

PERSPECTIVE

RESEARCHERS AT ISEAS – YUSOF ISHAK INSTITUTE ANALYSE CURRENT EVENTS

Singapore | 14 September 2017

Indonesia's Divided Digital Economy¹

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EXECUTIVE SUMMARY

- While its government aims to make Indonesia the biggest digital economy in Southeast Asia by 2025, the country suffers a significant digital divide with one of the lowest internet penetration rates in Southeast Asia.
- A May 2017 nation-wide survey shows that the use of the internet is still very limited, and that its use has a clear correlation with educational level.
- It reveals the prevalence of purchasing social media followers and of fake accounts.
- Indonesia needs to address the digital divide beyond issues of physical access. Other than coverage, speed, security and privacy, issues of education, and community and institutional structures should be taken into account to narrow this divide.

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¹ This is the third in the series based on the Indonesia National Survey Project, published under ISEAS' Trends in Southeast Asia, available at <https://www.iseas.edu.sg/articles-commentaries/trends-in-southeast-asia>.

INTRODUCTION

The stake for the digital economy in Indonesia seems to be high. Google, partnering with Temasek, published a study in 2016 which states that Southeast Asia—specifically Indonesia, Malaysia, Singapore, Thailand, Vietnam and the Philippines—is the world’s fastest growing internet region; its digital economy is expected to hit USD200 billion by 2025. The report singles out Indonesia as “the fastest growing internet market in the world”, expected to account for USD81 billion, fueled by an estimated 119 million online users. The country boasts one of the highest number of Facebook, Twitter, WhatsApp, and Instagram users in the world.² Foreign investment in information technology and e-commerce sectors has also increased. For example, Alibaba, which already controls Singapore-based Lazada Group, is leading a funding round of up to USD1.1 billion for Indonesia’s Tokopedia. Traveloka, the Indonesian travel booking startup, has raised USD500 million from investors including the US-based Expedia and China’s JD.com. Apple is building three research and development centres within Bumi Serpong Damai (BSD), to be integrated within the 25-hectare Digital Hub built by Sinar Mas Land.³

Yet, as has also been pointed out by analysts of Indonesia’s digital economy, Indonesia has a significant digital divide: the majority of Indonesia’s population does not even have access to the internet,⁴ the information and communication technologies (ICTs) infrastructure is very unevenly distributed with low internet penetration rate (at around 20-35%), low internet speed, and limited coverage of electronic payment systems.⁵ There is also a widespread lack of trust in online transactions, due to particularly high levels of fraud and cyberattack.⁶

At the same time, the government is picking up steam in rolling out various infrastructural projects and policies related to digital technology. In November 2016, it released its 14th economic package dedicated to e-commerce, stating that the country aims to create “1,000 technology entrepreneurs” with business valuation up to USD10 billion, and that the country’s e-commerce market will reach USD130 billion by 2020. The Presidential

² According to Statista Q4 2016, Indonesia has the fourth largest number of active Facebook users, third largest for Twitter, and seventh largest for WhatsApp. The country ranks 12th worldwide but highest in Southeast Asia for active Instagram users.

³ “Alibaba said to be in talks with Tokopedia,” *Bloomberg* 25 July 2017; “Indonesian travel site Traveloka to expand tourist attraction booking service,” *Reuters* 2 August 2017; “Alasan Apple Pilih BSD Jadi Markas Riset di Indonesia,” *CNN Indonesia* 1 April 2017.

⁴ Google Temasek, “e-economy SEA: Unlocking the \$200 billion digital opportunity in Southeast Asia,” May 2016; McKinsey & Company, “Unlocking Indonesia’s digital opportunity,” September 2016; Onno W. Purbo, “Narrowing the digital divide,” in Edwin Jurriëns, Ross Tapsell (eds.), *Digital Indonesia: Connectivity and Divergence*, Singapore: ISEAS – Yusof Ishak Institute, 2017.

⁵ Azali, Kathleen, “Cashless in Indonesia Gelling Mobile E-Frictions?,” *Journal of Southeast Asian Economies*, vol. 33 no. 3 (2016), pp. 364–86.

⁶ Budi Rahardjo, “The state of cybersecurity in Indonesia,” in Edwin Jurriëns, Ross Tapsell (eds.), *Digital Indonesia: Connectivity and Divergence*, Singapore: ISEAS – Yusof Ishak Institute, 2017.

Regulation that governs the e-commerce roadmap was signed by President Joko Widodo on 3 August 2017.⁷

In this essay, I discuss the nature of Indonesia's digital economy and digital divide by reviewing previous research reports and statistics. I then analyse them in the light of original data from the ISEAS Indonesia National Survey Project (INSP) carried out in May 2017, with a nationally-representative sample of 1620 respondents drawn from all 34 provinces. The data in the survey cover economic, social, and political issues, and are not designed to focus specifically or comprehensively on ICT topics. However, as it is based on a nationally-representative sample, the findings reveal very useful insights about the use of ICTs outside urban centres. The result reveals a particular correlation between education level and internet use, highlighting the need for the government to address digital ICT literacy and education. It also reveals a prevalence of the practice of purchasing social media accounts, raising the possibility of an important relation to political and sectarian divides. I end by highlighting policy responses for narrowing the digital divide.

