasan Seksual ditujukan untuk melegalkan seks bebas.	1	2	88
6	Saat ini sedang ada usaha untuk membangkitkan kembali PKI (Partai Komunis Indonesia).	1	2	88
7	Bumi sesungguhnya berbentuk datar, bukan bulat seperti sering diajarkan di sekolah.	1	2	88
8	Presiden Rusia Vladimir Putin masuk Islam.	1	2	88

Proximity with 4 friends

Dalam beberapa pertanyaan berikut, kami ingin mengetahui tentang jaringan dan interaksi sosial masyarakat Indonesia. Tolong sebutkan nama panggilan empat teman atau kenalan Anda yang berkomunikasi secara langsung dengan Anda setidaknya **dua kali dalam 12 bulan terakhir** untuk membicarakan hal-hal penting.

Dengan teman atau kenalan, yang kami maksud adalah orang-orang di luar keluarga I/B/S sendiri. Orang-orang ini bisa jadi **teman kerja, teman sekolah, tetangga, teman organisasi, teman pergaulan, atau kenalan lain**. [Semua informasi yang disampaikan akan kami jaga kerahasiannya]

Nama 1: _____

Nama 2: _____

Nama 3: _____

Nama 4: _____

PASTIKAN RESPONDEN TELAH MENYEBUTKAN EMPAT NAMA SEBELUM MENANYAKAN PERTANYAAN SELANJUTNYA.

76B. TULISKAN KODE JAWABAN UNTUK MASING-MASING NAMA [GUNAKAN KARTU BANTU]

No	A. Nama Teman	B. Seberapa dekat hubungan Anda dengan [Nama 1/ Nama 2/ Nama 3/ Nama 4]?	C. Apa agama [Nama 1/ Nama 2/ Nama 3/ Nama 4]?	D. Apa pendidikan [Nama 1/ Nama 2/ Nama 3/ Nama 4]?	E. Seberapa sering bicara isu-isu sosial, politik, dan agama dengan [Nama 1/ Nama 2/ Nama 3/ Nama 4]?	F. Seberapa berbeda atau tidak berbeda pandangan dalam isu sosial, politik, agama dengan [Nama 1/ Nama 2/ Nama 3/ Nama 4]?
1						
2						
3						
4						

A. Nama teman/kenalan sesuai yang disebutkan responden di atas.

B. Seberapa dekat hubungan I/B/S dengan [Nama 1/Nama 2/Nama 3/Nama 4]?

- | | |
|-----------------|------------------------------|
| 1. Sangat dekat | 4. Tidak dekat sama sekali |
| 2. Dekat | 99. TT/TJ (JANGAN DIBACAKAN) |
| 3. Tidak dekat | |

C. Apa agama [Nama 1/Nama 2/Nama 3/Nama 4]?

- | | |
|----------------------|--------------------------------------|
| 1. Islam | 5. Buddha |
| 2. Kristen Protestan | 6. Kong Hu Cu |
| 3. Katolik | 7. Kepercayaan tradisional Indonesia |
| 4. Hindu | 99. TT/TJ (JANGAN DIBACAKAN) |

