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Addressing Digital Inequality for the Socioeconomically Disadvantaged Through Government Initiatives: Forms of Capital That Affect ICT Utilization

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Digital inequality, or unequal access to and use of information and communication technologies (ICT), is a severe problem preventing the socioeconomically disadvantaged (SED) from participating in a digital society. To understand the critical resources that contribute to digital inequality and inform public policy for stimulating initial and continued ICT usage by the SED, we drew on capital theories and conducted a field study to investigate: (1) the forms of capital for using ICT and how they differ across potential adopters who are SED and socioeconomically advantaged (SEA); (2) how these forms of capitals are *relatively* impacted for the SEA and the SED through public policy for ICT access; and (3) how each form of capital influences the SED's intentions to use initially and to continue to use ICT. The context for our study involved a city in the southeastern United States that offered its citizens free ICT access for Internet connectivity. Our results show that SED potential adopters exhibited lower cultural capital but higher social capital relative to the SEA. Moreover, the SED who participated in the city's initiative realized greater positive gains in cultural capital, social capital, and habitus than the SEA. In addition, we find that the SED's initial intention to use ICT was influenced by intrinsic motivation for habitus, self-efficacy for cultural capital, and important referents' expectations and support from acquaintances for social capital. Cultural capital and social cultural capital also complemented each other in driving the SED's initial use intention. The SED's continued use intention was affected by both intrinsic and extrinsic motivations for habitus and both knowledge and self-efficacy for cultural capital but was not affected by social capital. We also make several recommendations for future research on digital inequality and ICT acceptance to extend and apply the proposed capital framework.

Key words: capital theory; habitus; cultural capital; social capital; economic capital; digital divide; digital inequality; ICT policy; socioeconomic inequality

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1. Introduction

In the last century, President Eisenhower's vision of an interconnected national highway system led to the Federal-Aid Highway Act and the creation of interstate highways, which profoundly transformed the U.S. economy. Just as the interstate highway system represented a key infrastructure investment, universal high-speed Internet access may be critical for economic growth, with the potential of generating a consumer surplus of 300 billion dollars per year for the U.S. economy (Crandall et al. 2003). Although the previous U.S. administration declared in 2004 that high-speed Internet access should reach every corner of the nation, the plan for how to achieve this primarily involved "the introduction of low taxes, more available spectrum and limited regulation as the way to encourage private companies" to bring high-speed Internet to the household (McCullagh 2004). However, some have expressed concerns about whether such an economic-centric approach can effectively achieve the goal of universal access (e.g., Kvasny and Keil 2006).

Household high-speed Internet penetration in countries like South Korea (89%), Hong Kong (80%), Iceland (76%), The Netherlands (71%), and Singapore (70%) is much higher than in other countries, including the United States (50%) (Political Gateway 2006). Some have warned that such lags by a nation can substantially hamper its innovation, economic development, and quality of life (Bleha 2005). Perhaps the most alarming aspect of high-speed Internet adoption is the problem of digital inequality (i.e., inequality in the access and use of information and communication technologies (ICT)), which prevents the socio-economically disadvantaged (SED) from participating in a digital world (Lenhart 2002, OECD 2001). While digital inequality varies across a variety of demographic, ethnic, and geographic factors (OECD 2001), income and education, which are indicative of one's socio-economic status, have been shown to be the most powerful predictors of ICT use or nonuse (Lenhart 2002, Jung et al. 2001).

Government digital-inequality initiatives, hereafter referred to as GDI, are being launched to offer citizens basic Internet connectivity. In the absence of strong Federal initiatives, municipalities across the United States have devised programs to provide low-cost or free high-speed Internet access, especially for the SED (e.g., Reardon 2005). Unfortunately, the results of such efforts are rather inconclusive (Kvasny and Keil 2006). What is easily lost in the present regulatory and political debates surrounding GDI for high-speed Internet is the thorny issue of what it takes to (1) promote initial ICT usage and (2) sustain continued usage among the SED.

