1 Challenges and opportunities of the digital 'revolution' in Indonesia

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Digital technology is fast becoming the core of life, work, culture and identity in Indonesia. In a young nation with a median age of 28 and a rapidly growing urban middle class, Indonesians are using digital technologies in ways that have made the world take notice. In 2016 Indonesia had 76 million Facebook users, the fourth highest number in the world. Jakarta has been named the world's 'most active city on Twitter' (Lipman 2012), while other platforms such as Instagram, WhatsApp, LINE, Path and Telegram are all being used in unique and dynamic ways. It is now commonplace to walk into a cafe in one of Indonesia's cities and see a group of young Indonesians all sitting in silence, eyes fixed on their mobile phones. Even outside the cities, there is voracious demand for admittance into the digital world. In research exploring the 'improbability' of a nation with over 13,0000 islands, a coastline of 54,000 kilometres and a population of 250 million with dozens of ethnicities, journalist Elisabeth Pisani (2014: 3) observed villagers climbing trees in order to get 2G phone reception; 'Millions of Indonesians live on $2 a day *and* are on Facebook', she wrote.

Indonesia's digital economy is an area of great potential, as shown by the rise of Go-Jek and Grab, ride-sharing companies whose success has been propelled by the ubiquitous use of smartphones. In mid-2016 Go-Jek raised $550 million in new capital, giving it a value of $1.3 billion, an incredible result given it had launched its first mobile phone application only a year and a half earlier (Pratama 2016). On the back of Go-Jek and other e-commerce successes, President Joko Widodo (Jokowi) stated that Indonesia aimed to have '1,000 technopreneurs' and a digital economy worth $130 billion by 2020 (Tapsell 2015a; Wisnu 2016).

Politically, digital platforms are being used to organise mass rallies, assist with election monitoring and generally provide a space for greater freedom of opinion and expression on a variety of issues, contributing in no small way to the country's rambunctious democracy. Anyone running for political office must now consider how to engage with the world of online campaigning, in particular by nurturing a presence on social media. As this book explains, digital technologies have had a marked impact on the media industry, governance, commerce, informal sector employment, city planning, disaster relief, health, education, religion, artistic and cultural expression, and much more.

Yet this rapid advancement of online communication, predominantly in urban areas, is only part of the story. While the number of Indonesians using the internet has followed the upward global trend, increasing sevenfold from 8.1 million in 2005 to 56.6 million in 2015 (see Chapter 13 by Pangestu and Dewi), Indonesia's internet penetration rate remains at only 25 per cent,[1] with around four-fifths of the country's internet users located on the islands of Java and Sumatra. For communities in disadvantaged regions, the infrastructure and media for digital communication and information are underdeveloped or unavailable. This situation is gradually improving, but behind the glossy sell of social media-driven campaigns, tech start-ups and e-commerce growth, the disruption caused by digital technologies is presenting significant challenges.

One of Indonesia's biggest challenges is to make sure that the internet does not lead to a more divided and unequal society, as users in urban areas with better access to high-speed internet adapt to the digital world faster than their fellow citizens in rural areas. While enabling emancipation in some cases, in other cases digital technology maintains or even reinforces social class and status distinctions. Even among those who do have internet access, there are literally millions of Indonesians who use it only to access Facebook or WhatsApp on their mobile phones via 2G satellite technology. Given the low speeds, these people are unable to use even Google or Wikipedia effectively, let alone seize the opportunity to become one of Indonesia's '1,000 technopreneurs'. Bridging the 'digital divide' (van Dijk 2005; Tsatsou 2014: 116–32) remains a huge challenge for the Indonesian government but, if achieved, will have a profound impact on the country's economy, society and culture.

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1 There are a number of conflicting reports on the level of internet penetration in Indonesia. Freedom House puts the penetration rate at 22 per cent but other sources claim that the figure is as high as 30 per cent, with rapid improvements in the year 2016. One of the difficulties in pinning the numbers down is that, when surveyed, many Indonesians answer 'yes' to using Facebook on their mobile phones, but 'no' to having internet access.

