UNDERSTANDING THE FACTORS AFFECTING DIGITAL INCLUSION AND EXCLUSION: A COMPARATIVE STUDY OF THE UNITED STATES AND INDONESIA

By

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ABSTRACT

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Research on the digital divide and digital inequality is often descriptive. The coexistence of a multitude of theoretical frameworks limits our knowledge to explain and/or predict the phenomenon. This dissertation tries to fill a gap in the literature about digital divides by proposing an integrative framework to explain digital outcomes in addition to access and uses. Informed by Giddens' structuration theory, the framework conceptualizes the digital divide as social practices that reflect the interplay of structures and human agency. This dissertation seeks to develop improved measures of digital outcomes and digital skills that can capture current digital practices. Furthermore, it aims to understand three issues that have not been explored in depth. First, it examines the relationships and interactions between social structures, human agency, access, internet use, and digital outcomes. Second, is asks which factors help individuals to improve their utilization of the opportunities offered by the Internet (digital inclusion) and which ones might contribute to falling behind relative to others (digital exclusion). A comparative research design, based on surveys in two countries, enables examining the extent to which models of the digital divide are supported in nations with differing economic, political, and cultural conditions. Three important findings emerge from the dissertation: First, interconnections were revealed between social structures, elements of agency, internet use, and internet outcomes. Second, the research shows that actors are an important factor to predict the second and third level of digital divides. Third, the structuration model of the digital divide can inform studies of digital inclusion and exclusion, and agency remains a key element in understanding digital divides. The effect of agency in influencing internet use and outcomes is moderated by access sustainability in the United States. In Indonesia, the moderation only occurs among users who earn low internet outcomes. However, more research will be necessary to refine the approach and

findings developed in the dissertation. In sum, this dissertation provides insights for the future direction of digital divides research and for decision-makers seeking to narrow digital divides.

Keywords: access divide, digital capital, digital divides, digital inclusion, digital exclusion, digital outcomes divide, digital skills divide, Giddens, Indonesia, internet use divide, structuration, structural equation modeling, the United States.

This dissertation is dedicated to my parents: Bapak, Ibu, Papa, and Mama
And also for the greatest gift from Allah: Elin, Delisha, and Feeza.
Without them, I would not be here and complete the degree
Thank you for always believing in me!

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I have completed another stage in my life and the future is coming!

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INTRODUCTION

Scholars studying the digital divide have examined the importance of the internet to society and whether it creates new inequalities that mimic other forms of social inequality. However, this field has encountered two main challenges that stifle its development. Firstly, Van Dijk (2005, 2020) insinuated that descriptive research has dominated the field and that it is also undertheorized. Consequently, empirical findings are often inconclusive and contradictory. A second problem is that scholars have employed diverse concepts to measure digital divides. Initially, the field focused on internet access of "haves" and "have nots" (NTIA, 1995, 1999; Katz & Aspden, 1997; Hoffman et al., 2000), often referred to as the "first-level" digital divide. The proliferation of computing devices and internet access has shifted focus to a "second-level" digital divide, in which internet use and skills were the focal point of the field (DiMaggio & Hargittai, 2001; Hargittai, 2002; DiMaggio et al., 2004). Concerning tangible results, the third level, that users can generate by using the internet, scholars developed a new measure of digital outcomes that identify types of capitals people yield from the online world (van Deursen & Helsper, 2018; Helsper et al., 2015).

Based on these reasons, this dissertation attempts to extend the literature by offering a framework that integrates previous studies and uses digital outcomes in new ways to better measure the digital divide, focusing on inclusion vs exclusion. Building on Giddens' (1984) Theory of Structuration, the dissertation conceptualizes digital divides as an outcome of social practices rather than the result of social conditions only. Reflecting on the theory, internet practices can be considered a product of users' capability and capacity to utilize the internet within the boundary of access availability and sustainability. Therefore, internet access as social structure can inhibit or promote agency to use the internet.

Moreover, employing comparative research, surveys in two countries enables the dissertation to examine to the extent models of the digital divide are supported in nations with differing economic, political, and cultural that aims: (1) it seeks to extend our knowledge about the digital divide and internet practices in middle-income countries, a group that has been less researched than high-income countries,

and (2) to have a better understanding of the patterns of digital exclusion and inclusion in two different national settings. In both cases, national patterns are studied and differences and similarities between countries are explored. The two countries chosen as case studies share similarities (e.g., both countries are political democracies; both nave an open media system) and differences (e.g., varying GDP per capita; different availability of telecommunication infrastructure). Treating two countries as distinct case studies, this dissertation aims to identify the contexts in which internet practice variations influence certain digital outcomes.

The following sections discuss the rationale, the theoretical framework, and the method and data collection strategy.

CHAPTER 1: RATIONALE

1.1. Background and motivation

Castells (1996) has argued that the internet is one of the critical backbones of contemporary society and a driver of economic and social development. Webster (2002) showed that, since the early 1990s, the introduction of user-friendly browsers has steadily increased the role of the internet in society. A World Bank report (Qiang et al., 2009) projected that a 10% increase in internet connectivity correlates with an additional 1.2% GDP growth in developing markets, thus harnessing the potential of the internet as important to improving economic well-being. In high-income countries, such as the United States, the use of the internet supports a digital economy sector, valued at 6.5% GDP in 2016. Its contribution is predicted to increase at an average of 5.6% annually (Barefoot et al., 2017). Some studies indicate that the internet did not close socioeconomic disparities but that it has widened social inequality (see example van Dijk, 2005; van Dijk, 2020; Witte & Mannon, 2010). The diversity and ambiguity of empirical findings imply that the question of whether the internet reinforces or reduces social inequality remains controversial. Detailed and nuanced studies on the digital divide are an attempt to better understand whether the internet sustains existing inequalities or creates new inequalities. Accordingly, social scientists have tried to build better theories that fit empirical data to elucidate the mechanisms underpinning digital inclusion and exclusion.

Despite the progress of research on the digital divide since the mid-1990s, when the term was first adopted, the phenomenon remained undertheorized and dominated by descriptive research (van Dijk, 2006; 2012), limiting the ability to explain and/or predict the impact of the internet on individuals and society. A gradual change of research focus from the first-level of access to the third-level of outcomes at an individual level has altered the terrain and the direction of the digital divide scholarship. Research on the digital divide initially focused on access (first level digital divide), interrogating a binary classification of users and non-users (Norris, 2000; Ragnedda & Muschert, 2013). Subsequently, it

researched inequalities of use and skills among internet users (second-level digital divide, see DiMaggio & Hargittai, 2001; Hargittai, 2001). The third level of the divide emerged in 2012 that explored tangible results of internet use, digital outcomes, and this new research avenue offers a new understanding of whether the benefits of the internet can translate into the offline world (van Deursen & Helsper, 2015, 2018; van Dijk, 2020). These first two levels of the digital divide mostly focused on identifying socio-demographic factors associated with digital exclusion (see example Katz & Aspden, 1996; Hoffman & Thomas, 1998; de Haan, 2003; Robinson et al., 2003; for a systematic review see Scheerder et al., 2017). Work in this area has oriented the digital divide field toward descriptive research It has also contributed to a fragmentation of the field and a lack of general insights that explain the impacts of the internet on society. Building broadly applicable theory is always a great challenge. Some scholars have attempted to propose overarching theories that were based on new ideas or they adopted or adapted existing theories. van Dijk (2012) offered a causal model of resources and appropriation that incorporated three levels of the divide to provide a general framework to study the digital divide. The model is promising, yet the full model has not been tested empirically, and it is guided by a materialist perspective that emphasizes internet practices as the outcome of social forces (van Dijk, 2020). This model seems to neglect the role of actors in shaping digital practices as the internet is an experiential technology (Eynon & Geniets, 2016; Livingstone & Helsper, 2007).

Several empirical studies show how disadvantaged individuals have appropriated and reinterpreted the use of the internet in ways that improved social welfare (Srinivasan & Burrell, 2013), facilitated the attainment of an academic degree (Müller, 2008; Robinson, 2008), promoted economic development (Aker & Mbiti, 2010), and even if it was used for leisure, users still produced creative contents to cater to social needs (Argo & Rangaswamy, 2013; Argo, 2012). The internet should not be considered a social structure that people act upon, but instead part of individuals' everyday activities, in which actors have the capacity to shape their practices (Appadurai, 2000; Argo, 2012). Gidden's (1984)

structuration theory approach offers a framework that can bridge the actors and structures distinction, and it understands internet use as a social practice that is an outcome of social structures and agency interplay. This approach can enhance the digital divide research that integrates social forces and human agency factors in shaping internet practices.

Extant literature on the digital divide has mostly examined developed regions and is therefore somewhat limited to understand the divide in other settings. Some comparative research has been conducted to understand the digital divide at a country-level across the globe (Norris, 2000; Ragnedda & Muschert, 2013), in Asia (Wong, 2002), in Africa (Evans, 2019), and in Europe (Kelly et al., 2017). The findings indicate an association between the digital divide and socio-economic inequalities. However, these studies focused on the first level of access divide and rarely examined the second (i.e., use and skills) and the third levels (i.e., digital outcomes). Research on the second and the third level of the digital divide will enhance the field, mainly to understand internet use and digital outcomes in developing regions. Conjectural evidence has shown social media is popular in developing countries. Data suggests that 37% of Facebook users are Asians (Internet World Stats, 2017) and three out of the top four Instagram users are coming from developing nations (Statista, 2020). Social media is not only used for leisurely purposes, but it has transformed from a social networking platform into "social commerce", an extension of the marketplace (Füller et al., 2009; Hajli, 2014). Small and medium entrepreneurs in developing regions have utilized social media as an online marketplace that can improve economic capital (see, for example, Ukpere et al., 2014; Syuhada & Gambetta, 2013; Odoom et al., 2017). Understanding digital exclusion using digital outcomes will enrich digital divide research as it gives a better measure of tangible results that can be generated through internet use. Aligned with this reason, a comparative study in two distinct countries that represent developing and developed regions will give insight into similarities and differences of contributing factors that affect digital exclusion and digital inclusion.

Building on the reasons above, this dissertation examines two research questions: First, what are the relationships and interactions between social structures, human agency, internet use, and digital outcomes. Second, which factors influence whether individuals can improve their utilization of the opportunities offered by the Internet (digital inclusion) or whether they lose relative to others (digital exclusion).

1.2. Digital divide and digital inequality

A U.S. National Telecommunications and Information Administration (NTIA) report entitled "Falling Through the Net" (NTIA, 1995) was one of the first attempts to identify an internet adoption gap. It suggested a divide between individuals who "have" and "have-not" access to the internet, often paralleling socio-economic status and spatial location. Being poor, a racial minority, old, less educated, and living in rural areas was associated with an individual being disenfranchised from the online world. Several studies have corroborated the findings of this report (for example DiMaggio et al., 2004; Norris, 2001; Van Dijk 2005; Warschauer, 2004; Bimber 2000; Rice and Katz, 2003; Zainudeen, et al., 2010).

The proliferation of the internet and digital technology have incrementally closed the access divide for the first and second generation of the internet[1] (Pew 2015; World Bank, 2019). Affordable computers, the variety of digital equipment, and the ubiquity of internet connection, either dial-up or broadband, were factors that drove the massive adoption of the internet across the globe. Moreover, mobile internet technology, such as smartphones, has enabled "leapfrogging" access technologies, mainly in developing countries where fixed internet access infrastructure is limited (Skuse et al., 2007; Watkins et al., 2012). However, the technology typically continues to evolve and next-generation internet, such as ultra-broadband connectivity and 5G mobile services, will likely create new inequalities of access and use.

[1] This study focuses on the first and second generation of the internet. First generation internet refers to the dial-up cable, first generation (1G) and 2G mobile internet. Second generation internet refers to broadband networks as well as 3G and 4G mobile internet. The upcoming generations of 5G wireless and gigabit networking are not included as these technologies are in their early stages of development and still evolving.

The pace of technological innovation is often ahead of the adoption of technology. Diffusion of innovation research (Rogers, 1995) suggests that the early adopters and early majority of the internet users are privileged cohorts who are typically young high-income males with strong technological orientation (see example Okazaki, 2006; Varma Citrin et al., 2000; Oh et al., 2003; Sin Tan et al., 2009). It is likely the future generation of the internet will create a new division based on similar demographic and socioeconomic characteristics. This dissertation will limit its focus on the current conditions of internet practices that are based on broadband internet and it has been adopted and been part of people's daily life.

An International Telecommunication Union (ITU) report (2019) shows a two-fold increase in global internet penetration in the past decade that half of the world population has used the internet, either using low-speed or high-speed connections. Although access is disproportionately distributed in that only 19% of individuals are online in the least developing countries, while 87% of people are connected to the internet in developed nations. Given the fact that access is improving in the developed regions, other issues have emerged whereby differences in individuals' usage and skills have created a new layer of digital inequality (DiMaggio et al., 2004; Hargittai, 2002; van Dijk, 2012; Robinson et al.,2015; van Deursen & van Dijk 2014; van Deursen & van Dijk 2013). Individuals utilize the internet to cater to their needs, such as interpersonal communication, information seeking, social connection, entertainment, learning, commerce, and surveillance (Papacharissi & Rubin, 2000; Flanagin & Metzer, 2001; Stafford et al., 2004; LaRose & Eastin, 2004; Cho et al., 2003; Robinson et al., 2015; Witte & Mannon, 2010; van Deursen & van Dijk 2013). Internet usage differences are not only predicted by users' motives and preferences but also by their socio-economic conditions (DiMaggio et al., 2004; Cho et al., 2003; Hsieh et al., 2008; van Deursen & van Dijk 2013). Users who are young, well educated, and affluent use the internet for productive activities, such as e-commerce, learning, and knowledge acquisition; while their counterparts engage in entertainment-driven activities (Cho et al., 2003; Witte & Mannon, 2010). Therefore, internet use

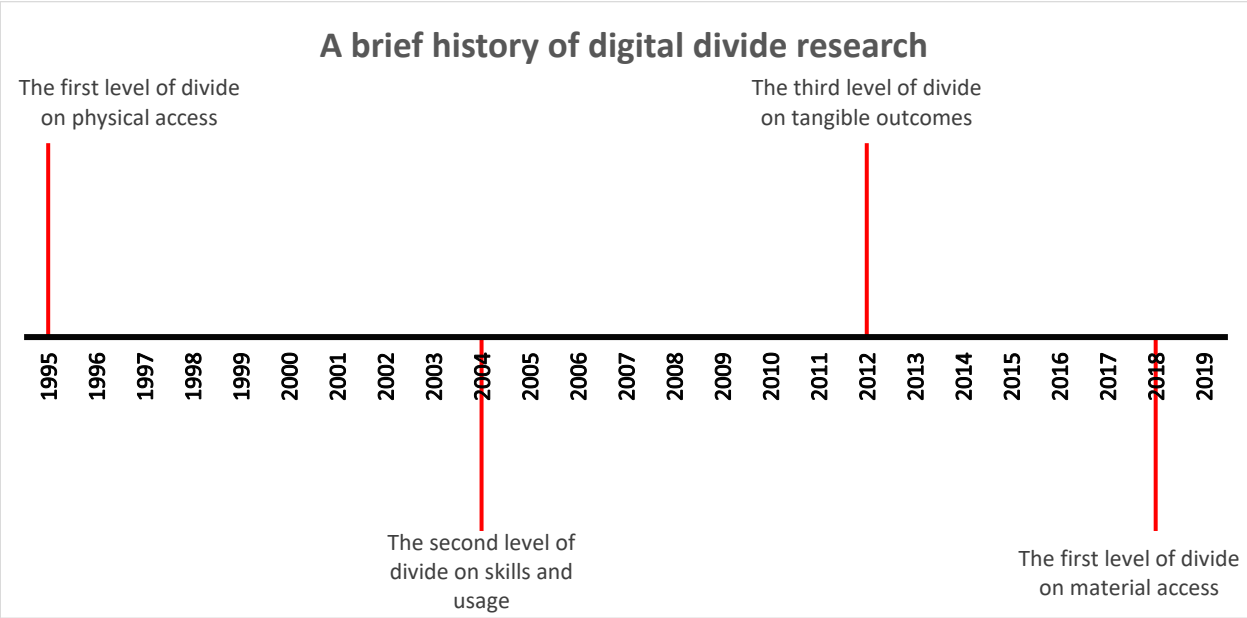
differences create a new inequality as productive users will accelerate and gain more benefits, socially and financially.

Another dimension of digital inequalities are variations in user skills. Users' proficiency is based on knowledge and competence which are required to operate computers, to navigate the internet, to seek and process information, and content creation (van Deursen & van Dijk, 2014; Helsper & Eynon, 2013; Mossberger et al., 2013; Warschauer, 2004). van Dijk's (2005) resources and appropriation model suggests that digital skills are an antecedent of internet usage; thus, levels of skills predict an individual's internet usage. Users need to acquire adequate skills to utilize and to navigate digital media. Lacking needed skills is detrimental, as users cannot benefit from the use of digital technology. For instance, digitally savvy persons can maximize the internet to serve their diverse needs (e.g., information, trade, shop, education) than others who have deficient digital skills.

The third layer of digital divide research focuses on digital outcomes which refer to the actual benefits people achieve in using the internet (e.g., van Deursen et al., 2014; Helsper et al., 2015). Previous research has measured potential internet outcomes using skills (e.g., DiMaggio et al., 2004), expected outcomes (e.g., Eastin & LaRose, 2000) or online activities (e.g., Livingstone & Helsper, 2007). Users who pursue capital-enhancing activities (e.g., commerce, education) may facilitate opportunities for positive outcomes (van Dijk, 2005; DiMaggio & Hargittai, 2001). However, it is a mere conjecture, and there is no clear understanding that usage differences manifest as different actual outcomes. For example, social networking is an advanced online activity (Helsper, 2008) but there is no assurance that it translates into improved social capital. In fact, social networking may reduce the number of offline friends and create a displacement effect that reduces the number of offline friends (Kraut et al., 1998). Recent research has used Bourdieu's theory of capital (1986) to operationalize tangible outcomes, specifically that the internet generates economic, social, cultural, and personal resources (Helsper et al., 2014). A person who accumulates resources from the online world arguably performs better in the real world. So, online capital

can translate into offline resources that subsequently benefit users in improving their socio-economic wellbeing. For instance, a person who used the internet to sell products in an online market can accrue financial benefits that will translate into offline economic advantages.

Figure 1. Timeline digital divide research (source: van Dijk, 2020 and van Deursen & van Dijk, 2018)



To sum up, digital divide research has evolved since the mid-1990s, and the research has also shifted focus (see Figure 1). Physical access was the primary focus in the first decade of the scholarship which differentiated “haves” from the “have-nots”. Over time, the research shifted focus to examine digital inequality of usage and skills among internet users. In 2012, the focus shifted again to digital outcomes, but a comprehensive measure of tangibles outcome was not developed until two years later (see the review in van Dijk, 2020). In 2018, the research focus returned to issues of access, investigating a new dimension of material access (van Deursen & van Dijk, 2018). The ongoing technological innovations and the unpredictability of their impacts on society create challenges for digital divide scholars and complicate the development of a theory or model that can capture the complexity of the relationships between humans and internet technology.

1.3. Research motivations

The socio-economic conditions of internet deployment and use have contributed to the emergence of access divisions (Norris, 2001; Van Dijk 2005; Warschauer, 2004; Bimber 2000; Rice and Katz, 2003; Zainudeen et al., 2010) and inequalities in usage and skills (Livingstone & Helsper, 2007; Hargittai, 2002; Hsieh et al., 2008), which amplify existing social inequality (Toyama, 2015; Agre, 2002). The internet triggers the "Matthew effect" (Merton, 1968) of accumulated advantage in which the gap in access, usage, and skills can further social inequalities, deepening the divide. However, a few studies have challenged the notion that 'the rich get richer' in which individuals at the bottom of the pyramid (BOP) could also benefit from digital technologies (see examples: Jensen 2007; Cho et al., 2003; Servon, 2008). One of the well-known studies of the use of mobile phones by fishery communities in Kerala, India, found that digital technology contributed to users' economic enhancement (Jensen, 2007). Jensen's study examines the role of information technology in improving market performance and community welfare by optimizing communication coordination in a developing region. Fishermen have used mobile phones to find information related to market demand and pricing, helping them find the best possible trades that eventually improve fishermen's economic wellbeing. Mobile phones caused a normalization effect in closing the economic gap for fishermen who lived under socio-economic constraints, in which the market was underperforming, and communication infrastructure was poor. However, these findings should be taken with a grain of salt. Digital technology is not a panacea to overcome social inequalities; people who adopt it do not automatically gain dividends.

Another study in Kerala from Srinivasan & Burrell (2013) contended Jensen's finding and it suggested mobile phones also sustained economic inequality. They replicated Jensen's study using a broader population of fishermen in northern and southern Kerala, and they discovered that the southerners had not accrued financial benefits as much as their northern neighbors, although both groups' mobile phone adoption rates were similar. The authors argued that political-economic conditions

have hindered such achievement; for instance, the southern fishermen valued a closed social network for conducting business, preferring small-scale fish vendors that hindered financial investment from outsiders (Srinivasan & Burrell, 2013). This seems to suggest the finding corroborates the amplification model that posits technologies "magnify existing social forces" (Toyama, 2015, p.30) in which fishermen in the north who are well-off, politically and socially, and have accumulated more advantages than their neighbors in the south. However, there is another important result from Srinivasan & Burrell (2013). They suggested the use of mobile phones in daily activities has an unintended positive consequence for social welfare that can compensate for economic disadvantages, mainly for fishermen who resided in the southern region. The role of digital technology in promoting human welfare is a complex process and multifaceted phenomenon. There are underlying factors involved in the process, and the fishermen have used mobile phones in a wide range of activities that encompass market-related and social livelihood activities. Thus, mobile phones do not only promote economic prosperity, but also social welfare, which improves trade relations, facilitates social connections, and offers protections during times of risk (Srinivasan & Burrell, 2013).

One critical insight from the two Kerala studies is that the determinism models (e.g., model, technology determinism) did not fully capture digital technology practices since fishermen appropriated and gave meaning to technology in their daily life. In other words, individuals are not docile under influential social forces, rather they have a capacity to transform social structures through practices. The fishermen in south Kerala reinterpreted the use of mobile phones to serve social welfare that was considered more valuable than economic benefit (Srinivasan & Burrell, 2013). Nonetheless, their actions were bounded by external conditions in which social connections and cultural values affected fishermen's use of mobile phones. Fishermen in north Kerala utilized feature phones to contact all available buyers for finding the best price of the day to maximize profit, while the southerners who prioritized physical and mental wellbeing only contacted the auctioneer or the church tax collector to sell their catch (Srinivasan

& Burrell, 2013). Therefore, the use of digital technology is a reflexive endeavor that depends on social conditions and individuals' interpretation of social milieu. This aligns with Gidden's structuration theory (1984) that offers the notion of the "duality of structure" in which the social system is a product and a condition of human practices. Building on these reasons, this dissertation will be guided by Giddens' theory to analyze structure and agency without giving predilection to either (Giddens, 1992; Whittington, 2010; Jones & Karsten, 2008). In the context of technology adoption, the interaction between structural properties (e.g., types of access, platforms modality) and human agency (e.g., motivation, skills) can provide an alternative framework to study the digital divide and inequality.

Building on key insights from structuration theory, this research aims to offer a new perspective on the multifaceted digital divides that goes beyond prior work. First, existing studies mostly adopted a deterministic model of linear relationships, such as technological determinism (Jensen, 2007) and the amplification model (Toyama, 2015). Gidden's structuration theory offers a recursive mechanism in which corresponding factors interact and are interdependent. Second, the internet is an experiential technology (Eynon & Geniets, 2016; Livingstone & Helsper, 2007) that is appropriated in daily life. Thus, internet practice is not the only effect of sociotechnical structures nor users' subjective interpretation. Rather, it is a reflexive endeavor in which actors consciously use the internet within the boundary of social structures and technological features. Structuration identifies the interplay between structures and agency that mold social practices, and this theory moves beyond two dominant approaches of objectivism and subjectivism. Third, Srinivasan & Burrell's (2013) study suggested the outcome of smartphone use was diverse among people who lived in the same area due to variations in structural and personal conditions. Structuration theory provides a framework to understand the process of digital inclusion and digital exclusion in which corresponding factors (i.e., technological resources and actors' characteristics) create diverse interactions.

In addition to offering a framework to study the digital divide, this dissertation is also concerned about digital skills and digital outcomes as part of digital divide research. Extant literature lacks consistency in measuring skills related to digital technology, and several terms are used interchangeably, such as "internet skills" (Scheerder, et al., 2017), “computer skills” (Eastin & LaRose 2000), “information skills” (van Dijk & van Deursen, 2014), and “digital skills” (van Dijk, 2012). Computer skills and information skills refer to a specific set of competencies, either related to the machine or information finding and processing, respectively. Digital skills and internet skills overlap, and both encompass broader proficiencies of medium-related (e.g., operating computers and software, navigating in the online world) and content-related skills (e.g., searching and filtering information, creating content). The main issue in measuring skills is the ever-changing nature of internet technology and the rapid development of new software and hardware. These developments create a new stratum of complexity that challenges the adequacy of the internet skills’ measures. Furthermore, the pervasiveness of the internet in everyday life has required users to be cognizant of privacy and security matters that are part of online safety practices (Anderson & Agarwal, 2010; LaRose et al., 2008; Miyazaki & Fernandez, 2001). The risk of data breaches and stolen passwords are pertinent issues that make users vulnerable and improving safety skills is a substantial resource to protect them from fraud. Therefore, safety skills are as valuable as medium-related and content-related skills for general internet users.

The recent research on the digital divide has emphasized digital outcomes as the third-level divide to evaluate effects of internet adoption and use. Digital outcomes are a better concept than previous measures of access, skills, and use to identify digital inclusion and digital exclusion. This new construct enables researchers to better understand individuals who are advantaged and disadvantaged and what types of benefits users can accrue from using the internet. Informed by Bourdieu’s theory of capital, this dissertation intends to identify dimensions of digital outcomes that can quantify economic and non-economic capital that users can gain from internet use (e.g., Scheerder et al., 2017; van Deursen & van

Dijk, 2015; van Deursen & Helsper, 2015). The concept of capital has been used by social scientists to identify social inequality at an individual level (Bourdieu, 1984) and individuals who use the internet can attain social resources (van Dijk, 2005). Therefore, by measuring capital accumulated from the internet, this study can identify digital inequality among users.

Using digital outcomes as a dependent variable will enhance digital divide research, which also aligns with the input-process-output model in which the outcomes are at the end of the access, skills, and use sequence. A comprehensive measure of internet outcomes is needed, and it should capture important dimensions related to the variety of benefits that people accrue through the internet. A few studies have treated digital outcomes as a dependent variable in that it is a function of access, skills, and usage, such as political participation (Chan 2014, 2016; Dimitrova et al., 2014), economic improvement (DiMaggio & Bonikowski, 2008; Stork et al., 2013; Jensen 2007;), educational attainment (Calvani et al., 2012; Castao-Muoz et al., 2015), personal gains (Choi & DiNitto, 2013; Pénard et al., 2013), and general outcomes (Scheerder, van Deursen, & van Dijk, 2017; van Deursen & Helsper, 2015; van Dijk & van Deursen, 2014). Nonetheless, most of these studies focus on a specific outcome related to the field of study. For instance, educational research emphasizes the role of digitization on academic attainment, and political scientists investigate the effectiveness of online platforms in supporting political participation. Although a narrow focus is beneficial within a study domain, general measures are expected to provide basic knowledge about the impact of technology on people. Proliferation of internet access and use has significantly altered society's social, political, and economic conditions (Castells, 1996). However, researchers have only recently begun to study digital outcomes (van Dijk, 2020). An individual who uses the internet can gain economic, educational, and personal benefits simultaneously regardless of the types of access, use, and skills that they have. Similarly, social media can provide opportunities for users to engage with diverse information related to education, commerce, politics, and social life. Therefore, a general measure of digital outcomes is preferable as it captures the gains achieved by individuals in diverse fields of social life.

Comparative research will benefit the field of the digital divide study as little is known about the digital divide and internet practices at an individual level in developing nations. Most research on the digital divide has taken place in developed regions which are more established socio-economically than middle-income countries. Nonetheless, some research indicates that digital technology users in the developing regions can still optimize the dividends (Ukpere et al., 2014; Sin Tan et al., 2009; Watkins, et al., 2012). Comparing internet practices in two distinct social settings will elucidate whether digital inclusion and exclusion processes are affected by similar corresponding factors. If the pattern is alike, it may help the field to build a general framework of the digital divide. However, the findings may also suggest divergence models in which each country generates a unique pattern that corroborates previous research of a multifaceted model of digital divides (van Deursen & van Dijk, 2015; van Deursen et al., 2017). It would suggest internet practices and the divides are context-dependent and be associated with economic, social, and cultural condition differences.

Therefore, this dissertation seeks to contribute to three issues that, if addressed successfully, will enhance research on digital divides among internet users. First, it offers a conceptual framework that integrates existing heterogeneous approaches. By proposing such a framework, this study seeks to enhance knowledge in understanding digital inclusion and digital exclusion processes. In these processes, internet use is not merely a consequence of social structures, rather than it is social practices that are influenced by an interplay between sociotechnical structures and users' agency. Extant literature on the digital divide and digital inequalities typically assumes a linear relationship between external structures, internet access, and internet use. In contrast, the dissertation offers a recursive process and interdependence between corresponding factors that lead to digital inclusion and exclusion. Incorporating new measures of digital skills and outcomes can enhance the study's internal validity and keep it better aligned with current practices of using the internet and digital technology. Second, this dissertation aims to improve measures of digital outcomes and digital skills that reflect the characteristics

of the current internet development. Lastly, the dissertation is a comparative study that researches the digital divide in two countries that represent developed and developing regions. It is an attempt to examine whether digital exclusion and inclusion follow a similar process in both countries. The research findings may inform whether generic patterns emerge across the two countries.

CHAPTER 2: LITERATURE REVIEW

2.1. A digital divide framework

Digital divide research emerged in the mid-1990s which concerned internet access inequality that followed demographics and socioeconomic lines. In the United States, male, white, high income, and highly educated individuals correlated with regular internet access, while the marginalized groups were disadvantaged. Moreover, the 1995 NTIA report focused on the issue of internet access and social exclusion and put the term "digital divide" on the agenda of public, scholarly, and political debates. While the discussion started in the United States the issue quickly spread across Europe and subsequently became a global issue (van Dijk, 2005). Conceptually, the digital divide is akin to the knowledge gap (Tichenor et al., 1970; Donohue et al., 1970) in which communication technology is seen to deepen inequality in favor of a privileged group. It is assumed that the internet is a mass media that facilitates a new means of communication that can augment the existing knowledge gap. Individuals with internet access are likely well informed and they perform better in society in comparison to their disadvantaged counterparts (van Dijk, 2005; de Haan, 2003; van Dijk, 2012; Peter & Valkenburg, 2006). In addition, digitization has brought a new era of the information economy which relies on knowledge-based productivity (Castells, 1996); laborers who can exploit information and communication technologies (ICT) will have the biggest advantages. It seems ICT offers a solution to ameliorate social inequality by providing ubiquitous access to people.

The United States government has launched several policies to improve internet adoption, such as the National Broadband Plan (NBP) to improve broadband access, mainly in rural and remote areas, and the E-rate program intended to guarantee affordable telecommunication access for eligible schools and libraries in the United States. (Mossberger et al., 2013). In 2017, the internet reached 87% of

Americans and 34% of the population were broadband subscribers (World Bank, 2019). As physical access uptake has improved, it is expected that the internet will close social inequality (NTIA, 1999).