To date, most (if not all) initiatives aimed at addressing digital inequality have focused on providing technology access, an approach that has proven to be ineffective. In part, this is because of our limited theoretical understanding of the phenomenon and the naïve assumption that digital inequality is only an issue of material access (DiMaggio et al. 2001). The technology access assumption makes it tempting to study digital inequality through the lens of technology acceptance theories. For example, Hsieh et al. (2008) applied the theory of planned behavior to investigate the effect of GDI, revealing differential post-implementation usage models between socioeconomically advantaged (SEA) and SED adopters. While Hsieh et al. (2008) contributed to our understanding of how to manage GDI, their findings also suggest the pivotal role of resources other than ICT access in understanding and addressing digital inequality.[1] Thus, in this paper, we focus on the forms of capital that are important in making the SED use a GDI-sponsored ICT and on the differential access that the SED and SEA have to these forms of capital. This perspective offers new insights because it acknowledges that in addition to technology access, which is largely an economic issue, digital inequality may result from unequal access to other types of resources (i.e., other forms of capital needed to use ICT). For example, the SEA and the SED may differ in terms of habitus[2] (or disposition), as well as cognitive and social resources for ICT use (De Haan 2004, Van Dijk and Hacker 2003, Kvasny and Keil 2006).

To investigate how digital inequality can be addressed, we use income and education as surrogates to classify individuals into advantaged and disadvantaged socioeconomic groups. We then follow a theoretically grounded approach to investigate: (a) differences in forms of capital for using ICT (i.e., habitus, cultural capital, social capital, and economic capital) between the SEA and the SED who have participated in a GDI and those who have not yet chosen to and (b) how these forms of capital affect initial and continued use of ICT by the SED. Our focus on digital inequality is in line with the call for IS scholars to emphasize issues of public interest (Lytras 2005). Given the constraints on what governments can spend on public-works digital projects, it is especially critical to generate knowledge that helps policymakers to address the profound societal problem of digital inequality. Therefore, we aim to address the following research questions:

1. How do SED and SEA potential adopters differ in access to capital for using ICT offered through a GDI?

2. How does participation in a GDI differentially impact capital for using ICT for the SEA and SED?

3. What forms of capital, above and beyond socioeconomic status assessed by income and education, should be considered by policymakers to stimulate *initial ICT use* by SED potential adopters?

4. What forms of capital, above and beyond socioeconomic status assessed by income and education, should be considered by policymakers to sustain *continued ICT use* by SED adopters?

[1] Both Hsieh et al. (2008) and this paper are based on a large-scale research project investigating the LaGrange Internet TV Project, a government intervention designed to address digital inequality. These two papers differ in their research questions, theoretical foundations, and scope of data used and contribute to different aspects of our understanding of the digital inequality problem.

[2] Habitus refers to individual disposition that influences actions (Kvasny and Keil 2006). Following the consumer research perspective that individual disposition is a critical psychological resource that affects behavior (Henry 2004), we view habitus as a form of capital. The use of the word *capital* implies a type of resource (Henry 2004).

2. Theory and Hypotheses

2.1. Digital and Socioeconomic Inequality

Sociologists have suggested that digital inequality relates to entrenched societal disparities (Norris 2001). Acknowledging the existence of various forms of social disparities, DiMaggio et al. (2004) called for theoretically grounded investigations into the effects of socioeconomic inequality on digital inequality. They stressed the need for a theoretical understanding of the behavioral differences between people with different socioeconomic conditions and, more importantly, whether these differences diminish if every individual has easy and autonomous access to technology. This emphasis on probing the relationship between socioeconomic inequality and digital inequality is reasonable, as income and education have been found to play an important role in explaining the use and nonuse of ICT (Lenhart 2002, Jung et al. 2001). Hsieh et al. (2008), for instance, illustrated that SED and SEA adopters differ in their continued use models.

The behavioral implications of socioeconomic inequality have been investigated in sociology, marketing, education, health psychology, and child development. In essence, one's socioeconomic status is associated with both the internal capacities and external resources that jointly shape behavior (Bornstein and Bradley 2003). Unfortunately, life factors, such as educational achievement, income level, health condition, employment status, and feelings of self-control and self-esteem, correlate with one another and tend to be lower for the SED (Bornstein and Bradley 2003, Williams 1990, Henry 2004). The discrepancies in internal and external capitals between the SEA and the SED impact life opportunities, living and working conditions, social ranking, and even worldviews (Williams 1990). Similarly, the capitals, or resources, required to use digital technologies seem to be unequally distributed between the SEA and SED (Kvasny and Keil 2006, De Haan 2004, Van Dijk and Hacker 2003).