Other challenges brought about by digitalisation are equally stark. New technologies strengthen or produce political, commercial and socio-religious forms of surveillance, manipulation and suppression. The same digital mechanisms that give minorities and marginalised groups a voice are used to track, discredit and threaten them. Information and communication technology (ICT) helps hardline groups expand their networks and mobilises individuals to participate in violent online and offline behaviour and activities. The collapse of distinct demarcations between the private and public realms has opened gateways for cybercriminals to gain access to confidential information. While digital engagement gives rise to expanded and intensified forms of connectivity, it also leads to dramatic, and sometimes even fatal, forms of misinformation, miscommunication and socio-political divergence.

While there is clearly a high level of engagement with, and strong enthusiasm and talent for, digital technologies in Indonesia, framing a scholarly critique around 'digital Indonesia' is no simple task. How can we make sense of the rapidly changing arena of digitalisation in one of the world's most diverse, geographically vast nations? We argue that the first step is to put the very idea of a technological 'revolution' into critical perspective by positioning the realities of the digital world in a context of colliding socio-political, cultural and natural environments.

This book is intended to weigh arguments about the impact of digitalisation in Indonesia by explaining its opportunities, but at the same time defining its challenges. While staying clear of overt techno-optimism, we maintain that Indonesia is at the forefront of the global debate about the effect of digital technology. Indonesia can play a world-leading role in the development of ICT applications in areas as crucial as poverty reduction, education, health care, environmental sustainability and disaster relief, to name a few. Digital technologies offer significant and wide-ranging opportunities to make the world a better place, but realising those opportunities means evaluating the challenges the new technologies bring. We intend this book to be a place where this evaluation begins. In the rest of the chapter, we elucidate our argument and provide a guide to help readers navigate the remainder of the book.

FRAMING 'DIGITAL INDONESIA'

This book deals with the intersections between digital technology and a broad range of sectors of Indonesian life. By 'digital' we mean the translation of various aspects of life into digits for information and communication purposes. Digitalisation's simplified system of representation can enhance the speed, scope and efficiency of information and commu-

nication practices. Its potential to bridge or compress time, space and even entities has made it one of the driving forces behind globalisation or a globalised 'network society' (Castells 1996; Appadurai 1997; Tsatsou 2014: 58–9). One of the remarkable characteristics of the digital in contemporary life, including Indonesian culture and society, is its capacity to facilitate mobility, co-presence and interconnectivity (Hjorth 2009). The use of ICT enables unexpected social interventions and connections, signalling for some the possibility of shifting 'capitalist societies out of the era of the mass media and into a post-media age in which the media will be re-appropriated by a multitude of subject-groups' (Guattari 1989: 144). The post-media age has not been without its own difficulties, however, as the case studies in this book show.

Of course, digital technologies did not arrive in Indonesia in a vacuum. The origins of the internet are commonly identified with the Advanced Research Projects Agency Network (ARPANET), established in the United States in the 1960s. The word 'internet', short for 'internetworking', was introduced in 1974 (Tsatsou 2014: 14–15). While ARPANET was initially used by the military and computer scientists, the open-source movement of the 1980s worked on alternatives for the more open development and use of digital communication networks. The World Wide Web was released in 1989 by a research team from the European Organisation for Nuclear Research (CERN) in Geneva (Tsatsou 2014: 15).

The internet arrived in Indonesia in the second half of the 1990s, 'into a mediascape that was already stretching the Indonesian state's capacity to control' (Hill and Sen 2005: 28). Initially, internet cafes (*warung internet*, or *warnet*) constituted the main public venues for citizens to access the internet for private use (Hill and Sen 1997). The growth of the mobile phone market in the twenty-first century has enabled more flexible and individualised forms of internet use. David Hill and Krishna Sen (1997, 2005), Onno Purbo (2002), Merlyna Lim (2002) and Yanuar Nugroho (2007) have all published pioneering studies on the role of digital technologies in the archipelago. While the internet is a relatively young medium, after a few decades of impressive growth in Indonesia and worldwide, it has developed its own history, including a history of its studies (Tsatsou 2014: 15–19). This book maps and analyses the expansion and specific directions of digital technologies in Indonesia since the 1990s. In doing so it builds on existing academic work from the time when the internet was still a relatively limited and exclusive domain in Southeast Asia.