THE DIGITAL ECONOMY AND THE DIGITAL DIVIDE

The digital economy is an economy based on computing and digital ICTs. It can be understood as consisting of three main, overlapping components: the digital ICT infrastructure (hardware, software), the process of organising through computer-mediated networks, and e-commerce (trading of goods or services online).⁸ Meanwhile, digital divides can be understood as “the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to their opportunities to access information and communication technologies (ICTs) and their use of the internet.”⁹

The leading indicator of the digital divide is the proportion of the population that has access to ICTs (see fig. 1). Following the global trend, over the past decade, there has been a steady increase of individuals in Indonesia using the internet. The internet arrived in Indonesia in the 1990s, and access was limited to the university networks and to fixed lines spread mainly through internet cafes/stalls (*warung internet*, or *warnet*).¹⁰ The development of mobile

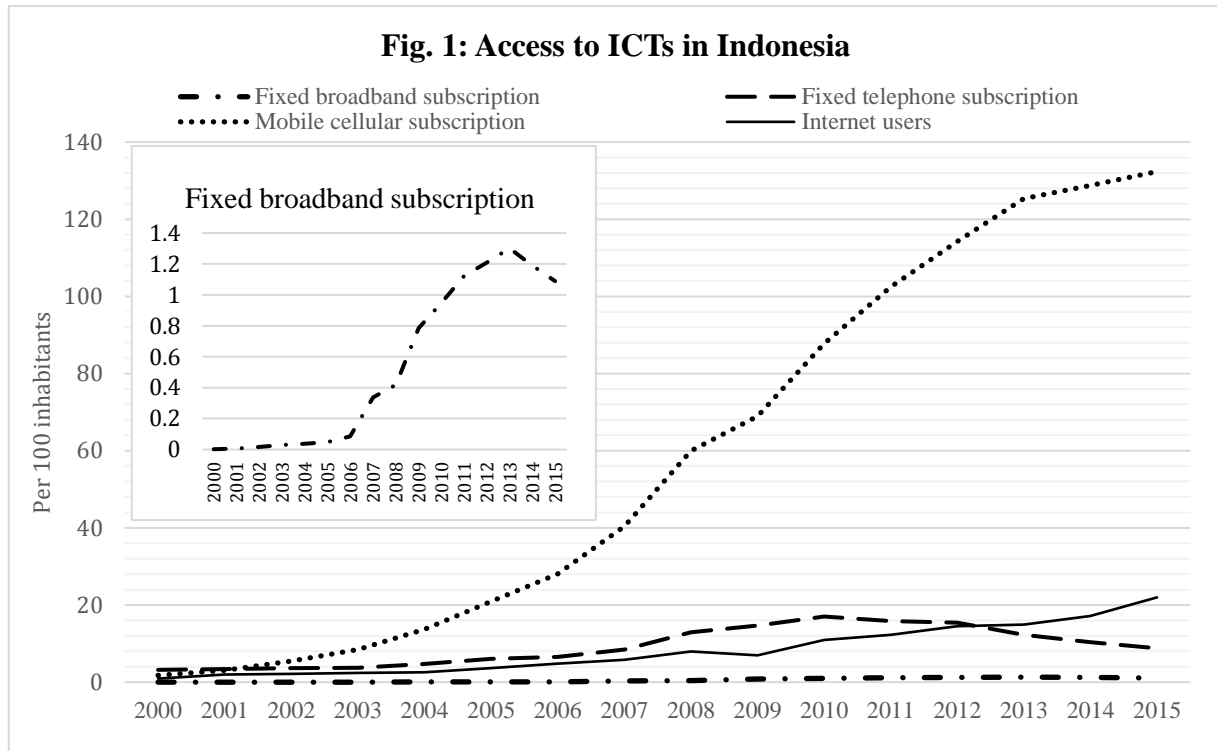
⁷ “Inilah Perpres No. 74 Tahun 2017 tentang ‘Road Map E-Commerce’ Tahun 2017-2019,” *Sekretariat Kabinet Republik Indonesia* 10 August 2017 <http://setkab.go.id/inilah-perpres-no-74-tahun-2017-tentang-road-map-e-commerce-tahun-2017-2019/> (accessed 11 August 2017).

⁸ OECD, *OECD Digital Economy Outlook 2015*, OECD Publishing, Paris, 2015. The digital economy is also deeply intertwined with the “sharing economy” which heavily relies on networks of digital ICTs and the internet to facilitate peer-to-peer economic exchanges; well-known examples include ride-hailing services such as Uber, Grab, and Go-Jek in Indonesia. For recent discussion, see Cassey Lee, “To Uberize or Not to Uberize? Opportunities and Challenges in Southeast Asia’s Sharing Economy,” *ISEAS Perspective* 2016 no. 33.

⁹ Hans Dieter-Evers and Solvay Gerke, “Closing the Digital Divide: Southeast Asia’s Path Towards a Knowledge Society,” *Working Paper* No. 5, Center for Southeast Asian Studies, Lund University, Sweden, 2004.