Consumer research suggests that individuals with different backgrounds may have distinct dispositions toward and expectations about a technology and may actually use it differently (Tsikriktsis 2004). Individuals tend to perceive a resource as having a higher value if that resource (e.g., education, services, health-enhancing activities, etc.) matches their distinctive needs and backgrounds (Federico 1991, Sirgy et al. 2001). In fact, people with different backgrounds and needs perceive differential value to be derived from their use of similar information technologies (Au et al. 2008). Given that the SEA tend to have higher education levels, are thought to be more innovative (Rogers 2003), and demonstrate greater ICT access and use (Lenhart 2002, Norris 2001), when being exposed to the same ICT, they may experience it in a different way from the SED.

2.2. Forms of Capital Underlying Digital Inequality

Social scientists have used concepts of capital, such as human capital, cultural capital, social capital, and economic capital (Schultz 1961, Becker 1975, Bourdieu 1984, Coleman 1990, Portes 1998), as organizing frameworks to understand associations among societal structures, life conditions, and human behaviors (Lin 2000). As inequality of capital closely relates to social structure, applying these concepts allows for the understanding of gaps between social groups and how such gaps can be addressed (Lee and Bowen 2006). For many years, scholars have been drawing on the concepts of capital to understand how to assess and formulate public policies toward addressing inequalities in education, cultural participation, sports, media consumption, and economic development (Dumais 2002, Bennett and Silva 2006, Bebbington 2007).

Based on the viewpoint that ICT consumption, like most human behaviors, is constrained by a variety of resources (Coleman 1990, Rogers 2003), some scholars (De Haan 2004, Warschauer 2002, Kvasny and Keil 2006) have proposed that ICT usage is affected by an individual's cultural, social, and material resources. In addition, consumer behavior literature identifies psychological disposition or motivation as a differentiating resource for human behaviors in general (Henry 2004) and ICT usage in particular (De Haan 2004, Van Dijk and Hacker 2003). Along these lines, individual habitus, or a person's disposition toward using ICT, has been recognized as an enabler of ICT use (Kvasny and Keil 2006, Kvasny 2002). Based on the above synthesis, we identify habitus, cultural capital (CC), social capital (SC), and economic capital (EC) as the key forms of capital for ICT use that underlie the digital inequality phenomenon.

Over time, these forms of capital have been variously defined, extended, and reconceptualized (Sullivan 2001, Reay 2004a). They have been appropriated for different human activities (Bennett and Silva 2006, Bebbington 2007) and operationalized variously across contexts (Dika and Singh 2002, Drissen 2001, Dumais 2002). Following recommendations to capture the richness of the phenomenon (e.g., Agarwal et al. 2000), we appropriate and define each form of capital and its subdimensions, as shown in Table 1. These forms of capital and their subdimensions emerged from a detailed literature review and were the constructs we used to characterize individual responses to a GDI that provides free ICT access. We explain Table 1 in the remainder of this section, defining each construct while also developing hypotheses for the

Table 1 Definitions of Key Forms of Capitals

Forms of capital	Definition	Subdimensions	Definitions of subdimensions
Habitus	Individual disposition toward using ICT offered through a GDI	Extrinsic motivation (EM)	Individual extrinsic motivation toward using ICT offered through a GDI
		Intrinsic motivation (IM)	Individual intrinsic motivation toward using ICT offered through a GDI
Cultural capital (CC)	The embodied competencies for using ICT offered through a GDI	Knowledge (KNOW)	The operational knowledge required by an individual to use ICT offered through a GDI
		Self-efficacy (SE)	The belief in one's capabilities to use ICT offered through a GDI
Social capital (SC)	The resources from social networks for using ICT offered through a GDI	Family, relatives, peers, and friends' influence (FRPF)	Perceived expectations from family, relatives, peers, and friends for one to use ICT offered through a GDI
		Support from acquaintances (SUPPORT)	Support from acquaintances who offer help to use ICT offered through a GDI
Economic capital (EC)	The monetary means to acquire and access ICT offered through a GDI	Subdimensions not identified; government initiatives are conceptualized as providing free ICT access, eliminating economic capital for ICT access as the basis of inequality. Moreover, to account for the effects of any supplementary monetary resources needed to access ICT provided by the GDI, we specify EC as a control variable.	

first two research questions: (RQ1) How do SEA and SED potential adopters differ in access to each capital (H2A and H3A)? (RQ2) How does their relative access to each form of capital change from participation in a GDI (H1, H2B, and H3B).