Subsequently, examining a disparity between individuals who have and who do not have physical access to the computer and the internet are part of scholarly endeavors (Norris, 2001; Warschauer, 2002; van Dijk, 2005). The first generation of digital divide research identified a correlation between sociodemographic factors (e.g., gender, age, income, and education) and access gaps (see examples: Warschauer, 2004; Bimber, 2000; Mossberger et al, 2013; Servon, 2008). The internet created a new layer of social stratum: "have" and "have-not" categories in which the latter represents the existing marginal groups of females, older generations, and low socioeconomic status groups (Hargittai 2003; van Dijk 2005, 2006; de Haan, 2003). These groups who were socially disadvantaged have had less opportunity to access the internet, thus it has made them more vulnerable and they have likely benefited less from digitization. In other words, individuals who are not connected to the internet will not benefit from the rise of the digital economy.

Moving beyond the assessment of demographic factors, some scholars explored a possible connection between individuals' psychological state, such as self-efficacy (Livingstone & Helsper, 2010), attitude (Venkatesh et al., 2003), and interest (Helsper & Reisdorf, 2017), and the access gap. These results indicated psychological dimensions were also contributing factors to the divide. Individuals who lack self-confidence, have negative attitudes, and are disinterested in technologies resided on the wrong side of the divide, being disadvantaged. Even though research on the first level of the digital divide has identified external constraints and individual internal factors that contributed to the access gap, there is no framework combining sociodemographic and psychological elements to explain the access divide.

As internet adoption improves, it supposedly bridges digital divides and reduces social inequity. Yet, a new divide emerged that went beyond physical access of "haves" and "have-nots" (DiMaggio & Hargittai, 2001; Hargittai, 2001). Two case studies in the United States (Witte & Mannon 2010) and in the

Netherlands (de Haan, 2003) have shifted attention toward a new terrain of digital deprivation among internet users in countries that have good internet infrastructure. They have raised a concern that giving access did not close the gap, but instead created another layer of division. A new term was proposed, "digital inequality" that encapsulated more nuanced dimensions of mental, skill, and usage access (DiMaggio & Hargittai, 2001; Hargittai 2001; DiMaggio et al., 2004; van Dijk & Hacker, 2003; van Dijk, 2005).

Moreover, Helsper and Reisdorf's (2017) comparative study, comparing the U.K. and Sweden exhibited that a lack of interest has driven "ex-use" and "non-use", called "digital underclass", to entirely avoid the internet irrespective of the availability and affordability of physical access. Other studies in the Netherlands demonstrate that skills and usage deficiencies have widened the gap, even among individuals who have used the internet frequently (van Dijk 2005; van Deursen & van Dijk 2013). Use and skill discrepancies have informed a much deeper understanding of a new divide that emerged among internet users. Usage and skill discrepancies have created a second layer of the digital divide among internet users and more people were excluded from the benefits. The digital inequality research has extended the field and it revealed individuals who had internet access did not automatically benefit from it. This new stream of the digital divide research brought a new perspective that there were more layers of digital schism and expanding internet access did not decrease social inequality (Hargittai, 2001; DiMaggio & Hargittai, 2001; Cho et al., 2003).

Providing internet physical and material access to non-users might close the first divide but for the continuance of internet use they need positive attitudes toward technology (Oh et al., 2003), financial capacity (Rice & Katz, 2003), and skills (van Dijk, 2005). In addition, extant literature also suggested other factors of demographics and socioeconomics affecting individual use, skills, and motivation (DiMaggio & Hargittai, 2001; Hargittai 2001; DiMaggio et al., 2004; van Dijk & Hacker, 2003). Policymakers need to propose a more comprehensive initiative and it should address the root cause of digital inequalities.

The advancement of internet technology in terms of bandwidth capacity (e.g., from dial-up to broadband) and devices (e.g., internet of things) has changed the contour of the digital divide research, therefore adjustment has to be made to keep up with recent developments. For example, the concept of access has changed over time to keep up with the current state of digital technology. The following subsections discuss the change of access, usage, and skill constructs over time.

2.1.1. Access

Early research on the digital divide has examined access related to computer ownership and internet dial-up connectivity, and questions that were posed, asked about households' computer and modem ownership (NTIA, 1995). Subsequently, the United States government proposed the information superhighway plan and devised several programs. The most noteworthy policies (NTIA 1999; Mossberger et al. 2012) (1) promulgated advanced information services to the people of America (The National Information Infrastructure (NII)), (2) provided broadband internet access to everyone's home (Universal Services Fund (USF)), and (3) served public internet connections at schools and libraries (E-rate program). These initiatives closed the physical access gap for the "have nots" and as evidence, there was an increase of 40.9% internet penetration in one year and 1 in 4 American households had a computer with internet access (NTIA, 1999). Therefore, research on the digital divide was adaptive to external changes by redefining the access construct that incorporated new measures of access points, types of internet service providers (ISPs), and types of computer devices (NTIA, 1999). Various access points at home, at work, at schools, and in public areas have improved individuals' accessibility in getting internet connections that they have not experienced before.

At present, access must be operationalized in a fine-grained measure that can capture important elements related to materials and physical connectivity in addition to the previous measures. Van Deursen and van Dijk (2018) identified physical and material access to the internet as two main constructs of access. Physical access refers to having or not having an internet connection, while material access is the

means needed to continuously use the internet and it includes devices, peripherals, and other related materials (van Deursen & van Dijk, 2018). Notwithstanding, this dissertation extends the definition of access beyond having or not having internet connections as the study focus is to understand physical divides among internet users. Physical access refers to the infrastructure availability to connect to the internet that encompasses types of connectivity (i.e., wired and wireless); connection quality (i.e., dial-up vs broadband, 3G vs 4G LTE); and access location, such as at home, at work, at school, and in public spaces. The Use of these subdimensions can identify physical access divides among existing users.

The ever-changing digital technologies have encouraged users to be adaptive to technology characteristics or otherwise they would fall behind. For instance, personal computers, laptops, smartphones, and the internet of things (IoT) are mediums that can facilitate connectivity to the online world. Individuals who have opportunities to use a variety of devices are more likely to accelerate and reap more digital dividends. To measure material access, the study adopts existing measures of device opportunity, device diversity, peripheral diversity, and device maintenance (van Deursen and van Dijk, 2018). Moreover, the hyper-connectivity state has made access to a multifaceted construct and this research examines access with various measures that capture important elements of physical and material access with their related subdimensions.

2.1.2. Use

The concept of use was adopted from the communication theory of uses and gratifications (U&G) when individuals use media strategically to serve social & psychological needs (Katz et al., 1974; Rubin, 2002; Ruggiero, 2000). It is assumed individuals are active users with motivation and they use media to achieve intended goals, therefore they select media to satisfy their needs. Research on traditional media use has identified four categories of acquiring news and information, diversion, social utility, and personal identity (Rubin, 2002). Moreover, the rise of digitization has changed the way people interact with the media since

computer-mediated technologies expand human capacity to interact and to communicate (Papacharissi & Rubin, 2000).

Table 1. Internet use (source: Blank & Groselj, 2014, 2015)

	Category	**Activities**
1	Entertainment	Watching: movies, tv, videos
2	Commerce	Ordering food, selling and buying goods
3	Information seeking	Searching for facts, definitions, and topics of interest
4	Socializing	Checking social network sites (SNS), using instant messenger, and participating in a chat room
5	Email	Attaching files/videos, sending an email using a list, and checking email
6	Blog	writing, reading, and maintaining a website
7	Production	uploading video and other creatives materials, and receiving jokes or humorous contents
8	Classic media	Searching for information about sports, local events, and news
9	School-work	Online distance learning, seeking jobs, and getting information for school
10	Political activity	Following political news, expressing political opinions, and reposting other's political comments
11	Vice	Gambling and accessing adult sites
12	COVID19 health info	Seeking information about COVID19 through various media channel

Digital technology extends the capacity of media use that encompasses interpersonal utility, pastimes, information seeking, convenience, and entertainment (Papacharissi & Rubin, 2000). Additional factors of pastimes and convenience are related to the digital media characteristics of synchronous communication, multimodality, and time control. Laptops and smartphones are an aggregation of previous media in that they can function as mass and personal media simultaneously. These media facilitate audiovisual elements that can be used to access news from mainstream mass media or to make a video call for interpersonal communication. Moreover, digital media tends to promote individuality in which ownership and control are in the hands of an individual. Laptops and smartphones are personal goods and are rarely shared with others, especially in developed countries. Digital media enhances human communicative capacity, yet at the same time becomes private media. Another study examined internet

use within the digital divide context and has developed a parsimonious model of internet use that has similar explanatory power and the research identified three patterns of usage: surveillance, consumption, social interaction uses (Cho et al., 2003). This simpler measure incorporated a new trend of e-commerce and social media activities to keep up with the contemporary conditions of internet usage.

The Internet offers abundant possible activities (Ruggiero, 2000) and extant U&G research has shown differences in measuring internet use (see example Papacharissi & Rubin, 2000; Cho et al., 2003;). This has created challenges for researchers because developing an inclusive survey instrument that captures the diversity of internet activities is expensive and time-consuming. Even if it can be achieved, too much variation creates a new obstacle to identify internet use patterns. Moreover, Blank & Groselj (2014) synthesized previous measures and offered a coherent scale using meaningful categories that yield a high internal consistency. They suggested eleven patterns of activities (Table 1) that reflect a breadth of use of the internet from social media and entertainment to capital enhancing actions of commerce and works (Blank & Groselj, 2014, 2015). The measure delineates meaningful activities that are seamlessly integrated into users' daily lives and represent the current use of the internet.

2.1.3. Skills

The appropriation model of digital technology emphasizes that the daily use of digital media is a function of digital skills (van Dijk, 2005). Therefore, digital skills are a critical element in understanding the adoption of digital technology (van Dijk & van Deursen, 2014; Scheerder, van Deursen & van Dijk, 2017; van Deursen & Helsper, 2015). Users need to acquire adequate skills to utilize and to navigate digital media. Lacking necessary skills is detrimental, as users cannot benefit from the use of digital technology. For instance, digitally savvy persons can maximize internet usage catering to diverse needs (e.g., information, trade, shop, education) more than others who are deficient.

The concept of skills is related to literacy and competence, in which they measure a person's capability to perform well in society (van Dijk & van Deursen, 2011). Essentially, literacy is a more

restrictive concept as it only examines persons' capability to read, understand, and to write information in their language (Bawden, 2008). Digital media offers complex activities beyond reading and writing, for instance operating computer and browser engines, traversing websites, and sifting through vast amounts of information. Therefore, digital skills encompass diverse activities related to the Use of information and communication technologies.

The extant literature on digital skills shows the concept was measured in diverse conceptual frameworks (for example Scheerder, van Deursen, & van Dijk, 2017; Eastin & LaRose, 2000; van Deursen & van Dijk, 2011; van Dijk, 2012). The dissertation classifies digital skills into three dimensions of medium-related skills, content-related skills, and safety-related skills (Table 2) that keep up with the recent development of digital technology. The addition of safety and security skills is compelling, and they should be acquired by internet users with the increasing concern about privacy, data breaches, and identity theft. Moreover, each dimension has consisted of sub-dimensions. The following subsection discusses further these dimensions and sub-dimensions.

2.1.3.1. Medium-related skills

2.1.3.1.1. Operational skills

These skills relate to the basic use of hardware (i.e., PC, laptop, tablet, smartphone) and are called “button knowledge” (van Dijk & van Deursen, 2014; Eastin & LaRose, 2000). Users need to acquire knowledge of how to operate diverse digital hardware, such as turning on and shutting down hardware, opening software or applications, writing and editing text, connecting to Wifi or Bluetooth, and saving and tracking folders and files. These basic skills are needed and without them, users will not be able to utilize the internet.

Operational skills are not taken for granted; users learn through formal and informal educational settings. The contemporary formal education system has incorporated operational skills into the curriculum and students encounter digital technology starting in their elementary school. Therefore, this

new generation yields better button knowledge than older generations. The ubiquity of information and communication technologies has made operational skills as important as reading and writing skills in traditional media.

Table 2. Digital skills (adopted from van Deursen & van Dijk 2010 and van Deursen et al. 2016 with one additional dimension of safety-related skills)

Dimension	Subdimension	Operationalization
medium-related	operational skills	basic skills to operate hardware and software (button knowledge)
	Information navigation skills	the skills to navigate and to orient in the online world
content-related	social skills	the actions via which users try to fulfill their information needs for instance to search, to select, and to evaluate information
	creative skills	create attractive and creative content using the assembling of pictures, music, and videos
safety-related[a]	safety skills	an individual ability to avoid risk and danger when accessing unsafe websites and spam emails
	security skills	the ability of users in using additional applications (e.g., password, third-party application) to protect computers, personal identities, bank accounts, and other valuable information that were stored in digital media

Note: [a] additional dimension proposed to enhance the external validity of digital skills

2.1.3.1.2. Information navigation skills

These skills are a compound of formal and informal skills from previous research (van Deursen et al., 2016). The information refers to specific skills associated with users' capability to search, select, and evaluate information derived from the internet (Scheerder, van Deursen, & van Dijk, 2017; van Deursen & van Dijk, 2009). Information skills are basically required to overcome information overload that makes users more efficiently scrutinize valuable content from reputable sources. The current issue of fake news and misinformation can be hindered if people have a high level of information skills. Individuals should be careful in investigating information and their sources, mainly in assessing information validity and accuracy. Having incorrect knowledge can distort individuals' perception of reality that leads to disorientation and social conflict. However, these skills are not taught in formal education yet; people learn from their own experiences or by observing other behaviors.

Moreover, the formal skills were intended to help users in navigating the world wide web space that can be challenging and frustrating simultaneously when users are not equipped with formal skills. These skills are essentially dedicated to browsing and navigating in the hypermedia context (van Dijk & van Deursen, 2011; van Deursen & van Dijk, 2010). Every website has its characteristics in terms of menus, features, and hyperlinks, and users need to understand the function of these characteristics. Many elderly and illiterate people may get lost in the internet milieu. Each website offers a unique structure that creates a steep learning curve for people who do not have the necessary knowledge. For instance: the Facebook interface is essentially different from Twitter, even though they both are social media platforms. Both also cater to distinct services and purposes. Digital natives may not have difficulty in dealing with social media, but it can be a distinct experience for the elder generation.

2.1.3.2. Content-related skills

2.1.3.2.1. Social skills

Digital media enable instant and synchronous communication between users and more platforms dedicated to serving social connections, such as social media. These skills focus on decoding and encoding message processes in interactive platforms of the internet (van Dijk, 2012; van Dijk & van Deursen, 2011). These skills help users to construct, understand, and exchange meaning in digital media. Users must be able to use email, to compose profiles on social media, to be part of online communities that require special communication skills, and to eloquently chat with others using SMS or other similar applications.

2.1.3.2.2. Creative skills

More content-generated platforms were available in digital environments, such as YouTube, Reddit, Quora, and social media. Thus, content creation skills have become increasingly crucial for users to reap the benefits of the internet. The rise of web 2.0 has changed the contour of the internet landscape and audiovisual has become the main content distributed in it. Users create attractive and creative content by assembling pictures, music, and videos (van Dijk & van Deursen, 2014). No less than two decades ago,

these contents were rendered by professional artists or producers, but digital media have diminished the boundary and more professional applications are available on the digital market to help ordinary users in producing valuable content.

Moreover, users can use digital media to serve their goals and interests, personally and professionally, to improve their position in society (van Deursen & van Dijk, 2009; van Dijk & van Deursen 2011). These skills allow users to reap financial and social benefits using computers and the internet. For instance, YouTube enables users to create a personal channel and to publish content in exchange for economic capital. Good content attracts users and YouTube sells them to advertisers. YouTube compensates producers based on the number of views. Monetization of content is the recent business model in digital media, and users can take advantage of it.

2.1.3.3. Safety-related skills

2.1.3.3.1. Safety skills

Initially, the concepts of safety and security were under the same concept (Scheerder, van Deursen, & van Dijk, 2017), but this study identifies that these serve two distinct purposes. Safety skills relate to the personal ability to avoid risk and danger in accessing unsafe websites and spam emails. Users need to adapt and to improve safety skills as criminal activities are pervasive in the digital world. For instance, when users click a spam email, it may transmit viruses that can harm computer software, or can create a backdoor to steal valuable information from an internal hard drive. Elderly people are prone to spam and phishing emails that can cost them dearly.

2.1.3.3.2. Security skills

These skills refer to the ability of users to utilize additional tools (e.g. passwords, third-party applications) to protect computers, personal identities, bank accounts, and other valuable information that are stored in digital media. Using two-factor authentication should be the norm for internet users shortly. Security threats become increasingly dominant features in the digital world and employing third-party applications

or changing passwords regularly can reduce the risk of being victims. However, security skills are the least priority for most internet users. People often look down on the importance of being secure and protected and more efforts need to be done, such as authenticating logins for every account.

2.1.4 Digital Outcomes

Examining the significance of the internet for the offline world is the current focus of the digital divide scholarship. Extant studies have examined the impact of the internet on the economic contribution (e.g., Hinson & Sorensen, 2006), political participation (e.g., Mossberger et al., 2007), educational attainment (e.g., Selwyn et al., 2001), and employment opportunity (e.g., Feldman & Klaas, 2002). These studies are informative, but they are often tied to one specific research area and therefore complicate a comprehensive assessment of offline results across multiple fields of activities. Understanding digital outcomes as diverse activities do not merely benefit research on digital inequalities but also renders practical dimensions to enhance public knowledge. For instance, if the broader measure can identify social consequences and economic impacts of the internet, policymakers can use the knowledge to enact new policies or to instigate social intervention programs that can improve people's socio-economic wellbeing. Eventually, the use of the internet is supposedly promoting capital-enhancing practices (Zillien & Hargittai, 2009) that can lead to the attainment of digital dividends (World Bank, 2016).

A growing interest in digital outcomes has enriched the study of the digital divide and a few studies have been conducted that construct internet outcomes as digital capital (Stern et al., 2009) and multi-domains of fields (van Deursen et al., 2014; van Deursen & Helsper, 2015). The former explores a possibility that the internet improves "opportunity structure" for regular users who are proficient, while the latter identifies activities related to the economic, social, political, institutional, and cultural fields. Digital capital is a multidimensional concept, and it can be gained through diverse online activities in various fields. Business organizations identify digital capital as knowledge and information currency in the new economy (Tapscott et al, 2000; Liu & Chen, 2009). In communities, it represents resources and

benefits that can be derived with the use of digital technologies (Roberts & Townsend, 2015), and on an individual level, the capital manifests in persons' disposition, which consists of knowledge and competencies, toward digital technology that is acquired through formal studying, informal learning, and socialization (Seale, 2013; Seale et al., 2015). Even though digital capital is a multi-level construct, essentially it is resources that can be drawn using digital technologies. Digital capital is information-based commodities that are translated into knowledge and a set of competencies.

The concepts of digital capital and the multi-domains complement rather than substituting for each other. The latter provides granular measures that can capture important dimensions of internet-related results. Although the term "digital capital" is more appealing as a concept, there is a downside, the Use of digital capital may overlap with other forms of capital such as economic, social, cultural, and symbolic. For instance, when an individual develops extensive networks using social media platforms, do these resources belong to offline social capital or online digital capital? This digital capital issue challenges new endeavors in digital divide research and this dissertation explores the possibility of developing a measure that fits with the current condition of internet development.

2.1.4.1. Measuring digital outcomes

Extant research on digital outcomes are mostly drawn from two distinct theoretical lenses of uses and gratifications (U&G) (Katz et al., 1974) and the theory of capital (Bourdieu, 1986). The former is part of media effects research in the communication field that media outcomes are the gratifications achieved after users engage with media (Rubin, 2002; Stafford et al., 2004), while Bourdieu's capital is a sociological perspective that identifies internet outcomes related to activity fields (van Dijk, 2005; Helsper et al., 2015).

U&G postulates individuals' media usage is driven by social and psychological drivers, such as needs and motivations and they actively utilize media that can maximize gratification obtained (Katz et al., 1974; Rubin, 2002). These also suggest media compete with other sources that can satisfy human internal drivers (Katz et al., 1974; Grant & Lutz, 2018). U&G emphasizes the autonomy of human beings

as active actors that can select and use media to satisfy needs or other internal motives. In the context of digital divide studies, U&G does not directly measure behavioral outcomes but has used proxy measures of attitudinal outcomes (Papacharissi & Rubin, 2000) and expected outcomes (Eastin & LaRose, 2000). The former explicates attitude as internet affinity and internet satisfaction, while the expected outcomes define users' expectations as activities related to social, informational, and entertainment factors. Pertaining to resources and appropriation theory, digital outcomes are a direct result of behavior, thus those proxy measures cannot provide an accurate measure of tangible outcomes (van Dijk, 2005, 2020).

Sociology provides an alternative model to investigate tangible outcomes and Bourdieu's theory offers a framework that can elucidate factual internet results in an actor's daily life (e.g., Helsper, 2008; van Deursen et al., 2014). The concept of capital can identify an individual's resources and they can be measured empirically. Bourdieu (1986) coined economic, social, and cultural capital to investigate resources that are possessed by a person. Economic capital represents monetary resources owned by a person, such as property, and money. Cultural capital manifests in knowledge, skills, education, and taste of arts that can increase an individual's social status. An individual who occupies a strategic position in a social network yields social capital, that can be used to extract other capitals. For instance, a person, we will name them "C", bridges the gap between two businessmen who otherwise would remain unconnected. "C" then has the advantage to facilitate business between two interested parties in exchange for economic capital. Therefore, social capital is a source of power that comes from social connections, and a person who yields it can use the capital for their benefits (Sallaz & Zavisca, 2007). Another important concept from Bourdieu (1986) is the field and it is a social world whereby actors are embedded and participate, and it guides their actions. An actor can occupy diverse fields in everyday life and each field represents a particular type of activity, such as politics, economics, and education. Capital and field are interlinked in which an actor can exercise capital to gain benefits in each field of activity.

In the study of the digital divide, Helsper's (2012) corresponding fields model hypothesizes: (1) there is a connection between digital and social exclusion, and (2) individuals who utilize the internet will be highly likely to reap positive outcomes, such as, a person who uses the internet for economic activities is predicted to financially benefit from the internet (van Deursen & Helsper, 2018). Moreover, a few studies have tested connections between types of internet capital and field of action, such as economic, social, cultural, political, institutional, and personal (van Deursen & Helsper, 2018; van Deursen, et al., 2017; van Deursen et al., 2014; Helsper et al., 2015). Each field is associated with a particular resource, so an actor who possesses economic capital could potentially perform better in the field of economic activity than his counterparts who lacked monetary resources.

An initial attempt to understand the extent to which the internet facilitates a certain outcome was conducted by Van Deursen et al. (2014) and the findings indicated that the internet exacerbates social inequality within each domain of internet outcomes. Age, gender, education, income, and social status are potential drivers of the division regardless of the outcome field. Another important remark is the study has tried to incorporate two competing theories of U&G and Bourdieu's model by employing internet use measures to identify fields of outcomes. However, the authors suggested that internet outcomes only offer "a preliminary exploration of beneficial internet use" (p. 19) and they should be treated as a starting point. Future research should be able to develop valid and reliable measures of digital outcomes in each domain.

This dissertation adopts tangible measures to capture factual outcomes and Bourdieu's (1986) capital classification is used to develop important dimensions related to economic, cultural, and social domains. Arguably, digital outcomes are not merely a product of external forces, as an individual can exercise agency (Giddens, 1984) to gain new chances independent of economic, social, and cultural backgrounds (Helsper et al., 2015). A few studies identified negative outcomes of the internet (i.e., excessive use, cybercrime and abuse, and loss of security and privacy) that creates backlash to internet

users (e.g., van Dijk, 2020; Blank & Lutz, 2018), yet it is a new avenue of digital divide research and will not serve the purpose of this dissertation. The dissertation focuses on positive outcomes that will be used to examine digital inclusion and exclusion and by specifying advantages and disadvantages outcomes, the research can identify under which conditions these results are more likely to occur.

Table 3. Digital outcomes (adapted from Helsper, et al., 2015 and van Deursen et al., 2017)

Dimension	Definition
Economic	the attainment of financial other economic materials after using the internet
Social	capitals that are yielded through interpersonal interactions, civic engagement, and strong attitudes toward community
Cultural	the achievement of personal disposition, cultural goods, and educational qualification
Personal	psychological and physical benefits in using the internet

The following section discusses four tangible outcomes related to the field of economic, social, capital, and personal (see Table 3). Each domain is conceptually distinct, but they are interrelated because power is distributed unevenly to advantage certain groups (Helsper, 2012).

2.1.4.1.1. Economic outcomes

The economic resources delineate monetary possession by individuals and are often measured by income, occupation, and other financial indicators. Information that is available on the internet can be converted into economic capital and people who can exploit online information have an upper hand to economically perform better. For instance, individuals can utilize the internet to find a better job opportunity by looking at information through job search websites (DiMaggio & Bonikowski, 2008). Moreover, LinkedIn, a social media platform, is used to showcase an individual's professional portfolio that can attract employers and recruiters who are looking for job candidates. The internet does not only enable individuals to find a better job but also to create a personal brand that can be used to attract employers and to develop professional networks. These advantages can be translated into monetary resources and individuals who use the internet will obtain more generous performance rewards (Helsper et al., 2015).

The internet promotes electronic commerce, and it has been adopted across the globe (Lynch et al., 2001). Online shopping has gained traction and more people involved in electronic transactions either as buyers or sellers (Hoffman et al., 2000). The digital business benefits individuals through convenience, providing better pricing, trading goods for mutual benefits, and offering a wide variety of merchandise (e.g., Bakos, 1998; Forsythe et al., 2006; Sarkar, 2011). Users can derive economic rewards from online shopping either as a seller to make profits from trading or as a buyer who can save money by finding a better price.

The rise of sharing economy has enabled broader economic activities: "recirculation of goods, increased utilization of durable assets, exchange of services, and sharing of productive assets" (Schor, 2016). Individuals can work as private contractors, such as working as uber drivers, or procuring rooms for Airbnb customers; The internet provides a platform for individuals to generate income as independent contractors working on their own time and under their terms. The sharing economy has become a global phenomenon and it opens new opportunities for people to generate income using the internet.

2.1.4.1.2. Social outcomes

Social resources are embedded in society and they enable individuals to access knowledge and support from others. Therefore, individuals need to develop social relationships and to be part of broader social networks. Social resources manifest in social capital (Bourdieu, 1986; Coleman 1988) which generates immaterial resources and can be exchanged for another type of capital. A person who occupies a strategic position (e.g., structural hole) in a social network may generate economic capital by bridging two unconnected clusters. For example, a middleman who connects a buyer and a seller can yield monetary benefits if the transaction is successful.

In the digital milieu, there are three forms of social capital that individuals can draw from (Quan Haase et al, 2002; Wellman, 2002): (1) network capital represents the number of interpersonal interactions a person develops, (2) civic engagement represents individual's participation in public spaces,

such as voluntary organizations and political activities, and (3) sense of community represents when a person has a strong attitude toward the community. A platform such as Facebook facilitates bonding and bridging connections (Ellison, et al., 2007) which can help an individual form network capital and a sense of community. Bonding connections suggest strong interpersonal linkages that help to maintain existing relationships with families and friends, while bridging connections suggest weak ties between acquaintances (Granovetter, 1973). The internet also facilitates Meso-level interactions between individuals and organizations or between organizations. A person can use the internet for civic or political purposes to engage with governments or public institutions. The internet can make one's voice be heard by larger audiences, and potentially audiences with more direct power within the political spheres, and indirectly affect political processes, such as using an electronic petition to oppose a government policy initiative (Margetts et al., 2014).

Operationalizations of social field outcomes can serve interpersonal and institutional purposes. Both generate social resources, and they can be used in private and civic spheres. Individuals may invest in interpersonal linkages within the private sphere, for social support and shared common interests with family and groups that they located in the private sphere. The internet also enables institutional outcomes when a person uses social ties to participate in civic organizations and political activities.

2.1.4.1.3. Cultural outcomes

This field's outcomes correspond to cultural capital and the notion of socialization and acculturation (Helsper 2012, van Deursen et al., 2014). Cultural capital manifests in three forms of personal dispositions, cultural goods, and educational qualifications (Bourdieu, 1986). The process of socialization and acculturation are important because they facilitate the sharing of social scripts (e.g., norms, knowledge, behavior). Bourdieu (1986) posited cultural capital embeds in social classes and an individual who belongs to a certain class follows its scripts to guide his aptitudes, behaviors, and aspirations. Gender, ethnicity, religion, and socio-economic status define a person's cultural capital.

Arguably, cultural capital is a means to reproduce and to maintain social classes in society by defining cultural competence one has as hereditary rather than an achievement. Children born into a well off family have a higher likelihood to succeed in the future because they inherit cultural goods, attend the best school, and yield high education qualifications (Bourdieu, 1984). These advantages create an uneven playing field that hinders social class mobilization.

The concept of cultural participation can be very wide and encompasses a diverse definition of knowledge, skills, and artifacts. This study limits the definition of cultural outcomes by focusing on the aspect of education. This is relevant to other internet outcomes discussed here: economic, social, and personal. The Use of the internet for educational purposes is prominent at present at all levels (i.e., elementary, secondary, and tertiary). Digital technologies can support online learning for people in the marginal group to attain a qualification degree (e.g., Müller, 2008; Robinson, 2008). This research examines the extent to which the internet supports educational access for diverse purposes such as college courses or professional training.

2.1.4.1.4. Personal outcomes

Personal outcomes reflect a person's self-interest motives to maximize benefits independent of their economic, cultural, and social backgrounds. Bourdieu (1986) discussed human capital as one of the primary fields to examine social inequality only in connection with other capitals and this capital is a by-product of cultural capital in which the attainment of educational qualification determines the degree of human capital (Bourdieu, 1986). For instance, a person who earns a graduate degree will perform better in a society economically and socially. It is assumed a person with a higher education degree has good aptitudes and better psychological well-being that enable them to take advantage of new opportunities (Helsper, 2012). This argument aligns with Gidden's (1984) agency model in which a person has an innate capacity to transform external milieu in their preference under certain social contexts and he can take advantage of new opportunities that enhance their future well-being.

This dissertation understands personal capital following Helsper's explication of micro-level resources that refer to a person's aptitude, psychological, and physical well-being (Helsper, 2012; Helsper et al., 2015). Therefore, personal outcomes represent internal elements of human beings and psychologists have examined skills, a person's disposition, and health measures to assess how well individuals are equipped to perform well in their daily lives. This study explores the extent to which internet usage can generate personal outcomes, such as to promulgate physical and mental well-being and to some degree leisure outcomes. Physical well-being relates to a person's health condition that enables them to participate in society or the laborious activities, while psychological well-being refers to self-actualization in which a person is satisfied with themself. The mental component often incorporates the leisure aspect of relaxing activities, such as attending a concert, which can improve happiness that leads to psychological well-being.

