Digital Inequalities and Young Adults in Greater Jakarta:

A Socio-Demographic Perspective

Ariane Utomo, Anna Reimondos, Iwu Utomo, Peter McDonald, & Terence H.Hull

BIODATA

Ariane Utomo

Ariane Utomo is a Research Fellow at the Australian Demographic and Social Research Institute of the Australian National University. Her research interests include issues in gender, education, and the labour market; online social capital; and transition to adulthood in Southeast Asia. Email: Ariane.utomo@anu.edu.au

Anna Reimondos

Anna Reimondos is a Research Assistant at the Australian Demographic and Social Research Institute. She works on a number of studies investigating various aspects of the transition to adulthood in Indonesia. She is also involved in a project examining relationship formation and dissolution patterns in Australia. Email: Anna.reimondos@anu.edu.au

Iwu Utomo

Iwu Utomo is a Fellow at the Australian Demographic and Social Research Institute. With Professor Terence Hull and Professor Peter McDonald, Iwu has successfully gained ARC funding for projects on Harmful Sexual Practices in Southeast Asia (2005-2008) and Transition into Adulthood in Greater Jakarta (2008-2011). Email: Iwu.utomo@anu.edu.au

Peter McDonald

Peter McDonald is Professor of Demography and Director of the Australian Demographic and Social Research Institute. Peter's recent work is focused on population policy, immigration, labour force and ageing in Australia, on the demography of Indonesia, and on theory relating to low fertility, and the implications of low fertility for population futures. Email: Peter.mcdonald@anu.edu.au

Terence H. Hull

Terence Hull is Adjunct Professor of Demography in the Australian Demographic and Social Research Institute and JC Caldwell Chair in Population, Health and Development in the National Centre for Epidemiology and Population Health. Terry's recent work includes population trends and reproductive health issues in Indonesia; fertility estimation in Southeast Asia; and transition to adulthood in Southeast Asia. Email: Terence.hull@anu.edu.au

ABSTRACT

Using data from a representative survey (N=3,006) and in-depth interviews (N=80), this paper examines the socio-demographic nature of the digital divide among young adults in Greater Jakarta. Results from the 2010 Greater Jakarta Transition to Adulthood Survey indicate that 85 per cent of respondents owned a mobile phone. Access to Internet and its purpose of use were strongly differentiated across socio-demographic lines including gender and education. Although 60 per cent of respondents had never used the Internet, 85 per cent of those who use the Internet access it on a daily basis, with mobile phones being the most common access point of the Internet. In support of the normalisation thesis, our multivariate analysis indicates that the gaps in access to mobile phones and the Internet between male and female are significantly smaller among younger respondents. Education, rather than gender, plays a pivotal role in explaining digital inequalities among young adults in our sample.

Keywords: *Young adults, Asia, Indonesia, Digital divide, Internet, Mobile phones*

INTRODUCTION

Young men and women around the world are experiencing the transition to adulthood in the midst of a global revolution in new technologies and methods of communication. In countries like Indonesia, the digital age presents a web of intricate challenges and benefits both for policy makers and the large cohorts of young people whose socio-demographic and political   importance is often linked to the term 'the youth bulge' (Fuller, 2011). In theory, with the largest cohort of adolescents and young adults who have the highest literacy, command of the national language, and achieved schooling of any in history, Indonesia's youth bulge is conducive for a rapid uptake in the use of Information and Communication Technology (ICT). Such demographic perspective is in line with the popular assumption that new technologies such as mobile phones and the Internet are changing the way young Indonesians communicate, form relationships, network, conduct business, and work.

Recently, international media have paraded the eccentricities of the digital revolution in Indonesia. The Economist (2011) noted that Indonesia hosts the world's second-largest number of users of Facebook and the world's third largest users of Twitter. The striking popularity of online social networks in Indonesia paradoxically occurs against the country's relatively low ranking of Internet penetration in Southeast Asia. The Jakarta Post reported that only 21 per cent of people aged 15-49 in Indonesia

use the Internet (The Jakarta Post, 2011). While young urban middle-class Indonesians are increasingly portrayed by international media as proficient users of mobile phones and Internet technology, relatively little is known about the patterns of use of new media, and the ensuing potential for a digital divide and information inequalities among different socio-economic segments of young people in the country.

This lack of empirical insights on the nature of the digital divide in Indonesia reflects the state of knowledge in the broader literature on the international variations of within-country information inequities (Cheong, 2007; Miller, 2001). Although research on digital and the ensuing knowledge divides among young adults in the US and OECD countries is relatively well-developed (Hargittai & Hinnant, 2008), less is known on the patterns and gaps of ICT uptake among young adults in developing societies with deeply-entrenched socio-economic inequalities.

In Asian countries where computer ownership is relatively low, mobile phones have proven to be important points of access to the Internet (Quibriaa et al, 2003). Therefore, any study of digital inequalities in Indonesia must also consider mobile phones ownership. Using data from a representative sample of 3,006 respondents aged 20-34 in the 2010 Greater Jakarta Transition to Adulthood Survey and its in-depth interviews sub-samples (N=80), this paper examines to what extent age, gender, education and employment status explains the patterns in mobile phones ownership, and access and use of Internet among young adults.

We begin our paper with a brief literature review outlining previous studies on the digital revolution and social change in Indonesia. Here, we identified that so far, there has been little discussion on the socio-demographic aspects of access and use of the new media in the country. To examine the nature of digital divide among young adults in Greater Jakarta, our conceptual framework is centred on theories of the normalisation and the social stratification of technology adoption (Norris, 2001).

First, we build upon the argument that the so-called *digital divide* is a reflection of the deep-rooted patterns of socio-economic stratification in modern societies (Norris, 2001). We extend critiques against framing the digital divide as a bipolar division between those with and without access to information technology (Hargittai, 2002; Warschauer, 2003), and proceed to adopt the framework used to examine the

secondary digital divide. Here, to establish whether socio-economic stratifications underlies ICT adoptions in Indonesia, our framework questions to what extent socio-demographic proxies of education, age, gender and employment status are related to access to mobile phones and the Internet, and to Internet's patterns of use.