2.2.1. Habitus.

Definition and Subdimensions. Scholars have suggested that individual motivation or orientation toward using an ICT has a critical effect on actual behavior (Warschauer 2002). Kvasny and Keil (2006) found that *habitus*, which describes an individual's disposition, attitude, and expected benefits about using ICT, affects actual practices. This is consistent with the view that habitus can be understood from people's attitudes toward, or the benefits they expect to derive from, a certain behavior (Warde 2006, Reay 2004b). Henry (2004) suggested that individual dispositions are important psychological resources. De Haan (2004) reported that positive/negative motivations are mental drivers/barriers for ICT engagement. To capture this psychological capital, we adapt the habitus concept to our investigative context and define it as an individual's disposition toward using ICT offered through a GDI. In the context of GDI, Kvasny (2002, p. 154) characterized habitus as whether an individual "does or doesn't view information technology as appropriate, interesting, or useful (Gorard 2000, Gorard and Selway 1999)." Therefore, to capture an individual's utilitarian and hedonic evaluations of ICT usage, we identify extrinsic motivation (EM) and intrinsic motivation (IM) (Davis et al. 1992, Venkatesh and Brown 2001) as constituent properties of habitus.

Initial Difference and Relative Change Based on Socioeconomic Status. Individuals with comparable social positions tend to share similar social judgments and expectations about the roles that they could possibly enact (Bourdieu 1984, Williams 1990). In general, digital technologies represent the mainstream proinnovation culture, and individuals with higher social status tend to hold a more favorable view toward ICT innovation (Kvasny and Keil 2006, Rogers 2003). Nonetheless, constrained government budgets for such policy interventions usually do not allow for cutting-edge technologies (Meader et al. 2001). Thus, the ICT distributed via GDI tend to be rudimentary in terms of their functional capabilities; they are targeted toward the SED and may not be as appealing as mainstream products and services. For this reason, we do not expect SEA potential adopters to have a more favorable view of *initiating* usage of an ICT from a GDI than their SED counterparts.

Individual disposition is responsive and continually restructured by personal interaction with the world (DiMaggio 1979, Reay 2004b). Given that most ICT offered through GDI are rudimentary in nature, we expect that SED adopters' views of the technology will exhibit a more positive shift, as compared to SEA adopters' views. We know from prior research that individual evaluation of an ICT may differ across innovation stages. For example, Bhattacherjee and Premkumar (2004) detected significant changes in outcome evaluation before and after initial usage. As compared to potential adopters, adopters base their evaluation on firsthand usage experience rather than on external information (Karahanna et al. 1999). Additionally, consumer research suggests that the utility derived from consuming a product may vary for people with different backgrounds (Tsikriktsis 2004). Organizational researchers maintain that it is not the volume of the offered resources but the *congruence* between a person's needs and the resources that will determine the effect of the resources (Sirgy et al. 2001).

Similarly, IS scholars have also found that the value derived from using ICT is contingent on whether the ICT fits one's unique needs (Au et al. 2008). The SEA are, by definition, more affluent than the SED (Kvasny and Keil 2006, Rogers 2003) and tend to have more access to and use of ICT (Lenhart 2002; NTIA 1999, 2000). In this vein, given that ICT from a GDI is functionally simple and primarily designated for the SED, the technology would be more congruent with the SED's backgrounds and needs than with those of the SEA. Compared to SEA adopters, SED adopters' usage experience with the technology is more likely to meet their expectations. Thus, after using the technology, SED adopters are expected to have a more positive change in their evaluation toward continuing to use the ICT than the SEA.

Hypothesis 1 (H1). *A greater positive difference in habitus for ICT from a GDI will exist between adopters and potential adopters for the SED than for the SEA.*

2.2.2. Cultural Capital.

Definition and Subdimensions. The skills, knowledge, and capabilities embodied within individuals are internal resources that enable human activities (Coleman 1990). Scholars have used a variety of terms to describe internal competencies, such as human capital (Coleman 1990), cognitive resources (De Haan 2004), and embodied cultural capital (Bourdieu 1984). In particular, Bourdieu conceives that cultural capital (CC) can manifest itself in three forms, including (1) objectified CC, such as pictures and books; (2) institutional CC, such as educational credentials; and (3) embodied CC, or the internal competencies needed to appropriate, understand, and use cultural artifacts. Among the three forms, embodied CC is closest to the aforementioned concepts of human capital and cognitive resources. Moreover, given that GDI tends to emphasize providing digital technologies (objectified CC) and that education attainment (institutionalized CC) is already captured by one's socioeconomic status, we focus our attention on embodied CC. In this study, cultural capital is defined as the embodied competencies needed to use an ICT from a GDI.