2.1.4.2. Differences in internet outcomes: inclusion and exclusion

Existing research has shown that internet outcomes depend on various factors, including demographics, socioeconomics, skills, uses, and psychological factors (e.g., Scheerder et al, 2017; Blank & Lutz, 2018; DiMaggio & Hargittai, 2001; Eastin & LaRose, 2000; Helsper & Eynon, 2013; Livingstone & Helsper, 2007; Mossberger et al., 2013). People with high socioeconomic status are very likely to use the internet for productive purposes and to gain economic advantages compared to less privileged counterparts (DiMaggio et al, 2004). Users are digitally included when they can benefit from the internet to gain resources or capital and ones who cannot fail to acquire positive results are most likely digitally excluded.

Research findings have shown that inclusion and exclusion processes follow social structures and people who are on the fringe, socially and financially, are more likely to be omitted from digital dividends (van Deursen et al., 2017; Helsper et al., 2014). However, a few results also suggest less privileged groups: in the rural area (Roberts & Townsend, 2005), women (Müller, 2008), the poor (Skuse et al., 2007), and the older (Choi & DiNitto, 2013) have taken advantages from digitization. These positive and negative

findings suggest that inclusion and exclusion processes are a complex and dynamic phenomenon (van Dijk & Hacker 2003; van Deursen et al., 2017) and the internet is not seen simply as a resource to be acted upon but it is also a consequence of human behaviors (Appadurai, 2000). The digital divide represents the structuration process rather than the reflection of social inequality.

Employing digital outcomes as a dependent variable to measure inclusion and exclusion processes will provide a more robust measure and they serve the current state of the digital divide research, rather than using internet access, digital skills, and internet use constructs. Furthermore, the dissertation will utilize the outcomes measure to create an index that can be used to categorize individuals who are included and are excluded from digital benefits. Users who generate aggregate scores above a certain threshold (e.g., 50^{th} percentile) fall into an inclusion group and their counterparts reside on the wrong side of the digital divide, of being disadvantaged. This index can also be treated as a continuum scale to create clusters of users (e.g., high, medium, and low) that go beyond a binary classification of an "included" and "excluded" bracket. However, this dissertation only attempted to create a binary category of inclusion and exclusion. By understanding corresponding factors that affect the formation of these clusters, the study will provide valuable information to the digital divide research. It will provide a context under which conditions social structures and individuals' capacity influence diverse strata of digital outcomes. For instance, people on the margin, such as the elderly, who had positive attitudes toward the internet have also received more benefits than younger users (Blank & Lutz, 2018). Empirical findings offer a more nuanced reality than is suggested by existing theoretical frameworks.

2.2. Psychological elements of the digital divide research

An individual has the capacity and the autonomy to direct actions to make thing happens in their lives and the psychological component found to influence a person's internet use (see examples: LaRose et al., 2003; Venkatesh et al., 2003; Eastin & LaRose, 2000; Helsper & Reisdorf, 2017; Livingstone & Helsper, 2010;). Adopting a psychological perspective into digital divide study can explore human's internal

elements that affect the use of digital technology. Social Cognitive Theory (Bandura, 1986) and the Theory of Reasoned Action (Fishbein & Ajzen, 2010; Ajzen & Fishbein, 1980) are two primary theories that have been used to understand individual behaviors. Using these theories, a few research on the digital divide has identified the role of attitudes (Venkatesh et al., 2003; Hsieh et al., 2008) and self-efficacy (LaRose & Eastin, 2004; Eastin & LaRose, 2000) that could hinder or promote individuals' engagement with the internet.

The use of psychological constructs in the study will explain the role of human agency to make a difference in their social practices. Variations of psychological drivers can differentiate internet use, regardless of users' socioeconomic milieu. For instance, a lack of self-confidence has decreased the amount of online time (LaRose et al., 2003) and a positive attitude has affected internet use intention continuance (Hsieh et al., 2008). This suggests actions that individuals take depend on human agency, whiles the agency capacity (to make a change) is associated with psychological attributes. Yet, this assumption does not reject the influence of social structures on a user's behavior. Social structures provide rules and resources that enable or restrict individual action; thus, their social activities integrate macro elements of social structures and micro levels of individual capabilities (Giddens, 1991; Oppong, 2014).

Self-efficacy and attitude will be adopted in this dissertation as the constructs of human agency that can explain the capacity of an agent to make a difference. Self-efficacy refers to an agent's belief to organize and to execute a particular action required to achieve a goal (Eastin & LaRose, 2000) and it is an important determinant of behavior under Social Cognitive Theory to study internet use (LaRose et al., 2003). Another component is the attitude that was drawn from Theory of Reasoned Action that explains an individual's beliefs and evaluation of the behavior of interest (Fishbein and Ajzen, 2010) and this construct has been used in diverse theoretical frameworks to study the adoption and the Use of technology (see review Venkatesh, et al., 2003).

2.3. A structuration model of the digital divide

While the digital divide framework is used to explicate core variables and their relationships in previous studies, structuration theory serves as a theoretical foundation for the study[2]. Structuration theory supports this dissertation as (1) it is a macro-level theory of society that can be used with other theories (Giddens, 1984; Oppong, 2014), (2) the theory offers a new perspective of a recursive model to understand relationships between corresponding factors from previous digital divide researches, (3) the structuration recognizes internet use as an experiential practice that reflects socio-technical conditions and humans' capacity to use technology features (Eynon & Geniets, 2016; Livingstone & Helsper, 2007), thus the practice is a reflexive endeavor to appropriate technology in everyday lives, and (4) the theory can illuminate a process whereby corresponding factors lead to digital inclusion and exclusion.

Furthermore, structuration theory delineates a relationship between ICT structure and users to examine the interdependent influence between ICT structural properties and individuals' behavior in which change resulted from the implementation of technology (Whittington, 2010, Heinze & Hu, 2005). This suggests the digital divide is the outcome of a dynamic process to the extent that core components are interplayed and rendered intended and unintended consequences that can instigate change. This perspective can provide new insight into the digital divide research which indicates a connection between social inequality and digital deprivation may be more complex than has been suggested by extant research. The internet is an experiential technology (e.g., Eynon & Geniets, 2016; Livingstone & Helsper, 2007) and its use is appropriated within a context (van Dijk, 2005). A person can creatively utilize the technology in a particular way that serves him best. Initially, fishermen in Kerala have used mobile phones only for economic purposes but subsequently, mobile communications have been utilized to accommodate social livelihood (Srinivasan & Burrell, 2013). Structuration theory provides a framework to

[2] Albeit structuration is considered a grand theory in social science without offering propositions or hypotheses, it can still be employed as a theoretical lens to examine social process (see review Poole and DeSanctis, 2004)

understand the interplay between digital divide core elements and how these interactions shape the outcomes of digital inclusion and exclusion.

2.3.1. Structuration theory

The book *Constitution of Society* (Giddens, 1984) introduced the concept of structuration as a new paradigm with the intent to bridge the divide between objectivism and subjectivism in sociology. Essentially the theory rejects the notion that society and social practices are individuals' subjective interpretations, instead, they are a product of social structures. Society is produced and reproduced in a dynamic interaction between the inertia of social institutions and the capacity of actors to enact change (Dixon et al, 2014). Giddens (1984) emphasized (1) human practice is a reflection of the interplay between actors' agency and structures that eventually produces and reproduces social conditions, and this notion bridges the epistemological fissure between two traditional paradigms, subjectivism and objectivism, and (2) structural properties of social systems only instantiate as forms of social actions that are reiterated continuously across time and space. These suggest the social system should be perceived as a continuity of structures and agency interplay that is situated in temporality and spatiality. Humans are not the producers of social structures, rather, they only use these structures in their actions to produce and reproduce social conditions. Thus, structures are the medium and outcomes of structuration; they exist because agents employ them (Poole and DeSanctis, 2004). Structure and agency are two pivotal elements in structuration; Giddens explicated these concepts using diverse theoretical perspectives.

2.3.1.1. Agency

Subjectivism is an anthropocentric view of the world and asserts that society only exists through the interpretation of human agents. Social structure is cognitive perception and is meaningless beyond the social constructions that individuals create. Giddens (1984) objects to this view and argues social structures are recursive involving human agency and structural properties interactions, the structuration. Agency reflects humans' capacities to influence the production and reproduction of social structure and

Giddens (1984) extrapolates individuals' actions and cognitive elements as the main components of human agency.

Actors and structures interactions are manifested in humans' actions which can directly influence the outcome of structuration. Structures can be produced or reproduced by human behaviors, but it also suggests structures can enable and constrain one's actions. The structuration proposes a stratification model of reflexive monitoring, rationalization, and motivation to understand individuals' actions in everyday life (Giddens, 1984). Reflexive monitoring is a continuing feature of daily actions and it is expended to surveil internal and external surroundings (Giddens, 1984). For instance, individuals are not merely assessing their daily conduct, but they are also expecting others to do the same. Meanwhile, rationalization provides a reasoning basis to justify the intentionality of daily actions and the competency of the agents (Giddens, 1984). These two components are contingent upon the reflexive actions of individuals to orient themselves with surroundings, while the rationalization emphasizes the autonomy to assert self-interest. Unlike reflexive monitoring and rationalizations, which are embedded in daily activities, motivation is an ad-hoc action that refers to the potential for activities carried out by individuals (Giddens, 1984). Motivation is circumstantial and daily actions are not driven by self-motivation, but routine actions. These three stratification components should be perceived as a process, rather than, a state and their interactions can be linear or cyclical. For instance, motivation can instigate rationalization which provides a theoretical understanding to conduct reflexive monitoring or an agent can employ rationalization and reflexive monitoring simultaneously when he poses a difficult situation without prior precedence. Moreover, human agents always have the capability of taking actions that disturb existing structures (Jones and Karsten, 2008). The stratification provides a lens to understand human actions that can affect the transformation of social structures.

Another important feature in Giddens's agency is the knowledge that an actor should know how society works and their involvement in it (Jones and Karsten, 2008). Thus, actors have assumed a

knowledgeable state of mind that by virtue has the capacity to continuously reflect on their practices and to orient in society. The structuration proposes three knowledge types: (1) discursive consciousness which states actors can articulate about social conditions, (2) practical consciousness, a belief that actors recognize social situations but can't necessarily voice them, and (3) unconscious cognition (Jones and Karsten, 2008). Discursive and practical consciousness is permeable and often they are interchanged during an actor's life course, mainly through socialization and learning experience (Giddens, 1984). Thus, an actor's knowledge is continuously upgraded through daily practices that make them skillful and competent agents in society.

Even though every member of society is equipped with cognitive skills of knowledgeability, he does not have full control over his actions. In their everyday lives, actors are aware of sociological situations that can promote or hinder their actions, thus society and social practices are not a product of social structures nor actors have the ultimate power over society to create social ordering, rather than through an interaction of both elements. The structuration suggests the constitution of society is through agency and social structure interplay, the duality of structure, in which the capacity of agents to produce or reproduce society depended on their ability to understand social conditions before instigating social practices (Jones and Karsten, 2008). Accordingly, human actions are a means of structural production and reproduction. They are also, simultaneously, an outcome of structure in which actors are embedded.

2.3.1.2. Structure

Giddens refutes the objectivist notion that social structures are a skeleton of an organism or a frame of a building that mold society and its members (Giddens, 1984, 1991). The objectivist posits humans are considered to have been doped by structures that make them docile to the imposition of external powers. Social structures reside independently outside human actors and they exist in a form of institutions, technologies, organizations, or other entities (Poole and DeSanctis, 2004). These structures are the

foundation of the social world and the knowledge about society and social behaviors and can only be perceived through the identification of social structures that shape them.

Borrowing from post-structuralist thought of two ideas of structure[3], subsequently, Giddens reinterprets structures as

> "a virtual order of transformative relations means that social system, as reproduced social practices, do not have *structures* but rather exhibit *structural properties* and that structure exists, as time-space presence, only in its instantiations in such practices and as memory traces orienting the conduct of knowledgeable human agents[4]" (Giddens, 1984, p.17).

The structuration distances its epistemological stance from either the functionalist and the subjectivist and suggests structures can only exist through social practices and embodied in actors' cognitive imprints (Poole, 2009). Structures are not fixed elements nor independent of human agents, rather they produce and reproduce through structuration, the interplay of human agents, and structural properties. Social structures are internalized and processed in actors' minds and they guide social practices, thus structures are a means and a product of humans' actions simultaneously. Yet, the transformation of social structures can only occur through social interactions that involve a group of actors (Giddens, 1991,1993)

Giddens (1984) proposes rules and resources as two elements of structural properties and they can enable or constrain social practices. Basically, rules refer to prescriptions for actions and they can manifest into codified rules (regulative functions) and can provide definition to social practices (constitutive functions) (Poole and DeSanctis, 2004). The regulative treat rules as a normative and formal procedure of a law that governs practices, and it follows with official sanction for those who disobey the rules. While the constitutive function provides an interpretation of the meaning of humans' actions and

[3] Post-structuralist defines structures as an intersection of two elements of presence (the matrix of social structure) and absence (underlying codes that govern social pattern) (for further discussion see Giddens 1984, pp. 16-18).

[4] In the original text, Giddens emphasized structures and the structural properties of social systems to differentiate his concept from the functionalist school of thought. *Structural properties* is a key concept to understand the structuration process in which structure can only be instantiated through their interaction with knowledgeable human agents (Giddens, 1984, pp.6-7).

it can manifest into social norms or values (Giddens, 1984). Resources are emergent sources that actors can utilize as social practice unfolds and there are two distinguishable types of allocative and authoritative resources (Giddens, 1994), and both resources engender a capacity to transform a structure in the structuration. Allocative resources refer to a capability producing command over objects, goods, and materials, while authoritative is creating command over actors or individuals (Giddens, 1984; Jones & Karstens, 2004). In the context of the digital divide study, authoritative resources are predominantly related to digital technology characteristics. For instance, users with broadband connections have fewer constraints than others who only have dial-up access to surf the internet.

Rules and resources as structural properties provide sources for a social system to render (1) political and economic power through the formation of structures of domination, (2) legalized norms/routines as structures of legitimation, and (3) discourses/meaning by structures of significations (Poole & DeSanctis, 2004; Giddens, 1984). Therefore, social properties generate a condition for structuration in which social order can be reproduced and be stabilized over time or it can be changed as actors modify structures through social practices.

The structuration provides an alternative view to examine society and it unifies subjectivist and objectivist camps in social sciences. The theory bridges the epistemological divide between subject authority and social object domination and offers a new perspective in understanding society and social practices (Giddens, 1984). Using a structuration lens to study the digital divide, this dissertation understands the divide through the lens of social practice in which social conditions are produced and reproduced chronically through agency and social structures interactions across time and space. This approach underlines a recursive process and the importance of knowledgeable actors and structures to shape internet practices. Actors are purposive agents whose conduct is driven by reflexive thinking to monitor social surroundings and to rationalize their actions and social structures render rules and resources that can enable or inhibit humans' actions. Unrecognized conditions of actions and unintended

consequences can hinder competent actors who yield skills and knowledge to transform social practices (Poole et al., 1984). Eventually, the duality of structure is the key to understand Giddens's structuration in which social structures are both medium and output of recursive human actions (Giddens, 1984).

2.3.2. The digital divide through a structuration lens

Structuration has been used to study technology, mainly in the field of Information System (IS) (for review see Poole and DeSanctis, 2004; Jones and Karsten, 2008), and only a few studies in digital divide research has adopted Giddens's model (Dixon et al., 2014; Benitez, 2006; see review Mason and Hacker, 2003; Selwyn, 2004). Even though the structuration theory has been used to study the digital divide, it was not employed as the main theoretical framework. For instance, the theory only limitedly applied to examine embedding and disembedding processes in a migrant area (Benitez, 2006) and it was also used to understand the role of libraries and librarians in creating a friendly structure for internet public access (Dixon et al., 2014). Both studies are qualitative research, and the findings are limited to the case that they examined. This research provided insightful information about a specific process in the structuration, but they did not employ Gidden's original formulation of the structuration theory.

One challenge to study the digital divide using a structuration lens is that Giddens never developed hypotheses or tangible premises but only a set of abstract notions. Nonetheless, he suggested the theory can be used as a sensitizing device for empirical work (Giddens, 1984). The structuration can be informative as a meta-theory that merges with an operational level theory that has a specific set of variables (Giddens, 1991; Oppong, 2014). Furthermore, this dissertation utilizes the structuration to inform the existing digital divide model and subsequently build a theoretical model to investigate two empirical cases. Structures and agency are two main components in the structuration. Giddens suggested that social structures are of memory imprints in humans' minds and only emerge through actions (Giddens, 1984). If structures are immaterial and actors, actions, and structures are inseparable, how can the structuration be explicated in empirical research? Information system research has provided

theoretical argumentations that the internet as technology provides resources and rules for actors and these resources and rules are structural properties that they can be drawn upon production and reproduction of structures in human interactions (for comprehensive reviews see Poole and DeSanctis, 2004; Jones and Karsten, 2008; Poole, 2009). Giddens did not reject social structures as external forces, but he argued they were internalized into a human's mind and instantiated through social actions. Thus, actors perceived structures through their properties that can inhibit or enable social practices. Social structures are not a dichotomy of material and immateriality, but they are embedded in the structuration process in which agency and structural properties in tandem influence social practices. In the IS, structures are explicated as material resources of technological artifacts and their properties (i.e., technology characteristics) are potential sources of structures (Orlikowski, 2000; Poole, 2009; Whittington 2010). For instance, laptops and smartphones are two distinct computer devices that each has unique technological features and characteristics. Users' perception of technology properties will affect technology use and subsequent outcomes. The use of technology in daily activities is affected by social structures that imprint in users' cognition and it interplays with a person's agency to achieve certain outcomes that can sustain or transform social conditions. This dissertation seeks internet access as a form of social structure that can influence digital capital attainment. Internet access properties will interact with persons' agency that they influence the appropriation of the internet in everyday life that can lead to certain digital outcomes.

The structuration does not offer deterministic formulation, yet it is a recursive flow that creates continuous feedback on a social system (Poole and DeSanctis, 2004). Therefore, social practices through structuration can produce or reproduce social conditions. This is problematic for empirical research which often employs a cross-sectional data collection strategy. Yet, Giddens acknowledges "*I do not try to wield a methodological scalpel. That is to say, I do not believe that there is anything in either the logic or the substance of structuration theory which would somehow prohibit the use of some specific research technique, such as survey methods, questionnaires, or whatever*" (Giddens, 1984, Introduction, p.xxx). A

few structuration researchers in IS had used a cross-sectional survey to study the appropriation of new technology in organizations (Ruël, 2002; Salisbury et al., 2002; for review see Poole and DeSanctis, 2004) and they built deterministic models to predict the consequences of technology. Following these studies, this dissertation will decompose and explicate essential elements of the structuration theory and merge them with the digital divide constructs to develop a theoretical model to examine the achievement of digital outcomes.

2.4. Hypotheses and research question

Based on the discussion in the previous sections, this study proposes several testable hypotheses and research questions. Structures are defined as rules and resources that can be drawn by actors in the process of structuration (Giddens, 1984;1991). The digital divide research identifies internet access as physical and material resources that affect internet use (van Dijk, 2005; van Deursen, 2018; van Deursen & van Dijk; Schreeder et al., 2017; Dixon et al., 2014; Stern et al., 2009). These resources provide structural properties that can be drawn by actors in daily activities. Users with better material resources tend to use the internet for more productive activities than their counterparts who have limited resources (Schreeder et al., 2017). Therefore:

H1: Physical and material resources are positively associated with internet use frequency and internet use diversity.

Humans are purposive actors who have the knowledge to reflexively monitor social surroundings (Giddens, 1984, 1991) and they are also competent actors who develop skills that enable them to articulate action in daily life (Giddens, 1984; Poole and DeSanctis, 2004). A person is an agent/agency who uses knowledge and skill to orient actions in everyday living. Some students of the digital divide employed agency constructs in terms of psychological elements of self-efficacy (LaRose & Eastin, 2004; Eastin & LaRose, 2000), attitude toward technology (Hsieh et al., 2008), and skills (Livingstone & Helsper, 2010; van Deursen & van Dijk, 2015) to represent individuals' agency that predicted internet use. Skills,

attitudes, and self-efficacy represent actors' conscious knowledge and these elements of agency help them to conduct internet practices. Skills have been defined as a set of knowledge to operate and navigate practices in the online world (e.g., Litt, 2013) and skills positively associated with internet use (Livingstone & Helsper, 2010; van Deursen & van Dijk, 2015). Conceptually, self-efficacy referred to actors' belief to execute a particular action (Bandura, 1986). Actors who are confident that they can accomplish certain objectives using the internet correlated with internet usage (LaRose & Eastin, 2004; Ceyhan & Ceyhan, 2008; Eastin & LaRose, 2000). Attitude explained an individual's overall evaluations to perform a particular behavior (Ajzen & Fishbein, 1980) and a positive attitude correlates with internet use continuance (Hsieh et al., 2008). Moreover, a compound of agency can predict:

H2: Better digital skills of users are associated with a higher frequency of internet use and higher internet use diversity.

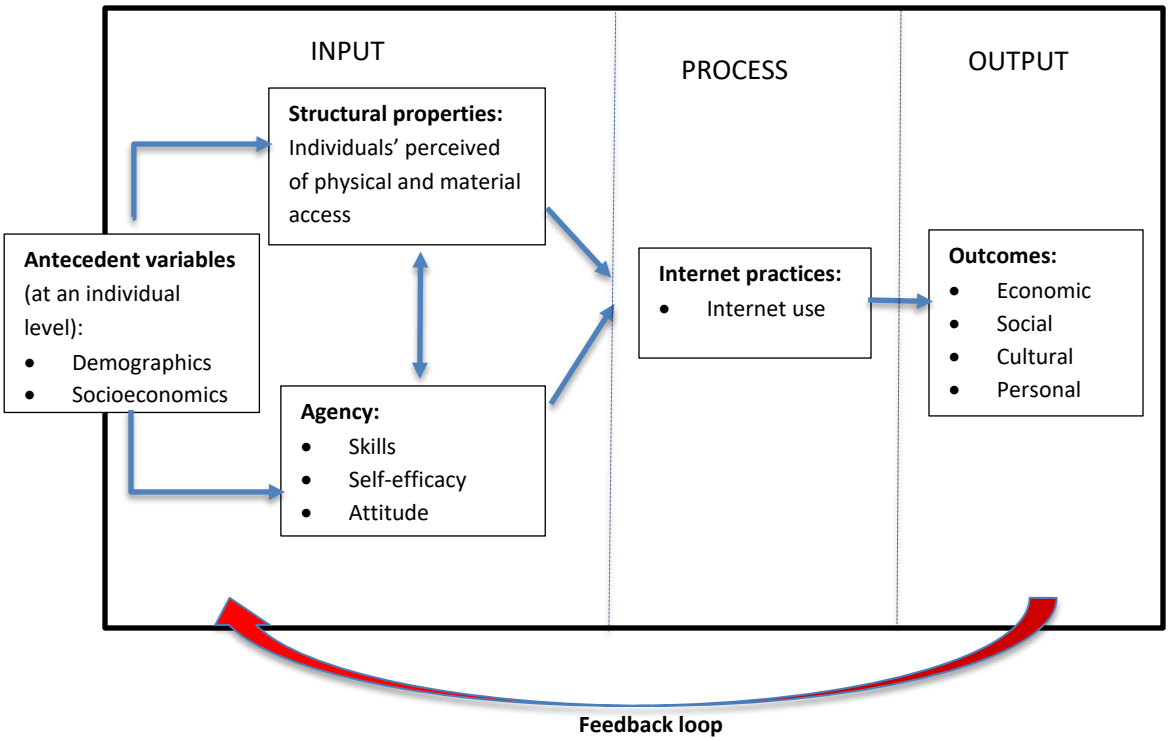
H3: Internet attitude is positively correlated with internet use frequency and internet use diversity.

H4: High self-efficacy contributes positively to internet use frequency and internet use diversity.

The structuration process leads to social practices and in the digital divide field it refers to the use of the internet in everyday life. Internet use represents the structuration process of social practice that is a product of the actor-structure interaction and it provides a basis for a deterministic model of the digital divide. The structuration theory posits social practices lead to specific outcomes that are either intended or unintended (Giddens, 1984) and following the theory, this study proposes that internet use as a social practice will impact digital outcomes. The third level of the digital divide has interrogated a relationship between internet use and digital outcomes (van Deursen & Helsper, 2015; van Deursen et al., 2017; Blank & Lutz, 2018; for systematic review Scheerder et al., 2017). Building on the structuration theory and empirical findings, the author proposes:

H5: Internet use is positively correlated with types of outcomes generated by the internet.

Figure 2. A theoretical model: the structuration of the digital divide



This study also intends to test the theoretical model in two distinct social systems and identify similarities and differences in the attainment of digital capital through structuration processes in two settings. Two case studies in two countries that represent developed and developing regions can enrich the digital divide field as little is known about a process of digital outcomes possession in middle-low income countries, mainly at an individual level. Therefore, this dissertation explores the following research question:

RQ1: Are there differences in the structuration processes that are associated with the patterns of digital exclusion and inclusion in two dissimilar countries?

This study seeks to conceptualize digital divides as the outcome of a process that affects digital inclusion and exclusion outcomes. Figure 2 illustrates a theoretical model that can be tested empirically. However, this dissertation only examined a parsimonious model of the structuration of the digital divide that relegated the feedback loop since the data only permitted a cross-sectional survey. The findings

would be restricted in understanding the input in the structuration of the digital divide without examining a recursive process. This has been a study limit that can be rectified in the future study when panel data or other longitudinal research designs are pursued. Nonetheless, a comparative approach would bring a new dimension that allows this dissertation to identify whether the structuration emerges as a unitary model in the two countries. If there are no variations in the models, it would suggest a general framework of the digital divide is taken place and the field of the digital divide can benefit from this finding.

CHAPTER 3: METHODS AND DATA COLLECTION

This dissertation focuses on digital divides among internet users, intending to understand the factors affecting digital outcomes that were gained using the internet. The study is designed as a comparative study investigating digital divides in two countries: The United States as an example of a high-income country, and Indonesia, as an example of a lower-middle-income country. Based on these two contrasting cases, this study tries to identify whether a generic model emerges from both contexts that can explain factors that are associated with digital exclusion and inclusion outcomes or digital capital.

3.1. Comparative research: The United States and Indonesia

Comparative analyses suggest that digital divides occur among developed countries (Corrocher & Ordanini, 2004), between developed and developing nations (Ayanso et al., 2014), and at a regional level (Wong, 2002). These studies used country-level data to identify divisions in physical access and internet use and the findings showed the gaps emerged in similar ways across contexts. Assessing the divides among countries benefits the digital divide field in understanding the universal patterns.

This dissertation employs a comparative approach to understand whether digital capital possession follows a similar pattern in two social settings: The United States and Indonesia, two countries representing developed and developing countries. Adopting a case-oriented approach (Ragin, 2014), this study tries to identify the different contexts in which an internet practice influences a certain digital outcome and whether a similar pattern that reflects the theoretical model emerges in two social settings. Although the United States and Indonesia represent two distinct case studies, they also share resemblances in political and media structures (see Table 4). The two countries are the third and the fourth most populous nation on earth, 327 million and 267 million people respectively (United Nations, 2019), and have adopted open political and media systems that make them valuable as the locus of study.

People in these countries have used the internet to cater to diverse needs, encompassing political, social, economic, and cultural activities, with almost no constraints. These will fit the purpose of the study to examine diverse internet activities that the internet has been facilitated in two countries. Therefore, these systems' likenesses will eliminate confounding factors at a macro level that may affect internet use in the United States and Indonesia.

Table 4. the United States and Indonesian characteristics

	United States	**Indonesia**
Similarities	*Political structure*: Democratic with Presidential *Media structure:* Free press system Open market telecommunication regime *Internet access:* Open access with almost no restriction	*Political structure:* Democratic with Presidential system *Media structure:* Free press system Open market telecommunication regime *Internet access:* Open access with some restrictions on pornography and gambling sites
Differences	*Economic status*:* High-income country (U$ 62,641 per capita) *Area:* Mainland *Internet access:* Wired internet broadband connectivity is distributed widely *ICT infrastructure**:* Internet users 87.27% 9 (2017) Broadband subscriptions 33.8% (2018) Computer ownership 90.2% (2018) Mobile phone subscriptions 129% (2018)	*Economic status:* Middle low-income country (U$ 3,894 per capita) *Area:* Archipelago *Internet access:* Wired internet broadband only in big cities and most users connect to wireless internet (i.e., 3G, 4G, and 4GLTE) *ICT infrastructure:* Internet users 39.9% (2018) Broadband subscriptions 3.3% (2018) Computer ownership 20.1% (2018) Mobile phone subscriptions 119.3% (2018)

*World Bank Data 2018; **International Telecommunication Union Data 2019 per 100 inhabitants, year in parentheses.

The differences are expected that the economic level of high and middle country correspond to developing and developed categories. Moreover, discrepancies of area and internet access will influence

the availability of technological structures (i.e., properties) in which these differences may vary internet practices. Study in developing countries (see example Kelly et al., 2017; Cirera et al., 2016) suggested users creatively found a way to overcome technological constraints and still gained benefits from the internet. Factors such as culture, religion, and ethnicity/race can influence digital divide conditions in each country. It was possible to include factors such as gender, ethnic/race, marital status in the analysis. However, other aspects of culture, such as religion, that often do not vary at an individual level, could not be included in the statistical analysis. The quantitative digital divide literature has not paid much attention to the influence of religion or religious values on internet access and use (for some example Abdelfattah et al., 2010; Barzilai-Nahon, 2006). A few qualitative studies suggested that orthodox religions could affect internet adoption (for review: Tsuria, 2020). This dissertation understands culture as a form of social categories, rather than consider it as a broad definition of a way of life. Therefore, culture was strictly measured through a person's association with gender, marital status, or race/ethnicity. Although these limited assessments cannot capture cultural values differences such as eastern vs western culture at a society level, social categories provide rich information about users at an individual level. Within the study limit, this dissertation recommended that future research can incorporate cultural values to understand better the role of culture in shaping internet practices in which the internet as an experiential technology can be 'reinvented' in daily life to suit users' social values (Sassi, 2005). This suggestion also aligns with the Social Shaping of Technology (SST) approach (Dutton, 2013) that social and cultural factors can influence the adoption and appropriation of the internet.

Structural differences are likely to generate variation in the interplay between actors and structural properties. A few studies in developing regions advised that users, such as in South and Southeast Asia (Samarajiva & Zainudeen, 2008) and East and Southern Africa (Adera et al, 2014), found innovative ways to overcome access and technological constraints that assisting them in narrowing digital divide and to alleviate poverty. Therefore, we expect that users in Indonesia may yield higher agency than

in the United States. These countries may develop a distinct pattern that is the product of the interactions between structure and agents.

3.2. Data collection

Data collection for this dissertation attained approval from Michigan State University's Institutional Review Board as an exempt project under the rules governing human subjects research. The approval allowed a 30-minute survey in the United States and Indonesia. Two online surveys were conducted in May and June 2020 in the United States and Indonesia with the assistance of two professional research companies. Surveys were conducted in each country's native language. Thus two questionnaires, one in English for Americans and one in Bahasa for Indonesians, were developed. Both versions of the questionnaire were proofread for grammatical errors and readability by experts.[5] In addition, pretesting was conducted in Indonesia to ensure the Bahasa version worked as intended and questions were understood. CloudResearch (MTurk Prime) provided panel subjects for the United States study, while Indonesian samples were recruited by Dynata. The cost of recruiting panels in the United States was $2.50 per respondent. Data collection in Indonesia cost $ 9.00 per subject. The survey companies did not reveal details on the incentives given to respondents who are participation in the study. Subjects in both countries filled in the online questionnaire that had been set up on Qualtrics survey software in two weeks window time. Respondents who completed the survey received compensation from the companies based on the user agreement. All responses were automatically recorded in the Qualtrics cloud storage and subsequently downloaded in the form of .csv format.