The smartphone has been a game changer in facilitating the adoption of the internet in Indonesia. In 2012, around 29 per cent of the 55 million Indonesians who connected to the internet did so via a mobile phone (Rao 2012: 6). By 2016 that share had increased to 70 per cent,

largely because of the massive expansion of the smartphone market (Balea 2016). Despite the growth of both mobile phone and internet use, however, great disparities in access remain. Fewer than 40 per cent of Papuans own a mobile phone, compared with an estimated 97 per cent of Jakartans (Jurriëns and Tapsell 2016). A person's social or physical position in the geo-political landscape of Indonesia, with its highly uneven spread and quality of digital infrastructure, to a large extent determines whether, how fast, how long, with whom, and on what other terms and conditions one can have digital connectivity. Digital access, often misleadingly called 'free access', comes with various costs, ranging from the financial costs of technological infrastructure and individual consumer items to the environmental costs of e-consumption and e-waste, the 'flexploitation' of formal and informal internet-related labour (McRobbie 2005: 382–3) and the social costs of stigmatisation and intimidation. In the context of Indonesia's post-1998 reform movement, Hill and Sen (2005: 145) came to the rather pessimistic conclusion that 'the Internet may be at best yet another index of inequality, at worst yet another impediment to equal participation in an emerging democracy'.

We test this and other hypotheses by examining a diverse range of sectors and actors that have created, sustained, reinforced, resisted or undermined the various digital connectivities and divides in contemporary Indonesia. The complex and fluid nature of the topic has led us to an interdisciplinary approach that draws on media studies, cultural studies, sociology, anthropology, political science, economics and history, among others. As digital technology and Indonesian life in the twenty-first century are closely interwoven and mutually constitutive, we stay away from making firm predictions about the digital future. Instead, we have included studies that carefully describe, analyse and contextualise the digital realities of everyday life in the world's fourth most populous country. The empirically based and theoretically informed research in this book demonstrates that digital technology has triggered and shaped developments in society in interaction with other media, ideas and practices. The five sections in the book refer to closely interrelated aspects of digital Indonesia: connectivity (Part 1), divergence (Part 2), identity (Part 3), knowledge (Part 4) and commerce (Part 5).

CONNECTIVITY

Part 1 of the book focuses on the various types of connectivity that can be facilitated by digital technology. One of the most important benefits provided by digital technology is its ability to connect citizens with their governments in new and efficient ways. Indonesia's bureaucracy is noto-

riously slow and debilitating, in many ways still living in the shadow of the authoritarian practices of the New Order (1965–98). Digitalisation has the potential to make the public service more transparent, and therefore less corrupt (Huang, Ismiraldi and Thornley 2016). As governor of Jakarta, Jokowi attempted to reduce corruption among low- and middle-level bureaucrats, and generally to make the bureaucracy more efficient in its operations. During the 2014 presidential election, both Jokowi and his opponent, former army general Prabowo Subianto, promised to reform the bureaucracy. Prabowo traded on his image as a man of action to show that he would not tolerate long deliberations or excessive bureaucratic processes. Jokowi made unscheduled visits (*blusukan*) to government offices, where footage of him checking on the progress of infrastructure and other projects was uploaded to YouTube.

In Chapter 2, we hear a view on e-governance from inside the presidential palace: the authors, scholar and e-governance specialist Yanuar Nugroho and researcher Agung Hikmat, both hold positions in the Executive Office of the President (Kantor Staf Presiden, or KSP). They reiterate that Jokowi is determined to make e-governance a central part of his program, 'as a means not only to deliver better public services and facilitate collaboration, but also to bolster the credibility of his government' (p. 21). However, while e-governance may be a way to clean up corrupt official and unofficial bureaucratic practices, the authors recognise that it is not a magic bullet. Rather, it needs to be placed in the context of wider bureaucratic reform, 'away from the old, militaristic style of service delivery into a new era of more accountable and effective government' (p. 34).