Knowledge has been suggested to be a necessary resource for understanding and operating an innovation (Rogers 2003). Self-efficacy describes the belief in one's ability to perform a behavior (Bandura 1986). Without sufficient self-efficacy, or confidence, even a person with adequate knowledge may not achieve intended outcomes. Therefore, some view self-efficacy as a person's "believed competencies" for task performance (Hu et al. 2007). Although cultural capital is often regarded as knowledge or skills (Thompson 1999, Sullivan 2001, Silva 2006), it has been extended to include individual confidence (Reay 2004a, De Bruin 2006). For instance, Reay (2004a) argued that confidence is a critical element that empowers an individual to activate available knowledge for action. Similarly, IS scholars have also conceptualized knowledge and self-efficacy as two different aspects of user competence (Macolin et al. 2000). As the SED are particularly vulnerable to lack of resources (Williams 1990), digital inequality studies have found that individuals' confidence (Teo et al. 2002) and knowledge (De Haan 2004) in using ICT strongly affect their practice. While acknowledging that human capital or embodied cultural capital are variously labeled and measured, we focus on knowledge (KNOW) and self-efficacy (SE) as the key constituent subdimensions of cultural capital.

Initial Difference and Relative Change Based on Socioeconomic Status. Individuals with higher socio-economic status tend to have more ICT access, exposure, and usage experience (Lenhart 2002, Norris 2001). The SEA's higher education attainment also offers more access to learning environments, such as schools, that facilitate the development of digital competencies (De Haan 2004). As a result, the SEA may be better positioned to use digital technologies and process information accessed through digital technologies (OECD 1997). The SED generally lack comparable levels of competencies relative to the SEA and are thus less able to engage in ICT usage (De Haan 2004, Kvasny and Keil 2006, Warschauer 2002). It is, therefore, reasonable to expect the SED to have less embodied competencies toward initiating ICT usage, including the usage of simple ICT sponsored by government programs.

Hypothesis 2 (H2A). *Socioeconomically disadvantaged potential adopters will have lower cultural capital than advantaged potential adopters for initiating the use of ICT from a GDI.*

Technology use can be conceptualized as an incremental learning process through which individuals obtain knowledge and experience, thus increasing their capacities to apply the technology (Saga and Zmud 1994). Direct experience enhances self-efficacy (Bandura 1986), and as suggested by research in education, individuals learn more effectively when pedagogical approaches are tailored toward personal differences and needs (Federico 1991). By viewing ICT use as a learning activity, it is not surprising that the use of similar ICT results in differential outcomes for people with different backgrounds (Au et al. 2008). Consequently, the nature of the technology offered from a GDI may require different learning for SEA and SED adopters. For the SED, using digital technologies, even basic ICT, represents a chance to enhance operational knowledge and confidence. In contrast, given that the SEA usually have more affluent digital backgrounds (Kvasny and Keil 2006,

Lenhart 2002), the functional simplicity or limitations of ICT from a GDI may represent a less valuable learning opportunity for them. In other words, the cultural capital that accrues from SEA adopters' usage of an ICT provided by a GDI may not be as dramatic as that experienced by their SED counterparts.

Hypothesis 2 (H2B). *A greater positive difference in cultural capital for ICT from a GDI will exist between adopters and potential adopters for the SED than for the SEA.*

2.2.3. Social Capital.

Definition and Subdimensions. Productive resources that reside in relationships among social agents are usually referred to as social capital (SC). Although SC generally describes the resources that one can obtain from a network of relationships, the concept has been variously defined (Bourdieu 1984, Coleman 1990, Lin 2000, Nahapiet and Ghoshal 1998), extended (Ihlen 2005), synthesized (Adler and Kwon 2002, Resnick 2002), and operationalized (Dika and Singh 2002). For instance, Bourdieu (1984) conceptualizes SC as the instrumental benefits that one can obtain from the social network. Stanton-Slaazar and Dornbusch (1995) thus measured SC as social network support. Coleman (1990) views SC more in terms of information, obligations, expectations, and norms. In the context of ICT, researchers have offered similar concepts that capture productive social resources for innovative behaviors. De Haan (2004), for example, indicated that such social resources as access to acquaintances in one's social setting who can offer advice or support would be instrumental for ICT use. It is also widely accepted that important referents' behavioral expectations, or subjective norms, will influence one's ICT use (Venkatesh and Brown 2001). Subjective norms tap into the idea of facilitation (friends expect me to perform the behavior) and hindrance (the opposite of facilitation) (Brass et al. 2004), implying that the nature of referents' expectations that derives from one's social group is arguably an instrumental resource (Portes and Sensenbrenner 1993) for technology engagement. With this backdrop, we define social capital as the resources in social networks for using ICT offered through a GDI. Although there might be many possible forms for SC, we focus on two SC factors that appear to be especially relevant to the GDI context: support from acquaintances (Support) and perceived expectations from family, relatives, peers, and friends (FRPF), who represent important referents in personal networks for one to use government-sponsored ICT.