The surveys only employed an age quota of minimal 18 years that is a standard for online data collection in which participants should be adults. Employing other demographics quotas such as gender, race, and income is expected to have samples that replicate the population in two countries. Hence, they

[5] Two members of the dissertation committee helped with the English version and two associate professors from University of Indonesia provided feedbacks for the final version in Bahasa Indonesia. Ten Indonesians participated in the pre-testing stage and they were allowed to comments on the surveys to improve the final version.

would be expensive and beyond the research budget. Thus, the cost is considered as part of the dissertation limitation. Financial constraints required that only an age quota was used. This generated a dataset that did not accurately track the socioeconomic composition of the respective populations. Furthermore, it was not possible to examine spatial variations (e.g., differences between urban and rural areas).

Data collection took place during the Covid-19 global pandemic. This might have had several effects. For one, work from home practices helped the online survey, as data collection was completed earlier than it was scheduled. Nonetheless, the high use of the internet during the global pandemic for work, business, academics, and other activities might have inflated responses on internet use measures. Subjects might have used the internet more frequently for various activities that might not have occurred before the pandemic. The internet became the main platform to facilitate daily affairs that previously might have been done offline, such as shopping and educational activities. These matters might have been amplified by the political situation in the United States during the time leading up to the presidential election. Due to these unique factors, it was difficult to establish a baseline to which the findings could be compared. A test of difference (using a t-test) suggested there was no difference in internet political use between the Indonesian and American samples. Findings must therefore be interpreted in the context of the global pandemic. The dissertation expands the frontiers of current knowledge in a few areas. As is the case in such endeavors, some of the findings need to be interpreted cautiously to avoid overly broad conclusions.

3.3. Data analysis

3.3.1. Data analysis approach

The dissertation aims to understand the digital divide processes in the United States and Indonesia and data analysis was directed to serve the purpose. A country-specific approach was employed for identifying patterns that emerged from the data. Data collection was guided by the proposed framework for the

dissertation (i.e., to develop hypotheses and instruments). The empirical data yielded new nuances and informed the framework. This dissertation tested a few approaches, such as using either the United States or Indonesia as a baseline for data analysis, yet the findings were unsatisfactory and ambiguous. A country-specific approach yielded the best results and they align with the existing literature on the digital divide that socioeconomic and cultural conditions affect factors contributing to the divides.

Moreover, the author pursued several paths of using structural equation modeling (SEM) to statistically explore the underlying relationships. SEM is preferred over path analysis modeling because it enables the incorporation of manifest variables to estimate the full model that reduces the biases from measurement errors. However, when research focuses to understand interconnections among variables in one single model, the path model is preferable as it allows a specific analysis (e.g., mediation).

This dissertation experimented with both covariance-based and Partial Least Square (PLS) SEM approaches to estimate the adequacy of the findings. Co-variance based estimates were generated using SPSS AMOS by calculating variance shared in the first-order (dimension level) and second-order (variable level). One challenge of using AMOS to render the structuration framework is that it hardly models reflective and formative constructs simultaneously in a high-order analysis (see Diamantopoulos, 2011; Wilcox, et al., 2008; Sarstedt, et al., 2019; Hair, et al., 2019). This dissertation tested the framework using AMOS to compute covariance structural analysis in two stages, hence the result did not satisfy SEM indices, mainly the model fit indicators and convergent validity. Thus, the results warranted the model did not fully reflect the data.

The second method of PLS based SEM was undertaken to overcome the issue that could not be handled well with the covariance-based method. It is argued that the PLS approach can solve the issue of reflective and formative constructs in the SEM (Wetzels et al, 2009; Sarstedt, et al., 2019; Hair, et al., 2019). Rather than calculating shared variance, SmartPLS also computes total variance explained to estimate the full model of the structuration process. After pruning indicators to improve convergent and

discriminant validities, SmartPLS yielded the final model that met all requirements. The results from SmartPLS have indicated that the PLS approach is a more appropriate method to handle reflective and formative constructs, especially for this dissertation, rather than the covariance-based method. However, this does not suggest that PLS is a better approach to estimate SEM as covariance-based is also an effective tool when latent variables consist of reflective constructs. Furthermore,

Internet access and internet use concepts vary between countries, while attitudes toward the Internet, internet self-efficacy, and digital capital generated high construct validity (see details in sections 3.3.3 and 3.3.4 for a more detailed discussion). These discrepancies are suspected as the results of the high use of the internet during the Covid-19 pandemic and socioeconomic factors that are associated with physical and material access availability in given countries.

Descriptive analysis was employed to identify demographics characteristics of respondents in each country and it followed by validity and reliability tests to assess the quality of research design and instruments. Cronbach's alpha was used to assess the consistency of instruments to measure the concepts. Principal component analysis (PCA) assessed the validity of the measures for items that are borrowed from previous research, and Exploratory Factor Analysis (EFA) using the Maximum Likelihood (ML) method has been used to evaluate the internet access concept. This dissertation developed an eclectic scale of access that can measure the concept of structure in a structuration model. Treating internet access as a new scale, EFA was conducted to ensure questions measured the concept of physical and material access. Subsequently, reliability analysis was conducted on the scale to make certain its internal consistency. Regression analysis and Structural Equation Modelling (SEM) were conducted to address hypotheses and research questions.

This dissertation also examined the condition of digital inclusion and exclusion in the United States and Indonesia. The aim of employing a binary specification of inclusion and exclusion is to explore further whether the pattern of the structuration process varies among internet users. The conceptual framework

suggested that digital outcomes would not be distributed equally, and those with socioeconomic and other privileges use the internet for productive purposes and gain more advantages (DiMaggio, et al., 2004). To achieve this objective, the independent variable of digital outcomes was transformed into a binary value of low and high. Using a percentile method, continuous values, that were rendered from aggregating respondents' responses on digital outcomes questions, was divided into two groups. 50^{th} percentile was the cut-off value to group respondents' scores and ones whose score below the threshold were labeled a low category. Those who yielded above the breakpoint were part of a high group. Subsequently, this new binary digital outcome was used to examine digital inclusion and exclusion. Those who generated low outcomes were considered disadvantaged thus digitally excluded and individuals who earned digital outcomes above the 50^{th} percentile were considered to benefit from the internet.

Using a binary value to assess digital outcomes could unveil additional information about the factors affecting the third level of the digital divide. In the first step, the binary digital outcome was regressed on demographics, access, and agency measures to identify which elements significantly influencing digital inclusion. Logistic regression could detect important factors that contribute to the improvement of digital capital, from low to high. In the SEM analysis, the binary values could identify a distinct path pattern between the low and the high internet users in two countries. The results would be compared to the baseline model when digital capital was set as continuous values. Collapsing continuous values will reduce the variance explained, albeit this issue has been addressed by using an SEM partial least squares approach. Essentially, SEM treated a binary outcome to group respondents without affecting the computation of the structuration model, rather than to identify a distinct pattern between two unique groups. This strategy can also be used to identify differences between gender (male vs female), or race (Caucasian vs non-Caucasian).

3.3.2. Demographics of respondents

750 subjects filled in a survey that was posted on MTurk Prime and after filtering out two attention check questions, 720 questionnaires were used for subsequent analysis. A similar number of panels participated in the Indonesian study. After data cleaning using the same protocol, 712 responses met the requirement. The final dataset consists of 1,432 cases from both countries and data imputation was conducted, although missing cases constituted only less than 1% of the total from two datasets. Imputation was conducted using R software with "MICE" package. A Predictive Mean Matching (PMM) method was chosen to fill in missing data as it is considered the best practice. The PMM algorithm can fill in missing values with more like real values regardless of data distribution (normal vs skewed) and the values can be either discrete or continuous (Little, 1988). PMM simulates the missing value case by identifying five cases that are like it and the algorithm would decide which value is the closest estimate of the missing value.

An overview of the demographics of subjects in the two countries is depicted in Table 5. In both samples, females were the majority and younger adults (below 39 years) made up most of the observations. The respondents were highly educated and half of them had earned bachelor and advanced degrees. In the United States, the composition of undergraduate and graduate degrees was almost balanced, while in Indonesia over half of them had a bachelor's degree. The economic status of Americans in the survey consists of almost an equal number in each income strata and over one-third had a full-time job.

In Indonesia respondents clustered from middle-low income groups. Over half of the respondents were in a relationship, either married or in a domestic partnership. The dissertation also gathered race and ethnicity data in each country.

Table 5. Demographics of respondents

Category	Subcategory	USA	Indonesia
Sex	Male	37.2%	48.5%
	Female	62.5%	50.9%
Education	High school diploma or less	19.0%	30.5%
	Some college or university, no degree	19.7%	3.5%
	Completed an associate degree	11.4%	9.8%
	Completed an undergraduate degree	26.3%	51.3%
	Completed a graduate or professional degree	23.3%	4.5%
Income[6]	Less than $20K	19.3%	26.7%
	$20K - $34.9K	16.8%	25.5%
	$35K - $49.9K	15.4%	16.2%
	$50K - $74.9K	20.0%	10.7%
	$75K - $99.9K	11.5%	8.3%
	Over $100K	16.8%	12.7%
Marital	Now married or in a domestic partnership	47.2%	58.0%
	Widowed	4.3%	0.6%
	Divorced	13.6%	0.8%
	Separated	1.3%	1.1%
	Never married - single	33.6%	39.5%
Age	18-29	21.7%	45.1%
	30-39	16.0%	33.6%
	40-49	16.1%	16.2%
	50-59	11.7%	3.9%
	60-69	21.8%	1.1%
	70+	12.8%	0.0%
Work situation	Employed full-time	34.9%	52.4%
	Employed part-time	7.6%	12.2%
	Full-time student	7.8%	11.9%
	Unemployed and currently looking for work	6.9%	5.8%
	Unemployed and not currently looking for work	2.9%	0.4%
	Retired	23.3%	0.8%
	Homemaker	5.8%	6.2%
	Self-employed	6.0%	10.4%
	Unable to work	4.7%	0.0%

[6] The income category was measured using a different scale, hence they are both deemed equivalent to represent economic status spectrum from the low to the high groups.

The United States context is shown in Table 6. For Indonesia, the Javanese ethnic group consisted of 67.8% of the total and was followed by Sumateranese (19.2%), other ethnics (5.5%), Sulawesenese (4.2%), Kalimantanese (2.9%), and Papuanese (0.3%). A report from Indonesia Census Bureau (BPS, 2010) indicated that almost 64.4% of Indonesians were Javanese, and trailed by Sumateranese (15%), Sulawesenese (8.1%), other ethnics (7.5%), Kalimantanese (3.8%), and Papuanese (1.1%), respectively. Javanese is the dominant ethnic in Indonesia with over two-third of the population and it is reflected in the census and the survey data.

Table 6. A comparison of the United States census data and the survey

Category	Subcategory	US Census (2019 data)	Survey
Age	18-29	38.9	21.7
	30-39	13.4	16
	40-49	12.3	16.1
	50-59	12.8	11.7
	60-69	11.7	21.8
	70-99	10.9	12.8
Education	HS diploma or less	41.8	19
	Some college or associate degree	26.5	31.1
	Bachelor's degree	20.2	26.3
	Advanced degree	11.4	23.2
Income	Less than $34,999	28.5	36.1
	$35,000 to $49,999	12.4	15.4
	$50,000 to $74,999	17.4	20
	$75,000 to $99,999	12.6	11.5
	Over $100,000	29.2	16.9
Gender	Male	49	37.2
	Female	51	62.5
Race	White	75.1	75.8
	African American	14.1	7.9
	American Indian or Alaska Native	1.7	1
	Asian	6.8	10.6
	Native Hawaiian and Other Pacific Islander	0.4	0.1
	Some other race	5.5	4.6

In the subsequent analysis, this dissertation refers to Javanese versus non-Java when identifying the majority versus the minority. Data from Indonesia are likely tilted toward the urban population in Java

Island where internet infrastructure is very well established. The survey data contained 50.9% females, slightly higher than the share of females in the Indonesia census of 49.7% (BPS, 2010). The Indonesian census bureau does not report detailed data on education and income. Therefore, no detailed table was provided to compare additional survey and population data.

Table 7. Age-weighted strategy

Age	**USA**			**Indonesia**		
	2019 Census	Survey	Weight	2018 Census	Survey	Weight
18-29	38.9	21.7	1.8	24.6	45.1	0.55
30-39	13.4	16	0.8	15.7	33.6	0.47
40-49	12.3	16.1	0.8	13.9	16.2	0.86
50-59	12.8	11.7	1.1	10.6	3.9	2.73
60-69	11.7	21.8	0.5	6.5	1.1	5.95
70-99	10.9	12.8	0.9	3.8	0[7]	375.67

The United States sample was skewed in almost every category in comparison with the census data (Table 6). The older generation, age 60 and above, was overrepresented and the group of 30 and below was underrepresented. A similar situation holds for the sex category, in that the share of females in the sample was 11.5% higher than in the general population. The survey was also tilted toward middle-low income groups with a better education. They had college experiences or attained higher education degrees. The white and non-white race composition matched the United States population, although Asian was overrepresented and African American was underrepresented. Since the United States data was slanted, mainly for the age category, a weighting approach was employed for further analysis. For instance, a 1.8 weight was applied for respondents who are 18 to 29 years old to match the population quota. A similar age-weighted strategy was also applied to the Indonesian survey in which the samples were heavily biased toward 18 to 39 years cohorts (see Table 7). This strategy aims to have datasets that

[7] There were no Indonesians over 70 years old in the survey, thus the age-weighted strategy would not create extreme outliers.

can approximate the population, nonetheless, the results should be carefully interpreted. Even though two datasets are not perfect representations of the United States and Indonesia population, using balancing age would reduce deviations, hence likely to suppress a large error. Therefore in the analysis and discussion sections, the findings were carefully interpreted to avoid overgeneralization.

That the demographics do not accurately reflect population characteristics was not unexpected, as data collection only could employ age quotas. Females, highly educated, and middle-low income were over-represented in the samples from both countries. The dissertation used several tools to deal with the deviations, most importantly weighted adjustments to the data.

3.4. Operationalization and measurement

The theoretical framework, as outlined in sections 2.1 and 2.2. above, explains factors affecting digital outcomes. The following sub-section explicates each concept and develops instruments that were used in data collection.

3.3.3. Dependent variable

Digital outcomes represent types of capital that a person generates after using the internet and there are four types of capital to be investigated in this study: economic, social, cultural, and personal. This classification follows Bourdieu's (1986) theory of capital that has been adopted in digital divide research (Helsper et al., 2015; van Deursen, et al. 2017; van Deursen & Helsper, 2017). This study defines outcomes as tangible results that users gain in using the internet and they manifest in the form of economic, social, cultural, and personal capital (Table 8). These dimensions can capture important domains in everyday life (van Deursen & Helsper, 2017). Although a recent study offers another dimension of political outcomes (van Dijk, 2020), it does not reflect the basic element of capital and some of its constructs are also incorporated in social outcomes indicators. This dissertation will use the term digital outcomes and digital capital interchangeably since they both are a similar concept that measures benefits users gained in using the internet. Moreover, this study aggregated economic, social, cultural, and personal as a unitary

measure and it has been treated as an index of outcomes that can measure a variety of digital capital. The index is a compound of four dimensions and subsequently, the study will identify a cut-off point based on the average score to create two tiers of outcomes: inclusion and exclusion.

Table 8. Digital outcomes operationalization

Dimension	
Digital outcomes: tangible results of economic, social, cultural, and personal capitals that users gain in using the internet	
Sub dimensions	**Indicators**
Economic: capital and wealth that individuals gained from using the internet relate to assets, employment, income, and education	Property: • I save money by buying products online • I sell goods that I would not have sold otherwise
	Finance: • The information and services I found online improved my financial situation • I bought insurance online that I would not have bought offline • I involved in the platform business (e.g. Uber, AirBnB, Grab) and gained financial benefits
	Employment: • The things I found online influenced how I do my job • I found a job online that I could not have found offline
	Education: • I got a certificate that I could not have gotten without the Internet
Cultural: resources that people gain relate to identity and belonging categories relate to certain beliefs	Identity: • The things I came across on the Internet made me think about the differences between men and women • Through the Internet, I learned new things about my ethnic group
	Belonging: • Through the Internet, I found people of a similar age that share my interests • Because of the information, I found and people I have met online, I feel more connected with religion or spiritual beliefs

Table 8 (cont'd)

Social: resources accrue through informal, formal, and political networks	Informal networks: • I have a better relationship with my friends and family because I use the Internet • I am in touch with my close friends more because I use the Internet • I have more friends because I use the Internet • People I meet online are more interesting than the people I meet offline
	Formal networks: • I became a member of a hobby or leisure club or organization that I otherwise would not have found • I became a member or donor of a civic organization I would not have become a member or donor of otherwise
	Political networks: • I have discovered online that I am entitled to a particular benefit, subsidy, or tax advantage that I would not have found offline • Online, I have better contact with my MP, local councilor, or political party
Personal: benefits individuals gain relate to physical, psychological, and interest	Health: • I am fitter as a result of the online information, advice, or programs/apps I have used • I have made better decisions about my health or medical care as a result of the information/advice I found online • Information I found online gave me more confidence in my lifestyle choices
	Self-actualization: • My knowledge increased because of the Internet • Using the Internet helps me to form opinions about complex social issues I would not fully understand otherwise
	Leisure: • Online entertainment made me feel happier • I go to events and concerts I would never have otherwise considered

* Adapted from van Deursen, et al (2017) and van Deursen & Helsper (2017) and the scales consist of items using a 5- point agreement scale as an ordinal-level measure. A zero is added to the outcome variables for which respondents never gained the benefits, thus creating a variable with a 0–6 scale for each outcome.

Digital capital was measured using 26 questions that asked subjects in the two countries about the types of benefits they had gained in the past six months in using the internet. Principal component analysis (PCA) with varimax rotation was conducted to confirm the construct validity of the scale and the

findings from both countries suggested most items loaded into their respective constructs. The digital capital scale formed six factors of economic capital, cultural capital, informal social capital, formal-political social capital, health personal capital, and self-actualization personal capital, and these dimensions essentially replicated previous studies at dimension level (van Deursen, et al., 2017; van Deursen & Helsper, 2017). Only two items "people I meet online are more interesting than the people I meet offline" (an item for informal social capital) and "I got to events and concerts I would never have otherwise considered" (an item for personal capital) did not converge in their constructs but they merged into formal-political social capital.

Validity and reliability tests yielded excellent scores (Table 9) and suggested the instruments adequately measure the digital capital construct. The rule of thumb for an acceptable reliability test is 0.6 and above (Chichetti, 1994), but above 0.7 is expected for existing scales. To assess the validity of the scale, Kaiser-Meyer-Olkin (KMO) score, and convergency indicators (i.e., loading factors) are required. A score of 0.5 - 0.6 is deemed tolerable, hence 0.7 and above are anticipated to assure a factor structure occurs (Williams, et al., 2010).

Table 9. Validity and reliability analysis at a variable level

Variable	The United States		Indonesia		Both countries	
	Validity	Reliability	Validity	Reliability	Validity	Reliability
Internet access	0.73	0.71	0.80	0.80	0.68	0.62
Internet skills	0.92	0.91	0.93	0.91	0.94	0.92
Attitude toward the internet	0.71	0.82	0.68	0.74	0.71	0.81
Internet self-efficacy	0.92	0.94	0.87	0.90	0.92	0.94
Internet use	0.95	0.95	0.94	0.95	0.96	0.95
Digital capital	0.90	0.87	0.87	0.95	0.90	0.87

*Validity score represents KMO and Bartlett's test and Alpha Cronbach's is used to generate reliability count.

The tests also confirmed a distinction between informal and formal social capital in which the latter incorporated the political aspect of social capital. Arguably, political capital is part of social capital (van Deursen, et al, 2017) rather than a discrete capital. Joining with civic organizations and contacting politicians or leaders about important issues are embedded in social activities. However, a new political

activity of online voting may represent a certain political capital when people directly gain the benefit. Further studies can incorporate online voting to prompt political capital.

3.3.4. Independent variables

3.3.4.1. Internet use

Internet use, representing the second level of the digital divide (DiMaggio & Hargittai, 2001; Hargittai, 2001; de Haan, 2003), examined the frequency, the variety, and the typology of individuals' engagement with the internet to serve certain needs (Blank & Groselj, 2014; Papacharissi & Rubin, 2000). The internet provides more activities than previous media and eleven activity categories were measured in this study (Table 10). This scale can capture a breadth of activities related to the current state of internet technology development. A new dimension of health information seeking related to Covid-19 was added into the scale as the pandemic created uncertainty. People strategically look for Covid-19 related information from various sources that can help them to orientate daily life and to reduce insecurity.

The Internet use scale consisted of forty-nine questions from twelve factors and it is expected that data from Indonesia and the United States would converge into dimensions that replicate the UK studies (Blank & Groselj, 2014, 2015). In addition, Internet use should capture both frequency and diversity of the use (Blank & Groselj, 2014; Papacharissi & Rubin, 2000), therefore this dissertation incorporated the frequency of use to improve the conceptual validity of the internet use construct.

Table 10. Internet use operationalization

Dimension	
Internet use: frequency and a set of activities that users undertake online	
Sub dimensions	**Indicators**
Frequency	How often do you go online? 1. Several times a day 2. About once a day 3. 3-5 days a week 4. 1-2 days a week 5. Every few weeks 6. Less often 7. Don't know/Refused

Table 10 (cont'd)

Entertainment	How often do you: Watch movies or films online? Watch TV programs on the Internet? Watch videos online?
Commerce	How often do you: Order groceries or food online? Sell things online? Buy a product online?
Information seeking	How often do you: Find or check a fact? Lookup a definition of a word? Investigate topics of personal interest?
Socializing	How often do you: Check or update your profile on a social networking? Do you instant messaging? Participate in chat rooms?
Email	How often do you: Check your email? Send attachments with your email? Use a distribution list for email?
Blog	How often do you: Read a web-log or blog? Write a web-log or blog? Maintain a personal website?
Production	How often do you: Post writing, stories, poetry or other 'creative' work Post a video or video clip? Get jokes, cartoons or other humorous content?
Classic media	How often do you: Get information about local events? Look for news - local, national, international? Look for sports information?
School-work	How often do you: Online distance learning for academic degree/job training? Look for jobs, work? Get information for school?
Political activity	How often do you: Following political news? Expressing political opinions on social media or other online platforms? Forwarding or reposting someone else's political comments?
Vice	How often do you: Bet, gamble, or enter sweepstakes? Look at 'adult' sites with sexual content?

Table 10 (cont'd)

Health seeking	Look on the internet for information or advice about COVID-19? Use email or the internet to communicate with a doctor or other health care provider for advice about COVID-19? Use email or the internet to communicate with a family member or friend about COVID-19? Use email or the internet to communicate with other people who have concerns about COVID-19?

*Adopted from Blank & Groselj (2014, 2015) and the scales of activities are measured using the Likert scale range from 'never' = 0 and 'more than once per day' = 5.

Statistical results from validity and reliability tests presented a new nuance of high variability between the two countries. In the United States, PCA with varimax rotation generated six components (i.e., productivity, entertainment, politics, information seeking, health, and commerce) from 36 items. In comparison, nine dimensions (i.e., productivity, commerce, politics, information seeking, schoolwork, email, health, entertainment, and vice) emerged from 42 questions in the Indonesian context. Patterns that diverge from the previous studies are not unusual in the internet use literature (Ruggeiro, 2000; Blank & Groselj, 2014). Variations in factors such as motivation, access, and demographics, and their interaction may affect variations of use (Busselle, et al., 1999; Jepsen, 2007; Bouliane, 2009).

Blank & Groselj's (2015) model is deemed contextual and can capture the complexity of contemporary internet activities. This scale has never been applied in settings outside the UK. This dissertation utilized the model with a slight modification to understand whether health information seeking became a pattern during the global pandemic. The empirical findings from the United States and Indonesia indicated discrepancies in patterns of usage compared to the original model. Moreover, the full sample of both countries also indicated usage variabilities. These differences might have been the impact of socioeconomics, cultural conditions, and the high use of the internet during the Covid-19 pandemic. Nonetheless, these are best guesses as no longitudinal data were available to corroborate them.

Table 11. Reliability of Internet Use (Alpha Cronbach's score)

		The United States	Indonesia	Both
Variable	Internet use	0.95	0.95	0.95
Dimension	Productivity	0.94	0.87	0.91
	Commerce	0.75	0.82	0.77
	Politics	0.91	0.93	0.92
	Infoseek	0.81	0.81	0.81
	School work	na	0.75	0.82
	Entertainment	0.85	0.71	0.83
	Health	0.86	0.83	0.86
	Email	na	0.82	na
	Vice	na	0.62	na

In the process to achieve an acceptable construct validity, items with a factor loading of less than 0.4 were dropped and some factors merged to improve factor convergence and achieve acceptable KMO scores. This process rendered a unique pattern in each country. The internet use patterns in Indonesia to some extent resemble those of the UK study, while the United States data rendered only half of the initial dimensions. Indonesian used the internet for eight categories of production, commerce, politics, information seeking, school-work, entertainment, email, and vice that were also done by the British. Three patterns of socializing, blogs, and classic media did not emerge as dimensions of internet use in Indonesia, albeit they were absorbed into those eight dimensions. For instance, socializing and blogs were part of production activities, and classic media incorporated into the email dimension. A reliability test was conducted to confirm the internal consistency of indicators either at variable or dimension levels and the results suggested reliability of measurements (Table 11).

3.3.4.2. Access

This dissertation took a different route in assessing access by focusing more on access sustainability rather than using a conservative valuation of ownership that users either "have" or "have not" internet connections. It follows Gonzales's (2016) recommendations that technology maintenance of physical

connection is a current problem of the access divide. A scale of eleven items using a six category of Likert scale ("not at all true" to "very true") was employed to measure respondents' perceived access.

Table 12. Access operationalization

Dimension	
Access: the availability of physical and material resources for individuals to access the internet	
Sub dimension	**Indicators**
Physical	• I have access to high-speed internet connections (e.g., broadband, 4G LTE) • Most of the time I connect to the wired internet (include WiFi at home, school, work or public spaces) • I have home internet access • Public internet is my main location to get internet access
Material	Devices and peripheral access: • Daily, I use two or more devices connected (i.e., laptop, desktop, tablet, smartphone, smart TV, and game console) to the internet • I have access to peripheral equipment (i.e., printer, scanner, additional screen, additional hard drive, and docking station)
	Device opportunity: • Desktop and/or laptop is my main device to access the internet • Tablet and/or smartphone is my main device to access the internet
	Maintenance expenses: • I spend money to maintain hardware and software

*Material access is adapted from van Deursen & van Dijk (2018) and all items were scored on a 5-point scale that ranged from 0 = "Not at all true of me" to 5 = "Very true of me"

Access as structural properties defines the availability of physical and material resources to have internet connections. Physical refers to types of connectivity (i.e., wired and wireless); connection quality (i.e., dial-up vs broadband, 3G vs 4G LTE); and access location, such as at home, at work, at school, and public spaces. These indicators measure users' perception of physical access in everyday life. While material resources encompass device opportunity, device and peripheral diversity, and device maintenance (van Deursen and van Dijk, 2018).

Previous studies measured physical access in terms of having or not having internet access that does not fit with this study context of the divide among internet users. Thus, a new physical measure was developed to capture important elements of physical access for internet users. Material resources were adapted from van Deursen and van Dijk's study (2018) as they were treated as dependent variables and

measured using nominal and interval scales. This study defines access as users' perception of resources that represent social structures, and they can enable or constraint internet use. Therefore, a new measure was developed, and the existing measure was adjusted to fit the purpose of the study (see Table 12).

These questions were developed as an eclectic scale designed to measure users' perception about physical and material access. This scale combined a new measure of physical access and existing material access. Three steps were taken to assess the validity and reliability of the scale: (1) EFA was conducted using Maximum Likelihood extraction with varimax rotation to achieve discriminant validity; (2) the reliability of the EFA finding was tested to assure the scale's internal consistency; and (3) lastly, assessed model fit indices to gauge convergent validity. The final scale was used for further statistical analysis.

Table 13. Validity and reliability test of internet access

	Dimension	Reliability (Alpha Cronbach's)	CFA (KMO)	Model-fit indices
The United States	Mobile	0.70	0.73	RMSEA = 0.07, SRMR = 0.03, CFI = 0.97
	Material	0.62		
Indonesia	Fixed	0.79	0.80	RMSEA = 0.07, SRMR = 0.04, CFI = 0.96
	Mobile	0.51		
	Material	0.75		
Both countries	Fixed	0.66	0.68	RMSEA = 0.05, SRMR = 0.08, CFI = 0.95
	Mobile	0.72		
	Material	0.69		

In the United States sample, EFA yielded three discrete factors after three items were dropped. The result depicted that the physical and material dichotomy did not fit the data. Both constructs were interacted and created three new factors: fixed, mobile, and material access. However, the reliability analysis and Confirmatory Factor Analysis suggested fixed access should be dropped. The fixed access factor rendered a low-reliability score (Alpha Cronbach's = 0.30) below the threshold. After excluding fixed access, a new EFA was conducted and the analysis yielded a better value of convergent validity (KMO = 0.73). The reliability test also generated acceptable results for mobile access (Alpha Cronbach's = 0.70)

and material access (Alpha Cronbach's = 0.62). Eventually, the model fit indices advised two components are appropriate to measure internet access (RMSEA = 0.07, SRMR = 0.03, CFI = 0.97).

Three dimensions of fixed, mobile, and material access were formed from eight indicators in the Indonesia study and the scale showed acceptable validity and reliability scores (Table 13). The same constructs were also found when data from the two countries were aggregated. It is likely a three-dimension of internet access is a better scale and model fit indices supported it. In the United States, fixed access did not emerge from the dataset. A high percentage of households in the United States with a computer (89.3%) and internet subscriptions (81.9%) (Census Bureau, 2016) presumably could be a reason that fixed access did not converge as a valid factor of internet access. Home internet is considered the default access and taken for granted by Americans. The CFA results from two countries suggested indicators did not converge into similar dimensions, and the validity and reliability scores indicated a few questions should be dropped or rephrased to improve the scale (e.g., "I can do all desired online activities satisfactorily"). More research is needed to establish a better scale that can conclusively measure physical and material access sustainability.

3.3.4.3. Agents/Agency

Agency is a compound construct of skills, self-efficacy, and attitude to measure actors' competency and autonomy to orient with surroundings (Table 14). Giddens (1984) identified actors as knowledgeable beings who engender cognitive capabilities about the circumstances of their actions. Skills, self-efficacy, and attitude are three dimensions that represent actors' knowledge and motivation to use the internet.

In the empirical analysis presented in section 4, agency was treated as three discrete variables and the findings were interpreted accordingly. The reason for this approach is that merging skills, attitudes, and self-efficacy into one concept could inflate error variance (measurement imprecision) as each dimension measures a particular aspect of the agency. Moreover, in the literature, they are

considered as discrete constructs (for example, Eastin & LaRose, 2000; Oh, et al., 2003; LaRose, et al., 2003).