The remainder of the paper is organised as follows. Section 3 outlines the target population, data collection and methodology. In section 4, our results are organised into three major themes. The first part provides an overview of mobile phone usage and an analysis of the demographic and socio-economic determinants of mobile phone ownership. Here, we highlight the importance of mobile phones as an Internet access point. Second, we examine the so-called *second order* digital divide through three different aspects of Internet use: frequency, point of access and purpose. Here, we draw on a multivariate framework to examine the relationship between gender, education, and employment to determine the purpose of Internet use. Lastly, we present a graphical depiction of the preceding multivariate analyses to better understand what is happening to the magnitude of the digital divide across gender and education groups across the respondents' age groups.

In section 5, we discuss our results and reflect upon the implications of our findings for the broader scholarship on digital divide and development. Qualitative insights are interspersed in the discussion of our survey results. Should social stratification play a large role in explaining the gap in new media adoption and use, we argue that addressing *the digital divide* through provisions of equipment and its associated technology for young people without addressing its underlying drivers is a rather simplistic approach for policy makers to adopt. Section 6 provides a conclusion to our paper.

LITERATURE REVIEW

Young adults at the centre of the digital revolution and social change

In the field of Indonesian studies, the dominating discussion concerning ICT is on examining the relationship between the digital revolution and social change in Indonesia. Lim (2003, 284) noted the "coincident" role of the Internet and Internet cafes in greasing the momentum of the Reform movement that saw the end of Suharto's 32 year reign in 1998. Despite the fact that only 1 per cent of the population were using the Internet in 1998, the emergence of the Internet and Internet cafes facilitated their users to connect with the wider civil society. Lim highlighted the transformative role played by Internet cafes (Ind: *warung Internet)* which not only provided a virtual space for the exchange of information, but also offered a physical space where people could meet and networks could be built. In line with Lim's argument, Hill and Sen (2007, 133) also highlighted the Internet's role and "its articulation into the political democratisation" in Indonesia. They proposed that the Internet offered a novel and effective way to communicate with the public, making it a useful tool to opposition groups wanting to challenge the New Order regime and to subsequently foster electoral democracy in the country. Liu (2011) critically examined the notion of the Internet as a 'democratic enclave' that was left uncontrolled by the New Order Regime through a comparative lens alongside the case of Singapore and Malaysia. These studies have been pivotal in understanding the role of the Internet in Indonesia's recent development.

While the symbolic relationship between the digital revolution and masses of youth in fuelling socio-political change has been extensively reviewed (Hill & Sen, 2007; Kluver & Banerjee, 2005; Wong, 2001), there has been no attempt to specifically frame the demographic aspect of Indonesia's current age structure against the coincidental appearance of the digital revolution and political reforms. Having a large proportion of young people in the population serves to accelerate the spread of new vectors of communication because they are relatively more adept in embracing such technologies than are older generations (Abbot, 2011; Fuller, 2011; Kalathil & Boag , 2003; Wheeler, 2009). As demonstrated in the case of the Middle East, having a youth bulge has enhanced the enabling power of the World Wide Web to facilitate social and political change.

In Indonesia, the socio-demographic characteristics of the 61 million strong cohorts of young adults aged 20-34 (Statistics Indonesia, 2011b) are conducive for ICT adoption. The strategic importance of these cohorts is underlined by their marked achievements of literacy and education relative to the older cohorts. Being an archipelago consisting of diverse ethnic groups and languages, the degree to which members of a particular cohort are able to communicate in a common language might be interpreted as a sign of their potential to be 'wired and 'connected'. Figure 1 illustrates that relative to older cohorts, the ability to communicate in Bahasa Indonesia among our cohorts of interest is almost universal. On the contrary, however, the experience and extent of engagement of individuals in different segments of the cohorts in the new participatory space facilitated by ICT is unlikely to be universal. This condition mirrors the situations in the many parts of the developing regions of the world where within-country information inequities remain pervasive.

Figure 1 Population Census 2010: Population of Indonesia by Age Groups and Indonesian Language Ability
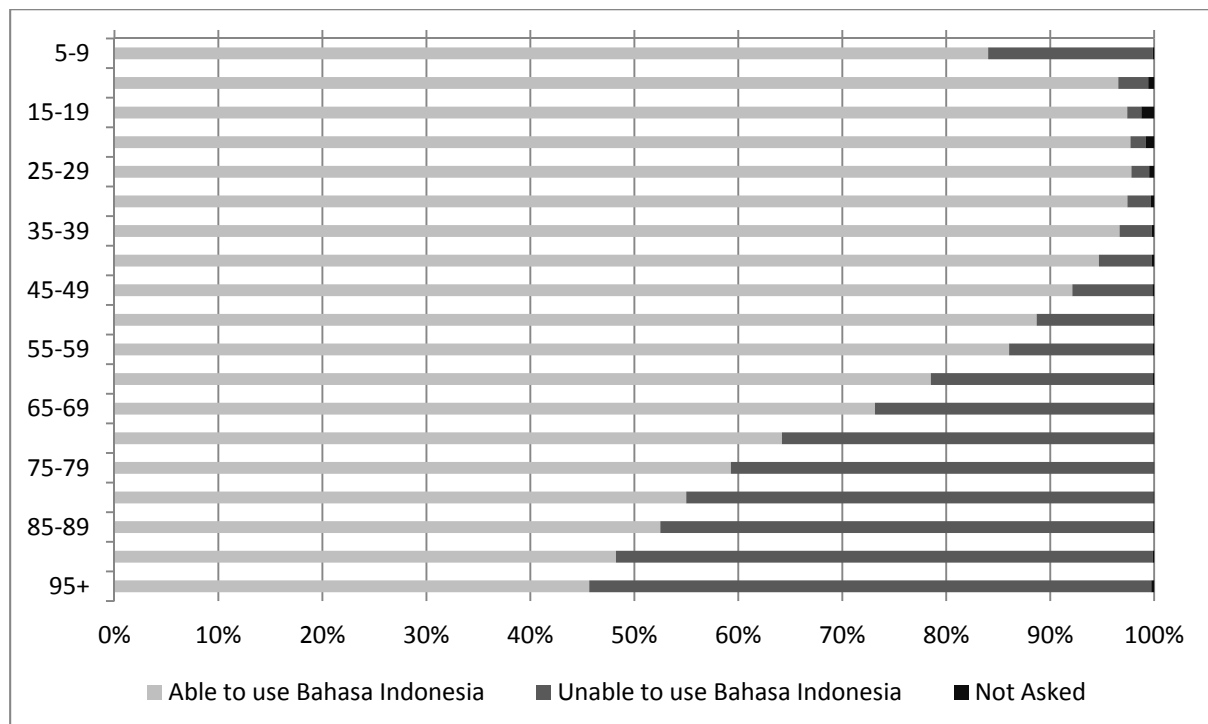
Source: Population Census 2010 (Statistics Indonesia 2011c)