Undoubtedly, public sector reform through e-governance will not happen easily. But in thinking about the implications of greater connectivity between citizens and government, Nugroho and Hikmat point out that the digital world is full of Indonesian citizens who are themselves innovating. For example, consumers can now order their favourite dinners delivered right to their doors through Go-Jek's new digital application, Go-Food. These improvements in efficiency in everyday aspects of life mean that citizens are increasingly expecting similar innovations and efficiencies from their governments. Moreover, the government can incorporate commercial and other technical innovations into its own processes, thereby improving e-governance. In other words, the breakthroughs in digital technology being made by the private sector should not necessarily be seen as separate from the goal of better governance.

From a consumer point of view, connectivity can also be found in the convergence of old media (television) and new media (the mobile phone). In Chapter 3, Emma Baulch demonstrates how consumers' engagement with digital technology is represented and shaped by the advertisements telecommunication network providers make for commercial television.

These ads promise freedom and innovation, and are central to 'the imagining of a digitally networked nation' (p. 45). They also confirm continuities, rather than breaks, between past and present forms of media use, and between past and present class-related distinctions. The telco ads focusing on smartphone and social media use confirm middle classness and social mobility, while those focusing on the cheaper SMS and voice call market confirm images and stereotypes of the lower economic classes or 'the masses'.

Nevertheless, even within a consumer regime shaped by television ads and controlled by media oligarchs, mobile phone and social media use, in combination with other cultural strategies, can offer opportunities to imagine new forms of self-identity, social connectivity and (lower-)class politics. For example, Baulch describes how the connectivity afforded by the mobile phone and social media has turned female concert goers in Bali from passive onlookers to active mediators between offline and online spaces. Music management and fans also use colloquial language and technologies associated with the lower class, such as text messaging, as cultural counterstrategies and as facilitators of alternative associational life.

One of the earliest and most prominent trends in digital connectivity in Indonesia has been the convergence of technologies and sectors in the media industry (Tapsell 2015b). In Chapter 4, Ross Tapsell describes the impact of media convergence on concentration of media ownership in Indonesia. Digital technology facilitates connections between information and communication formats and institutional forms that used to be relatively distinct from each other, such as the print media, radio and television (Jenkins 2006). The transformation of print, sound and vision into digital formats has given rise to new, multimedia ways of creating, transmitting and receiving media content. While this development promised to create greater diversity in news and entertainment, in practice the domination of a small number of politically powerful, Jakarta-based media companies with a national reach has reduced the level of diversity (Lim 2012; Nugroho, Putri and Laksmi 2012). Under oligopolistic circumstances, digitalisation contributes to the rationalisation of resources across media sectors and stages of the production process, strengthening the homogenisation of media content. Tapsell refers to a digital 'ecosystem' in which the media giants are aiming to incorporate more and more consumer services—beyond media services—into streamlined e-commerce packages. This is making it difficult for smaller, more specialised media companies to survive.

The chapters in Part 1 of this book go beyond the much-used and well-accepted concept of digital media convergence to highlight the centrality of new forms of connectivity to an understanding of power rela-

tions. Can bottom-up forces of the citizenry drive innovation and shape practices in the mainstream media, the advertising world and government? Or is the digital era simply allowing powerful media oligarchs and politicians to exert their power in new ways? The chapters in this section of the book identify a trend towards more centralised, homogenised forms of connectivity. This is not to deny or underestimate, however, the at times ingenious efforts of media activists, artists and ordinary citizens to overcome socio-technological divergence, as explored in the next section of the book.

DIVERGENCE

Part 2 of the book analyses real-life forms of social divergence and counter-strategies that shape the use of ICT. In Chapter 5, Onno W. Purbo, one of Indonesia's leading digital media activists (Barker 2015), argues that the digital divide is not only a matter of level of access to technology and material infrastructure, as the government seems to believe, but is also related to factors such as education, socio-economic status, age, income and location, all of which affect the ability to adopt digital media. Rather than technology access per se, adoption depends on people's awareness of the potential benefits of using the internet. In that sense, internet skills go beyond the acquisition of practical computer skills to require specific forms of digital literacy (Rheingold 2012). Various chapters in this book (Chapter 3 by Baulch, Chapter 9 by Slama, Chapter 10 by Nuraniyah, Chapter 11 by Azali, Chapter 12 by Jurriëns) demonstrate that the issues of digital adoption and digital divide are not only class related, but also have clear gender dimensions.