D. Apa pendidikan terakhir [Nama 1/ Nama 2/ Nama 3/ Nama 4]?

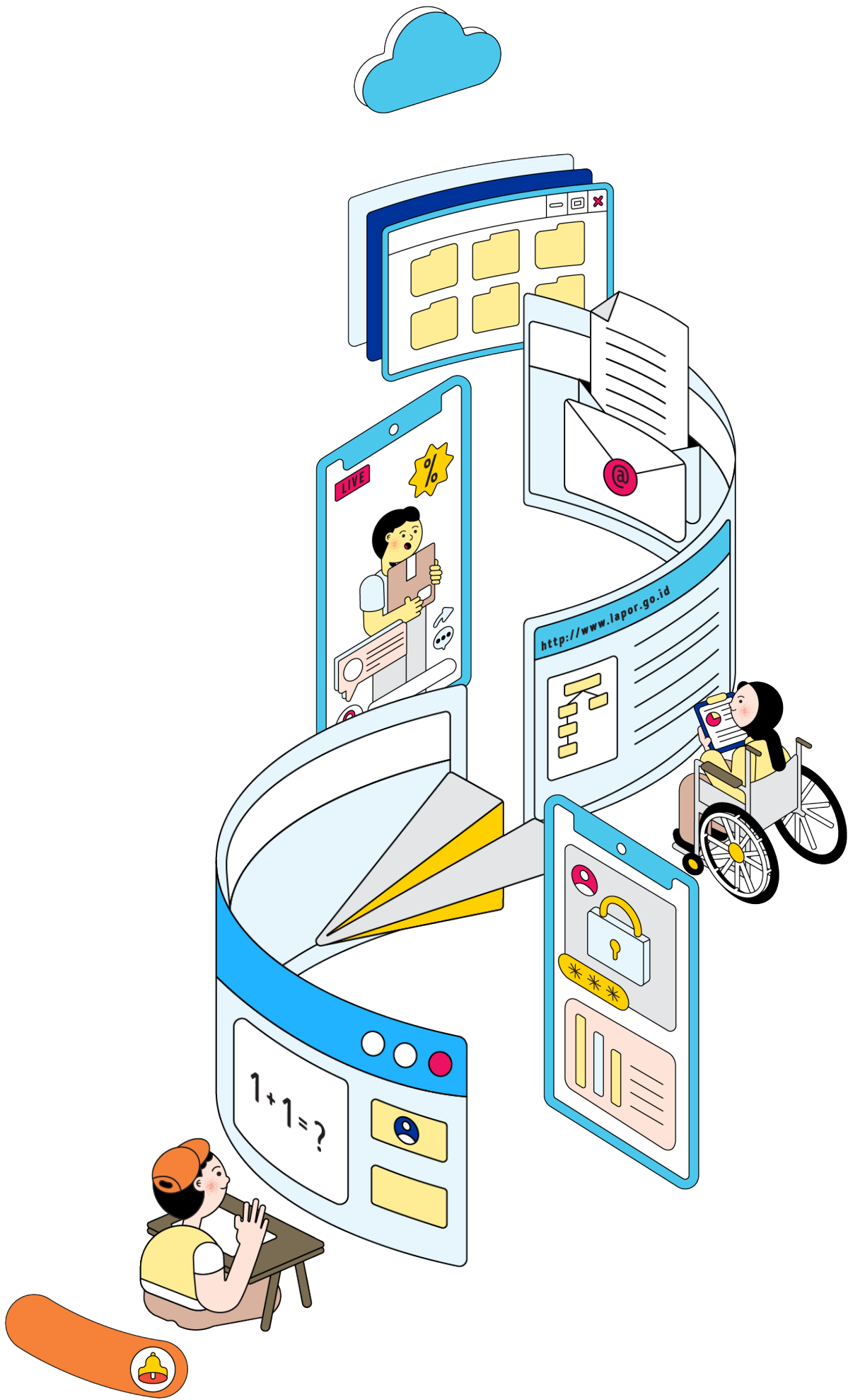
- | | |
|--------------------------|-------------------------------------|
| 1. Tidak pernah sekolah | 5. Tamat SLTA/ sederajat |
| 2. Tidak tamat SD | 6. Tamat Akademi/diploma |
| 3. Tamat SD/ sederajat | 7. Tamat S1 atau lebih tinggi |
| 4. Tamat SLTP/ sederajat | 8. Tamat S2 atau S3 (Pasca-sarjana) |

E. Seberapa sering atau jarang Anda membicarakan isu-isu sosial, politik, dan agama dengan [Nama 1/Nama 2/Nama 3/Nama 4]?

- | | |
|------------------|-----------------|
| 1. Sangat sering | 3. Jarang |
| 2. Cukup sering | 4. Tidak pernah |

F. Secara umum, seberapa berbeda atau tidak berbeda pandangan [Nama 1/Nama 2/Nama 3/Nama 4] dalam isu-isu sosial, politik, dan agama dengan pandangan Anda sendiri?