¹⁰ For pioneering studies on the role of digital technologies in Indonesia, see David T. Hill and Krishna Sen, *The Internet in Indonesia’s New Democracy*, London & New York: Routledge, 2005; Onno W. Purbo, “Kekuatan Komunitas Indonesia di Dunia Maya,” *Pantau* 4 February 2002; Merlyna, Lim, “Cyber-Civic Space in Indonesia: From Panopticon to Pandemonium?”

phone technology has strongly facilitated its adoption. The sight of Indonesians holding two or more mobile devices, and frequent articles about Indonesia having one of the largest number of users of Facebook, Twitter, and Instagram have prompted many remarks that there are more SIM cards than people in Indonesia,¹¹ and subsequently, that the Indonesian population—the fourth largest in the world, with a young median age of 28—has rapidly become a “tech-savvy” urban middle class freely accessing the internet.



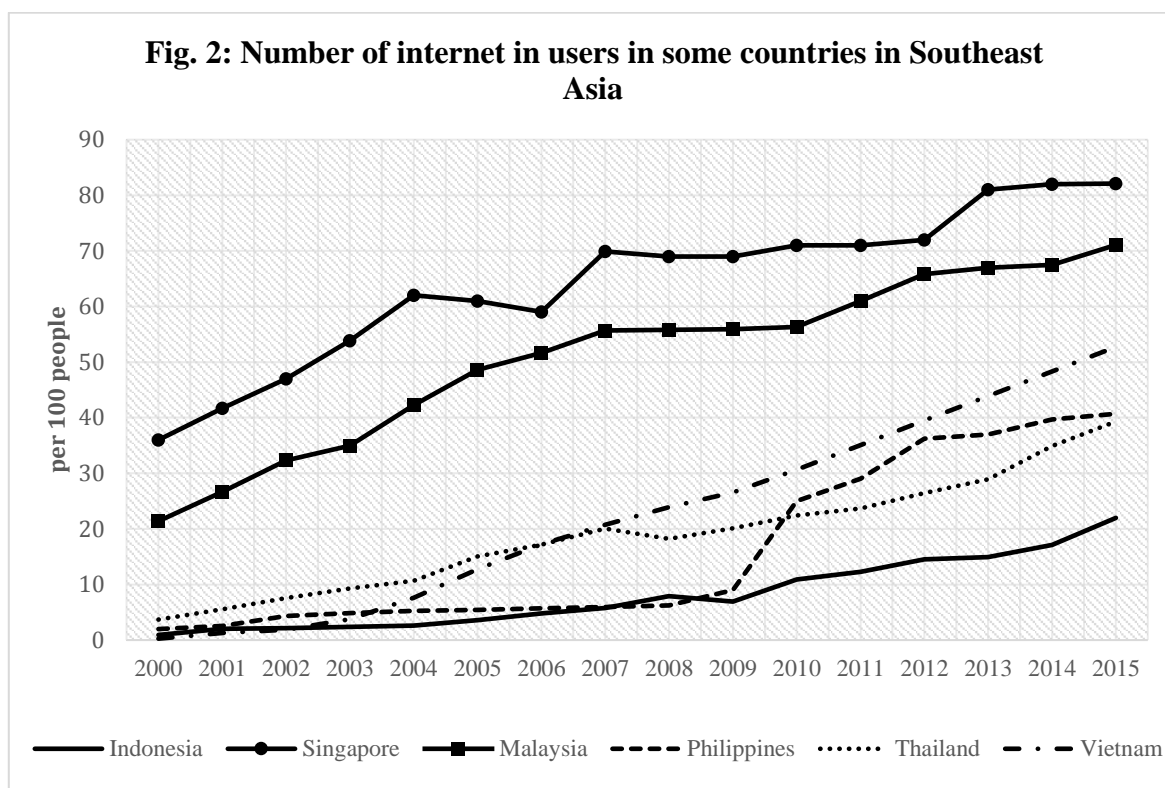
Source: ITU World Telecommunication/ICT indicators database, and World Bank estimate

But how much growth does the digital economy contribute to the country, and how “tech savvy” are Indonesians? In assessing the digital divide, we need to consider not just the quantity, but also the quality of access. According to Akamai, the average internet speed in Indonesia has increased considerably from 2.4 Mbps in 2014 to 6.7 Mbps in 2016. Nevertheless, it is still slower than the global and regional average, with access, speed and

International Development Planning Review vol. 24 no. 4 (2002), pp. 383–400; Yanuar Nugroho, “Does the Internet Transform Civil Society? The Case of Civil Society Organisations in Indonesia,” PhD Thesis, University of Manchester, 2007. For a more recent anthology, see Edwin Jurriëns, Ross Tapsell (eds.), *Digital Indonesia: Connectivity and Divergence*, Singapore: ISEAS – Yusof Ishak Institute, 2017.

¹¹ Judith Balea, “The latest stats in web and mobile in Indonesia,” *Tech in Asia* 28 January 2016. The number of mobile subscriptions has also outpaced growth in other important human development indicators such as access to electricity, water source, and secondary schooling. See Mari E. Pangestu & Grace Dewi, “Indonesia and the digital economy,” in Edwin Jurriëns, Ross Tapsell (eds.), *Digital Indonesia: Connectivity and Divergence*, Singapore: ISEAS – Yusof Ishak Institute, 2017, pp. 233-235.

costs varying greatly across the country.¹² Indonesia also has one of the lowest internet penetration rates in Southeast Asia (fig. 2).