Especially in rural areas, a lack of internet affordability, skills, awareness and cultural acceptance, combined with a lack of content and services in local languages, constitutes a considerable hurdle to digital literacy. According to Purbo, top-down strategies by the government focusing on material infrastructure, such as the Smart Village program to connect all Indonesian villages to the internet, are insufficient. The sustainability of rural digital networks also relies on technical education, building infrastructure in response to local demand, keeping costs down and exploring the economic opportunities that can arise from the use of digital technology. As ICT is no longer a compulsory subject at school, the drive to increase digital literacy currently depends largely on the educational services and campaigns of NGOs, commercial media providers and independent electronic forums.

While the predicament of citizens with few digital literacy skills is often forgotten in the excitement around the digital 'revolution', so too

is the plight of those unlucky citizens who have felt the wrath of the state for their online activities. In Chapter 6, human rights lawyer and researcher Usman Hamid reminds us of the role of digitalisation in enabling creeping state control. He highlights the cases of Alexander Aan, the moderator of a Facebook page for atheists who was jailed under the ITE Law for 'disseminating information aimed at inciting religious hatred or hostility' (Jurriëns and Tapsell 2016); and of the Papuan activists who have been subjected to online surveillance and crackdowns. For every techno-optimistic report of how Papuans film atrocities on their mobile phones and upload them to the internet for the world to see, there are numerous other reports showing how Papuan activists 'expose themselves to potentially fatal pushback from a state that can readily infiltrate social media, track down activists and impose severe sanctions' (p. 104).

Indonesia is ranked only 'partly' free in the latest Freedom on the Net report (Freedom House 2016), in part because of the rise in the number of online defamation cases brought under Law No. 11/2008 on Information and Electronic Transactions (the ITE Law). This contentious law is specifically tailored to control the online realm by making it easier to bring criminal online defamation cases; the number of prosecutions under the law rose from just two in 2009 to 41 in 2014 (SAFENET 2015). While the law is intended to protect the reputations of citizens who have been defamed online, in fact over a third of complainants are state officials, while the defendants include activists, lawyers, researchers and journalists, as well as ordinary citizens (Chapter 6 by Hamid).

The debate about freedom of expression on the internet can be linked to the turmoil surrounding 'hoax news' in Indonesia. Jokowi was reported as saying in early 2017 that while the 'Information Age is very open', information needs to be filtered 'or it will tear apart our unity' (Suherdjoko 2017). Budi Rahardjo (Chapter 7) tends to agree, writing that online hate speech and fake news is a 'destabilising force in Indonesian society' (p. 121). The Indonesian government has set up an agency inside the presidential palace to prevent the spread of slanderous and false news stories, and is asking the police to trace the perpetrators (Tapsell 2017).

Rahardjo also discusses cybercrime, in particular the balance between security and privacy. In 2014, Indonesia was ranked second (after China) among the countries from which cyberattacks were launched. Indonesian citizens who readily place information about themselves online are now vulnerable to identity theft and online fraud. Much like its solution to fake news, the Indonesian government is taking a centralised approach to the issue of internet security by creating a new national cybersecurity agency (Paskalis 2017). As Rahardjo observes, the government's use of website-blocking and content-filtering tools may reduce cybercrime, but

it also runs the risk of being perceived as censorship, state overreach or an attempt to control society.

At the heart of these various issues of divergence lie the challenges of formulating internet policy. There are considerable differences in views both within government and in society about the role of government in narrowing the digital divide, identifying and limiting cybercrime, and managing citizen commentary online. These discussions are taking place globally, too, but they are being played out very openly in Indonesia's vibrant public sphere.

IDENTITY

Part 3 of the book focuses on the actual practices of digital technology users, and how these practices bring into being or further develop specific forms of individual and group identity. The chapters confirm that the digital mediascape is not determined solely by technologies and networks, but also by forms of human agency (Fuchs 2008; Tsatsou 2014: 38–41). Groups and individuals in the digital realm invite others to join their communities by offering subject positions that have broad appeal, in fields as diverse as social activism, religion and militant fundamentalism.