Table 14. Agency operationalization

Dimension	
Agency is users' skills and psychological states that help them to use the internet	
Sub dimension	**Indicators**
Skills: a set of knowledge to operate and navigate an action	Medium-related (adopted from van Deursen et al., 2016): *Operational skills* • I know how to open downloaded files • I know how to download/save a photo I found online • I know how to use shortcut keys (e.g., CTRL-C for copy) • I know how to open a new tab in my browser • I know how to bookmark a website *Information navigation skills* • I find it hard to decide what the best keywords are to use for online searches • I find it hard to find a website I visited before • I get tired when looking for information online • Sometimes I end up on websites without knowing how I got there • I find the way in which many websites are designed confusing
	Content-related (adopted from van Deursen et al., 2016): *Social skills* • I know which information I should and shouldn't share online • I know when I should and shouldn't share information online • I am careful to make my comments and behaviors appropriate to the situation I find myself in online • I know how to change who I share content with (e.g., friends, friends of friends, or public) • I know how to remove friends from my contact lists *Creative skills* • I know how to create something new from existing online images, music, or video • I know how to make basic changes to the content that others have produced • I know how to design a website • I know which different types of licenses apply to online content • I would feel confident putting video content I have created online

Table 14 (cont'd)

	Safety-related Safety skills • I know how to detect spam email • I know how to change passwords regularly • I know when I encounter unsafe websites Security skills (adopted from LaRose et al., 2008) • I know how to update virus protection • I know how to scan with anti-spyware • I know how to erase cookies • I know how to use a spam filter • I know how to use a firewall • I know how to use a pop-up blocker
Attitude: individual's overall evaluations to performs a particular behavior	Attitude toward the internet (adopted from Helsper et al., 2017) • Technologies such as the internet make life easier • Knowing how to use the internet is beneficial when trying to get a job • I feel that people pressure me to be constantly connected • There are a lot of things on the internet that are good for people like me
Self-efficacy: actors' belief to execute a particular action with the skills they possess	Internet self-efficacy (adopted from Eastin & LaRose, 2000) I feel confident… … understanding terms/words relating to Internet hardware … understanding terms/words relating to Internet software … describing functions of Internet hardware … troubleshooting Internet problems … explaining why a task will not run on the Internet … using the Internet to gather data … confident learning advanced skills within a specific Internet program … turning to an online discussion group when help is needed

*Employing a 5-point agreement scale 1 = "strongly disagree" to 5 = "strongly agree" for all scales.

3.3.4.3.1. Internet skills

Users need to acquire practical knowledge of literacy and competence that can help them to utilize hardware and to navigate in the online environment. This study identified three components of medium-related (van Deursen & van Dijk, 2014), content-related (van Deursen & Helsper, 2015), and safety-related skills (LaRose, et al., 2008) that capture the current development of internet practices. Safety-related skill is a new dimension that is incorporated in this dissertation to evaluate the increasing concern over harmful practices over the internet, such as concern over privacy, data breach, and identity stolen.

Table 15. Validity and reliability tests of internet skills

Dimensions	The United States		Indonesia		Both countries	
	Validity	Reliability	Validity	Reliability	Validity	Reliability
Operational	0.73	0.71	0.80	0.80	0.68	0.62
Navigational	0.92	0.91	0.93	0.91	0.94	0.92
Social	0.71	0.82	0.71	0.82	0.71	0.81
Creative	0.92	0.94	0.92	0.94	0.92	0.94
Safety-security	0.95	0.95	0.94	0.95	0.96	0.95

**Validity score represents KMO and Bartlett's test and Cronbach's Alpha is used to generate reliability count.*

Internet skill consists of dimensions and subdimensions (Table 14) as such medium-related is a composite of operational and information-navigation skills, and social and creative skills make up content-related skills. PCA detected the second-order model of internet skills and the findings showed consistency between the operationalization and empirical data across datasets (Table 15). This suggests the scale appropriately measures the given concept and it is reliable as well.

3.3.4.3.2. Attitude toward the internet

Attitude toward the internet is a psychological element that motivates actors to use the internet. This element describes the potential for action to be carried away by individuals (Giddens, 1984, 1991). Conceptually attitude explains an individual's beliefs and evaluation of the behavior of interest (Fishbein and Ajzen, 2010). Helsper et al. (2017) proposed four questions related to users' comprehensive assessments to use the internet to measure attitude and they are adopted in this dissertation.

After conducted PCA and inter-item reliability analysis, one question "I feel that people pressure me to be constantly connected" was excluded for further analysis. This item failed the reliability and validity test across datasets and the remaining indicators were sustained with acceptable scores (see Table 9).

3.3.4.3.3. Internet self-efficacy

Self-efficacy is one important construct in the Social Learning Theory (Bandura, 1986) and in the digital divide literature, this concept is a significant predictor of internet outcomes and internet use (e.g., Eastin

& LaRose, 2000; LaRose, et al., 2012). Self-efficacy refers to an agent's belief to organize and to execute a particular action required to achieve a goal (Bandura, 1986). A scale of eight indicators from Eastin & LaRose (2000) was replicated in this dissertation and it yielded excellent inter-item consistency (see Table 9).

3.3.5. Control variables

Demographic measures are employed to represent the social backgrounds of respondents. Income, gender, age, race (the United States context), ethnicity, education, marital status, and occupation are controlling variables and previous researches have shown a correlation between demographics and the first (Hargittai, 2001; de Haan, 2003; van Deursen & van Dijk, 2018;) and the second level of the digital divide (DiMaggio et al, 2004; Peter & Valkenburg, 2006; Livingstone & Helsper, 2007). Demographics will be treated as fixed factors to clarify the relationship between corresponding factors.

CHAPTER 4: FINDINGS, ANALYSIS, AND DISCUSSION

This dissertation employed OLS regression analysis and Structural Equation Modelling (SEM) to explore hypotheses and research questions. Regression analysis was conducted to identify factors affecting the three levels of digital divides. To examine the first level of the divide, demographics were used as predictors of the access divide. Skills and internet use are the dependent variables in the second level of the digital divide and components of structure and agency were treated as independent variables. Moreover, demographics were included to control the regression equation. The third level divide assessed factors affecting digital capital and has utilized all variables from the first and the second levels as explanatory variables.

In SEM analysis, the partial least square approach was employed to estimate full model variances of high order constructs involving complex inter-connections between latent and observed variables (Sharma, et al., 2019; Sarstedt et al., 2020). Besides the PLS based approach, the author also tested the model employing a covariance-based approach, using the AMOS software. One limitation of using the covariance-based SEM is that the method could not appropriately assess and estimate the discriminant and construct validity of a model that used formative and reflective constructs simultaneously (see discussion in section 3.3.1), regardless of types of analytical software. Subsequently, with its limitation, AMOS enabled path-analysis to estimate the model and the findings did not satisfy all statistical requirements, mainly the model fit indices. Therefore, this dissertation applied the PLS method to estimate the structuration model. The main advantage of utilizing this approach rather than covariance-based is it is not only identifying commonly shared variance of variables in the model, although it uses total variances to assess the proposed model (Sarstedt et al, 2019). This dissertation utilized SmartPLS software for SEM analysis to generate the structuration models from three datasets: The United States,

Indonesia, and both countries (i.e., two countries data were merged). Moreover, SEM is also utilized to examine digital exclusion and inclusion in the United States and Indonesia.

4.1. Findings

4.1.1. First-level digital divide

Using demographics as independent variables, the findings suggest that a divide in access is not a uniform condition across the countries (Table 16). Status as an unmarried older females with a high school diploma or less and low income were associated with being digitally disadvantaged in the United States. In Indonesia, the picture differs in that the access divide is associated with older cohorts from ethnic minorities without higher education experiences and part of low economic class.

Table 16. OLS estimating access

Predictors	Access		
	United States	**Indonesia**	**Both countries**
Country (The United States)	na	na	**.14** (.17)**
Sex (Male)	**-.24** (.07)**	-.05 (.07)	-.02 (.04)
Education (HS diploma or less)	**.09** (.02)**	**.12** (.03)**	**.11** (.02)**
Income (Less than $34,999)	**.08** (.02)**	**.22** (.02)**	**.13** (.01)**
Marital (Married)	**-.08** (.02)**	.00 (.02)	**-.04** (.01)**
Race/Ethnic	-.02 (.02)	**-.09** (.02)**	**-.05** (.02)**
Occupation (Full-time)	-.02 (.01)	-.02 (.01)	-.00 (.01)
Age	**-.03** (.00)**	**-.02** (.00)**	**-.02** (.00)**
Constant	4.87** (.21)	4.42** (.21)	4.46** (.17)
R^2	.28	.24	.24
N	720	712	1432

Notes: Sig. level ** p<0.01, * p<0.05, p< 0.1. Standard error in parentheses

One interesting fact in the United States part of the study is that race was not a significant predictor. Additional analyses employing weights to the race category to align the survey data with the general population data generated the same result. One possible explanation is the ubiquity of internet access, mainly mobile internet, that alleviates the access gap for minority groups (Perrin & Turner, 2020). Moreover, being female has the strongest effect size (β = -.24, p<.01),followed by education (β = .09, p<.01), income (β = .08, p<.01), marital status (β = -.08, p<.01), and age (β = -.03, p<.01). Despite race,

other demographic predictors are consistent with previous studies in the United States (e.g., Whitacre & Mills, 2007; Bimber, 2000; DiMaggio et al., 2004; Hargittai, 2003; Warschauer, 2004). The OLS model in the United States explained 28% of the variance ($F(7, 712) = 38.69$, $p < .01$) and the finding corroborated access gap studies in higher education (Reisdorf et al., 2020), among older adults (Friemel, 2016), and the general population (Talukdar & Gauri, 2011). These other findings provided hints that demographics can predict between 20% to 30% of the internet access divide.

For Indonesians, when they were asked about internet access, income was the biggest barrier ($\beta = .22$, $p<.01$), and being economically disadvantaged ($\beta = .12$, $p<.01$) is the second factor associated with a marginal position in the digital milieu. In comparison with other ethnicities, Javanese would be advantaged as being non-Javanese correlated negatively with internet access – Javanese is the ethnic majority that makes up over 60% of the population (BPS, 2018). Java Island is the economic epicenter in the country and internet access availability is much better, and usually, internet access is not a constraint factor for Javanese. Education, income, ethnicity, and age estimates 24% variance explained of the access divide in Indonesia ($F(7,704) = 32.45$, $p <.01$). Compared to the United States gender was not a strong factor in explaining differences in access in Indonesia. One possible explanation for this finding may be the involvement of females in the digital economy (Jurriëns & Tapsell, 2017) and their involvement in cultural movements, such as promoting the Hijab movement (Nisa, 2013). Anecdotal evidence suggested women, mainly housewives, in Indonesia are utilizing social media (e.g., Instagram, Facebook) as a platform for e-commerce.

Non-significant negative coefficients on occupation in both countries have given a signal that a part-time job or as an independent contractor becomes a common feature in the digital economy and working as non-full-time workers may install them into infrequent internet access. Education, income, and age are the common predictors in the United States and Indonesia. Nonetheless, two dissimilar social categories were in play in predicting access: gender for Americans and ethnicity in Indonesia. Gender has

remained an important issue and American females are less likely to have constant access. Being the majority of Javanese in Indonesia associated with sustainable access. Examining the overall explanatory power from regression models of the access divide, there is a slight difference between the United States (R^2 = .28, F(7,712) = 38.70 , p<.01) and Indonesia (R^2 = .24, F(,704) = 32.45, p<.01). But it might be caused by one additional, statistically significant, factor in the United States. Therefore, it can be argued demographics can explain a similar proportion of the access divides in both countries comparably well, with about a quarter of the total variance explained.

Moreover, a country dummy variable was developed to control for other country-level factors that were not incorporated in the estimation equation, such as culture, politics, and religion. Treating the country as a dummy variable, the finding suggested that Indonesians had a better chance to improve access. This is plausible as the internet penetration in Indonesia is below 40% (World Bank, 2018) and still has room for further growth, while in the United States with almost 90% (ITU, 2019) penetration the progress in access would be considered plateau. The patterns of the access divide for both countries combined have followed the combination of factors from the two with exceptions sex and occupation and it explains 24% variance in estimating the access divide (F(8, 1423) = 55.42, p < .01).

4.1.2. Second-level digital divide

The second digital divide refers to skills and uses inequalities (DiMaggio et al., 2004; Hargittai, 2002; Helsper et al., 2015; Hsieh et al, 2008), and this dissertation examined them in both countries. In statistical analyses, internet access was incorporated as an independent variable that affects the second level divides along with demographic factors.

4.1.2.1. Internet skills divide

Aggregating three skillsets of medium-related, content-related, and safety-related skills, the regression findings demonstrated access and age are consistent covariates of skills in the United States, Indonesia, and both countries (Table 17). The effect magnitude of access varied in two settings in which it had a high

impact in Indonesia (β = 0.30, p < .01) in comparison with the United States (β = 0.23, p < .01). Meanwhile, age's coefficients have remained the same in each condition (β = -0.30, p < .01).

Moreover, in the United States, status as a female from minority races who earned a high school diploma and less were went hand in hand with the digital skills gap. Social categorizations are associated with a new underprivileged class in the digital milieu. It is argued Americans who are socially marginalized have not as much of an opportunity to reap adequate skills to compete in the internet era. Moreover, access, sex, education, race, and age explained 18% of the skills divide variance into the United States (F(8, 711) = 19.36, p < .01).

Table 17. OLS estimating internet skills

Predictors	Skills		
	The United States	**Indonesia**	**Both countries**
Country (The United States)	na	na	.03 (.04)
Access	**.23** (.03)**	**.30** (.03)**	**.35** (.02)**
Sex (Male)	**-.19** (.06)**	-.02 (.04)	**-.10* (.04)**
Education (HS diploma or less)	**.08** (.02)**	.00 (.02)	**.04* (.01)**
Income (Less than $34,999)	-.01 (.02)	**.06** (.02)**	.00 (.01)
Marital (Married)	-.02 (.02)	-.02 (.02)	-.02 (.01)
Race/Ethnic	**-.05* (.02)**	-.03. (.02)	**-.03* (.01)**
Occupation (Full-time)	.02 (.01)	**-.04** (.01)**	-.01 (.01)
Age	**-.01** (.00)**	**-.01** (.00)**	**-.01** (.00)**
Constant	4.20** (.25)	3.65** (.18)	3.47** (.17)
R^2	.18	.33	.26
N	720	712	1432

Notes: Sig. level ** p<0.01, * p<0.05, p< 0.1. Standard error in parentheses

These patterns are not observable in Indonesia as those who engender low skills usually come from low-income groups and they did not occupy full-time jobs. Economic factors were the biggest challenge while social categories have not appeared as a hindrance to the acquisition of digital skills for Indonesians. The OLS regression model explains 33% of the variance of the skill divide in Indonesia (F(8, 703) = 43.33, p <.01). Moreover, aggregating the datasets from the two countries suggested the country did not create an effect on the skills divide. Moreover, both country's data model followed the United States' specification. Eight explanatory variables explain 26% variance when the two datasets were

combined ($F(9, 1422) = 55.78$, $p < .01$). Demographics and access can explain the skill divide better in Indonesia than in the United States. One interpretation is that other factors (e.g., motivation, need) may have contributed to Americans' digital skills gap. Future research will be needed to explore these issues further, for example, by identifying additional factors of individual and environmental that may contribute to the skills gap in the United States.

Additional OLS was conducted to estimate each dimension of digital skills (Table 18) and it provided a deeper understanding that medium-related, content-related, and safety-related skills gaps varied across demographic characteristics. In the United States, less-educated users might be marginalized further as they lacked content, medium, and safety skills that could help them to strive in the digital society. Moreover, knowledgeable males who had sustainable access would be accelerated as they acquired aptitudes that enable them to be a creative user, to develop social networks, and to safely traverse the online world. The gender gap is persistent, and policymakers need to consider developing policies to improve the possession of medium and safety proficiencies among women. Even though race was elusive in predicting internet access, it emerged as an important factor for non-white Americans to acquire digital skills. They were less likely to have the basic knowledge to operate and to navigate the internet than their counterparts.

Indonesians faced a different challenge. Basic aptitudes to operate and navigate the online world associated with young males who had a steady income and sustainable access, and this is typical of urban users (Sujarwoto & Tampubolon, 2016). More advanced skills, for example, the ability to socially engage through the internet and produce content, were also more often for younger cohorts who had a full-time job and do well financially with stable internet access. Safety skills are supposedly a new knowledge for Indonesians and all independent variables, except for income, are significantly associated with them.

Treating the country as a dummy variable, the findings indicated a country's effect on medium and content skills. Americans were more equipped with basic skills, while Indonesians were adept with

content-related skills. Gender and internet access were consistent predictors of each dimension of digital skills.

4.1.2.2. Internet use divide

This dissertation measured internet use using two components of the amount and the variety that replicated Blank & Groselj's study in 2015. The findings are presented in Table 18. Variables from the skill divide with four additional variables that reflect structure and agency were inserted into OLS regressions to estimate the use divide in different settings. Demographics, access, and agency capacities have shown associated with the use divide, hence these factors varied across datasets. The estimated OLS models explained 43% to 58% of the variance. Overall, this is comparable to similar studies, but it also suggests that additional factors are in play half of the cause of internet use.

Social categories and economic status significantly influenced Americans' internet use. Females ($\beta = -.15$, $p < .01$) and older cohorts ($\beta = -.01$, $p < .01$) were less likely to benefit from internet use. Higher educational attainments ($\beta = .06$, $p < .01$), working full-time ($\beta = -.03$, $p < .01$), and non-white race ($\beta = .04$, $p < .05$) put an individual on the right side of the United States divide. These users were advantaged and more likely to accelerate in the digital world than their counterparts. Moreover, sustainable internet access ($\beta = .36$, $p < .01$) and self-efficacy ($\beta = .18$, $p < .01$) positively boosted the time spent and variety of internet use in the United States. Structure and agency variables in the OLS provided a more nuance understanding ($R^2 = .51$, $F(4, 715) = 188.21$, $p < .01$) beyond traditional demographics predictors ($R^2 = .07$, $F(7, 708) = 15.17$, $p < .01$). The result suggested individuals' internal and external factors influenced the United States of the internet.

Table 18. OLS estimating dimensions of skills divide

Variables	The United States			Indonesia			Both countries		
	Medium	**Content**	**Safety**	**Medium**	**Content**	**Safety**	**Medium**	**Content**	**Safety**
Country (The United States)	na	na	na	na	na	na	**-.15** (.05)**	**.29** (.04)**	-.06 (.06)
Access	.02 (.04)	**.38** (.04)**	**.39** (.06)**	**.12** (.03)**	**.40** (.03)**	**.38** (.04)**	**.18** (.03)**	**.45** (.02)**	**.43** (.03)**
Sex (Male)	.08 (.07)	**-.19*(.07)**	**-.63** (.11)**	**.14** (.06)**	-.08. (.05)	**-.14* (.07)**	**.12** (.05)**	**-.11** (.04)**	**-.32** (.06)**
Education (HS diploma or less)	**.09** (.03)**	**.06* (.02)**	**.09* (.04)**	.04 (.02)	-.02 (.02)	-.02 (.03)	**.06** (.02)**	.02 (.02)	.04 (.02)
Income (Less than $34,999)	-.00 (.02)	.00 (.02)	-.04 (.04)	**.05* (.02)**	**.07** (.02)**	**.07** (.03)**	.01 (.02)	.01 (.01)	.01 (.02)
Marital (Married)	.01 (.02)	**-.05* (.02)**	-.05 (.03)	.02 (.02)	-.02 (.02)	**-.05* (.03)**	.01 (.01)	-.04** (.01)	-.02 (.02)
Race/Ethnic	**-.08** (.02)**	-.02 (.02)	-.05 (.04)	.02 (.02)	-.02 (.02)	**-.09** (.03)**	-.03. (.02)	-.01 (.01)	-.06 (.02)
Occupation (Full-time)	**.04* (.02)**	-.00 (.01)	.01 (.02)	-.02. (.01)	**-.03** (.01)**	**-.07** (.01)**	-.01 (.01)	-.01. (.01)	**-.03* (.01)**
Age	**-.01** (.00)**	**-.02** (.00)**	-.00 (.00)	**-.01* (.00)**	**-.01** (.00)**	**-.02** (.00)**	-.00 (.00)	**-.01** (.00)**	-.00 (.00)
Constant	4.82** (.29)	3.56** (.26)	4.02** (.44)	3.49** (.22)	3.40** (.19)	4.10** (.28)	3.97** (.21)	2.83** (.18)	3.64** (.26)
R^2	.55	.35	.14	.10	.40	.30	.07	.41	.18
N	720	720	720	712	712	712	1432	1432	1432

Notes: Sig. level ** p<0.01, * p<0.05, p< 0.1. Standard error in parentheses

Regarding internet use, Indonesians faced a situation that was different from the United States. Elements of agency: skills and self-efficacy were more pronounced and key determinants in the OLS model. Structure and agency contributed to 36% of internet use ($F(4, 707) = 99.65$, $p < .01$). Adding demographics into the equation only slightly improved the variance ($\Delta R^2 = .07$, $F(7, 700) = 12.15$, $p < .01$). Being part of marginal social groups of unmarried ($\beta = -.04$, $p < .01$), ethnic minorities ($\beta = -.04$, $p < .05$), and older generations ($\beta = -.02$, $p < .01$) was negatively associated with internet use. The result was magnified if these social groups were economically deprived, defined as low income ($\beta = .06$, $p < .01$), and working for non-fulltime occupations ($\beta = -.02$, $p < .01$).

Table 19. OLS estimating internet use

	Internet Use		
Predictor	**The United States**	**Indonesia**	**Both countries**
Country (The United States)	na	na	**.08* (.04)**
Access	**.36** (.03)**	**.15** (.03)**	**.29** (.02)**
Skills	-.01 (.04)	**.18** (.05)**	.01 (.03)
Attitude	.03 (.03)	.06 (.05)	-.02 (.02)
Self-efficacy	**.18** (.03)**	**.14** (.04)**	**.20** (.02)**
Sex (Male)	**-.15** (.05)**	-.06 (.05)	**-.13** (.03)**
Education (HS diploma or less)	**.06** (.02)**	.02 (.02)	**.03* (.01)**
Income (Less than $34,999)	.02 (.02)	**.06** (.02)**	**.03** (.01)**
Marital (Married)	-.01 (.01)	**-.04** (.02)**	-.02. (.01)
Race/Ethnic	**.04* (.02)**	**-.04* (.02)**	-.02 (.01)
Occupation (Full-time)	**-.03** (.01)**	**-.02* (.01)**	**-.03** (.01)**
Age	**-.01** (.00)**	**-.02** (.00)**	**-.01** (.00)**
Constant	1.69** (.24)	1.58** (.28)	1.68** (.18)
R^2	.58	.43	.53
N	720	712	1432

Notes: Sig. level ** p<0.01, * p<0.05, p< 0.1. Standard error in parentheses

The findings from the United States and Indonesia have signaled the importance of agency and structure in predicting internet use. In the United States, variance explained ($R^2 = .58$, $F(7, 708) = 15.16$, $p < .01$) is higher than in Indonesia ($R^2 = .43$, $F(7, 700) = 12.15$, $p < .01$). Access sustainability contributed 13% --two times of self-efficacy-- of the usage divide for Americans and this informed internet physical and material access is more essential than the role of actors to close the gap. A different picture emerged from

the Indonesia data, where agency (i.e., self-efficacy and skills) was more resonant than access in predicting the use gap. These findings from the United States and Indonesia painted a contrasting picture of the usage divide dynamic in each country. Access and actors are two important factors to understand the gap, but their contributions vary and need to be contextualized. Moreover, models for both countries showed that access ($\beta = .29$, $p < .01$) and self-efficacy ($\beta = .20$, $p < .01$) are two major components associated with usage. Overall the model is a hybrid that combines the United States and Indonesia findings. A country variable contributed to the use ($\beta = .08$, $p < .01$) and individuals who reside in Indonesia are likely to spend more time on the screen and to utilize the internet for diverse activities.

4.1.3. Third level digital divide

Digital capital is the most complex construct in the digital divide literature, intended to measure tangible outcomes of using the internet (Scheerder et al., 2017; van Deursen & Helsper, 2015). This dissertation approximated digital capital using economic, cultural, social, and personal capital metrics. The goal was that the new scale is would a comprehensive measure that can capture the complexity of the outcomes concept. PCA and Cronbach's alpha tests were employed to assess the validity and reliability of the scale of the digital outcome. Tests suggested that the scale is well developed (as shown in Table 9) and measured the intended concept.

In the analysis of the third-level digital divide, variables from the first and the second levels were combined to predicts the digital capital divide. In general, demographics did not significantly contribute to digital outcomes in each dataset with two exceptions. First, in the United States, having a full-time job is negatively associated with digital outcome attainment. Second, Indonesians who were economically disadvantaged were less likely to have digital capital. Further analysis also suggested adding demographics into OLS regression contributed to a minuscule impact ($\Delta R^2 = .02$, $F(7, 707) = 2.17$, $p < .05$) in the United States and insignificant in Indonesia ($\Delta R^2 = .01$, $F(7, 699) = .850$, $p > .05$). Psychological factors of attitude and self-efficacy and internet use determined the benefits users gained from the internet.

Notwithstanding, variations across countries. In the United States, attitude (β = -.29, p <.01) and internet use (β = -.12, p<.05) negatively associated with digital capital. These are unexpected findings and need to be interpreted with caution. Those who had positive attitudes toward the internet were associated with lower digital outcomes, while users who saw the internet negatively were associated with higher outcomes.

Table 20. OLS estimating digital outcomes

Predictor	Digital outcomes		
	The United States	**Indonesia**	**Both countries**
Country (The United States)	na	na	**.15** (.05)**
Access	.00 (.04)	.02 (.02)	.03 (.03)
Skills	-.04 (.06)	**-.10** (.04)**	-.05 (.04)
Attitude	**-.29** (.04)**	.05 (.03)	**-.22** (.03)**
Self-efficacy	.02 (.04)	**.13** (.03)**	.04 (.03)
Internet use	**-.12* (.05)**	**.21** (.03)**	.02 (.03)
Sex (Male)	-.10 (.07)	.03 (.03)	-.02 (.04)
Education (HS diploma or less)	.04 (.03)	-.01 (.01)	.02 (.02)
Income (Less than $34,999)	.01 (.02)	.02. (.01)	.03. (.01)
Marital (Married)	.01 (.02)	.01 (.01)	.01 (.01)
Race/Ethnic	.02 (.02)	-.00 (.01)	.00 (.02)
Occupation (Full-time)	**-.03* (.02)**	.00 (.01)	-.02. (.01)
Age	.00 (.00)	.00 (.00)	.00 (.00)
Constant	5.69** (.34)	2.29** (.21)	4.38** (.22)
R^2	.14	.24	.07
N	720	712	1432

Notes: Sig. level ** p<0.01, * p<0.05, p< 0.1. Standard error in parentheses

A similar inference seems to explain the negative relationship between internet use and digital outcomes. Several interpretations could be offered, such as Americans might be prudent users that restrain internet use and only conduct activities that benefit them. Another possible explanation is that they understand that the internet can be detrimental to a person. Discussion on issues of social displacement (Kraut et al., 1998; Dimmick et al, 2004), privacy infringement (Clarke, 1999), and excessive or addiction (Weinstein & Lejoyeux, 2010; Grohol, 1999) have deterred users. However, these are educated guesses and more research is needed to elucidate these unexpected findings.

A different narrative emerged from the observations in Indonesia, self-efficacy (β = .13, p<.01) and internet use (β = .21, p<.01) correlated with positive outcomes while having adequate digital skills (β = -.10, p<.01) rendered fewer digital benefits. Those who were confident in using the internet for diverse purposes also were characterized by high digital capital. At the same time, inept users are associated with gaining higher internet outcomes than their counterparts. In contrast, adept individuals are less likely to earn capital in the online world as they are economically privileged in the offline world (see Table 19). A negative relationship between skills and digital outcomes deviates from the expectation and it is not easy to understand since the evidence is anecdotal. Additional analyses using a moderation strategy.

4.1.4. A structuration model of the digital divide

The structuration (Giddens, 1984) posited the interaction of structure and agency will affect social actions and this dissertation showed the interaction could have happened under specific circumstances. Using SEM analysis to test the structuration model of the digital divide, the findings in the United States and Indonesia provided a different path. An agency and structure interaction has happened in the United States data; hence it did not take place in Indonesia.

SEM involved several stages as four out of six variables were involved in second-order factor analysis. For example, skills consisted of five dimensions: operational, navigational, social, creative, and safe security that required first-order factor analysis to measure the validity of each dimension and second-order to validate skills as a variable. The first stage necessitated manifest variables (i.e., indicators for each dimension) grouped into one dimension using a reflective latent variable strategy. In the second-order, the formative latent variable method was employed in which each dimension formed a variable for the final model. Employing SmartPLS, the structuration model of the digital divide model was estimated. The first-order and the second-order must satisfy convergent validity[8] (i.e., composite reliability and

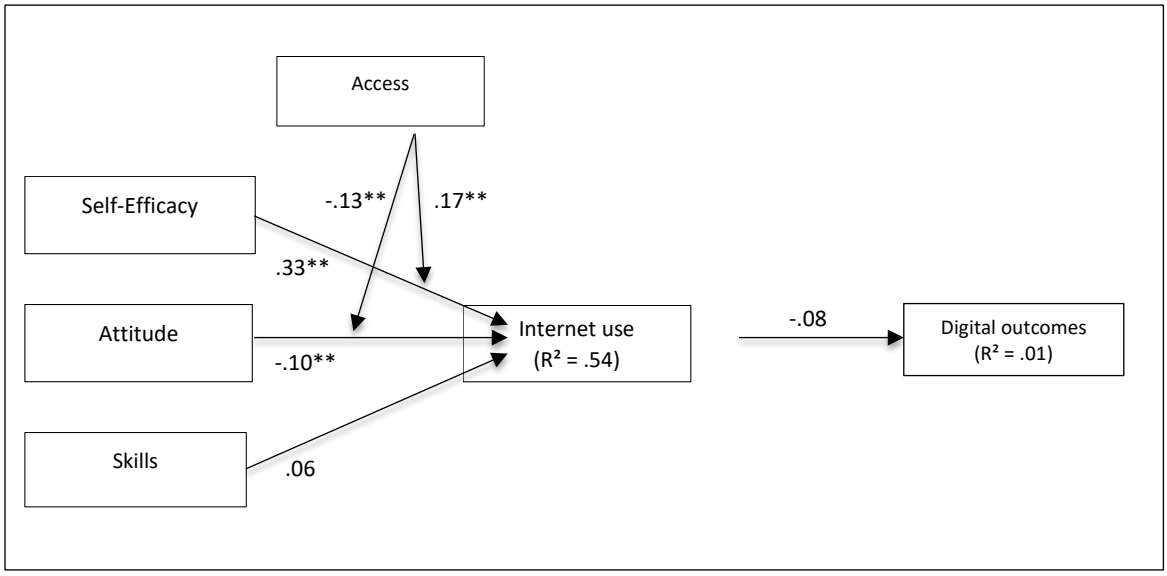
[8] The composite reliability score should be no less than 0.7 for each dimension and variable, while AVE scores have to be 0.5 and over.

Average Variance Extracted (AVE)) and discriminant validity[9] (i.e., Fornell-Larcker criterion and Heterotrait-Monotrait Ratio (HTMT)). In the process, several manifest variables were dropped to achieve convergent and discriminant validity. After the model specified and met the requirement, the full model was developed using standardized scores of latent variables. The figures presented in this section only depicted the full model (variable level of analysis).