Initial Difference and Relative Change Based on Socioeconomic Status. In general, the SEA tend to have more social resources for human activities (Coleman 1990), including applying ICT, as compared to the SED (e.g., Warschauer 2002). This assumption, however, requires further elaboration in the case of GDI. Lee and Bowen (2006) argued that one's social advantage with regard to an activity is contingent on whether the activity is geared for the social group to which s/he belongs. The GDI interventions are aimed at connecting the disadvantaged to the digital world at the lowest possible cost and typically involve technology that is targeted at the SED, which may make the technology less appealing to the SEA (Meader et al. 2001). Situated in the social network in which their acquaintances and referents are likely to share similar profiles and/or backgrounds, the SED may be exposed more to referents who expect them to use the type of technology offered through a GDI. They may also have additional acquaintances that are knowledgeable about such a technology and are in a position to offer support. Therefore, in relation to SEA potential adopters, SED potential adopters may actually have more social capital with regard to using government-sponsored technology.

Hypothesis 3 (H3A). *Socioeconomically disadvantaged potential adopters will have higher social capital than advantaged potential adopters toward initiating the use of ICT from a GDI.*

While social capital can facilitate activities, activities can also reproduce social capital (Resnick 2002). The use of ICT may extend one's access to important resources, including social resources (e.g., Warschauer 2002). Prior research suggests that ICT use offers opportunities for maintaining and strengthening existing social contacts as well as for expanding one's social network (Wellman 2001). As a result, ICT use may increase one's exposure to those who are in a position to share knowledge and offer further ICT support. Usage, as a learning experience, can also help individuals to develop mental models that are sensitive and responsive to social signals about ICT, such as referents' expectations for ICT use. In other words, using ICT may lead to higher social capital that promotes continued use. Given that the ICT offered through a GDI is conceived and designed more for the SED's situation, such a reproductive effect on social capital may be stronger for the SED than the SEA.

Hypothesis 3 (H3B). *A greater positive difference in social capital for ICT from a GDI will exist between adopters and potential adopters for the SED than for the SEA.*

2.2.4. Economic Capital. Economic capital affects one's ability to acquire and gain access to ICT (Kvasny and Keil 2006, De Haan 2004). In this study, economic capital refers to the monetary means to access

the government-sponsored ICT. The SED understandably tend to have less economic capital than the SEA. However, because most government policy initiatives aimed at addressing digital inequality are designed to remove economic barriers to ICT access (Kvasny and Keil 2006, Meader et al. 2001), differences in economic capital between the SEA and the SED are not theorized.

2.3. Impact of Capital for ICT on the Behavioral Intentions of the SED

To complement the above theorization about the differences between the SED and SEA in ICT capital and the differential impact on each group from participation in a GDI, we now theorize on the influence of each form of capital on the SED's ICT behavioral intentions. This is related to our third and fourth research questions. We theorize on these influences by specifying behavioral models for (a) SED potential adopters' initial usage intention and (b) SED adopters' continuance intention. The logic for the models is based on the notion that the availability of critical resources affects individuals' general behaviors (Coleman 1990), as well as ICT use (De Haan 2004, Warschauer 2002). Although we expect cultural capital, social capital, and habitus to be important determinants of the SED's ICT usage (De Haan 2004, Kvasny and Keil 2006), the impact of their subdimensions on both the SED's initial and continued use intentions requires more nuanced theorizing.