In Chapter 8, John Postill and Kurniawan Saputro examine how Indonesian activists have attempted to communicate key issues of the digital age to the broader public, by strategically using the common, personified categories of victim (*korban*), volunteer (*relawan*) and voice (*suara*). These three categories relate, respectively, to the fields of digital rights activism, data activism and media advocacy, each with its own specialist knowledge, use of media technology, and temporal and spatial scaling. Postill and Saputro elaborate their argument by providing an example of each.

Activists have used the victim (*korban*) category to mobilise public resistance against lawsuits brought by powerful individuals and organisations against ordinary citizens or minorities under the ITE Law's defamation clause (article 27(3)). In late 2014, the various digital victimhood movements formed an umbrella organisation, Digital Democracy Forum (Forum Demokrasi Digital, or FDD), to represent the digital rights and interests of civil society and negotiate with other stakeholders, including politicians and policy-makers. The volunteer (*relawan*) category is represented by the Election Guardians (Kawal Pemilu), an independent data activism movement that monitored the 2014 presidential elections in the public interest, by recruiting volunteers for the nationwide collection of polling station results. An example of the voice (*suara*) category is Papuan Voices, a video production and distribution program that enables Papuans to give expression to their oppression and marginalisation.

Digital technology is used not merely to present stories about Papua, but also to value the voices of local citizens themselves.

As one would expect in the country with the world's largest Muslim community, Indonesians also use digital social media to express religious piety and explore forms of religious practice and communality. The new media include Islam-related mobile phone applications, online study gatherings and social networking. In Chapter 9, Martin Slama demonstrates how these digital practices build on—but also deviate from—existing, offline forms of religious behaviour. For instance, discussions about religious and personal affairs that begin in offline prayer groups often continue through mobile phone messaging between individuals and their teachers. This typically involves female students requesting advice from, but sometimes also challenging the authority of, male teachers. Other groups use digital applications to read the Qur'an together, creating their own forms of social bonding, discipline and punishment. Some see posting religion-related status updates on Facebook as a form of proselytisation, even if the posts are not grounded in any form of theological expertise. At the same time, these social media users face the risk of being accused of the religiously objectionable act of seeking the admiration of others (*riya*).

Digital media applications are popular not only among the majority of moderate Muslims, but also among radical minorities. Some of these radical groups use encrypted mobile chat applications to sustain and strengthen their communities. Nava Nuraniyah argues in Chapter 10 that extremist chat groups facilitate more open and intimate discussion among members than more public social media such as Facebook and Twitter, in part because the chat groups are less subject to control by moderators. In general, the groups are about social bonding, cohesion and expansion, and are not directly aimed at planning and training for acts of terrorism. The fact that the recruitment of members often takes place through offline networks again confirms the strong interconnections and blurred lines between digital media and the 'real' world in Indonesia.

One of Nuraniyah's findings is that the majority of conversations in female chat groups are about mundane personal matters rather than radical religious affairs. Despite having a much smaller number of participants, the female chat group she studied was far more active in publishing messages than the male group. The members of both groups cherished the social dimensions of being part of a community of like-minded people in the digital world, often after becoming alienated from their families and friends in the offline world. In combination with offline practices, online socialisation can become a pathway to further radicalisation, including the plotting and execution of terrorism. As the

online forums offer opportunities to monitor and possibly influence the behaviour of potential terrorists, Nuraniyah's advice for governments and their intelligence services is to engage with the digital communication technology rather than trying to ban it.

KNOWLEDGE

Apart from creating a sense of communal or individual identity, one of the primary functions of digital media use in contemporary society is to facilitate the sharing of knowledge. Part 4 of the book therefore focuses on the various ways of producing, collecting, transferring and receiving information that are facilitated by Indonesia's digital infrastructure. Key developments in recent years have been the digitisation of library and archive collections as well as the creation of digital resources for education, music and the visual arts. These initiatives have come with their own challenges.

As Kathleen Azali points out in Chapter 11, the politicisation of information in Indonesia since colonial times has not only made certain sources of knowledge inaccessible, but also created a general distrust of libraries and archives. The Indonesian library sector suffers from poor self-esteem and a negative public image as well as a lack of funds, material resources, staff, and professional knowledge and skills. Although the majority of staff in libraries are female, very few women are involved in digitising collections, thus confirming a serious gender divide in the development and application of digital technology in Indonesia.