To date, studies on digital divide concerning Indonesia have focused primarily on its inter-countries or its inter-regional dimensions. For example, Srinuan et al. (2010)

examines the role of GDP per capita, the urban proportion of population, the competition level of the telecommunications market, and the independent regulator, in explaining the digital divide for a group of ASEAN countries, including Indonesia. Large country-wide initiatives, such as the Meaningful Broadband Project of the *Indonesia Group against Digital Divide* organisation, also tend to operate at reducing inter-regional inequality in access to ICT via infrastructure investment and development (Digital Divide Institute, 2013). Primarily because of the lack of large representative survey data, very little is known about the socio-demographic nature of the digital divide and the ensuing information and knowledge divide within Indonesia.

Only a few studies have examined the characteristics and usage patterns of Internet users within Indonesia from a socio-demographic perspective. These studies tend to be limited in scope, for example using only a university student sample (Wahid, 2007), or focusing only on users of Internet cafes (Wahid et al., 2006; Furuholt et al., 2008). Young people's use of new media has also been investigated by a number of anthropological studies. In a study of 56 young Internet users in Yogyakarta, Slama (2010) examines how Internet chatting has become an integral part of the urban youth culture. Young women's engagement with both online media and mobile phones in Muslim Southeast Asia, was also investigated by Nillan (2012). While these studies have generated important theoretical insights on the dynamic relationship between young people, the digital revolution, and social change in Indonesia, they still involve little discussion on the nature and the extent of the digital divide among the millions of young people in the country.

Conceptualising the digital divide among young adults in Indonesia

The literature on digital divide has evolved since it was first conceptualised in the early 1990s. The term digital divide was initially used to describe unequal access to computer and Internet among individuals, communities, and countries (Warschauer, 2010). Since its first inception, the scholarship on digital divide has moved away from the simplistic binary measures of individuals with or without access to ICT (Riggins & Dewan, 2005; Warschauer, 2007; Warschauer, 2010). For example, in analysing information inequality among American youth, Lenhart and Horrigan (2003) argue that the divide is better conceptualised as a spectrum with a continuum of both frequency and patterns of access and use of digital technology. This ranges from very frequent

users, through intermittent users, to those who have little access or have never used digital technologies. Along this line, there is a subsequent shift in focus in the literature: from one that heavily concentrates in examining whether people have physical access to ICT (*first order* digital divide), to another where the focus is examining whether people have the skills and knowledge to be effective users of digital information and technology (*second order or secondary* digital divide, and digital/knowledge inequalities) (Hargittai, 2002; Amoretti & Casula, 2009; Warschauer, 2010). Such shift in concentration is attributed to the so-called normalisation of the Internet, a gradual process whereby mobile phones and the Internet become more affordable, easier to access, and are adopted widely across societies (Norris, 2001; Amoretti & Casula, 2009).

Studies that measure how proxies of social divide underlie information inequalities are predominantly based on data from the US and other industrial countries (Hargittai, 2002; Cheong, 2007; Galácz & Smahel, 2007; Martin & Robinson, 2007). These studies identified common socio-demographic factors behind the first and second-order digital divide, such as, age, gender, income, education level, race and geographic location. However, the level of significance and magnitude of influence of each of the variable tend to vary across countries. For example, in the US in 2006 where normalisation of the Internet was already well under-way, the gender gap in Internet adoption was quite small at 2 per cent. But in Singapore, another country with relatively high Internet penetration, the gender gap was larger at 14 per cent (Galácz & Smahel, 2007).

Given the dearth of data-driven perspectives on the socio-demographic nature of the digital divide from developing nations, the objective of our paper is to examine the nature of first and second-order digital divide among young adults in Greater Jakarta – the most urbanised region in Indonesia. Our conceptual framework is built upon the theories on the social stratification and normalisation of technology adoption (Rodgers, 2003; Norris, 2001). Specifically, we test the proposition that the differentials in technology and new media adoption and use in our target population is essentially a reflection of the underlying social divide (Warschauer, 2001). Under this hypothesis, digital technologies have influenced the lives of many, but young adults in different segments of the society will be exposed to very different experiences depending on the resources at their command. To measure the extent of normalisation, we test whether

the size of the gender and education gap in mobile phone ownership and weekly internet use is smaller among respondents in younger age groups than those in their mid 30s.

DATA AND METHODS

Data

This paper stems from an ongoing project that examines numerous dimensions of transition to adulthood in Greater Jakarta, a metropolis of nearly 10 million people (Statistics Indonesia, 2011a). Face-to-face interviews were conducted with 3,006 men and women aged 20-34 living in Jakarta and in the adjacent cities of Bekasi and Tangerang. The interviews used a standardised questionnaire to collect a wide range of information on young adults' demographic and social characteristics, as well as information about their past and current education and work experience. In addition, information was also collected on attitudes and values, as well as use of Internet and other media.

To ensure a representative sample, the sampling procedure involved a two-stage cluster sample using the Probability Proportional to Size (PPS) method. Firstly, sixty Kelurahan (Urban Villages) were selected using PPS and then five neighbourhoods (Rukun Tetangga) were chosen within each selected Kelurahan by systematic random sampling. The 300 selected RT were then censured and a sample of eligible respondents (aged 20-34) was selected by random sampling from this census.