4.1.4.1. Structuration model in the United States

After the model was specified to satisfy convergent and discriminant validity thresholds, the full model was established for the final analysis. Interactions of agency and structure appeared in the model in which access interacted with psychological elements of agency, self-efficacy, and attitude. Figure 3 showed the final results of the structuration model also rendered adequate model fit indices that reflected the data (χ^2 = 78.86, NFI = 0.95, SRMR = 0.07) and the structuration process explained 54% variance of internet use.

Figure 3. The structuration model of the United States

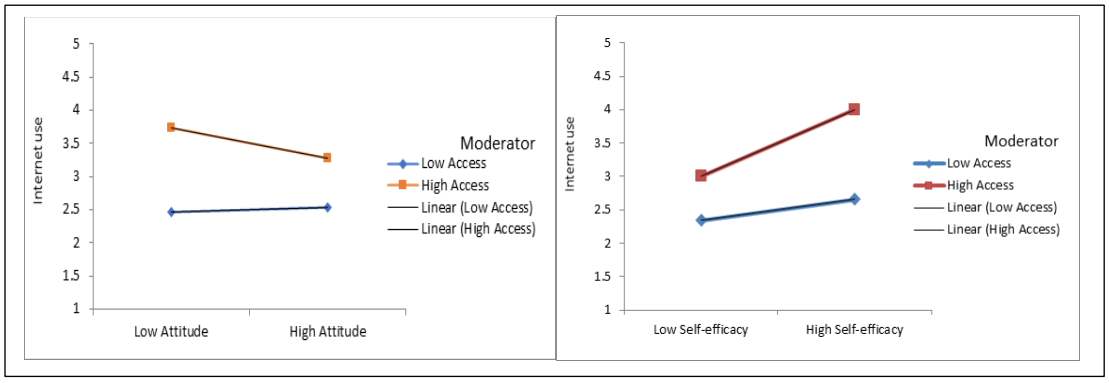


Sig. level ** p<0.01, * p<0.05, p< 0.1

[9] Fornel-Larcker criterion suggested the AVE square of a variable should be greater than the square latent variable correlations and HTMT value have to be below 0.9 two assess discriminant validity between two reflective constructs.

The model indicated a sequence in which agency and the interaction of agency and structure were associated with internet practice, which, in turn, was connected with the attainment of digital capital. In the first part of the process, the finding identified self-efficacy (β = .33, p <.01) and attitude (β = -.10, p <.01) affected internet use. There are two important messages from these results: (1) hypothesis four is supported that indeed those who possess high self-efficacy used the internet frequently through diverse activities and (2) hypothesis three, that positive attitude negatively correlated with internet use, is not supported. Moreover, these elements interacted with access (see Figure 4). Access fortified the positive relationship between self-efficacy and internet use, and it means access would promote the effect of self-efficacy on the use of the internet. The finding is expected. Users who engender high confidence would use the internet more frequently for various purposes when internet access is sustainable. The effect of self-efficacy on internet use is different for different values of access sustainability. The impact of self-efficacy on internet use is greater for those with relatively stable access rather than ones who have intermittent connections.

Figure 4. The structure and agency interactions in the United States



However, at the same time, access has reinforced the negative association between attitude and internet use. Attitude's impact on internet use is varied across access values. For instance, for those who have sustained access, having a positive attitude would decrease internet use exponentially in comparison with users who are skeptical toward the internet. Whereas the effect of having a positive or negative

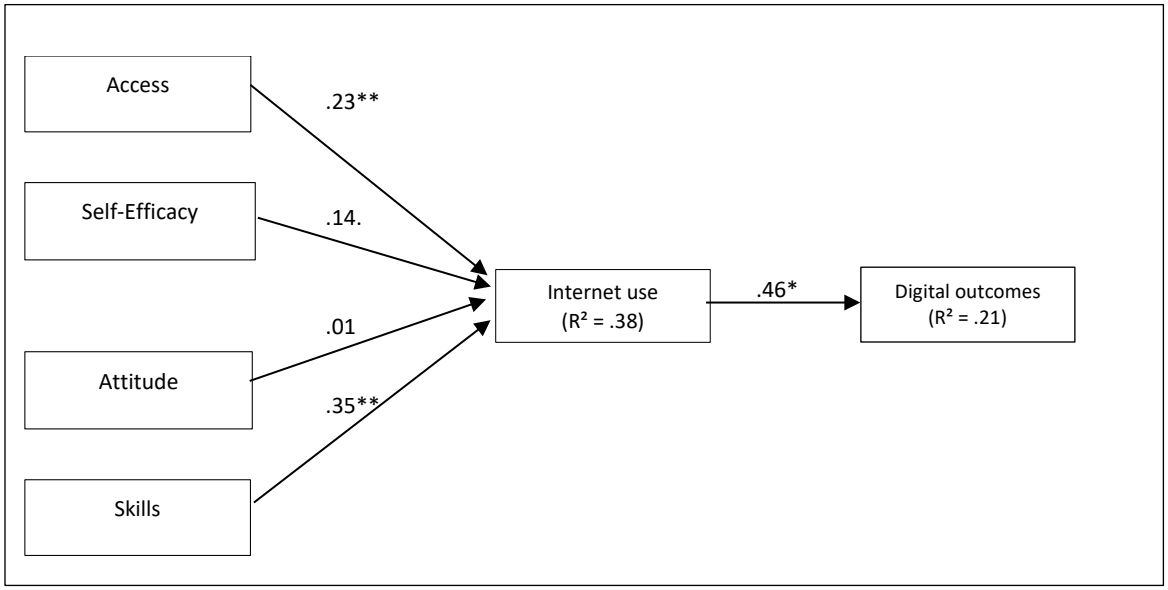
attitude on internet use is relatively marginal for those with low access. This finding corroborates the result from section 4.1.3. One possibility it the existence of a negative relationship between attitude and internet use but the study did not generate specific data to support such a claim. Future research will need to investigate further whether this negative relationship can be found and what factors can explain it. Furthermore, the United States structuration model yielded an insignificant negative association between the second level of the digital divide, internet use, and digital capital ($\beta = -.08$, $p > .05$). Again, this finding was unexpected in that those who use the internet frequently for diverse purposes are less likely to be associated with higher digital capital. Again, more future research is needed to examine these associations. Additional examinations in identifying indirect effects in the model yielded insignificant path coefficients toward digital capital (Table can be found in the appendix). No factors in the structuration model associated with digital capital attainment in the United States but through a marginal effect of internet use. Digital outcomes might be a result of other factors that were not incorporated into the model.

4.1.4.2. Structuration model in Indonesia

The results from the Indonesian survey diverged from the structuration model (see Figure 5). Rather than moderating the effect of agency on internet use, access became an independent variable that directly connected to the usage. Skills ($\beta = .35$, $p < .01$) and access ($\beta = .23$, $p < .01$) has become significantly associated with internet use. This result suggested hypotheses one and two are supported that access as external resources and digital skills positively correlated with the amount of time and variability of internet use. Moreover, exogenous variables contributed to 38% variance explained of internet use and subsequently, confirming hypothesis five that internet use generated a positive strong effect on digital capital ($f^2 = .27$). Model-fit matrices suggested the SEM model for Indonesia consistent with the data ($\chi^2 = 38.96$, NFI = 0.98, SRMR = 0.05), and no more specifications are needed.

Structure and agency are two separate factors, and they are associated with internet practices independently. The duality of agency and structure did not emerge from Indonesia's data that suggests users are barely equipped with the capabilities to monitor surroundings and reflexively react upon them (Giddens, 1991). Indonesian internet users are seemingly more traditional in that their actions are either driven by the sustainability of access or inner skills to operate and navigate the internet. One possible interpretation is the internet adoption in Indonesia is considered recent and it was started at the end of the 1990s (Hill & Sen, 2000; Lim, 2003). The internet has not fully developed yet, and it may influence users' digital competencies and capabilities. Indonesian users considered either skills or access as contributing factors correlated with their usage. They did not necessarily engender a positive attitude about the internet nor had high self-efficacy to start utilizing the internet.

Figure 5. The structuration model of Indonesia



Sig. level ** p<0.01, * p<0.05, p< 0.1

Digital capital is associated with internet use and this process resembles Helsper's (2012) corresponding fields model in which capital is obtained through a connection with internet use. This model also suggested relationships between three levels of the digital divide in which access, skills, use, and capital are interrelated as a process. The SEM findings supported these interconnections through

three indirect paths: (1) digital capital can be observed through access and internet use connection (β = .11, p <.01), (2) skills connected with internet use that subsequently correlated with digital attainments (β = .16, p <.01), and (3) self-efficacy, internet use, and digital capital paths, hence it yielded small coefficient and marginally significant (β = .07, p <.10).

Table 21. Indirect effect to estimate digital outcomes

Specific indirect effects	β	sd	P Values
Acc*Att -> InternetUse -> Digital outcomes	-0.01	0.03	0.75
Acc*SelfEff -> InternetUse -> Digital outcomes	-0.03	0.03	0.37
Acc*Skills -> InternetUse -> Digital outcomes	0.05	0.04	0.20
Access -> InternetUse -> Digital outcomes	**0.11**	0.02	**0.00**
Attitude -> InternetUse -> Digital outcomes	0.01	0.03	0.79
SelfEfficacy -> InternetUse -> Digital outcomes	0.07	0.04	0.10
Skills -> InternetUse -> Digital outcomes	**0.16**	0.05	**0.00**

Note: $p < .01$, $\chi^2 = 38.96$, NFI = 0.98, SRMR = 0.05

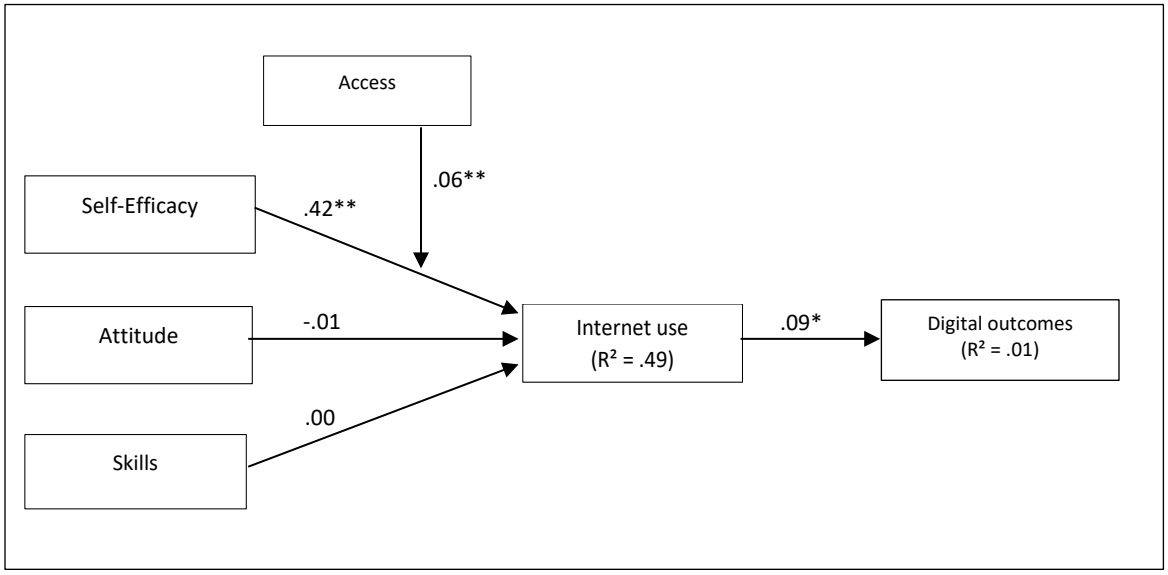
Digital outcomes were not only connected through a direct path from internet use, they can also be followed through indirectness (Table 21). Access was associated with internet use that eventually correlated to the digital capital (β = .11, p < .01). A similar indirect effect also occurred when the connection of skills to digital outcomes was mediated by internet use (β = .11, p < .01). This informs that Indonesians who have sustainable access or yield adequate digital skills might connect to the attainment of digital outcomes when they use the internet frequently to cater to diverse purposes. Moreover, engagement with the internet was crucially mediated the digital capital, and Indonesians who utilize the internet in daily life would likely benefit from it, even when the impact is weak. One last important finding from Indonesia is that skills (β = .08, p < .05) and access (β = .05, p < .05) could directly connected to digital outcomes. This suggests skills and access are two important elements to understand the divides in Indonesia.

4.1.4.3. A combined structuration model

This section attempts to understand whether a combination of the two datasets offers a different picture of the structuration process. Prior analysis raise a flag of caution in that the results may just be a hybrid model in between each country's findings.

Merging data from the United States and Indonesia, SEM analysis informed a connection between three levels of digital divides (see Figure 6). Access moderated the effect of self-efficacy on internet use that subsequently correlated with the outcomes. Attitude and skills did not associate with internet use as their coefficients were considered weak and insignificant.

Figure 6. The structuration model of both countries data merged

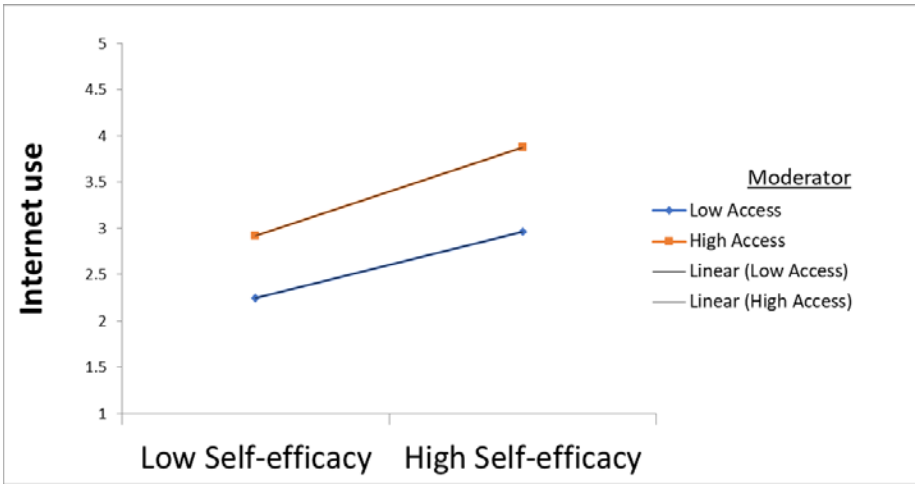


Sig. level ** p<0.01, * p<0.05, p< 0.1

An interaction of access and self-efficacy (β = .06, p<.01) suggests that access strengthened the positive relationship between self-efficacy and internet use (β = .42, p<.01). Sustainable access and internet use are positively correlated, and it might indicate those who were already confident with the technology used the internet frequently to cater to diverse needs. Moreover, for someone who has low self-efficacy, owning sustainable access is associated with positive internet use in comparison to their counterpart. The magnitude of self-efficacy on internet use became stronger when internet access was

prolonged (see Figure 7). Exogenous variables explained 49% of internet usage variances and then correlated with digital capital. Hence the coefficient between internet use and digital capital is considered small, it is significant (f^2 = .01).

Figure 7. The interaction of structure and agency in both countries merged



The SEM results also suggested three indirect paths that led to the digital capital realization (Table 22). Firstly, self-efficacy connected with the use of the internet and later on produced digital capital (β = .04, p <.01), and the second path is internet use bridged a route between access and self-efficacy interaction and capital (β = .01, p <.05). Lastly, access created a path to digital outcomes when mediated by internet use (β = .04, p <.01). Albeit, the small coefficient effects were rendered by the indirectness, they differed from zero and not by a mere chance. Inter-relationships among three levels of the digital divide that emerged from the data have suggested dynamic connections. However, this dissertation has a limitation with cross-sectional data and no further inference can be made.

Integrating the two data sets rendered a hybrid model of the structuration that diverges from the findings from two countries. The coefficients of magnitude of attitude (β = -.01, p > .05) from the United States model and of skills (β = .00, p > .05) in Indonesia data were decreased in the input stage; while access (β = .04, p < .01) and skills (β = .04, p < .05) produced a direct path on digital capital. This suggests

when countries' specific conditions were discarded, self-efficacy, and access have become the main elements associated with internet use and digital outcomes in the structuration model. Self-confident users who have sustainable access might be advantaged from the internet and their online activities correlated directly with the attainment of digital outcomes.

Finally, two important notes from the two countries' data are that the findings corroborate hypotheses one and five that the former indicated a positive association between access and internet use, whereas the latter affirmed internet use and digital capital positive relationship.

Table 22. Indirect effects to estimate digital outcomes

Specific indirect effects	β	sd	P Values
Acc*SelfEff -> InternetUse -> Digital outcomes	**0.01**	0.00	**0.03**
Access -> InternetUse -> Digital outcomes	**0.04**	0.01	**0.00**
Attitude -> InternetUse -> Digital outcomes	0.00	0.00	0.61
SelfEfficacy -> InternetUse -> Digital outcomes	**0.04**	0.01	**0.01**
Skills -> InternetUse -> Digital outcomes	0.00	0.00	0.94

Notes: $p<.05$, ($\chi^2 = 54.75$, NFI = .98, SRMR = 0.04).

4.1.5. Digital inclusion and digital exclusion

4.1.5.1. Inclusion and exclusion: third level of the digital divide

The findings from previous sections (4.1.1. to 4.1.3.) suggested variations of factors influencing each level of the digital divide in the United States and Indonesia. This section explores further whether the gap varies between those who are received more and less digital outcomes. The reasons behind this analysis were explained in section 2.1.4.2. and understanding inclusion and exclusion can inform future research and decision-makers that factors affecting those who yield fewer digital outcomes are different than others who earn higher outcomes. There are layers of digital divides among internet users.

This dissertation has considered users who generate higher benefits from the internet are digitally included and those who yield fewer advantages tend to be digitally excluded. Grounding on this assumption, logistic regression was employed to estimate factors affecting the change of digital outcomes between those who were excluded and included, and the findings are shown in Table 23. The table depicts

the logit estimand of digital capital when it was treated as a binary value and compares it with the finding from the OLS model (see also Table 20, OLS regression of digital outcomes).

Table 23. Estimating factors affecting digital exclusion and inclusion.

Predictors	The United States			Indonesia		
	OLS	Logistic		OLS	Logistic	
	β	β	Exp(β)	β	β	Exp(β)
Access	.00 (.04)	.00 (.11)	1.00	.02 (.02)	.07 (.15)	1.07
Skills	-.04 (.06)	-.12 (.15)	0.88	**-.10** (.04)**	**-.54* (.28)**	0.58
Attitude	**-.29** (.04)**	**-.64** (.12)**	0.53	.05 (.03)	.06 (.22)	1.06
Self-efficacy	.02 (.04)	.07 (.10)	1.07	**.13** (.03)**	**.42** (.20)**	1.52
Internet use	**-.12* (.05)**	-.19 (.14)	0.82	**.21** (.03)**	**1.01** (.18)**	2.76
Sex (Male)	-.10 (.07)	-.22 (.19)	0.80	.03 (.03)	.35. (.22)	1.42
Education (HS diploma or less)	.04 (.03)	.09 (.07)	1.09	-.01 (.01)	-.13 (.09)	0.88
Income (Less than $34,999)	.01 (.02)	**.12* (.06)**	1.13	.02. (.01)	**.18* (.09)**	1.20
Marital (Married)	.01 (.02)	.08 (.05)	1.08	.01 (.01)	.07 (.07)	1.07
Race/Ethnic	.02 (.02)	.01 (.07)	1.01	-.00 (.01)	.07 (.11)	1.08
Occupation (Full-time)	**-.03* (.02)**	-.04 (.04)	0.96	.00 (.01)	-.06 (.05)	0.94
Age	.00 (.00)	-.01 (.01)	0.99	.00 (.00)	.01 (.01)	1.01
Constant	5.69** (.34)	4.02** (.99)	55.53	2.29** (.21)	-4.56** (1.33)	0.01
R^2	.14	-		.24	-	
Pseudo R^2 (Cox and Snell)	-	.11		-	.17	
N	720			712		

Notes: Dependent Variable for logistic regression is a binary digital capital (reference category = Low); while OLS has measured digital capital in a continuous value.
Sig. level ** p<0.01, * p<0.05, p< 0.1, standard error in parentheses
Logistic regression, β = log odds, Exp (β) = odds ratio

In the United States, attitude and income seem to be important factors that connect to a digital outcome improvement. For Americans who had a positive attitude toward the internet, the odds of having high digital capitals are 47% lower than those with a low attitude. This aligns with the OLS result that there was a negative association between attitude and digital outcomes. Internet use and occupation association were diminished in logistic regression, while income has emerged. Users who earned $35,000

and over would have the odds of 13% higher to gain digital inclusion than those whose income is less than $35,000.

The finding from Indonesia depicted that skills, self-efficacy, and internet use have remained significant contributors, in similar directions, for the attainment of digital capital. Skills are negatively associated with the outcome, while self-efficacy and internet use could improve digital outcomes. Although one additional factor, income, associated with digital inclusion. Those who earned more than the baseline group had 20% better odds to gain higher digital capital. The negative association of skills on the attainment of digital capital is unexpected but could not be fully explained from the available data.

Income as an external structure could shape the condition of the internet milieu, mainly to inhibit and to promote digital inclusion and exclusion. Those with financial gain have a better opportunity to raise digital capital than their counterparts. This signal a divide among internet users and income discrepancies would meaningfully be correlated with the attainment of digital benefits. Internet users could still gain digital benefits, but they were not distributed equally. Unfortunately, the distribution followed economic stratification, and the evidence was put forth from the United States and Indonesia data.

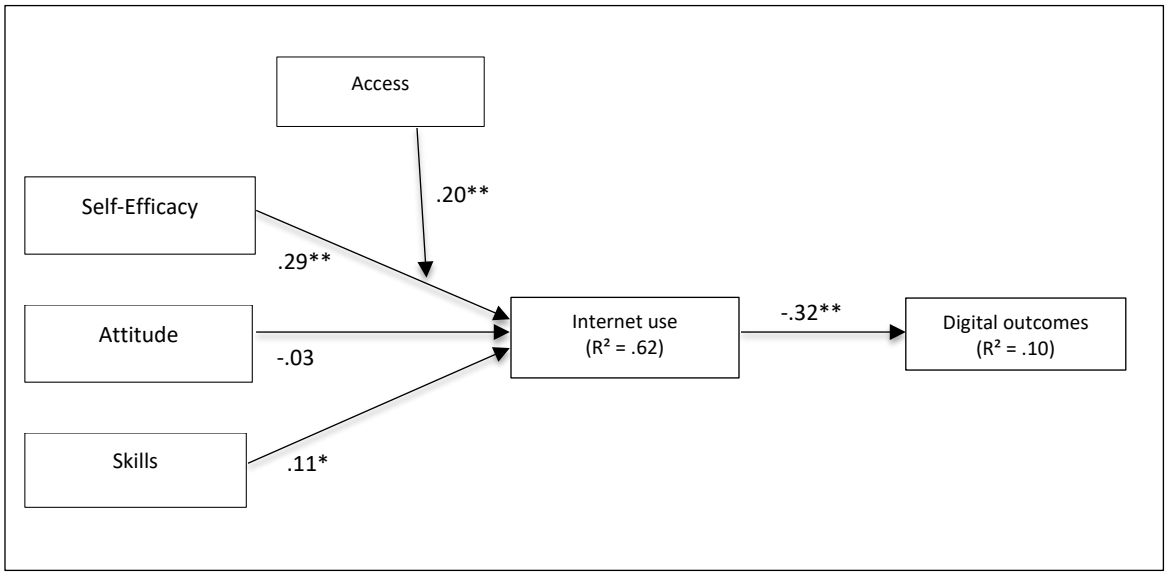
4.1.5.2. Inclusion and exclusion: the structuration model in the United States

Differentiating those who received high and low digital outcomes provided granular information to the extent inclusion and exclusion has occurred in the country. The findings delineated that the structuration for those who gained low digital outcomes (Figure 8) diverged from the country's model (Figure 3). While in the high digital outcomes condition (Figure 10), the structuration framework aligned with the finding from the United States data.

The framework in the low digital capital delineated self-efficacy is the only exogenous variable that interacted with access. Self-efficacy positively associated with Internet use ($\beta = .29$, $p<.01$), while its interaction with access also rendered a positive relationship with internet engagement ($\beta = .20$, $p<.01$). Internet use mediated a relationship between structure and agency elements. A negative correlation

between internet use and digital outcomes (β = -.32, p<.01) is unexpected, nonetheless it is consistent with findings from sections 4.1.3. Those who used the internet intermittently gained more outcomes than frequent internet users.

Figure 8. The structuration model of the United States – digital outcomes "low" condition



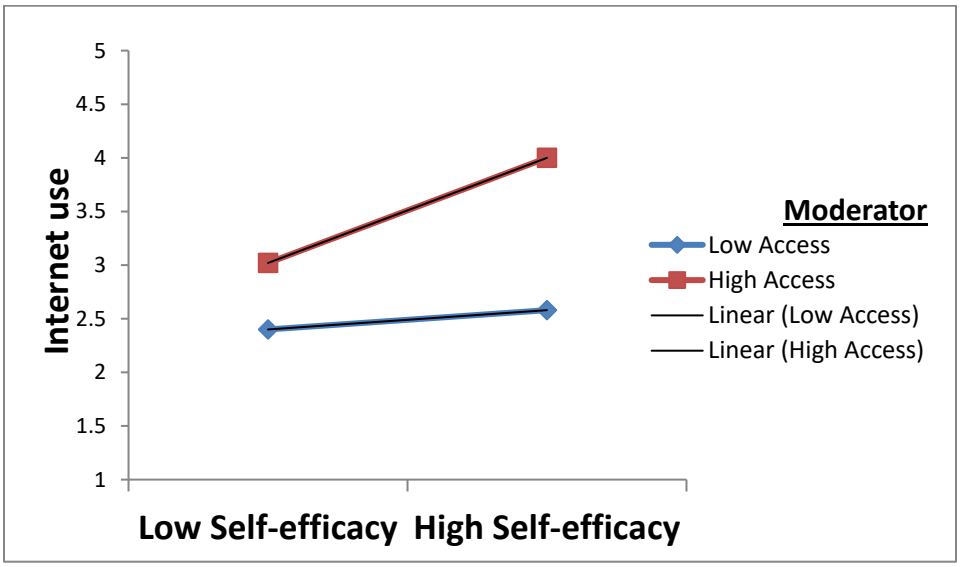
Notes: Sig. level ** p<0.01, * p<0.05, p< 0.1; model fit indices: χ^2 = 3.64, NFI = .996, SRMR = .022.

Looking closely at the interaction element in the model, it informed that access strengthened the positive relationship between self-efficacy and internet use (Figure 9). The effect of self-efficacy on internet use was conditional and varied across access values. The gap of internet use between those with low and high self-efficacy was relatively steady when access was low. However, when access was intensified the divide between low and high has increased exponentially. Providing sustainable access could be a strategy to improve internet use, mainly for those who are self-confident.

SEM analysis for those who gained high outcomes almost replicates the structuration model at the country level and the only difference is a significant negative association between internet use and digital outcomes (β = -.26, p<.01). The finding suggested that internet use mediated a connection between structure and agency, and digital outcomes. It also indicated the structuration associated with internet practices and subsequently, connected to the attainment of outcomes. However, the finding from cross-

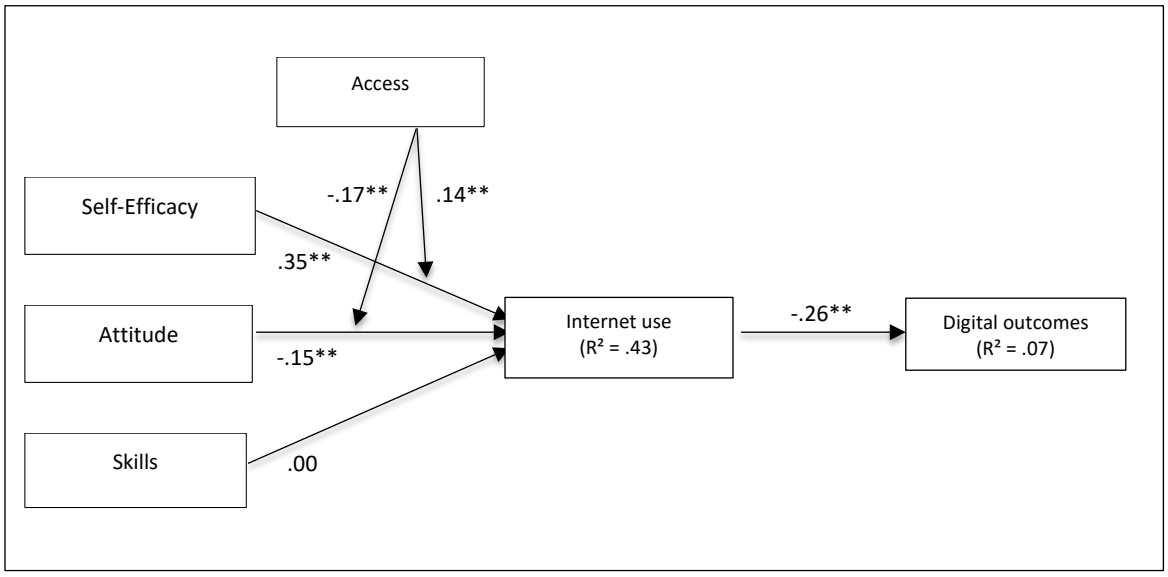
sectional data cannot suggest that the process works in sequence as a causal mechanism. This is only an early signal and future research is needed to confirm the structuration process.

Figure 9. Access and self-efficacy interaction for low digital outcomes



A similar interpretation, as section 4.1.4.1., is derived to explain the finding in high outcomes condition. Self-efficacy positively associated with internet use (β = .35, p<.01), while attitude correlated negatively with internet use (β = -.15, p<.01). Furthermore, access gave a conditional of moderating effect (Figure 11) on the relationship between self-efficacy on internet use (β = .14, p<.01) and the effect of attitude on internet engagement (β = -.17, p<.01). The amount of time spent on the internet and usage variability of the internet was connected to the decrease of digital capital and this result is consistent with the third level divide finding (section 4.1.3.). In a high outcomes condition, internet use is significantly associated with the attainment of digital capital, but the direction is negative.

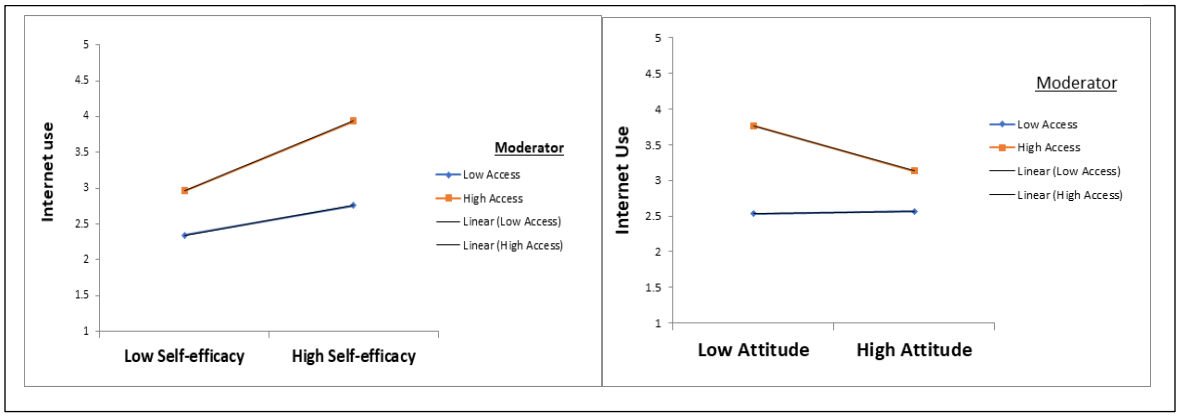
Figure 10. The structuration model of the United States – digital outcomes "high" condition



Notes: Sig. level ** p<0.01, * p<0.05, p< 0.1; Model fit indices: χ^2 = 16.67, NFI = .984, SRMR = .037.