Nevertheless, since the late 1990s a number of online educational, academic and creative initiatives have increased the availability of knowledge in the public domain. The most comprehensive of these systems is Indonesia OneSearch (http://onesearch.id/). Digitisation has made major collections of knowledge more accessible and affordable, and encouraged collaboration and convergence between libraries, archives and museums. At the same time, it has created new problems related to technological obsolescence, physical decay and failures in interoperability. At least as important as resolving such technological issues, Azali argues, is creating awareness about the social, legal, political, economic and cultural foundations and consequences of knowledge production through both offline and online repositories.

Another way of making knowledge and information available to the public, and avoiding or circumventing state crackdowns and surveillance, is to adopt hacking strategies. While hacking may disrupt services or infringe on intellectual copyright, normally it is not meant to create any permanent damage to information and communication systems

(Denning 2001: 241). Visual artists are one pioneering group using hacking as a means to access, generate and share data. In creative, imaginative and often unexpected ways, they are producing meaningful alliances between art, science and society, and between the virtual, material and natural environments (Jurriëns 2017).

In Indonesia, the Yogyakarta-based new media art collectives House of Natural Fiber (HONF), XXLab and Lifepatch are among the most active and adventurous communities (see Chapter 12 by Edwin Jurriëns). Some aspects of their work have materialised in art objects that have attracted the interest of art collectors and exhibition and festival organisers, but in general their art practices tend to be process rather than object oriented. These collectives have developed collaborative art projects with local communities to address problems related to agriculture, waste management and health, and to explore scenarios and solutions for a better, more sustainable future. Their projects and approaches are supported and facilitated by digital technology, but also build on longer, pre-digital traditions of social engagement in modern and contemporary art. XXLab, an all-female collective, is helping to close the gender gap in digital Indonesia by showcasing women's roles as active and innovative participants in art, science and society.

COMMERCE

While the production and sharing of digital knowledge is fundamental to Indonesia's long-term development, activities designed to generate an immediate financial benefit form a far more substantial part of the country's digital information and communication services. The commercial application of digital technology in Indonesia constitutes the main theme of Part 5 of the book.

In Chapter 13, former minister of trade (2004–11) and minister of tourism and creative economy (2011–14) Mari Pangestu and researcher Grace Dewi provide a comprehensive overview of the progress of Indonesia's digital economy. Although the contribution of the digital economy to GDP grew from just 2.5 per cent in 2005 to 7.2 per cent in 2015, Pangestu and Dewi argue that Indonesia 'is not extracting full economic value from the digital economy, including its potential to contribute to development and inclusion' (p. 248), and in fact lags behind its ASEAN peers. The authors chart policy solutions to address this situation, including both improving communications infrastructure and developing human resources. In analysing the potential for economic growth through the digital economy, Pangestu and Dewi find that the success stories are concentrated in two areas, retail sales and transport, due to the ability of

tech companies in these industries to raise capital both domestically and abroad. The remaining chapters in Part 5 of the book provide specific case studies relating to these two industries.

In Chapter 14, Bede Moore, an Australian national and Harvard University graduate, provides an insider's account based on his role as a founding member of the e-commerce industry in Indonesia. He discusses the growth of the industry from 2011 to 2016, a period when Indonesia's digital economy was still in the 'relatively early stages of inception' (p. 256). One of his key findings concerns the role of large conglomerates in shaping, and in turn dominating, the industry. In 2015, for example, Cosseboom (2015) described how Indonesia's 10 largest conglomerates were investing in the start-up world, arguing that 'Indonesia's big families recognize they must be a part of the tech boom, or face certain redundancy in 10 years' time'. The concentration of capital in digital start-ups suggests that Indonesia's so-called '1,000 technopreneurs' may all be fishing from the same small pool. As Moore explains, changes to regulations in 2014 gave local conglomerates a significant advantage over foreign investors. This created the rather paradoxical situation in which the president was calling for more foreign investment in the digital economy, despite the government imposing restrictions that limited foreign business and capital.