Source: ITU and World Development Indicators, <http://data.worldbank.org>

Less than half of the mobile devices used in Indonesia are smartphones.¹³ The main reason for Indonesians having multiple devices and SIM cards is the need for them to balance between lower connection prices and signal quality since mobile cellular signals from different operators are very unevenly spread (fig. 3).¹⁴ We also need to bear in mind that the vast majority of mobile subscriptions in Indonesia—up to 98%—are prepaid.¹⁵ These prepaid SIM cards are cheap (IDR 10,000, or SGD 1), require minimal identity check,¹⁶ and

¹² Akamai is the largest Content Delivery Network (CDN) based in the US which produces the quarterly *The State of the Internet/Connectivity Reports*. Google Temasek, “e-economy,” p. 29 states that the global average of internet speed in 2016 was 23.3 Mbps, although Statista and Akamai use a much lower global average of internet speed at 7 Mbps.

¹³In January 2016, We are Social reported that 85% of the population own mobile phones, 43% own smartphones, in “Digital in Indonesia: A snapshot of the country’s key digital statistics indicator”.

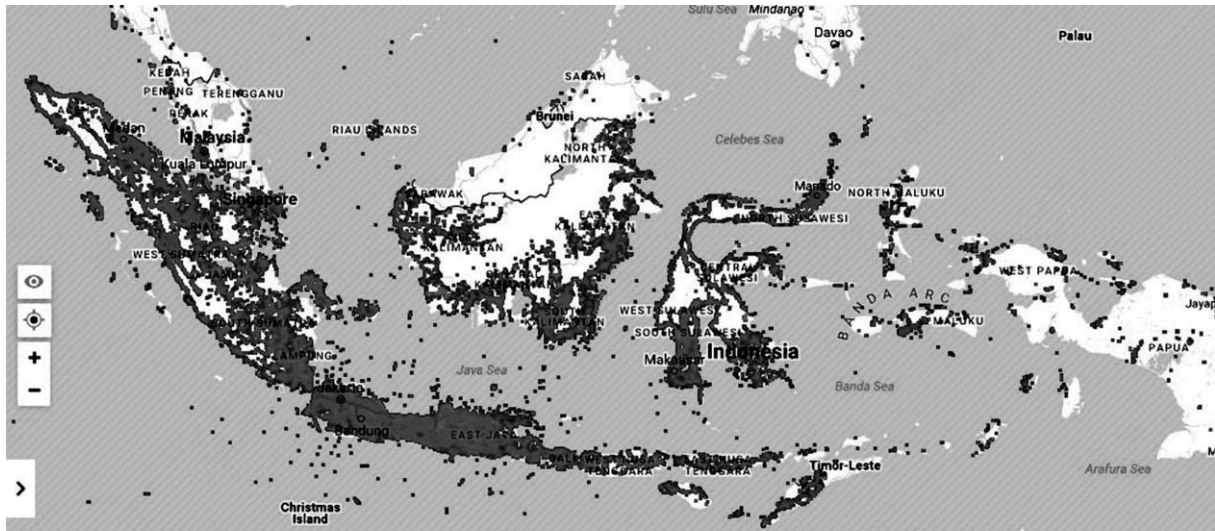
¹⁴ More SIM cards than the total number of population are also more common in more developed countries (e.g. in 2015, Singapore has 146.526 and Malaysia 143.89 per 100 inhabitants). See *ITU Facts and Figures*.

¹⁵ GSMA intelligence. See also “Indonesia mobile carriers dangle postpaid plans for the data-hungry,” *Nikkei Asian Review* 5 October 2016.

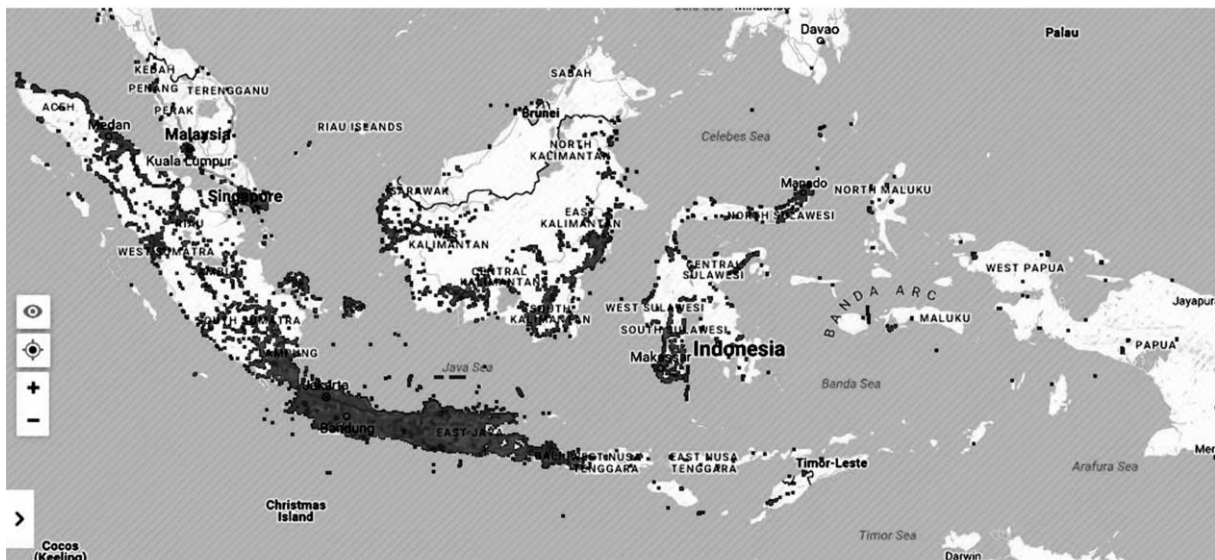
¹⁶ Technically, when users buy new SIM cards, they are required to register their numbers with the government, but this requirement was widely ignored. Under the pretext of reducing criminal activity orchestrated using mobile phones, the pressure was increased on providers to register their

have short validity dates. In short, they are economically cheap and legally easy to acquire, swap, and discharge.