In the second stage of the survey, one year after the initial survey, a quota sample of survey respondents was randomly selected to participate in further in-depth interviews. This qualitative data collection was carried out under a primary objective to obtain further insights into the dynamics and life patterns of young adults. The underlying research themes in this data collection revolved around challenges relating to education, employment, social relations, marriage, sexuality, religion, politics, digital technologies, and migration that young adults face in their life experiences. The initial sample design involved randomly choosing 126 respondents representing each sex, three age groups, and three education categories. For this particular paper, we

analysed interview findings for the 38 male and 42 female respondents who were successfully interviewed.

Methods

We employ a range of methods to analyse digital divide (in terms of access) and second order digital inequalities. We use descriptive statistics to examine the broad patterns in mobile phone ownership, weekly access of Internet via mobile phone owners, access to Internet via any location/devices, frequency of Internet exposure among all Internet users, and Internet access points among our respondents.

We test the bivariate relationship between the socio-demographic groupings of respondents against 1) mobile phone ownership and 2) weekly Internet access via mobile phones. Chi-square statistics are employed to test the strength of the relationship between these measures and the socio-demographic correlates of age-group, gender, and educational attainment.

To follow, we measure the extent in which age, sex, education, and current activity predicts ICT adoption in a multivariate framework. Here, we use step-wise logistic regression models to examine the same dependent variables as in the bivariate exercise: 1) the likelihood of mobile phone ownership, 2) the likelihood of accessing the Internet at least once a week among mobile phone owners.

To delve deeper into the issue of second order digital divide, we model likelihood of accessing the Internet for a list of purposes. Here, we ran the regression to predict Internet use for a total eleven purposes. Out of the many potential uses of the Internet, the eleven reasons that we asked respondents were shortlisted to best represent the broader research themes of how young adults navigate their transition to work (for example using Internet in job search), their transition to marriage (dating, online social networks), and how religion affects their daily life. We acknowledge that there are other important potential uses of the Internet that we did not cover in our survey, such as online games, which is rather popular among students, downloading music, visiting pornographic sites, online shopping, online chatting such as Yahoo Messenger, and Skype just to name a few.

Finally, we use results from our multivariate analyses to graphically depict the variations in mobile phones ownership and weekly Internet access adoptions between

respondents in different socio-demographic segments. These two measures may be used as proxies for the first order digital divide. To gauge into the variations in the predicted probability of ICT adoption across socio-demographic groupings, we first add an interaction term between age and sex, and on a separate regression, another interaction term between age and education. Plotting our multivariate analyses in such a way helps to understand the extent to which how the competing theories of normalisation and stratification of ICT adoption may apply among young adults in Greater Jakarta.

RESULTS

Mobile Phones: Ownership and Access to the Internet

A relatively high percentage of respondents, 85 per cent, indicated that they owned a mobile phone. However, as shown in Table 1, there was considerable variation in phone ownership according to sex, age, and highest education level. Males were significantly more likely to own a mobile compared to females, and younger respondents were also more likely to own a phone compared to their older counterparts. Ownership of mobile phones was strongly related to education. For example, only 60 per cent of respondents educated only up to primary school owned a mobile phone, compared with 97 per cent of those with post-school qualifications. Although ownership of mobile phones increases with education, it is clear that mobile phone usage is widespread even among those in the lower socio-economic groups. Having a mobile phone is no longer a unique privilege of the urban middle class.

Surprisingly, the majority of mobile phone owners, two thirds, never accessed the Internet through their phones (Table 1). This low percentage could either be because their phones do not have Internet capabilities, or because they do not access Internet despite having 3G mobile phones. As the likelihood of Internet access via mobile phones increases with education level, it is plausible that young adults from lower socio-economic backgrounds tend to have the cheaper and more basic types of mobile phones with no Internet capabilities.

Table 1 Percentage of respondents who own a mobile phone and who access Internet via a mobile at least once week, by sex, age and highest level of education.

	Own a mobile phone	Access Internet through mobile at least once a week *(among mobile phone owners)*	Total
	%	*%*	*Freq.*
Sex	**		
Male	89	28	1,241
Female	82	26	1,746
Age group	**	**	
20-24	90	38	990
25-29	85	26	967
30-35	81	16	1,030
Highest education level	**	**	
Primary school or less	60	3	401
Junior high school	74	3	506
Senior high school	91	25	1,465
Certificate	97	48	259
Bachelors	98	58	354
Total	85	27	2,987

** Differences significant at p<0.05 using a chi-square test

Source: Greater Jakarta Transition to Adulthood Survey 2010

Table 2 describes mobile phone ownership and access to Internet via mobile phones in a multivariate framework. We utilise a step-wise logistic regression to model two outcomes. In Model 1, we estimate the likelihood of respondents owning a mobile phone. In Model 2, the dependent variable is the likelihood of Internet access via mobile phones among those respondents who owned a mobile phone. We run five sub-models for each outcome. For example, Model 1a examines how sex influences the likelihood of owning a mobile phone. In Model 1b, we add age into the regression along with sex. Unlike the bivariate analysis in Table 1, where age was grouped into three categories, here we use single years of age as an explanatory/control variable. In Model 1c, our three control variables are sex, age and highest completed education. In Model 1d, we control for sex, age, and current activity. In Model 1e, we estimate the effects of sex, age, education, and current activity on the likelihood of owning a mobile phone.

In the first three models (1a-1c) we find that men are significantly more likely to own a mobile phone. However, once we control for the current activity, sex is no longer

a significant predictor of mobile phone ownership. Such results could be explained by the correlation between sex and age with the activity variable. For example, the vast majority of those who are not in the labour force (90 per cent) are women.

Age is a significant predictor of both mobile phone ownership and Internet use via mobile. As expected, even after controlling for sex, education, and activity, younger people are more likely to own a mobile phone, and among mobile owners, are more likely to access the Internet via their mobile phone.

Both Model 1 (owning a mobile) and Model 2 (using Internet via mobile) show a strong education gradient in the odds of owning a mobile and of using it for accessing the Internet. In Model 1c, holding everything else constant, the odds of mobile phone ownership for a university graduate is almost twenty seven times greater than the odds for someone with primary school education or lower. Among those who own a mobile phone, the odds of accessing the Internet via mobile phones is forty nine times greater for university-educated respondents relative to those with primary school education.