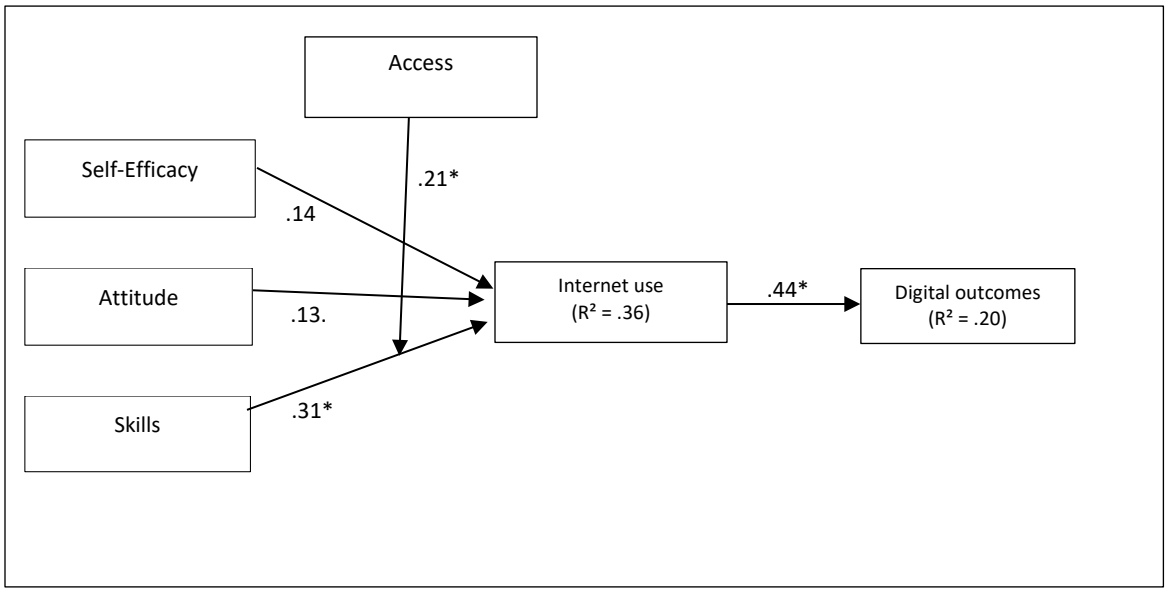
The interactions between elements of agency and access as structure rendered a different magnitude on internet use. Access reinforced a positive relationship between self-efficacy and internet use, while it brought a negative impact on the connection between attitude and internet usage. From both interactions, the effect of agency elements on internet use was stronger when access has become sustainable.

Figure 11. Interactions for high digital outcomes



4.1.5.3. Inclusion and exclusion: the structuration model in Indonesia

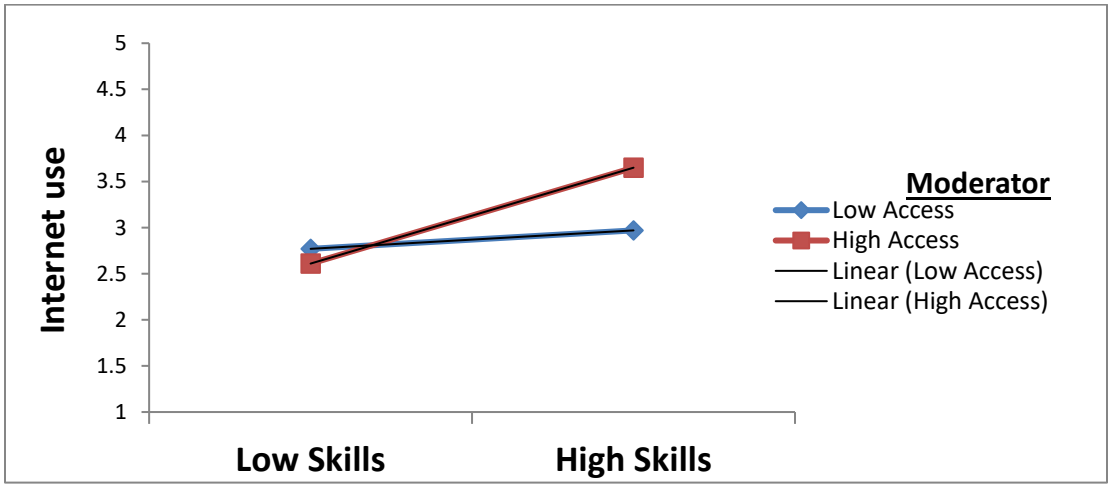
Figure 12. The structuration model of Indonesia – digital outcomes "low" condition



Notes: Sig. level ** p<0.01, * p<0.05, p< 0.1; Model fit indices: χ^2 = 18.41, NFI = .975, SRMR = .055

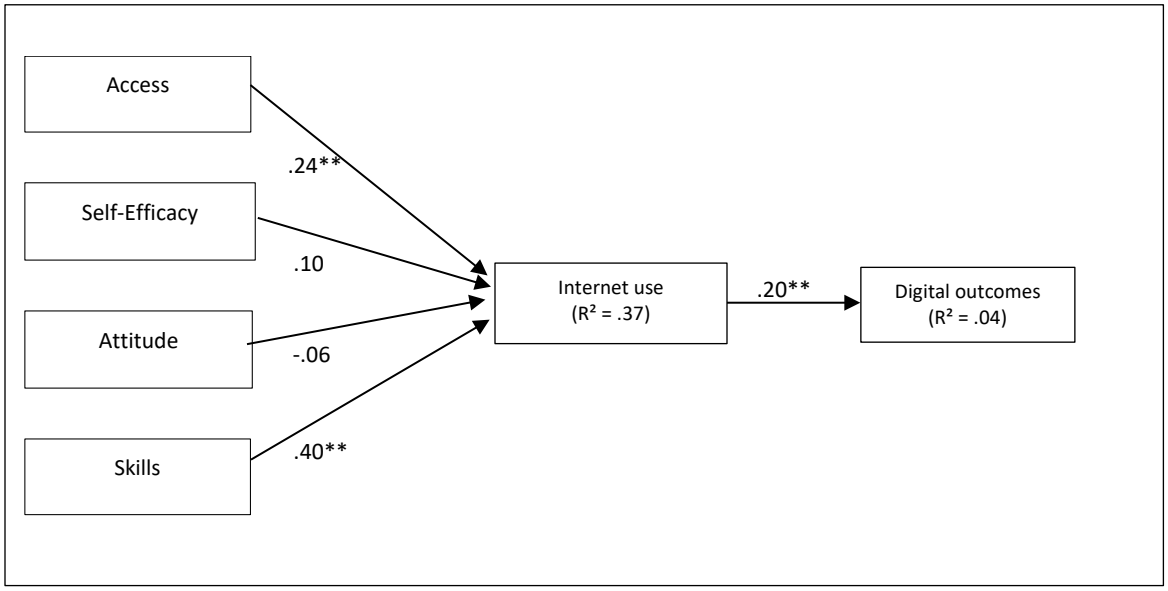
A new pattern emerged from Indonesia data when the model estimated those who earned low digital capital (Figure 12). Diverge from the model at the country level (Figure 5), access rather than directly connected to internet use, interacted with skills. Other than this exception, the model followed the previous finding in section 4.1.4.2. Skills improved internet use (β = .31, p<.01) that afterward, the usage associated with the positive attainment of digital outcomes (β = .44, p<.01).

Figure 13. Skills and access interaction for low digital outcomes



Access gave a positive conditional effect of skills on internet use and the impact magnitude increased exponentially for those who had sustainable access (see Figure 13). Users who had limited access could also yield improvement in their internet usage, yet the effect is less strong. However, these conditions only applied when digital outcomes were set at a low condition. In the high outcome conditions, the model replicated the country's model (see Figure 5). There was no interaction and access became an exogenous variable in the model. Skills (β = .40, p<.01) and access (β = .24, p<.01) positively associated with internet use that subsequently connected with digital outcomes (β = .20, p<.01).

Figure 14. The structuration model of Indonesia – digital outcomes "high" condition



Notes: Sig. level ** p<0.01, * p<0.05, p< 0.1; Model fit indices: χ^2 = 12.29, NFI = .986, SRMR = .049

Moreover, the finding in high digital outcomes conditions partially supported the Resources and Appropriation Theory of the digital divide (van Dijk, 2005, 2020). The theory postulated a connection between three levels of digital divides that access influences internet usage that eventually leads to the attainment of digital outcomes (i.e., participation in society). However, this theory has not been tested empirically, and only a part of the model was assessed in several studies (see examples, Helsper, et al., 2015; van Deursen, et al., 2017; van Deursen & van Dijk, 2015; van Deursen & van Dijk, 2011; van Deursen & van Dijk, 2009; van Dijk & van Deursen, 2014; van Dijk & Hacker, 2003).

4.1.6. Summary of findings

This dissertation proposed five hypotheses and one research question (section 2.4). Several statistical methods were used to test them (see Table 24). Internet access has indeed contributed to internet use regardless of country-specific conditions. The study found positive relationships of varying magnitudes across data sets. These confirm hypothesis one (H1). The strongest association was found in the United States ($\beta = .50$, $p < .01$); while the association was weaker in Indonesia ($\beta = .23$, $p < .01$). Merging the two datasets to explore whether one statistical model applies to both countries yielded a moderate correlation between internet access and internet use ($\beta = .40$, $p < .01$).

Hypothesis four (H4), that self-efficacy had a positive significant result on internet use, was also supported for each country, and when two countries' data were merged. The positive coefficient sign implies that users with higher self-efficacy were more likely to spend more time online and to utilize the internet for diverse activities. The magnitude of this association in each dataset is considered moderate and has the strongest effect when two countries' data were aggregated ($\beta = .42$, $p < .01$).

A positive relationship between skills and internet use could only be detected in the Indonesian data but not in the United States, thus hypothesis two (H2) is only evidenced in one country. The magnitude is considered a moderate effect ($\beta = .42$, $p < .01$). Skillful Indonesians more frequently use the internet to cater to diverse needs. In contrast, hypothesis 3 was not supported in three conditions. Albeit a significant negative association was found in the United States data that a positive attitude toward the internet negatively affected American users ($\beta = -.10$, $p < .01$). Grounding on this finding, again, Americans can be deemed savvy users who understand the internet better, including evaluating the good and the bad of this technology.

The last hypothesis, H5, proposed a positive relationship between internet use and digital outcomes. The findings showed the connection only happened in Indonesia and when data from the two

countries were merged. The association was stronger for the for Indonesian data (β = .46, p < .01), while the coefficient for the combined data was weaker (β = .09, p < .01).

Table 24. Summary of findings

Hypothesis	United States	Indonesia	Both
H1: Access --> internet use	√ (+)	√ (+)	√ (+)
H2: Skills --> internet use	..	√ (+)	..
H3: Attitude --> internet use	..*	..	..
H4: Self-efficacy --> internet use	√ (+)	√ (+)	√ (+)
H5: Internet use --> outcomes	..	√ (+)	√ (+)
Research question			
Access*SelfEff --> internet use	√ (+)	..	√ (+)
Access*Attitude --> internet use	√ (-)	..	..

Notes: Symbols in parentheses inform positive (+) or negative (-) directions of the path coefficient. (√) refers to significant coefficients and (..) represents insignificant results that occurred by chance.
* significant relationship with a negative coefficient

The research question sought to clarify whether evidence of structuration could be found in the two countries. The findings could not prove that the structuration as a process has occurred. However, this dissertation provided a signal that elements of agency (i.e., self-efficacy and skills) interacted with access as an external structure, especially in the United States and when two countries' data were merged. It can be argued that the interactions could reflect users as self-governing actors who act independently notwithstanding external constraints that may inhibit their actions (Giddens, 1984; Bandura, 1986). Furthermore, American users experienced two different paths of structuration--that self-efficacy improves internet practices when access is sustained and, in another circumstance, attitude restrained the use of the internet even when access is prolonged. This suggests the externality of internet access intermingled with individuals' psychological components of self-efficacy and attitude. Access can inhibit or propel internet practices.

Building on this finding, American subjects are considered mature users and they can reflexively monitor external constraints and act accordingly (Gidden, 1993, 1991). These findings on structuration

may inform future studies on the digital divide that moves beyond demographics and psychological assessment.

4.2. Analysis and discussion

There is no unitary model that emerged from the data, and the digital divide is, indeed, a dynamic phenomenon (van Dijk & Hacker, 2003; DiMaggio et al., 2004; Hargittai, 2003), requiring a multifaceted modeling approach (van Deursen & van Dijk, 2015; van Deursen et al., 2017; van Dijk, 2020). Employing regression analysis to identify factors affecting the digital divides in each level and Structural Equation Modeling (SEM) to examine the structuration model of the digital divide, the findings provide rich information that digital inequalities should be contextualized. Internal (e.g., agency) and external factors (e.g., access, demographics) can mitigate or reinforce the divide.

The findings from the access divide revealed that social categories (e.g., sex, race, age) and economic status (e.g., income, education) have remained significant contributors in both the United States and Indonesia. These factors are more prominent in the United States than in Indonesia, and that is somewhat surprising due to internet ubiquity. Since internet penetration has reached 90% of the population, access should not have been a big issue in the United States (Pew Research, 2005). Nonetheless, Gonzales (2016) found that the issue of access has shifted from availability to sustainability. Problems of instability in internet connections, malfunction of devices, and logistics limitations are frequently faced by those who are socioeconomically disadvantaged in the United States (Gonzales, 2016). Technology maintenance is more prevalent now than before 2020 since online learning and work from home are the main activities during the COVID-19 pandemic. The global pandemic magnified what scholars refer to as social amplification (e.g., Toyama, 2015) when technology increases social stratification, which has persisted in the country for decades.

Income and education emerged as the main barrier to digital access in Indonesia. Income distribution and access to higher education are privileged to those who resided in urban areas in Java

Island, Indonesia, a developing country (Suryadarma et al., 2006). The finding of the first level of divide aligned with socioeconomic inequality in the country and the internet widened the existing gap. The regional division between Java Island and the rest of the country will not be resolved anytime soon, as the internet might magnify the problem. The development of Palapa Rings to give increased broadband access to people who live outside Java Island (Iskandar, 2007) may not instantaneously close the gap, and providing access is only the first step to remedy the digital divide. The Project is a government endeavor to wire the archipelago and to provide broadband internet not only to the main islands but also to the remote areas. Although The Palapa Rings Project is expected to be fully functioning in 2021, it still may take a few years before internet access is available to most Indonesians.

The sustainability of access has become more germane to rectify the skills gap than demographics. The issue of sustainability emerged in three datasets. One striking result from the digital skills finding is that the United States data suggested social categories (e.g., gender, race) associated with the skill gap, whereas in Indonesia economic statuses (e.g., income, occupation) have remained significant contributors. The result in the United States is consistent with previous research that social categories have deepened offline and online stratification. Gender inequality exacerbated internet skills acquisitions, and females are more likely to work in low-skill tasks in the digital world than males (Hargittai & Shaw, 2015; Hargittai & Shafer, 2006). Race persisted as a significant factor in stratifying digital disadvantages in the United States (Witte & Mannon, 2010; DiMaggio & Garip, 2012). Economic factors were closely associated with the digital divide in Indonesia, either in the first or the second level. A similar situation occurred in East Asia, where the digital gap persisted among groups with low incomes (Tseng & You, 2013). This condition might transform into other developing nations in which they mostly strive to improve economic welfare, and where wealth improvement might resolve many problems, including digital inequality.

Structure and elements of agency played a greater role in estimating internet use than demographics. The data also suggested a contingency process that the first level of access gap and the second level of skills divide spilled over to internet use. This finding imitates Resources and Appropriation Theory (van Dijk, 2015, 2020) that the three levels of the digital divide work in sequence and interrelated. Moreover, self-efficacy, a belief to organize and to execute a particular task required to achieve an objective (Bandura, 1986), drove users' amount of time spent and variability of usage on the internet. The internet is experiential technology, and once a person is accustomed to it, they develop the self-confidence to accomplish objectives (Dutton & Shepherd, 2003).

The third level of the digital divide demonstrated that structure, agency components, and internet use primarily predicted the attainment of digital capital whereas demographics turned into insignificant contributors. In the United States dataset, the regression equation delineated that internet use and attitude are negatively associated with digital capital, and SEM analysis corroborated these relationships. This dissertation contemplates that Americans are more experienced and prudent users. Those with high attitudes to the internet may carefully craft and restrain their uses to avoid internet negativity. Others who are skeptical of technology may try to embrace the internet to catch up with the current condition and to gain digital outcomes. However these potential relationships cannot be discerned so that this unique set of observations will require additional, future analyses. Whereas in Indonesia, digital capital can be acquired by those who are highly self-confident and increasing their internet usage. Moreover, less skillful users in America have gained more from the internet. It is argued adroit users possess financial advantages, and they might not perceive the internet as the main source to gather capital. Digital capital is a complement to offline capital.

Regression analysis from three levels of the digital divide presented a sequence process that the lower level influences the higher level of the divide, and the demographics effect gradually diminished when the level increased. Structure and forms of the agency also played significant roles either to propel

or to mitigate the digital divide. This finding suggests research on the digital divide should emphasize users' cognitive and affective elements. Moreover, findings from the United States revealed unexpected associations, such as a negative association between internet use, attitude, and digital capital need further investigation.. Indonesians emerged as enthusiastic users as they use the internet more frequently to cater to diverse purposes and these actions are associated with the attainment of digital capital.

The structuration model of the digital divide exhibited a similar trend as regression analysis with some variations. The model was structured as a sequence path incorporating three levels of the divides. The United States model demonstrated interactions between access and psychological elements associated with internet use; hence internet use only marginally correlated with outcomes achievement. Access strengthened relationships between users' psychological traits and their usage, either in a positive or a negative direction. Access strengthened a negative association between attitude and the use of the internet and at the same time, it was also associated with a positive connection between self-efficacy and internet usage. These findings of negative and positive associations in the structuration model are interesting but need further research to clarify underlying mechanisms that cause these associations.

Interconnections between three levels of the digital divide occurred in Indonesia, hence access did not interact with any forms of agency. Access stood as an exogenous variable and directly with skills predicted internet use and subsequently, the United States age influenced digital capital. This linear process is to some extent follow van Dijk's (2005, 2020) propositions of Resources and Appropriation Theory in which the first level leads to the second level of the digital divide. The third level of the digital divide, digital capital, can be gained through extensive usage by users who have stable access with adequate internet skills. This type of user can be deemed a technology aficionado. They are excited about the internet and have know-how knowledge to execute actions to gain benefits. Access sustainability has never been an issue as they are privileged individuals, economically and socially.

Merging datasets from the United States and Indonesia rendered a more comprehensive model in which the structuration process preceded internet usage intending to gain digital capital. Persons with stable access would benefit more in their internet usage and digital capital achievement. Concerning the second and third levels of the digital divide, self-efficacy has been a strong contributor and previous research suggested self-efficacy could mitigate the negative impact of the internet (Eastin & LaRose, 2000; LaRose et al., 2003; LaRose et al., 2008; LaRose et al., 2012). The findings from the structuration model of the digital divide advised that developing a unitary model to understand digital divides is unfounded. Reiterating the first line from the analysis section, the digital divide is a dynamic phenomenon (van Dijk & Hacker, 2003; DiMaggio et al., 2004; Hargittai, 2003) that creates a multifaceted model (van Deursen & van Dijk, 2015; van Deursen et al., 2017; van Dijk, 2020). Regression analysis and SEM corroborated this assumption.

A divide also occurred for regular users and findings from section 4.1.5 informed further about conditions of digital inclusion and exclusion. Income has been a key factor that drove inclusion and exclusion in the third level of the digital divide. Those who occupy high economic strata are more likely included digitally and this indicates social amplification (Agre, 2002; Toyama, 2015) can deepen a (new) divide among internet users. Moreover, the structuration models suggested variations of factors that affect digital inclusion and exclusion. For those who gained low digital outcomes, access is an important matter. Data from Indonesia and the United States depicted when access interacted with one element of agency, it gave a conditional effect of agency on internet use. Access moderates the improvement of internet practices. Internet use influenced the inclusion and exclusion of digital outcomes in each country. However, in the United States internet use is negatively associated with the attainment of digital benefits. This contradicts hypothesis five, yet provides new insight. Based on the data collected for this study, these observations cannot be fully explained and will have to be addressed by future research.

The structuration model of the digital divide offers a new approach to better understand the phenomenon of the digital divide. The findings suggest interconnections between the first, second, and third level of digital divides, with variations in the models that emerged for the two countries. Several new findings arose that will need further elaboration in the future. Nonetheless, the structuration model is informative and extends existing literature. Interconnections and interactions between demographics, access, elements of agency, internet use, and digital outcomes provide a better understanding of digital divides. Moreover, the study found that structure and actors are two important elements in understanding the second and the third levels of digital divides. Future research can reflect on this dissertation's findings to elaborate and develop a comprehensive model based on the structuration model that emphasizes structure and agency interactions.

CHAPTER 5: CONCLUSION AND DIRECTIONS FOR FUTURE RESEARCH

This study attempted to elaborate on previous research on the digital divide. Three levels of digital divides were examined, and the findings showed a new nuanced and deeper understanding of the issue. Furthermore, this study also enhances the literature by applying the structuration theory to examine digital outcomes (digital capital). Actors are an important element to understand digital divides that they have the capabilities to reflexively react within structural boundaries. The findings suggested access provided conditional boundaries that interacted with elements of agency and access sustainability can hinder or prompt internet practices. These findings also mean that structure and agency work simultaneously and can affect digital inclusion and exclusion. Demographic factors remain significant contributors to the first level of the divide even though these elements are more pronounced in the United States than in Indonesia. Arguably, the marginalization of intersectional factors of race, age, and gender persisted for Americans.

In the second and the third levels, the role of demographics was attenuated, and a form of agency and access turned into prominent predictors across datasets. This suggests the more advanced along the divides, the role of actors turn out to be more imperative. This finding is informational that improving elements of agency could mitigate the second and third levels of digital divides. Self-efficacy and skills are important components and improving these elements may bridge the digital. For instance, policymakers and activists might advocate digital literacy programs that will equip users with capabilities to analyze, evaluate, and produce content as part of digital participation (Livingstone, 2004). The internet is experiential technology, and skills can be improved through daily practices. Further analysis using SEM depicted the extent to which structuration processes (models) varied across different settings. Reiterating from the discussion section, the structuration process in each country reflects the actors' capabilities in dealing with the surroundings (Giddens, 1984, 1991). Even though findings from the United States revealed interesting connections between attitude, internet use, and digital capital, further research is

needed to clarify these connections. Indonesia's data suggested creative users that engendered better medium-related skills than their counterparts in the developed country (section 4.1.2.1). A few studies also found a similar trend in other developing regions that users are creative actors and always strive under limited resources (Samarajiva & Zainudeen, 2008; Adera et al, 2014). The structuration model of the digital divide enhances the literature through (1) merging three levels of the divides into a sequence process to understand better the phenomenon, and (2) the structuration informs underlying conditions of structure and agency interactions that influence the attainment of digital outcomes.

Although this dissertation generated significant findings, technical and methodological limitations offer room for future research. The first challenge is related to the sampling. Getting samples that can replicate populations in both countries is feasible, but it requires financial expenses beyond the research budget. The study sought to overcome this constraint by employing an age weighing strategy. Another issue related to samples is the global pandemic that has influenced internet engagement. Data collections in two countries were finished in less than a week. This benefitted this dissertation, time-wise, but also signaled that people spent inflated time on the internet. The mean of samples in Indonesia is 5.7 and in the United States is 5.8 from a 6 Likert Scale. This might inflate users' responses compare to 'normal' time before the global pandemic. But this is only a wild guess as no baseline data can be inferred to compare the data.

The second problem is associated with instrumentation, including developing a new measure of access and the use of second-order factor analysis in the analysis. The access scale is in early development and can be rectified in future research. Results from validity and reliability tests were promising but the scale might be improved with different wordings and structures. A second-order analysis is a complex process, and it can be mitigated by pretesting and trimming indicators before the full study. The third issue is experimented with data analysis, mainly to establish the structuration model. Even though the datasets from the two countries were normally distributed, the covariance-based estimands did not

satisfy the statistical requirements. Using formative constructs in the second-order stage created a new layer of complexity as AMOS that is built on the covariance-based method has limitations to render discriminant and convergent validity indices. A PLS method was used as the alternative and the results were drawn from it. The findings are amenable to the theoretical propositions. Lastly, the structuration theory is not a theory per se that offers rigor propositions or postulates. Therefore, there are no comparable studies that can be used to reflect the findings. The theory advised that actors would conscientiously reflect on the structure of externalities in daily practices and this dissertation found that the interactions between elements of agency (i.e., self-efficacy and skills) that interacted with access had an impact on internet practices. This can enhance digital divides scholarship that the role of actors and structural boundaries affecting digital inclusion and exclusion.

The digital divide continues to evolve as technology and its uses change. The digital divide scholarship is multifaceted research and there are plenty of research paths that can be explored in the future. One key insight from this study is that the sustainability of access as a construct is informational for the digital divide scholarship since the issue of access availability has become less relevant with the ubiquity of internet access. Understanding the structuration model of the digital divide as a recursive process will fit with the internet as experiential technology. Users learn from the internet that subsequently they make improvements to overcome the challenges. Everybody always experiences digital divides to some extent as new technology emerged. Users will adapt and the process is dynamic. Longitudinal data can be informative and can explain better than a cross-sectional study. This study examines divides between two countries but did not explore the possibility of digital gaps between generations and across one generation. Extending the scope of the study focus might be pursued but with the time constraint, as this study only focuses on the divide at a country level. Hargittai (2010) identified the second level divide among the so-called net generation. This digitally native generation who was

supposedly internet savvy experienced a divide and those who are socioeconomically privileged had an upper hand to accelerate in the digital milieu.

In addition to its theoretical contribution and empirical contributions, this dissertation also offers practical insights for practitioners and policy-makers. The findings highlighted that digital divides are associated with complex factors that need to be comprehended in detail. Interconnections between three levels of digital divides and the importance of structure and agency have emerged from the data and allowed a better understanding of the divides. Digital gaps should be contextualized corresponding to a country's socioeconomic and cultural conditions. For example, access sustainability is a main factor to mitigate the usage divide in the United States, while the data from Indonesia suggested that agency (i.e., skills and self-efficacy) is an important element to increase internet use. Therefore, any interventions or policies should be based on data and a multifaceted analytical perspective.

To sum up, this dissertation attempts to understand the condition of digital divides and to identify factors affecting digital inclusion and inclusion. A framework of the structuration model of the digital divide is found to be informational. This model identified that agency and social structures interacted and can affect the second level and the third level of digital divides. The findings can enhance literature in the field that examines interactions between elements of agency and social structure provides a new nuance in understanding digital divides. Actors have remained an important factor to mitigate digital divides. Future research may pay more attention to the elements of agency than understanding social structures. This dissertation also offers a new scale to measure access sustainability and it is in early development with some limitations. It can be improved in the future as the issue of technology sustainability is relevant to the current condition. Access should not be limited to the physical connections, but also material aspects of the variety of devices and financial support. This access sustainability is strongly associated with users' socioeconomic status. The findings on digital inclusion and exclusion informed that a gap occurred

between those who gained more and fewer benefits. The internet creates multi-layers of divisions, even among frequent users.

APPENDICES

APPENDIX A: Questionnaire
(The United States version)

Access

		Not at all true (1)				Very true of me (5)
Physical						
1	I can do all desired online activities satisfactorily					
2a	My primary internet connection is wireline access (e.g., fiber optic, TV cable, telephone, WiFi)					
2b	My primary internet connection is wireless (e.g., cellphone, smartphone)					
3	I use mobile internet as a complementary means to access the internet					
4	I have internet access at home					
5	I mainly access the internet in public places (e.g., libraries, cafés, restaurants)					
Material						
5	I daily use two or more devices that are connected to the internet (e.g., laptop, desktop, tablet, smartphone, smart TV, game console)					
I have access to peripheral equipment:						
6a	Printer and/or scanner					
6b	Additional screen					
6c	Additional hard drive					
6d	Docking station					
My primary device to access the internet is:						
7a	Desktop, laptop, and tablet					
7b	Smartphone					
8	I spend money to maintain and to upgrade hardware and software					

Agency

		Not at all true (0)				Very true of me (5)
Skills						
Medium-related						
1	I know how to open downloaded files					

2	I know how to download/save a photo I found online					
3	I know how to use shortcut keys (e.g., CTRL-C for copy)					
4	I know how to open a new tab in my browser					
5	I know how to bookmark a website					
6	I find it hard to decide what the best keywords are to use for online searches					
7	I find it hard to find a website I visited before					
8	I get tired when looking for information online					
9	Sometimes I end up on websites without knowing how I got there					
10	I find the way in which many websites are designed confusing					
Content-related						
11	I know which information I should and shouldn't share online					
12	I know when I should and shouldn't share information online					
13	I am careful to make my comments and behaviors appropriate to the situation I find myself in online					
14	I know how to change who I share content with (e.g., friends, friends of friends, or public)					
15	I know how to remove friends from my contact lists					
16	I know how to create something new from existing online images, music, or video					
17	I know how to make basic changes to the content that others have produced					
18	I know how to design a website					
19	I know which different types of licenses apply to online content					
20	I would feel confident putting video content I have created online					
Safety-related						
21	I know how to detect spam email					
22	I know how to change passwords regularly					
23	I know when I encounter unsafe websites					
24	I know how to update virus protection					
25	I know how to scan with anti-spyware					
26	I know how to erase cookies					
27	I know how to use a spam filter					
28	I know how to use a firewall					
29	I know how to use a pop-up blocker					

Attitude						
30	Technologies such as the internet make life easier					
31	Knowing how to use the internet is beneficial when trying to get a job					
32	I feel that people pressure me to be constantly connected					
33	There are a lot of things on the internet that are good for people like me					
Internet self-efficacy						
I feel confident …….						
34	… understanding terms/words relating to Internet hardware					
35	… understanding terms/words relating to Internet software					
36	… describing functions of Internet hardware					
37	… troubleshooting Internet problems					
38	… explaining why a task will not run on the Internet					
39	… using the Internet to gather data					
40	… confident learning advanced skills within a specific Internet program					
41	… turning to an online discussion group when help is needed					

Internet use

		Several times a day	About once a day	3-5days a week	1-2 days a week	Every few weeks	Less often	Don't know/refused
Frequency of use								
1	How often do you go online?							

		Never (0)	Less than one monthly (1)	Monthly (2)	Weekly (3)	Daily (4)	More than once per day (5)
Variety of activities							
How often do you:							
Entertainment							
1	Watch movies or films online?						
2	Watch TV programs on the Internet?						