One of the most prominent e-businesses in Indonesia is Go-Jek. Initially providing only motorcycle taxi services, by 2016 Go-Jek had expanded its services to 12 different app-supported businesses, ranging from various types of transport and courier services to food, entertainment and banking. In their analysis of the impact of the new technology on labour rights and opportunities for workers in the informal sector, Michele Ford and Vivian Honan (Chapter 15) ask a straightforward research question: is a Go-Jek driver better off than a traditional *ojek* driver? The answer is central to the debate on labour relations in the twenty-first century. As the authors explain, the app-based transport providers have faced fierce resistance from conventional transport providers in Indonesia, leading to protests and violence.

Until recently, conventional transport providers were subject to much stricter licensing and tax regulations than digital providers. The government introduced new tax and licensing regulations for app-based businesses in 2016 (Faisal 2016) but left the motorcycle taxi services largely untouched. Taxi drivers and informal workers who have made the switch to app-based transport companies have seen improvements in their working conditions and wages, but do not have control over ride pricing and still lack job security. Go-Jek drivers are also confronted with payment cuts and fines issued by the company's management, amidst rapidly increasing competition from other online transport companies

and drivers. At the same time, Ford and Honan argue, Go-Jek's status as a pseudo-employer allows its drivers to organise themselves, stage demonstrations and partake in collective bargaining, in ways that are not available to truly self-employed workers in the informal sector.

The case studies in Part 5 of the book tap into global debates about the creative destruction and disruption to traditional business models caused by digitalisation (Christiansen 1997; Danneels 2004). But they also provide a fascinating and original insight into the burgeoning issue of what might be called 'digital resource nationalism'. Much of the debate about Indonesia's digital economy is framed in terms of making sure that Indonesia reaps most of the rewards. This manifests itself in a number of ways. For example, Indonesians commonly express concern that Indonesia's best and brightest young technopreneurs are being wooed away by foreign companies in Silicon Valley, creating a brain drain in the local tech industry. Second, the Indonesian government frequently claims that large foreign corporations are deliberately and regularly underpaying taxes, singling out Google on a number of occasions in this regard (Idris 2017). Third, the entry of foreign tech companies (such as Malaysian-born online transport company Grab) has led to calls to ensure the success of locally grown companies (such as Go-Jek). Central to future policy settings for the digital economy in Indonesia will be broader debates about the effectiveness of globalisation and free trade, and the role of nationalistic economic policy-making.

CONCLUSION

This book explores how a broad range of actors, including governments, businesses, journalists, activists, artists, educators, religious fundamentalists, rescue and security forces, and ordinary citizens, engage with digital technology and mediate connections with others. The case studies in the book demonstrate how the digital has blurred the boundaries between producers and consumers of technology, between the public and private spheres, between the virtual and the 'real', and between the global, the national and the local. Some manifestations of the digital bring a critical and refreshing perspective to the very idea of Indonesia as a geo-political entity, by enabling the mapping and imagining of alternative networks and communities.

Overall, the research presented in this volume confirms an expansion of opportunities provided by people's engagement with digital technology in the specific socio-political constellation of twenty-first-century Indonesia. The new technology has facilitated the exchange of information and communication at an unprecedented speed, scale and

volume. The development of online data platforms has increased access to knowledge previously hidden in libraries, archives and museums, and has compensated for the limited availability of such resources in the first place. Through the convergence of old and new technologies, news media are able to channel the latest information in cost-effective, flexible and attractive formats. Fast and far-reaching digital networks are enabling governments and businesses to deliver services and products that are fine-tuned to the needs of citizens and consumers. Digital technology has given minorities and marginalised groups, including women, new opportunities to shape their identities and share them with the world. It has also opened up a spectrum of creative possibilities, including artist- and NGO-initiated projects aimed at community empowerment and environmental sustainability.

To realise the full potential of digitalisation, and create awareness about its darker side, Indonesia needs to harness the collaboration of all parties involved in or affected by the digital, including governments, businesses, civil society, academics, activists, artists, journalists and consumers. For its digital aspirations to bear fruit, the country needs to be able to draw on in-depth studies of the historical continuities and divergences between old and new media usages, as well as analyses of the complex interrelations between the virtual, material and natural environments. With this book, we attempt to present one cog in what needs to be a larger collaborative and interdisciplinary machine.

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