Adding activity into the model slightly reduces the effects of highest education level on mobile phone ownership and use of Internet via mobile phones, but the effects of education remain significant. Not surprisingly, controlling for sex, age and highest education, students stand out as the group with the highest digital attachment as measured by these two outcomes.

Table 2. Predictors of owning a mobile phone and of using Internet via mobile phone (Odds ratios)

	1. Owning a mobile phone					2. Using Internet via mobile				
	Model 1a	Model 1b	Model 1c	Model 1d	Model 1e	Model 2a	Model 2b	Model 2c	Model 2d	Model 2e
Sex										
Male (ref)										
Female	0.56***	0.58***	0.69***	0.90	0.96	0.90	0.94	0.96	1.36***	1.21*
Age		0.93***	0.96***	0.95***	0.96***		0.89***	0.87***	0.92***	0.89***
Highest education level										
Primary school or below (ref)										
Junior secondary school			1.74***		1.83***			0.96		1.03
Senior secondary school			5.79***		5.67***			8.95***		7.93***
Certificate/Diploma			22.64***		20.14***			30.03***		26.27***
University degree			26.61***		21.92***			48.99***		39.25***
Activity status										
Employed (ref)										
Unemployed				0.53***	0.47***				0.76*	0.72*
Student				4.03**	2.70*				2.08***	1.97***
Not in the labour force				0.35***	0.47***				0.20***	0.31***
Baseline	8.33***	55.75***	7.16***	36.94***	6.24***	0.39***	7.09***	1.27	3.38***	0.78
N	2,987	2,987	2,985	2,987	2,985	2,543	2,543	2,541	2,543	2,541

Note: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Source: Greater Jakarta Transition to Adulthood Survey 2010

Internet: Exposure, Purpose of Use, And Access Points

In this section, we examine the exposure to Internet, access points, as well as the purpose and of Internet use among users in our sample. Our survey indicates that a large proportion of young adults remain disenfranchised from the Internet. About 50 per cent of male and 65 per cent of female respondents had never accessed the Internet.

At large, the variance in the exposure of young people in different segments of the society to the Internet technology is influenced by their age-group and education. Younger cohorts are more likely to be exposed to the Internet than the older ones. For example, among the youngest age group in our sample of 20-24, about 35 per cent accessed the Internet on a daily basis but a considerable 41 per cent admitted to never accessing it. In comparison, among the oldest age group of 30-34, the proportion of daily users is significantly lower (16%) while the corresponding figure for non-users is much higher (74%). As was the case with mobile phone ownership, education, a proxy of social class and upward mobility also acts as a strong predictor of Internet exposure. Among those who have only completed primary or junior high school, over 90 per cent never used the Internet. In contrast, 70 per cent of respondents with university degrees reported using the Internet on a daily basis. Our multivariate examination of how age, education and sex predict weekly Internet access will be discussed in the next section.

Aside from looking at the variance in exposure to Internet among young adults, we also briefly explored whether recent developments in mobile phone technology have altered the landscape of Internet access points, and ultimately reduced the demand for Internet cafes. Indeed, our survey indicates that the access point used by most people to access the Internet was their mobile phones, with around 28 per cent using this means at least at some time. Internet cafes were the second most popular access point, although the frequency of access here was typically less concentrated.

Among the Internet users in our survey, we examine how the Internet is used- that is for what purposes. Figure 2 shows the frequency of using the Internet for various purposes, by order of popularity. The three most popular uses were for online social networking, e-mail and to search for general information. Our findings are in line with

the aforementioned popularity of online social networks in Indonesia as reported by the media. A number of IT observers have attributed the popular acceptance of online social networks to several factors. These include a receptive social culture that highly ranks solidarity, mutual aid, sharing and openness (as opposed to privacy), the related tendency for young Indonesians to eagerly follow social trends, the rise of affordable mobile phone technology, and the technical features of online social networks such as Facebook that is free and user friendly (Masna, 2011; Safitri, 2011; Putra, 2011) .

Figure 2 Frequency of using the Internet for various purposes (among Internet users in the sample)
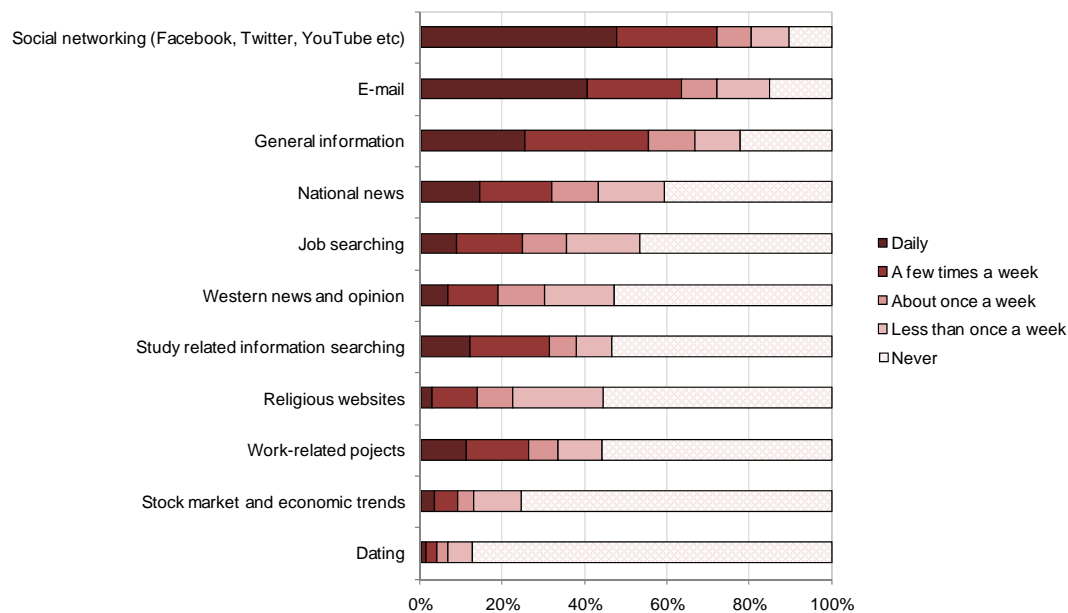
Source: Greater Jakarta Transition to Adulthood Survey 2010

In our subsequent analysis on the purpose of Internet use, the determinants of using the Internet for the various reasons as listed in Figure 2 were further explored using logistic regression (Table 3). In each of our models, the dependent variable was equal to 1 if the respondent indicated that he/she used the Internet for that specific purpose at least on a weekly basis, and zero otherwise. Note that nine out of the eleven models are significant at the 1 per cent level. Note that we limit our sample to Internet users.