Fig. 3: Maps showing uneven mobile cellular signal coverage by the two largest providers, Telkomsel and Indosat.



Mobile cellular coverage of Telkomsel



Mobile cellular coverage of Indosat

Source: OpenSignal, taken 6 August 2017.

customers in 2014. See Freedom House, *Freedom on the Net 2016: Silencing the Messenger: Communication Apps under Pressure* (Washington, 2016). Nonetheless, it is still very easy to get a SIM card without providing proper identification, with the sellers in SIM card stalls simply entering random credentials. The pressure to enter proper credentials is also low because prepaid SIM card subscriptions do not come with any device.

This makes it difficult for researchers to gather accurate data on the use of SIM cards, and has contributed to significant differences and conflicting reports on the level of ICT penetration and the potential of the digital economy in Indonesia. These then lead to difficulties in making precise assessments of and comprehensive policies for the digital economy. For example, the Association of Indonesia Internet Service Providers (APJII) states that the number of internet users in Indonesia has more than doubled to 52% in 2016, while Freedom House puts the number from ITU in 2015 at 22%.¹⁷ The Nielsen Consumer and Media View, meanwhile, stated in August 2017 that the internet penetration in the country has increased to 44% compared to 26% in 2012.¹⁸ Government statistics from different departments also vary considerably. To further add to the confusion, up to 11%—literally millions—of Indonesians when surveyed state that they use Facebook, but at the same time say that they do not use the internet.¹⁹

This is not just an argument over statistics or semantics—it brings us to the next digital divide: other than just access, there is also a significant divide in digital usability and literacy. As an example of the former, mobile internet users with limited prepaid data packages tend to spend more time on Facebook, WhatsApp, and increasingly also Instagram (both owned by Facebook), and are very selective in using web browsers or apps that use a lot of data. Many mobile providers also offer cheaper “social-only” data plans that limit access to these select social media or messaging applications. Thus access, communication and transactions on the internet are effectively limited to only these platforms. For the latter, the chronic shortfall in skilled labour and human resources in general, and ICT specialists such as programmers, developers, and engineers in particular, has been frequently cited as one of the most longstanding constraints on the development of the digital economy.²⁰ Go-Jek, for instance, had to eventually bring in two Indian startups to handle their technological scaling up.²¹

¹⁷ The APJII 2016 survey result was published by Polling Indonesia and APJII in November 2016, using cluster probability random sampling (n=1250), and provinces as analytical unit. It stated MoE $\pm 2.8\%$ with confidence level 95%. <https://www.apjii.or.id/survei2016> (accessed 5 August 2017). Some sources claimed rapid improvements in the year 2016. For Freedom House report, see *Freedom on the Net 2016: Silencing the Messenger, Communication Apps under Pressure*. Washington, 2016.

¹⁸ Nielsen interviewed 17,000 people over the age of 11, but the interviews were carried out only in major cities across Indonesia. “Indonesian Netizens Hooked on 'Dual-Screening' Habit: Nielsen,” *Jakarta Globe*, 27 July 2017.

¹⁹ “Millions of Facebook users have no idea they’re using the internet,” *Quartz* 9 February 2015. This point is also frequently highlighted in Edwin Jurriëns, Ross Tapsell (eds.), *Digital Indonesia: Connectivity and Divergence*, Singapore: ISEAS – Yusof Ishak Institute, 2017.

²⁰ Bede Moore, “A recent history of the Indonesian e-commerce industry: an insider’s account,” in Edwin Jurriëns, Ross Tapsell (eds.), *Digital Indonesia: Connectivity and Divergence*, Singapore: ISEAS – Yusof Ishak Institute, 2017, p. 271. Other global market research projects that have heaped praises upon the potentials of Indonesia’s digital future but highlighted the chronic lack of skilled labour and human resources include McKinsey (2012) and Google Temasek (2016).

²¹ Go-Jek started in 2010 as a hailing app for motorbike taxis, though now it also operates logistics, a food delivery business and a mobile payment business. “Sequoia plays matchmaker: Go-Jek acquires 2 Indian startups for tech muscle,” *Tech in Asia* 19 February 2016.

Of course, it is worth remembering that “similar arguments were peddled in 2011, before the tech sector had a foothold and when nobody could imagine Indonesians being so indulgent as to trust a website with their credit card details.”²² The flurry of excitement and funds invested in the digital economy and e-commerce in Indonesia was unimaginable as recent as six years ago. Nevertheless, it is also worth remembering that in 2016, the World Development Report warned against digital ICTs being exuberantly viewed as the key driver of economic development, since their aggregate impact has increasingly fallen short of initial expectations, and sometimes exacerbates persistent problems of concentration, inequality, and control.²³ This brings us to the next problem of how to estimate the benefits, challenges and uncertainties of the digital economy.