Recent studies have shown that the SED tend to use ICT more for hedonic than utilitarian purposes (Shah et al. 2001, Bonfadelli 2002). Consumer researchers maintain that people have different dispositions towards hedonic or utilitarian activities (Holbrook 1986). Constantly struggling with life's difficulties, the SED are more likely to use avoidance coping strategies (Henry 2004), and hedonic use of ICT offers a venue to escape from reality (Venkatesh and Brown 2001). Meanwhile, the SED's lower ICT experience (Lenhart 2002) may render them less capable of fully appropriating the instrumental value of ICT. Thus, one potential reason for their differential ICT usage is that the SED may recognize and appreciate enjoyment more than the utility obtained from ICT use. Given that enjoyment and utility derived form ICT use are driven by intrinsic and extrinsic motivation, respectively (Venkatesh and Brown 2001, Brown and Venkatesh 2005), we expect the following hypothesis to hold true.

Hypothesis 4 (H4A). *The intrinsic motivation dimension of habitus will influence SED potential adopters' initial usage intention of ICT from a GDI more strongly than the extrinsic motivation dimension of habitus.*

Hypothesis 4 (H4B). *The intrinsic motivation dimension of habitus will influence SED adopters' continued usage intentions of ICT from a GDI more strongly than the extrinsic motivation dimension of habitus.*

Rogers (2003) argued that lack of adequate operational knowledge may not only discourage initial acceptance but also hinder the actual application of an innovation. Meanwhile, self-efficacy is the psychological factor that activates and enables human actions (Bandura 1986, Hu et al. 2007, Reay 2004a). Compelling evidence also supports the effect of self-efficacy on initial and continued use of ICT (Hill et al. 1986, Agarwal et al. 2000). Given that the SED are particularly vulnerable to resource conditions (Kessler 1979, Williams 1990), we expect both self-efficacy and knowledge to be important dimensions of cultural capital for the SED's initial and continued use.

Hypothesis 5 (H5A). *The self-efficacy and knowledge dimensions of cultural capital will influence SED potential adopters' initial usage intention of ICT from a GDI.*

Hypothesis 5 (H5B). *The self-efficacy and knowledge dimensions of cultural capital will influence SED adopters' continued usage intention of ICT from a GDI.*

In the context of digital inequality, researchers contend that individuals, especially the disadvantaged, can benefit from resources in social networks, which facilitate their ICT innovative behaviors (Kvasny and Keil 2006, Warschauer 2002, Payton 2003). Prior studies suggest that referents' normative expectations will affect ICT use (Venkatesh and Brown 2001). Also, having access to acquaintances who can provide information and knowledge about ICT use represents not only instrumental assistance but also emotional support that can encourage both initial and continued usage (Galegher et al. 1998).

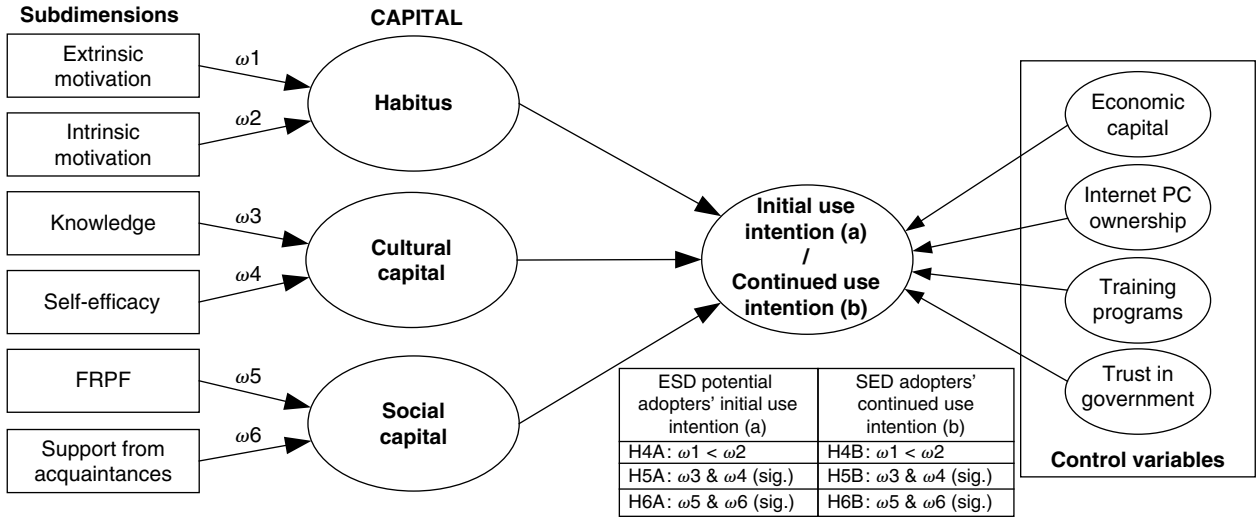
Hypothesis 6 (H6A). *The FRPF and support from acquaintances dimensions of social capital will influence SED potential adopters' initial usage intention of ICT from a GDI.*