The model predicting the effects of socio-demographic characteristics on using the Internet for dating purposes was significant at the 5 per cent level, while the model predicting use of Internet for Religious purposes was significant at the 10 per cent level. Due to the small number of individuals with junior high school, or below, education who

used the Internet, the education variable was regrouped into three categories so that the lowest category encompassed all those educated up to senior high school or below.

The results from Table 3 show that holding everything else constant, among Internet users there were little or only weak differences in the purpose of using the Internet among male and female respondents. As explained earlier however, this could be partly due to a gender effect being subsumed by the activity variable, but even bivariate analysis (not shown here) confirms the absence of a gender effect. The only case where a strong gender effect was evident was that women were less likely to look up general information.

In terms of age, the strongest age difference was that younger people were more likely to be using the Internet for social networking, job searching, and also for study related reasons.

Table 3. Logistic Regression of Purpose of Internet Use (among Internet users)

	E-mail	Social networks	Religious websites	Western news and opinion	National news	Job searching	Stock market, economic trends	Work-related projects	Study related	Other general information	Dating
Sex											
Male (ref)	--	--	--	--	--	--	--	--	--	--	--
Female	1.21	0.87	0.85	0.80*	0.82	0.92	0.70*	0.78*	0.92	0.73**	0.62*
Age	1.00	0.93***	1.01	1.02	1.02	0.93***	1.01	1.01	0.91***	0.98	0.98
Highest education level											
Senior high school or below (ref)	--	--	--	--	--	--	--	--	--	--	--
Certificate	2.49***	2.57***	1.22	2.28***	1.64***	1.79***	1.73**	1.37*	1.22	2.01***	1.21
University	6.74***	3.51***	1.62***	2.89***	2.95***	1.88***	3.23***	2.26***	1.99***	3.67***	0.57*
Activity status											
Employed (ref)	--	--	--	--	--	--	--	--	--	--	--
Unemployed	0.92	0.81	0.98	1.15	1.06	5.58***	1.79**	1.27	1.76***	1.13	1.27
Student	2.64***	3.96***	0.82	1.58**	1.29	0.64**	0.98	0.40***	18.82***	3.16***	1.17
Not in the labour force	0.47***	0.53***	1.14	0.73	0.63**	0.69	0.99	0.42***	0.93	0.65**	0.41
Constant	1.30	19.05***	0.21***	0.16***	0.34**	2.52**	0.08***	0.33**	4.08***	2.22*	0.17**
Number of observations	1,233	1,233	1,233	1,233	1,233	1,233	1,233	1,233	1,233	1,233	1,233
Overall model significance	<0.001	<0.001	0.053	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.027

Note: * p<0.1; ** p<0.05; *** p<0.01

Source: Greater Jakarta Transition to Adulthood Survey 2010

In terms of education, those with higher education were more likely to use the Internet for every purpose although there was only a weak relationship for looking at religious websites, for study-related reasons, and for seeking romance. One of the strongest effects was for email usage. The odds of someone with a university degree using the Internet for email were nearly seven times the odds of someone with senior high school education or below.

Another variable that was related to the purpose of Internet usage was a person's activity. Not surprisingly people who were unemployed were significantly more likely to use the Internet for job searching compared to others, and students were more likely to use the Internet for study related purposes. Relative to respondents in the rest of the activity categories, students also stood out as being significantly more likely to use the Internet for emails, for online social networks, and to seek other general information.

Visualising the digital divide

Are younger people across different segments of the society exhibiting signs of normalisation in ICT adoption? Indeed, our preceding multivariate analyses have established a negative relationship between age and ICT adoption. A graphical representation of these analyses gives a clearer depiction on the magnitude of the *first order* digital divide across age groups.

In Figure 3, we plot the predicted probability of owning a mobile phone based on a logistic regression with age, sex, education, and an interaction term between age and sex as control variables. The lines in the graph depict how the interaction between sex and age predicts mobile phone ownership among respondents of an average education qualification. Here, we can see that the gender gap in mobile phone ownership has somewhat disappeared among younger respondents. A 20 year old has statistically equal probability (about ninety per cent) of owning a mobile phone whether the individual is male or female. In contrast, the difference in the probability among a 34 year male and female is about 10 percentage points.

While the pattern of mobile phone ownership has seemingly undergone the process of normalisation among males and females in our younger respondents, the

patterns of inequalities of mobile phone ownership by education are showing a weaker convergence (Figure 4).   For a 20 year old, the probability of owning a mobile phone is reduced from almost certain if he/she possesses tertiary qualifications, to just 70 per cent if he/she did not complete junior high school.