ESTIMATING BENEFITS, CHALLENGES AND UNCERTAINTIES

In the INSP survey, only 31% of respondents have ever used the internet. This is higher than the reported average of internet penetration at 22% by ITU in 2015, but much lower than the ones reported by APJII (52%) and Nielsen (44%, done in major cities) in 2016, though not so much lower than the government estimate of 34.9%.²⁴ And while a higher number of internet users live in urban areas, access is still limited to only around 41.8% among urban dwellers and only 61.1% among high-income respondents.²⁵

There is a particularly high correlation between internet use and education level. The internet is widely used among high education respondents (84.3%), almost double the rate among medium education respondents (43.3%), while the use among low education respondents is only 7.12%.²⁶ The results echo the APJII 2016 survey that showed particularly high internet use among college students (89.7%), even though in terms of composition, college students only make up 7.8% of the total internet users.²⁷ While the strong correlation between high education and internet use may not be causal, it is important to remember that only a very small percentage of total Indonesian population have high (college-level) education (5.42% according to the 2010 census). Meanwhile, despite the high growth of mobile subscriptions, and the penetration rate of 132 (fig. 1), only 73.89% of respondents in the INSP survey states that they own a cell phone, of which only 41.44% owns a smartphone. Compared to the rate of internet use, however, the education level does

²² Bede Moore, “A recent”, p. 268. Moore is the co-founder and former Managing Director of Lazada Indonesia.

²³ World Bank, *World Development Report 2016: Digital Dividends*, Washington: 2016.

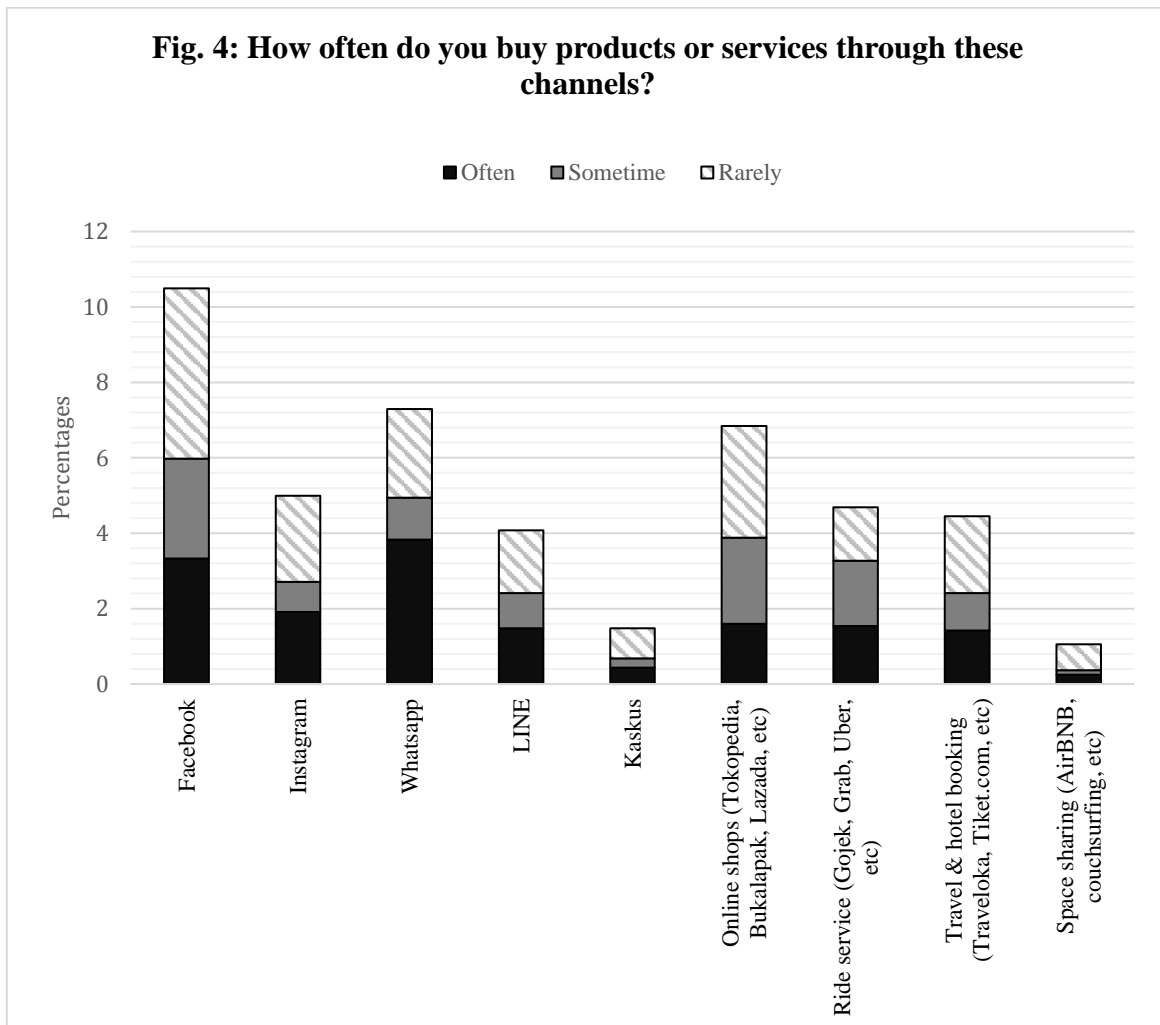
²⁴ Aware of previous research showing that many Indonesians cannot differentiate between the internet and Facebook, the INSP survey included brand names, i.e. mentioning Facebook, WhatsApp, Instagram, etc to facilitate the respondents, which likely contributed to the higher number.