- | | |
|-------------------|-------------------------|
| 1. Sangat berbeda | 4. Sangat tidak berbeda |
| 2. Berbeda | |



CLOSING THOUGHTS: INSIGHTS AND CONSIDERATION ON THE PATH AHEAD

As we conclude this volume on inclusive digital transformation, it is good to reflect on the key insights and next steps that can guide our efforts in ensuring that digital advancements benefit all. Numerous recommendations have been put forth by the authors, and they ultimately converge around two fundamental pillars: i) the establishment of comprehensive policies and regulations that foster inclusivity, and ii) the imperative of enhancing digital literacy to empower individuals. These dual pillars are vital for ensuring equitable access to digital resources and opportunities for all.

The imperative for strong regulations and policies

The chapters collectively emphasize the importance of robust regulatory frameworks that do not merely provide access to digital infrastructure but also ensure that this access is equitable and sustainable. Rural areas, especially those in the eastern provinces, continue to lag behind in terms of connectivity and services. Our analysis highlights the urgent need for policies that prioritize infrastructure development in these underserved regions. Furthermore, the protection of personal data and the ethical use of algorithms must be central to our regulatory efforts. As digital platforms increasingly influence public discourse and individual privacy, safeguarding citizens from exploitation and bias is more crucial than ever. Equally important is the regulation of political campaign finance in the digital age. Ensuring transparency and fairness in how political messages are disseminated online is essential for a healthy democracy.

Recommendations from this volume, highlight the intricate nature of challenges posed by digital technologies, underscoring the need for holistic policies that address all dimensions of these issues.

Elevating digital literacy

Digital literacy emerges as a critical theme throughout our discussions, highlighting the need to address existing disparities in access to, and understanding of digital technologies. Targeted literacy programs are essential to bridge this gap, especially for groups at risk of being left behind, such as elderly women, individuals in rural areas, and those from low-income households. These populations require tailored interventions that acknowledge their unique barriers to digital engagement.

Importantly, digital literacy extends beyond simply knowing how to use gadgets; it encompasses the ability to utilize internet access for productive and ethical purposes. This means fostering skills that allow individuals not only to navigate digital spaces effectively but also to critically access and assess information, recognize misinformation, and engage in constructive debates rather than remaining confined to echo chambers. Gen Z, in particular, is vulnerable to disinformation due to their heavy reliance on digital platforms for news and social interaction. By equipping them with the tools to discern credible sources and participate in informed discussions, we can enhance their capacity to contribute to meaningful dialogues in the digital realm.

Furthermore, promoting responsible digital citizenship encourages individuals to engage positively in various discourses, thereby enriching the online landscape for all. By investing in comprehensive digital literacy initiatives, we can empower communities, enabling them to fully participate in the digital economy and society while fostering a more inclusive and respectful online environment.

Tackling disparity: A call for subnational levels focus

While national level data may paint a promising picture of Indonesia's digital transformation, it is essential to disaggregate this data to understand the realities at subnational level. Localized assessment will reveal the nuances of digital access and usage, allowing policymakers to identify specific disparities and tailor interventions accordingly. A commitment to understanding and addressing these disparities will be crucial for achieving true inclusivity in Indonesia's digital future.

Measuring inclusivity: Indonesia Digital Inclusivity Index

Should Indonesia strengthen its policies and empower its people, especially young people, establishing a clear benchmark to gauge progress towards inclusivity would be essential. We propose the creation of a Digital Inclusivity Index that encapsulates the various dimensions discussed in this volume, including digital access, literacy, data protection, and algorithmic fairness, and potentially other criteria, determined together by all stakeholders. While Indonesia has developed a digital literacy index, it does not fully encompass all aspects of the broader digital transformation.

The development of this index must actively involve all stakeholders to ensure a collaborative and participatory approach. By setting a rigorous measurable standard to measure our success, we can build confidence in our efforts to achieve inclusive digital transformation while also establishing a framework for continuous improvement and accountability.

In conclusion, as we look to the future, it is clear that the journey towards an inclusive digital landscape is a collective responsibility. The recommendations and insights offered in this volume serve as a roadmap for policymakers, stakeholders, and communities alike. By prioritizing strong regulations, elevating digital literacy, addressing disparities, and measuring our progress through the Digital Inclusivity Index, we can work together to ensure the promise of digital transformation, culminating in an improvement in the quality of life for all Indonesians.



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