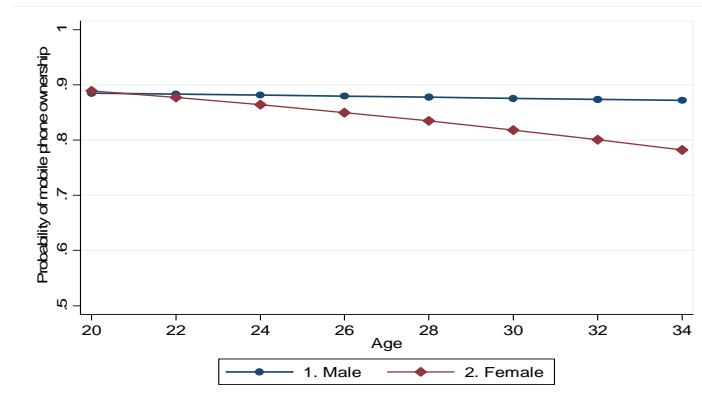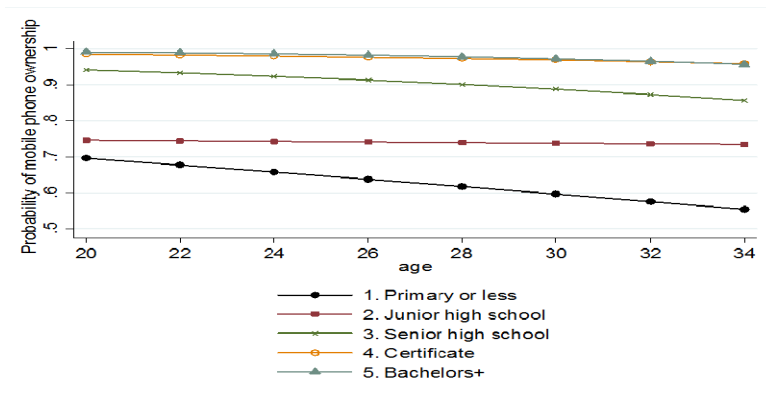**Figure 3 Predicted probability of mobile phone ownership: interaction between age and sex**

Figure 4 Predicted probability of mobile phone ownership: interaction between age and education

Source: Greater Jakarta Transition to Adulthood Survey 2010

The patterns towards normalisation evident in mobile phone ownership are quite distinct to the patterns of Internet adoption. We model the likelihood of weekly Internet assets via any location/device with interaction terms between age and sex (Figure 4) and between age and education (Figure 5). As in the case of mobile phone ownership, Figure 5 shows that the probability of internet access for a 20 year female is not significantly different to her male counterparts. However, as opposed to the relatively little variations in mobile phone ownership across men and women across the age span in Figure 2, there is a much sharper decline in the probability of weekly Internet access as age increases. On one hand, similar to the amount of the

gender gap in phone ownership, the gender gap in the probability of weekly internet access at age 34 is also around 10 percentage points. However, the predicted probabilities for weekly Internet access for both males and females in this oldest age category are much lower than their corresponding probabilities for mobile phone ownership.

The results of our analysis in Figure 6 are in line with the stratification thesis. Across age groups, the gap in weekly Internet access between respondents with senior high schools and tertiary qualifications are declining, but the gap between them and those of lower education attainment is persistently large. At around 10 per cent, the probability of someone with junior high school qualification or lower to access the Internet on a weekly basis is low and constant at any age. Considering that respondents with junior high school qualifications or lower, made up one-third of our sample, these statistics suggest that a large segment of young adults in Greater Jakarta remain disenfranchised from the information revolution associated with the Internet.

Figure 5 Predicted probability of using Internet at least once a week: interaction between age and sex
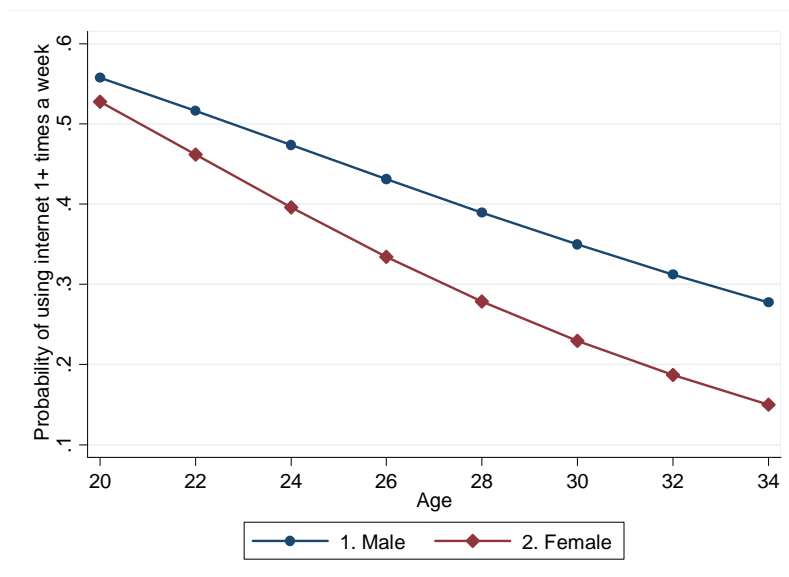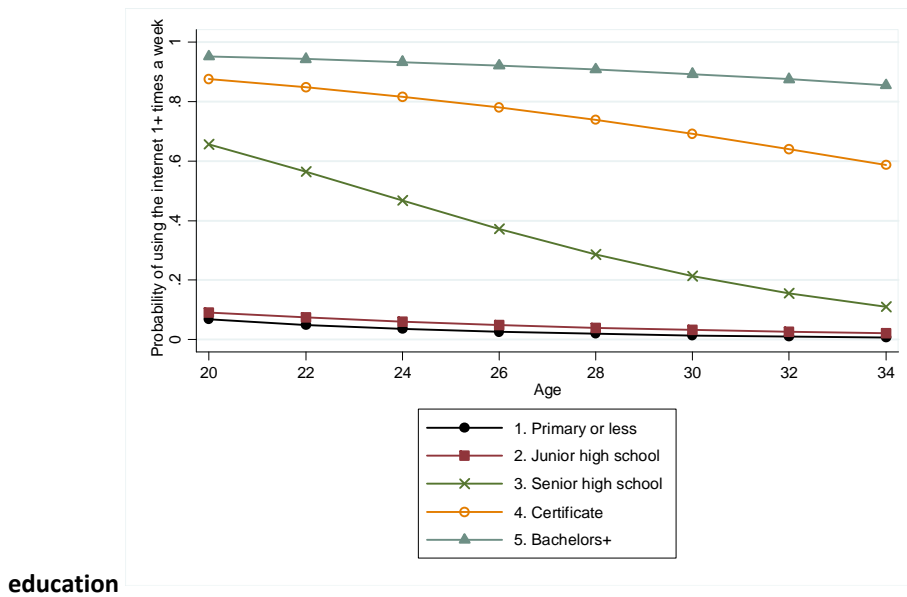
Figure 6 Predicted probability of using the Internet at least once a week: interaction between age and

education

Source: Greater Jakarta Transition to Adulthood Survey 2010

DISCUSSION

Our survey findings suggest that in spite of near universal ownership and use of mobile phones, 60 per cent of young adults have never accessed the Internet. Among those who did use the Internet, either through a mobile phone, an Internet café, or through an office or home computer, the majority, 85 per cent, used it very frequently, either daily or several times a week. Our findings also indicate that mobile phones were the most common access point for using the Internet among young adults. Among these users, the most common purpose was for social networking. The reasons were similar by sex or age, but education and employment were decisive factors for turning to the Internet for information. Just as education is a strong predictor of mobile phone ownership, higher levels of education are also associated with increasing likelihood of Internet usage.