²⁵ Other sources state that the majority of the population and internet users live in the western region of the country, especially in Java, but even then, the highest penetration rate is only 56% in Jakarta. About 83% of internet users live in urban areas, but even within Indonesia’s largest cities, on average, less than 20% of urban dwellers have regular access to the internet. See Purbo, “Narrowing”, p. 75.

²⁶ For the education categories, INSP survey defines medium education respondents as having completed middle or high school; high education respondents have at least some college education, a college or a postgraduate degree.

²⁷ *Penetrasi & Perilaku Pengguna Internet Indonesia*, Jakarta: Polling Indonesia & APJII, 2016.

not make a particularly high difference to the rate of cellular phone use (97% among high education, 86.1% among medium education, and 56.6% among low education).



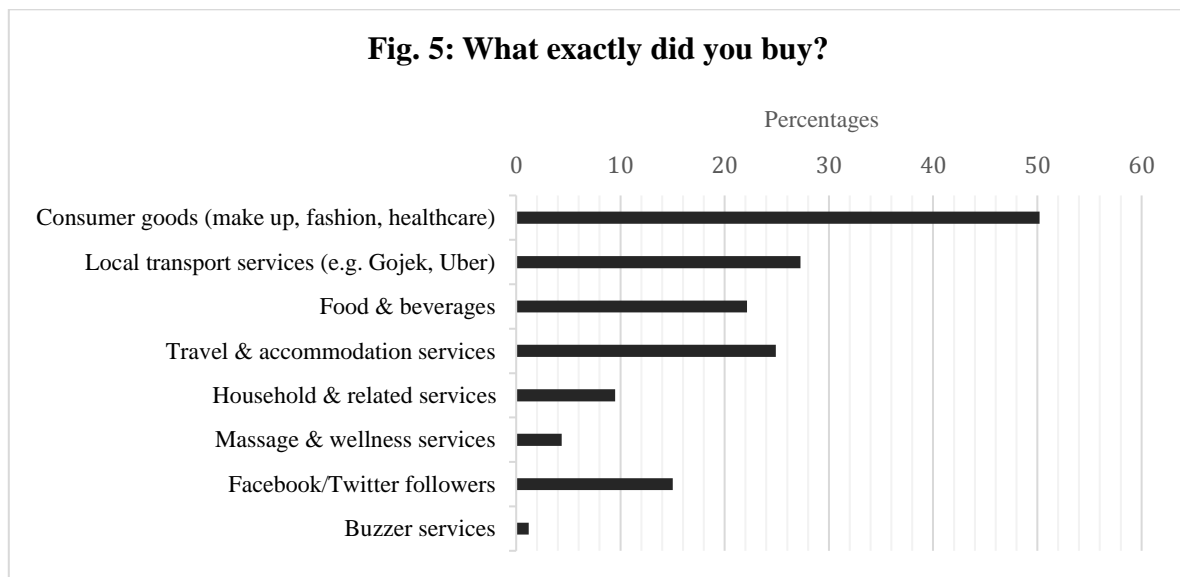
Source: INSP Survey (May 2017), ISEAS-Yusof Ishak Institute.

In August 2017, amidst growing concerns over a slowdown in purchasing power and a drop in retail sales even after the Muslim fasting and holiday month, a number of renowned Indonesian e-commerce CEOs and business consultants asserted that consumers were merely “shifting” from conventional brick-and-mortar establishments to online shopping.²⁸ Bukalapak, one of the largest e-commerce sites in Indonesia, questioned the statistics on falling purchasing power, saying that the company had been recording a surge in transactions online. JNE, one of the largest logistics companies in Indonesia, added that up to 60% of their deliveries came from orders made through online stores, not including goods traded through social media and messaging accounts that were not detected by statistics and the taxation system.²⁹

²⁸ Rhenald Khasali, “Daya Beli Terpuruk, Tetapi Jalan Semakin Macet,” *Kompas* 29 July 2017; “Lawanlah Shifting dengan Inovasi,” *Kompas* 6 August 2017. Rhenald Khasali is a professor (Guru Besar) in Management, Faculty of Economics, University of Indonesia, and has written a number of best-seller management books.

²⁹ “Daya Beli Lesu, Ini Kata Bos Bukalapak,” *Detik Finance* 3 August 2017.

Yet, the INSP survey reveals that only up to 14% of respondents had ever bought any products or services online, including through social media and messaging applications. It might be that these companies have measured volumes based on their own experience, which cannot be taken as representative of a broader trend. The INSP survey, however, is based on a nationally-representative sample, and its results are more in line with the statement made by the Central Statistics Agency (BPS) that even though official statistics are still struggling with the actual numbers of online transactions, the total number of online shopping is clearly still very limited.³⁰



Source: INSP Survey (May 2017), ISEAS-Yusof Ishak Institute.