3	Download music?						
4	Listen to music online?						
5	Watch videos online?						
Commerce							
6	Buy a product online?						
7	Make travel reservations/bookings?						
8	Pay bills?						
9	Use your bank's online services?						
10	Compare products and prices?						
11	Order groceries or food online?						
12	Sell things online?						
Information seeking							
13	Find or check a fact?						
14	Lookup a definition of a word?						
15	Investigate topics of personal interest?						
Socializing							
16	Do instant messaging?						
17	Participate in chat rooms?						
18	Post pictures or photos on the Internet?						
19	Check or update your profile on a social networking?						
Email							
20	Check your email?						
21	Send attachments with your email?						
22	Use a distribution list for email?						
Blog							
23	Make or receive phone calls over the internet?						
24	Read a web-log or blog?						
25	Write a web-log or blog?						
26	Maintain a personal website?						
Production							
27	Post a video or video clip?						
28	Post writing, stories, poetry or other 'creative' work						
29	Get jokes, cartoons or other humorous content?						
30	Upload videos or music files?						
Old media							
31	Look for news - local, national, international?						
32	Look for sports information?						
33	Get information about local events?						
34	Make travel plans?						
School-work							
35	Look for jobs, work?						

36	Get information for school?						
37	Get information for work?						
38	Online distance learning for academic degree/job training?						
Vice							
39	Bet, gamble or enter sweepstakes?						
40	Look at 'adult' sites with sexual content?						
Political activity							
41	Following political news?						
42	Forwarding political videos?						
43	Forwarding or reposting someone else's political comments?						
44	Expressing political opinions on social media and other online platforms?						
45	Sending messages or email supporting a social and political cause						
Health Covid-19 information							
46	Look on the internet for information or advice about COVID-19?						
47	Use email or the internet to communicate with a doctor or other health care provider for advice about COVID-19?						
48	Use email or the internet to communicate with a family member or friend about COVID-19?						
49	Use email or the internet to communicate with other people who have concerns about COVID-19?						

Digital outcomes

In the past of six months, have you experienced these following:

		I've never had the experience (0)	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
Economic outcomes							
1	I save money by buying products online						
2	I sell goods that I would not have sold otherwise						
3	The information and services I found online						

	improved my financial situation						
4	I bought insurance online that I would not have bought offline						
5	The things I found online influenced how I do my job						
6	I found a job online that I could not have found offline						
7	I got a certificate that I could not have gotten without the Internet						
Cultural outcomes							
8	The things I came across on the Internet made me think about the differences between men and women						
9	Through the Internet I learned new things about my ethnic group						
10	Through the Internet I found people of a similar age that share my interests						
11	Because of the information I found and people I have met online, I feel more connected with religion or spiritual beliefs						
Social outcomes							
12	I have a better relationship with my friends and family because I use the Internet						
13	I am in touch with my close friends more because I use the Internet						
14	I have more friends because I use the Internet						

15	People I meet online are more interesting than the people I meet offline						
16	I became a member of a hobby or leisure club or organization that I otherwise would not have found						
17	I became a member or donor of a civic organization I would not have become a member or donor of otherwise						
18	I have discovered online that I am entitled to a particular benefit, subsidy, or tax advantage that I would not have found offline						
19	Online, I have better contact with my MP, local councilor, or political party						
Personal outcomes							
20	I am fitter as a result of the online information, advice, or programs/apps I have used						
21	I have made better decisions about my health or medical care as a result of the information/advice I found online						
22	Information I found online gave me more confidence in my lifestyle choices						
23	My knowledge increased because of the Internet						
24	Using the Internet helps me to form opinions about complex social issues I would not fully understand otherwise						

25	Online entertainment made me feel happier						
26	I go to events and concerts I would never have otherwise considered						

Demographics

1	What sex were you assigned at birth (e.g., on your birth certificate) • Male • Female • Prefer not to answer
2	Which best describes the highest level of education you have achieved? • High School diploma or less • Some college or university, no degree • Completed an associate degree • Completed an undergraduate degree • Completed a Graduate or Professional degree • Prefer not to answer
3	How much is your gross income annually? (this will be changed for the Indonesia study that can meet the country's standard. Hence an equal value as the US standard) • Less than $20,000 • $20,000 to $34,999 • $35,000 to $49,999 • $50,000 to $74,999 • $75,000 to $99,999 • Over $100,000
3	How much is your gross income monthly? (for Indonesians) • Less than or equal Rp. 3.000.000 • Rp. 3.000.001 to Rp. 6.000.000 • Rp. 6.000.001 to Rp. 9.000.000 • Rp. 9.000.001 to Rp. 12.000.000 • Rp. 12.000.001 to Rp. 15.000.000 • More than Rp. 15.000.000
4	What is your marital status? • Now married or in a domestic partnership • Widowed • Divorced • Separated • Never married (single)
5	How do you self-identify in terms of race? (for Americans) • White • African American

	• American Indian or Alaska Native • Asian • Native Hawaiian or Pacific Islander • Some other race
5	How do you self-identify in terms of ethnicity? (for Indonesians) • Javanese • Sumateranese • Kalimantanese • Sulawesenese • Papuanese • Some other ethnics
6	Year of birth (example 2001) ……..
7	Think about your current work situation. Which of the following is your current employment status? • Employed part-time • Employed full-time • Full-time student • Unemployed and currently looking for work • Unemployed and not currently looking for work • Retired • Homemaker • Self-employed • Unable to work

APPENDIX B: STRUCTURAL EQUATION MODELLING RESULTS

B.1. United States of America

Digital capital with a continuous measure

Table 25. Indirect effect United States

Specific indirect effects					
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Acc*Att -> InternetUse -> DigitalCapital	0.01	0.01	0.01	1.41	0.16
Acc*SelEff -> InternetUse -> DigitalCapital	-0.01	-0.01	0.01	1.29	0.20
IntAcc -> InternetUse -> DigitalCapital	-0.04	-0.04	0.03	1.48	0.14
IntAttitude -> InternetUse -> DigitalCapital	0.01	0.01	0.01	1.42	0.16
IntSelfEfficacy -> InternetUse -> DigitalCapital	-0.03	-0.03	0.02	1.49	0.14
IntSkills -> InternetUse -> DigitalCapital	0.00	-0.01	0.01	0.84	0.40

Table 26. Total effect United States

Total effect					
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Acc*Att -> DigitalCapital	0.01	0.01	0.01	1.41	0.16
Acc*Att -> InternetUse	-0.13	-0.13	0.04	3.64	0.00
Acc*SelEff -> DigitalCapital	-0.01	-0.01	0.01	1.29	0.20
Acc*SelEff -> InternetUse	0.17	0.17	0.03	5.36	0.00
IntAcc -> DigitalCapital	-0.04	-0.04	0.03	1.48	0.14
IntAcc -> InternetUse	0.50	0.50	0.03	18.17	0.00
IntAttitude -> DigitalCapital	0.01	0.01	0.01	1.42	0.16
IntAttitude -> InternetUse	-0.10	-0.10	0.04	2.77	0.01
IntSelfEfficacy -> DigitalCapital	-0.03	-0.03	0.02	1.49	0.14
IntSelfEfficacy -> InternetUse	0.33	0.33	0.04	7.48	0.00
IntSkills -> DigitalCapital	0.00	-0.01	0.01	0.84	0.40
IntSkills -> InternetUse	0.06	0.06	0.04	1.37	0.17
InternetUse -> DigitalCapital	-0.08	-0.08	0.05	1.49	0.14

Table 27. Construct validity and reliability United States

Construct reliability and validity				
	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Acc*Att	1	1	1	1
Acc*SelEff	1	1	1	1
DigitalCapital	1	1	1	1
IntAcc	1	1	1	1
IntAttitude	1	1	1	1
IntSelfEfficacy	1	1	1	1
IntSkills	1	1	1	1
InternetUse	1	1	1	1

Table 28. Discriminant validity United States

Discriminant validity								
Fornell-Larcker criterion								
	Acc*Att	Acc*SelEff	DigitalCapital	IntAcc	IntAttitude	IntSelfEfficacy	IntSkills	InternetUse
Acc*Att	1							
Acc*SelEff	0.484	1						
DigitalCapital	-0.125	-0.17	1					
IntAcc	0.11	0.124	-0.073	1				
IntAttitude	-0.189	-0.049	-0.327	0.189	1			
IntSelfEfficacy	-0.057	-0.059	-0.117	0.441	0.371	1		
IntSkills	-0.087	-0.151	-0.187	0.347	0.506	0.721	1	
InternetUse	0.016	0.163	-0.076	0.651	0.16	0.549	0.4	1
Heterotrait-Monotrait Ratio (HTMT)								
	Acc*Att	Acc*SelEff	DigitalCapital	IntAcc	IntAttitude	IntSelfEfficacy	IntSkills	InternetUse
Acc*Att								
Acc*SelEff	0.484							
DigitalCapital	0.125	0.17						
IntAcc	0.11	0.124	0.073					
IntAttitude	0.189	0.049	0.327	0.189				
IntSelfEfficacy	0.057	0.059	0.117	0.441	0.371			
IntSkills	0.087	0.151	0.187	0.347	0.506	0.721		
InternetUse	0.016	0.163	0.076	0.651	0.16	0.549	0.4	

Digital capital with binary values (low category)

Table 29. SEM measures of low category United States

Specific indirect effects					
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Acc*Att -> InternetUse -> DigitalCapital	0.04	0.03	0.01	2.41	0.02
Acc*SelEff -> InternetUse -> DigitalCapital	-0.06	-0.06	0.02	3.03	0.00
IntAcc -> InternetUse -> DigitalCapital	-0.16	-0.16	0.04	4.35	0.00
IntAttitude -> InternetUse -> DigitalCapital	0.01	0.01	0.02	0.64	0.52
IntSelfEfficacy -> InternetUse -> DigitalCapital	-0.09	-0.09	0.03	3.53	0.00
IntSkills -> InternetUse -> DigitalCapital	-0.04	-0.04	0.02	1.93	0.05
Total effect					
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Acc*Att -> DigitalCapital	0.04	0.03	0.01	2.41	0.02
Acc*Att -> InternetUse	-0.11	-0.11	0.05	2.37	0.02
Acc*SelEff -> DigitalCapital	-0.06	-0.06	0.02	3.03	0.00
Acc*SelEff -> InternetUse	0.20	0.20	0.04	4.97	0.00
IntAcc -> DigitalCapital	-0.16	-0.16	0.04	4.35	0.00
IntAcc -> InternetUse	0.51	0.51	0.03	15.84	0.00
IntAttitude -> DigitalCapital	0.01	0.01	0.02	0.64	0.52
IntAttitude -> InternetUse	-0.03	-0.03	0.05	0.62	0.54
IntSelfEfficacy -> DigitalCapital	-0.09	-0.09	0.03	3.53	0.00
IntSelfEfficacy -> InternetUse	0.29	0.29	0.05	5.35	0.00
IntSkills -> DigitalCapital	-0.04	-0.04	0.02	1.93	0.05
IntSkills -> InternetUse	0.11	0.11	0.05	2.23	0.03
InternetUse -> DigitalCapital	-0.32	-0.31	0.07	4.48	0.00

Table 30. SEM reliability and validity of low category United States

Construct reliability and validity								
	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)				
Acc*Att	1	1	1	1				
Acc*SelEff	1	1	1	1				
DigitalCapital	1	1	1	1				
IntAcc	1	1	1	1				
IntAttitude	1	1	1	1				
IntSelfEfficacy	1	1	1	1				
IntSkills	1	1	1	1				
InternetUse	1	1	1	1				
Discriminant validity								
Fornell-Larcker criterion								
	Acc*Att	Acc*SelEff	DigitalCapital	IntAcc	IntAttitude	IntSelfEfficacy	IntSkills	InternetUse
Acc*Att	1							
Acc*SelEff	0.498	1						
DigitalCapital	-0.124	-0.178	1					
IntAcc	-0.026	0.119	-0.231	1				
IntAttitude	-0.42	-0.181	-0.173	0.245	1			
IntSelfEfficacy	-0.191	-0.116	-0.237	0.461	0.433	1		
IntSkills	-0.233	-0.236	-0.188	0.382	0.482	0.749	1	
InternetUse	-0.086	0.16	-0.318	0.706	0.281	0.591	0.484	1
Heterotrait-Monotrait Ratio (HTMT)								
	Acc*Att	Acc*SelEff	DigitalCapital	IntAcc	IntAttitude	IntSelfEfficacy	IntSkills	InternetUse
Acc*Att								
Acc*SelEff	0.498							
DigitalCapital	0.124	0.178						
IntAcc	0.026	0.119	0.231					
IntAttitude	0.42	0.181	0.173	0.245				
IntSelfEfficacy	0.191	0.116	0.237	0.461	0.433			
IntSkills	0.233	0.236	0.188	0.382	0.482	0.749		
InternetUse	0.086	0.16	0.318	0.706	0.281	0.591	0.484	

Digital capital with binary values (high category)

Table 31. SEM measures of high category United States

Specific indirect effects					
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Acc*Att -> InternetUse -> DigitalCapital	-0.04	-0.04	0.02	2.62	0.01
Acc*SelEff -> InternetUse -> DigitalCapital	0.04	0.04	0.01	2.50	0.01
IntAcc -> InternetUse -> DigitalCapital	0.12	0.12	0.03	4.46	0.00
IntAttitude -> InternetUse -> DigitalCapital	-0.04	-0.04	0.02	2.15	0.03
IntSelfEfficacy -> InternetUse -> DigitalCapital	0.09	0.09	0.03	3.28	0.00
IntSkills -> InternetUse -> DigitalCapital	0.00	0.00	0.02	0.00	1.00
Total effect					
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Acc*Att -> DigitalCapital	-0.04	-0.04	0.02	2.62	0.01
Acc*Att -> InternetUse	-0.17	-0.17	0.05	3.14	0.00
Acc*SelEff -> DigitalCapital	0.04	0.04	0.01	2.50	0.01
Acc*SelEff -> InternetUse	0.14	0.14	0.05	2.80	0.01
IntAcc -> DigitalCapital	0.12	0.12	0.03	4.46	0.00
IntAcc -> InternetUse	0.45	0.46	0.04	10.24	0.00
IntAttitude -> DigitalCapital	-0.04	-0.04	0.02	2.15	0.03
IntAttitude -> InternetUse	-0.15	-0.15	0.06	2.73	0.01
IntSelfEfficacy -> DigitalCapital	0.09	0.09	0.03	3.28	0.00
IntSelfEfficacy -> InternetUse	0.35	0.35	0.07	5.05	0.00
IntSkills -> DigitalCapital	0.00	0.00	0.02	0.00	1.00
IntSkills -> InternetUse	0.00	0.00	0.08	0.00	1.00
InternetUse -> DigitalCapital	0.26	0.26	0.06	4.80	0.00

Table 32. SEM validity and reliability of high category United States

Construct reliability and validity								
	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)				
Acc*Att	1	1	1	1				
Acc*SelEff	1	1	1	1				
DigitalCapital	1	1	1	1				
IntAcc	1	1	1	1				
IntAttitude	1	1	1	1				
IntSelfEfficacy	1	1	1	1				
IntSkills	1	1	1	1				
InternetUse	1	1	1	1				
Discriminant validity								
Fornell-Larcker criterion								
	Acc*Att	Acc*SelEff	DigitalCapital	IntAcc	IntAttitude	IntSelfEfficacy	IntSkills	InternetUse
Acc*Att	1							
Acc*SelEff	0.414	1						
DigitalCapital	0.032	0.013	1					
IntAcc	0.15	0.079	0.153	1				
IntAttitude	-0.052	0.022	-0.185	0.128	1			
IntSelfEfficacy	0.025	-0.025	0.124	0.407	0.302	1		
IntSkills	0.007	-0.096	-0.012	0.296	0.505	0.679	1	
InternetUse	-0.012	0.104	0.264	0.562	0.022	0.476	0.277	1
Heterotrait-Monotrait Ratio (HTMT)								
	Acc*Att	Acc*SelEff	DigitalCapital	IntAcc	IntAttitude	IntSelfEfficacy	IntSkills	InternetUse
Acc*Att								
Acc*SelEff	0.414							
DigitalCapital	0.032	0.013						
IntAcc	0.15	0.079	0.153					
IntAttitude	0.052	0.022	0.185	0.128				
IntSelfEfficacy	0.025	0.025	0.124	0.407	0.302			
IntSkills	0.007	0.096	0.012	0.296	0.505	0.679		
InternetUse	0.012	0.104	0.264	0.562	0.022	0.476	0.277	

B.2. Indonesia

Table 33. SEM indirect and total effect Indonesia

Specific indirect effects					
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Acc*Att -> InternetUse -> DigitalCapital	-0.01	-0.01	0.03	0.32	0.75
Acc*SelfEff -> InternetUse -> DigitalCapital	-0.03	-0.03	0.03	0.91	0.37
Acc*Skills -> InternetUse -> DigitalCapital	0.05	0.06	0.04	1.29	0.20
Access -> InternetUse -> DigitalCapital	0.11	0.11	0.02	4.42	0.00
Attitude -> InternetUse -> DigitalCapital	0.01	0.01	0.03	0.27	0.79
SelfEfficacy -> InternetUse -> DigitalCapital	0.07	0.07	0.04	1.65	0.10
Skills -> InternetUse -> DigitalCapital	0.16	0.16	0.05	3.54	0.00
Total effect					
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Acc*Att -> DigitalCapital	-0.01	-0.01	0.03	0.32	0.75
Acc*Att -> InternetUse	-0.02	-0.03	0.05	0.32	0.75
Acc*SelfEff -> DigitalCapital	-0.03	-0.03	0.03	0.91	0.37
Acc*SelfEff -> InternetUse	-0.06	-0.06	0.06	0.93	0.35
Acc*Skills -> DigitalCapital	0.05	0.06	0.04	1.29	0.20
Acc*Skills -> InternetUse	0.11	0.13	0.08	1.37	0.17
Access -> DigitalCapital	0.11	0.11	0.02	4.42	0.00
Access -> InternetUse	0.23	0.23	0.05	4.89	0.00
Attitude -> DigitalCapital	0.01	0.01	0.03	0.27	0.79
Attitude -> InternetUse	0.01	0.01	0.05	0.27	0.79
InternetUse -> DigitalCapital	0.46	0.46	0.05	9.67	0.00
SelfEfficacy -> DigitalCapital	0.07	0.07	0.04	1.65	0.10
SelfEfficacy -> InternetUse	0.14	0.15	0.08	1.75	0.08
Skills -> DigitalCapital	0.16	0.16	0.05	3.54	0.00
Skills -> InternetUse	0.35	0.34	0.09	3.74	0.00

Table 34. SEM validity and reliability Indonesia

Construct reliability and validity									
	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)					
Acc*Att	1	1	1	1					
Acc*SelfEff	1	1	1	1					
Acc*Skills	1	1	1	1					
Access	1	1	1	1					
Attitude	1	1	1	1					
DigitalCapital	1	1	1	1					
InternetUse	1	1	1	1					
SelfEfficacy	1	1	1	1					
Skills	1	1	1	1					
Discriminant validity									
Fornell-Larcker criterion									
	Acc*Att	Acc*SelfEff	Acc*Skills	Access	Attitude	DigitalCapital	InternetUse	SelfEfficacy	Skills
Acc*Att	1								
Acc*SelfEff	0.594	1							
Acc*Skills	0.564	0.706	1						
Access	-0.163	-0.238	-0.233	1					
Attitude	-0.346	-0.207	-0.192	0.351	1				
DigitalCapital	-0.070	-0.099	0.015	0.300	0.291	1			
InternetUse	-0.127	-0.167	-0.141	0.480	0.359	0.461	1		
SelfEfficacy	-0.213	-0.322	-0.224	0.517	0.543	0.394	0.532	1	
Skills	-0.200	-0.227	-0.366	0.525	0.550	0.318	0.557	0.769	1
Heterotrait-Monotrait Ratio (HTMT)									
	Acc*Att	Acc*SelfEff	Acc*Skills	Access	Attitude	DigitalCapital	InternetUse	SelfEfficacy	Skills
Acc*Att									
Acc*SelfEff	0.594								
Acc*Skills	0.564	0.706							
Access	0.163	0.238	0.233						
Attitude	0.346	0.207	0.192	0.351					
DigitalCapital	0.070	0.099	0.015	0.300	0.291				
InternetUse	0.127	0.167	0.141	0.480	0.359	0.461			
SelfEfficacy	0.213	0.322	0.224	0.517	0.543	0.394	0.532		
Skills	0.200	0.227	0.366	0.525	0.550	0.318	0.557	0.769	

SEM for Indonesia digital capital low condition

Table 35. SEM measures of low condition Indonesia

Specific indirect effects					
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Acc*Att -> InternetUse -> DigitalCapital	0.01	0.01	0.03	0.46	0.64
Acc*SelfEff -> InternetUse -> DigitalCapital	-0.10	-0.09	0.04	2.27	0.02
Acc*Skills -> InternetUse -> DigitalCapital	0.09	0.08	0.05	1.85	0.07
Access -> InternetUse -> DigitalCapital	0.06	0.06	0.03	1.80	0.07
Attitude -> InternetUse -> DigitalCapital	0.06	0.05	0.03	1.80	0.07
SelfEfficacy -> InternetUse -> DigitalCapital	0.06	0.07	0.06	1.02	0.31
Skills -> InternetUse -> DigitalCapital	0.14	0.12	0.06	2.25	0.03
Total effect					
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Acc*Att -> DigitalCapital	0.01	0.01	0.03	0.46	0.64
Acc*Att -> InternetUse	0.03	0.02	0.07	0.47	0.64
Acc*SelfEff -> DigitalCapital	-0.10	-0.09	0.04	2.27	0.02
Acc*SelfEff -> InternetUse	-0.23	-0.20	0.09	2.51	0.01
Acc*Skills -> DigitalCapital	0.09	0.08	0.05	1.85	0.07
Acc*Skills -> InternetUse	0.21	0.19	0.11	1.98	0.05
Access -> DigitalCapital	0.06	0.06	0.03	1.80	0.07
Access -> InternetUse	0.13	0.14	0.07	1.88	0.06
Attitude -> DigitalCapital	0.06	0.05	0.03	1.80	0.07
Attitude -> InternetUse	0.13	0.11	0.07	1.93	0.06
InternetUse -> DigitalCapital	0.44	0.44	0.07	6.06	0.00
SelfEfficacy -> DigitalCapital	0.06	0.07	0.06	1.02	0.31
SelfEfficacy -> InternetUse	0.14	0.16	0.13	1.09	0.28
Skills -> DigitalCapital	0.14	0.12	0.06	2.25	0.03
Skills -> InternetUse	0.31	0.28	0.13	2.37	0.02

Table 36. SEM validity and reliability of low condition Indonesia

Construct reliability and validity									
	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)					
Acc*Att	1	1	1	1					
Acc*SelfEff	1	1	1	1					
Acc*Skills	1	1	1	1					
Access	1	1	1	1					
Attitude	1	1	1	1					
DigitalCapital	1	1	1	1					
InternetUse	1	1	1	1					
SelfEfficacy	1	1	1	1					
Skills	1	1	1	1					
Discriminant validity									
Fornell-Larcker criterion									
	Acc*Att	Acc*SelfEff	Acc*Skills	Access	Attitude	DigitalCapital	InternetUse	SelfEfficacy	Skills
Acc*Att	1								
Acc*SelfEff	0.489	1							
Acc*Skills	0.592	0.709	1						
Access	-0.034	-0.092	0.044	1					
Attitude	-0.293	-0.154	-0.238	0.307	1				
DigitalCapital	-0.102	-0.193	-0.100	0.242	0.335	1			
InternetUse	-0.099	-0.207	-0.084	0.382	0.392	0.444	1		
SelfEfficacy	-0.164	-0.288	-0.187	0.447	0.502	0.375	0.523	1	
Skills	-0.228	-0.168	-0.284	0.394	0.582	0.330	0.511	0.776	1.000
Heterotrait-Monotrait Ratio (HTMT)									
	Acc*Att	Acc*SelfEff	Acc*Skills	Access	Attitude	DigitalCapital	InternetUse	SelfEfficacy	Skills
Acc*Att									
Acc*SelfEff	0.489								
Acc*Skills	0.592	0.709							
Access	0.034	0.092	0.044						
Attitude	0.293	0.154	0.238	0.307					
DigitalCapital	0.102	0.193	0.100	0.242	0.335				
InternetUse	0.099	0.207	0.084	0.382	0.392	0.444			
SelfEfficacy	0.164	0.288	0.187	0.447	0.502	0.375	0.523		
Skills	0.228	0.168	0.284	0.394	0.582	0.330	0.511	0.776	

SEM for Indonesia digital capital high condition

Table 37. SEM measures of high condition Indonesia

Specific indirect effects					
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Acc*Att -> InternetUse -> DigitalCapital	-0.02	-0.02	0.02	1.47	0.14
Acc*SelfEff -> InternetUse -> DigitalCapital	0.02	0.01	0.02	0.72	0.47
Acc*Skills -> InternetUse -> DigitalCapital	0.01	0.01	0.03	0.22	0.83
Access -> InternetUse -> DigitalCapital	0.05	0.05	0.02	2.16	0.03
Attitude -> InternetUse -> DigitalCapital	-0.01	-0.01	0.02	0.83	0.41
SelfEfficacy -> InternetUse -> DigitalCapital	0.02	0.02	0.02	1.00	0.32
Skills -> InternetUse -> DigitalCapital	0.08	0.07	0.04	1.99	0.05
Total effect					
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Acc*Att -> DigitalCapital	-0.02	-0.02	0.02	1.47	0.14
Acc*Att -> InternetUse	-0.11	-0.12	0.07	1.72	0.09
Acc*SelfEff -> DigitalCapital	0.02	0.01	0.02	0.72	0.47
Acc*SelfEff -> InternetUse	0.08	0.06	0.11	0.77	0.44
Acc*Skills -> DigitalCapital	0.01	0.01	0.03	0.22	0.83
Acc*Skills -> InternetUse	0.03	0.06	0.12	0.23	0.82
Access -> DigitalCapital	0.05	0.05	0.02	2.16	0.03
Access -> InternetUse	0.24	0.26	0.07	3.45	0.00
Attitude -> DigitalCapital	-0.01	-0.01	0.02	0.83	0.41
Attitude -> InternetUse	-0.06	-0.07	0.07	0.90	0.37
InternetUse -> DigitalCapital	0.20	0.19	0.07	3.03	0.00
SelfEfficacy -> DigitalCapital	0.02	0.02	0.02	1.00	0.32
SelfEfficacy -> InternetUse	0.10	0.12	0.09	1.08	0.28
Skills -> DigitalCapital	0.08	0.07	0.04	1.99	0.05
Skills -> InternetUse	0.40	0.36	0.14	2.87	0.00

Table 38. SEM validity and reliability of high condition Indonesia

Construct reliability and validity									
	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)					
Acc*Att	1	1	1	1					
Acc*SelfEff	1	1	1	1					
Acc*Skills	1	1	1	1					
Access	1	1	1	1					
Attitude	1	1	1	1					
DigitalCapital	1	1	1	1					
InternetUse	1	1	1	1					
SelfEfficacy	1	1	1	1					
Skills	1	1	1	1					
Discriminant validity									
Fornell-Larcker criterion									
	Acc*Att	Acc*SelfEff	Acc*Skills	Access	Attitude	DigitalCapital	InternetUse	SelfEfficacy	Skills
Acc*Att	1								
Acc*SelfEff	0.755	1							
Acc*Skills	0.522	0.780	1						
Access	-0.285	-0.395	-0.488	1					
Attitude	-0.350	-0.256	-0.134	0.358	1				
DigitalCapital	0.007	0.057	0.037	0.186	0.172	1			
InternetUse	-0.178	-0.207	-0.271	0.504	0.290	0.197	1		
SelfEfficacy	-0.253	-0.310	-0.262	0.548	0.563	0.240	0.488	1	
Skills	-0.162	-0.318	-0.463	0.630	0.485	0.214	0.566	0.746	1
Heterotrait-Monotrait Ratio (HTMT)									
	Acc*Att	Acc*SelfEff	Acc*Skills	Access	Attitude	DigitalCapital	InternetUse	SelfEfficacy	Skills
Acc*Att									
Acc*SelfEff	0.755								
Acc*Skills	0.522	0.780							
Access	0.285	0.395	0.488						
Attitude	0.350	0.256	0.134	0.358					
DigitalCapital	0.007	0.057	0.037	0.186	0.172				
InternetUse	0.178	0.207	0.271	0.504	0.290	0.197			
SelfEfficacy	0.253	0.310	0.262	0.548	0.563	0.240	0.488		
Skills	0.162	0.318	0.463	0.630	0.485	0.214	0.566	0.746	

B.3. Both countries

Table 39. SEM measures of both countries

Specific indirect effects					
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Acc*SelfEff -> InternetUse -> DigitalCapital	0.01	0.01	0.00	2.24	0.03
Access -> InternetUse -> DigitalCapital	0.04	0.04	0.01	2.88	0.00
Attitude -> InternetUse -> DigitalCapital	0.00	0.00	0.00	0.51	0.61
SelfEfficacy -> InternetUse -> DigitalCapital	0.04	0.04	0.01	2.75	0.01
Skills -> InternetUse -> DigitalCapital	0.00	0.00	0.00	0.07	0.94
Total effects					
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Acc*SelfEff -> DigitalCapital	0.01	0.01	0.00	2.24	0.03
Acc*SelfEff -> InternetUse	0.06	0.06	0.02	3.18	0.00
Access -> DigitalCapital	0.04	0.04	0.01	2.88	0.00
Access -> InternetUse	0.40	0.40	0.02	17.77	0.00
Attitude -> DigitalCapital	0.00	0.00	0.00	0.51	0.61
Attitude -> InternetUse	-0.01	-0.01	0.02	0.56	0.58
InternetUse -> DigitalCapital	0.09	0.09	0.03	2.90	0.00
SelfEfficacy -> DigitalCapital	0.04	0.04	0.01	2.75	0.01
SelfEfficacy -> InternetUse	0.42	0.42	0.03	13.30	0.00
Skills -> DigitalCapital	0.00	0.00	0.00	0.07	0.94
Skills -> InternetUse	0.00	0.00	0.03	0.08	0.94

Table 40. SEM validity and reliability both countries

Construct reliability and validity							
	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)			
Acc*SelfEff	1	1	1	1			
Access	1	1	1	1			
Attitude	1	1	1	1			
DigitalCapital	1	1	1	1			
InternetUse	1	1	1	1			
SelfEfficacy	1	1	1	1			
Skills	1	1	1	1			
Discriminant validity							
Fornel-Larckner							
	Acc*SelfEff	Access	Attitude	DigitalCapital	InternetUse	SelfEfficacy	Skills
Acc*SelfEff	1						
Access	-0.052	1					
Attitude	-0.164	0.382	1				
DigitalCapital	-0.052	0.065	-0.129	1			
InternetUse	-0.059	0.614	0.338	0.089	1		
SelfEfficacy	-0.244	0.539	0.497	0.052	0.612	1	
Skills	-0.234	0.578	0.551	-0.012	0.529	0.763	1
Heterotrait Monotrait Ratio (HTMT)							
	Acc*SelfEff	Access	Attitude	DigitalCapital	InternetUse	SelfEfficacy	Skills
Acc*SelfEff							
Access	0.052						
Attitude	0.164	0.382					
DigitalCapital	0.052	0.065	0.129				
InternetUse	0.059	0.614	0.338	0.089			
SelfEfficacy	0.244	0.539	0.497	0.052	0.612		
Skills	0.234	0.578	0.551	0.012	0.529	0.763	

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