From our in-depth interviews, we found cases supporting a picture often portrayed by the popular media: that of Indonesian young adults as avid and proficient Internet users. Yet, on the other end of the spectrum, we were also confronted by the stark contrast of respondents with very little knowledge of the Internet and its applications. We found that women in the 30-34 age bracket with lower education and economic status were the least likely to have used mobile

phones and Internet technology than their younger, better educated cohorts. But even respondents at the lowest end of use on the spectrum, are very aware of mobile phones and Internet technologies. Even when they hardly access these technologies personally, they are exposed through other people in their households and among their friends and neighbours:

> *No, don't mention computers, I have never even touched a mobile phone. Rather, I hardly touch one; I don't like pressing the buttons. My child is normally the one who presses the buttons. On Saturdays, when my husband is off work, he asks, 'do you want to make a phone call?'... (so he would make the phone call and) when it is connected, he gives the phone to me (Lasmini, 33, female, married, primary school graduate, housewife).*

> I now can use a mobile phone. Thanks to my child who taught me (how to use it)…Some people call me but not every day. I also make phone calls but very rarely. I don't call someone every day, only when I need to. My credit would be finished and I would rather use it (the money) to buy snacks for my poor child (Ijah, 32, married, junior high school graduate, housewife).

At the policy level, results from our study highlight the deficiencies in the current initiatives to combat information and knowledge inequalities in the country. For example, the major initiative of Meaningful Broadband Project reflects heavy technological determinism undertones (Habibie, 2012). But as illustrated by the above quotes, simply giving someone a mobile phone does not warrant that he or she will know how to use it effectively or will be able to afford to use it on a regular basis.

At the theoretical level, our findings from both the survey and in-depth interviews are in line with the literature suggesting that young, male, and highly educated individuals are the first in line when it comes to adopting new technologies (Rogers, 2003). Despite deriving a sample from Greater Jakarta, the most urbanised part of Indonesia, our study suggests that the digital and the ensuing information/knowledge divide remains prevalent even among the age groups who are most likely to be the early adopters of technology. On one hand, when measuring the gender gap of mobile phone ownership, our results are in support of the normalisation thesis. On the other hand, although there is weak convergence, the gaps in mobile phone ownership across young adults in different education segments remain considerable. Measuring the digital divide in terms of weekly access to the Internet further supports the social stratification thesis. Although the gender gap is smaller among younger respondents, large and persistent gaps in

Internet access continue to occur between people in the lower end of the education spectrum to those in the mid and higher range. In sum, education, rather than gender, plays a pivotal role in digital inequalities among young adults in our sample.

On this note, we reflect upon the limitations presented by our findings. First, due to the cross-sectional nature of our dataset, we cannot ascertain how much of the observed decline in digital inequalities is due to period or cohort effects. Second, while social inequalities affect the degree of access to and use of ICTs, the causality also goes the other way. As proposed by Mossberger et al. (2003), differential use of ICTs may exacerbate social inequalities and create new forms of disadvantage in society. The limitations of our datasets imply that we cannot measure such reverse causality. We advocate for future longitudinal research into digital inequalities in both urban and rural Indonesia.

CONCLUSION

Indonesia presents an interesting case study of how globalisation, the digital revolution, and rapid socio-political change are altering the transition to adulthood in unexpected ways. Through online social networks, young adults build new dimensions of social capital. Their use of the Internet, but perhaps more importantly the messaging capacities of inexpensive mobile phones allow them to build and maintain networks, efficiently conduct job searches, seek romance, and even carry out business to generate income through commercial transactions. Through opening up such gateways of information, the Internet facilitates their ability to navigate school-to-work transitions by tapping into study-related and employment-related information. By facilitating direct access to information, the Internet breaks down person-to-person cultural taboos. It is being used to disseminate information on topics such as reproductive and sexual health but it is also a tool for religious proselytising and the promotion of conservative moralities. By diminishing geographical boundaries and facilitating a culture of instant communication the Internet and mobile phones change the way young adults engage with the world, but there is no assurance that their engagement will be either liberating or healthy. All sorts of messages are crowding the virtual worlds of ideas, beliefs and connectivity. What seems incontrovertible though is that the young adults of today have a very different relation to information than did their parents, and it is equally clear that their

children will be exposed to technological innovations that are beyond our capacity to imagine. That can only mean that the impacts we see today will grow with time.

What is seen today as a socio-technological innovation seems to be well on track to live up to the concept of a 'digital revolution' remembering that the digital age is younger than the respondents in this survey since it is generally believed to have begun with the second millennium when computers became a ubiquitous part of production, commerce and communication across the globe. Young Indonesians are still coming to grips with the potential unleashed by such access to information and communication. Every day sees innovations in their personal and social behaviour as they tap the deep pools of information in their management of their learning, working, partnering and spiritual lives.

As evident through the results of our study, most important in this change, though, is the fact that a large proportion of young people are still disenfranchised from the socially important benefits that the technologies offer. Digital technologies have influenced the lives of many, but young people in different segments of the society will be exposed to very different experiences depending on the resources at their command. The challenge for the nation is how to open the door wider to allow all young adults to enter and participate in this new social space. By examining the socio-demographic drivers of the digital divide, our study advocates the calls for a more holistic approach in addressing information and knowledge inequalities (Warschauer, 2010; Hargittai, 2002). Simply ensuring that everyone in the country has the physical and technical access to ICT, through say PC and broadband provisions, without advocating for training and educational support at the same time, is likely to be a futile policy option.

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