As for online purchasing patterns, Facebook, WhatsApp and Instagram seem to be the most frequently used channels (fig. 4). Among those who have made purchases online, consumer goods and local transport services seem to be the most popular, followed by travel and accommodation services, and food and beverage. Indeed, there has been an increase in investments in online shops whose numbers are consequently growing. These shops (such as Tokopedia, Lazada, Bukalapak) sell goods and services, ride-sharing services, and travel booking, but their use is still limited across the nation. This may have been caused by various factors: (1) as discussed previously, many telecom operators offer cheaper plans (or allowing “free” access when the data package has run out) to foreign social and messaging platforms like Facebook and WhatsApp; and (2) many ride- and space-sharing services are only available in urban areas.

Interestingly, up to 15% of the respondents state that they have bought “Facebook/Twitter followers”, and 1.19% have bought a “buzzer service” (fig. 5). The business of Facebook/Twitter followers, fake accounts, bots and buzzers have existed as a niche market for quite some time, and was initially used primarily for advertising and promoting brands. It recently gained public attention in Indonesia in the run-up to Jakarta’s highly polarized

³⁰ “Daya Beli Diklaim Tak Susut Cuma Karena e-Commerce,” *CNN Indonesia* 7 August 2017.

gubernatorial election in February 2017.³¹ More recently, the national police caught a syndicate that was allegedly paid tens of millions of rupiah per project to mobilise more than 800,000 accounts to produce and multiply millions of on-demand sectarian posts and videos.³² This raises the issue of their possible contribution to political and sectarian divides.

CONCLUSION

The discussion above shows that despite the high expectations on digital economy and e-commerce in Indonesia, there are formidable challenges. The digital economy in Indonesia is still at a preliminary stage, and the available data are far from comprehensive, but we can nevertheless make some preliminary inferences. First, in terms of access, the number of Indonesians using the internet increased twentyfold from 0.9% in 2000 to 22% in 2015, but this is still very low when compared to other countries in the region (fig. 2). Second, in terms of quality, there are issues of topographical challenges, highly uneven coverage, lax security and privacy, with many loopholes for identity theft embedded in disposable, easy-to-acquire prepaid SIM cards.

Third, considering that almost a third of Indonesians who use the internet cannot tell the difference between the internet and Facebook, and that there is a strong correlation between internet use and education level, the problem of digital usability and literacy needs to be better addressed. Indeed, better education is one major issue that has been repeatedly raised by various reports on the challenges faced by the digital economy in Indonesia.³³ Yet ICT subject has actually been removed from the list of compulsory subjects for school, leaving the drive to increase digital literacy in Indonesia to scattered campaigns, programmes and services carried out by private and public institutions.

³¹ Generally, bots are (fake) social media accounts made through pieces of software (robots, often shortened as “bots”) that can automate the creation of accounts, content, and/or interaction on social media, in thousands and even millions—thus making tracking and verification extremely difficult. Meanwhile, buzzers are generally understood as having a persona similar to a real person. The terms “followers” and “buzzers” are used in INSP survey in consideration of the fact that they are more widely used in Indonesia than the rather niche term of “bots.” For average users, it is very difficult to distinguish between “real” users, buzzers, and bots, and oftentimes these are intermixed, with very dynamic and still little understood mechanisms. See “In Indonesia, buzzers are not heard, but tweet for money,” *Reuters* 23 August 2013; “Twitter Tussle in Social Media,” *TEMPO* 8 January 2017.

³² “Sindiket Saracen Dibayar Puluhan Juta untuk Sebarkan Isu SARA,” *Detik* 23 August 2017; “Ketua Kelompok Saracen, Jasriadi: Saya Pendukung Prabowo,” *TEMPO* 3 September 2017, p. 77. See the academic discussion on the role of social media and buzzers in the highly divisive Jakarta gubernatorial election in 2017 in Lim, Merlyna, “Freedom to Hate: Social Media, Algorithmic Enclaves, and the Rise of Tribal Nationalism in Indonesia,” *Critical Asian Studies*, 49 (2017), 411–27.

³³ For examples, see Google Temasek, “e-conomy SEA: Unlocking the \$200 billion digital opportunity in Southeast Asia,” May 2016; McKinsey & Company, “The Archipelago’s Economy: Unleashing Indonesia’s Potential,” September 2012; McKinsey & Company, “Unlocking Indonesia’s digital opportunity,” September 2016. See also Pangestu & Dewi, “Indonesia,” pp. 227–255 and Moore, “A recent,” pp. 256–274. Adrian Vanzyl, CEO of Ardent Capital, also stated talent shortage as the number one factor dragging growth.

Finally, there are signs of a growing digital industry that contributes to and profits from the increasing political and sectarian divide. Whether or not Indonesia wants to emerge as the regional digital economy leader, the digital divide has to be addressed in relation to factors beyond merely physical and digital access. The government needs to take into account other parameters such as content, language, literacy, education, and different community and institutional structures if it is to help people engage with these technologies in meaningful socio-economic ways.³⁴

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³⁴ See Purbo, "Narrowing," pp.75-92, and M. Warschauer, *Technology and Social Inclusion: Rethinking the Digital Divide*. Cambridge & London: The MIT Press, 2003.