Hypothesis 6 (H6B). *The FRPF and support from acquaintances dimensions of social capital will influence SED adopters' continued usage intention of ICT from a GDI.*

2.3.1. Control Variables. We specified four control variables to safeguard against plausible rival explanations.

1. Given that subsidies in government initiatives specifically address the SED's deficient economic resources to obtain ICT, we do not expect economic capital to influence either the SED's initial usage intention or their continuance intention. Thus, economic capital was controlled for by the type of GDI that

Figure 1 ICT Usage Behavioral Models for the Socioeconomically Disadvantaged



*FRPF = Family, relatives, peers, and friends' influence.

we are investigating. Nevertheless, we have included it as a control variable in case users need economic resources to access the ICT from the GDI that were not adequately addressed by the policy initiative.

2. Typically, governmental digital inequality initiatives are accompanied by public training programs for using the sponsored ICT. While these programs are available to the public, we controlled for participation in training programs offered as part of the GDI.

3. Having an alternate platform for Internet access at home may lessen an individual's need to use Internet access provided by government interventions. Because an Internet PC was the standard for household Internet access, Internet PC ownership was also specified as a control variable.

4. Prior research shows that people's trust in their e-commerce service providers affects their usage intentions (Gefen et al. 2003), and residents' trust in the government influences their willingness to use governmental services (Kvasny 2002). Because the government is the provider of ICT in a GDI context, we controlled for individuals' trust in the government.

3. Methodology

3.1. LaGrange Internet TV Project

In this study, we examined the efforts of one municipality—LaGrange—to tackle the problem of digital inequality. LaGrange is a city located 60 miles southwest of Atlanta, Georgia, with a population of 27,000 and is believed to be the first municipality in the world to offer free high-speed Internet access to every resident.[3] In 2000, using its own hybrid cable infrastructure, city officials negotiated with Charter Communications (a cable TV carrier) and WorldGate (an Internet service provider) to provide free LaGrange Internet TV (LITV) service to every home. Thus, residents paid nothing beyond the $8.70/month fee for basic cable TV service.[4]

The Internet TV provided TV-based Internet access using a digital cable set-top-box and a wireless keyboard. The connection ran at the speed of 158 Kbps, almost three times faster than dial-up (56 Kbps). Free training was available to every resident over cable TV and at the public library. The Internet TV was much simpler to use and less costly than a personal computer, allowing the government to subsidize a large-scale implementation. As the device contained no hard drive, users did not need to install or maintain operating systems or application programs. However, for the same reason, the equipment did not support storing files, printing, and browsing websites that require software plug-ins.

We chose to study the LITV project because it provided a unique opportunity to investigate (a) differences in capital between the SED and SEA who had not yet initiated use of LITV and those that had and (b) the behavioral models of the SED to initiate use and to continue using LITV. Although LITV was available to everyone on request, the initiative was primarily aimed at those who might not otherwise be able to afford the technology and gave the SED a chance to experience the benefits of high-speed Internet access at home. This context provided a living laboratory to examine the differential impact of the free

[3] National Public Radio, "Morning Edition," Susanna Capeluto, August 22, 2000.

[4] Because of poor TV reception in LaGrange, the majority of the population had cable TV. In those few cases where a household wanted to use LITV but could not afford the cable TV fee, the city provided free cable on request.

LITV intervention on different forms of capital across socioeconomic groups and to understand the behavioral intention models of the SED. Given this context and our research objectives, a survey approach was the research method of choice.

3.2. Data Collection

Measurement items used in the survey were adapted from existing scales (Appendix I). Most key constructs were operationalized with multiple items, except for support from acquaintances. Consistent with prior research measuring the presence or absence of support from personal networks (Coleman 1990, Wu and Rudkin 2000), a single item measuring whether the subject has received acquaintances' help for using LITV was used for Support. Although this dichotomous measure is rather simple, it does address the key issue in the digital inequality context, namely, the availability of support from personal networks. Following the recommendations of Ajzen and Fishbein (1980) and Karahanna et al. (1999), we developed two versions of the survey: one for residents who already had the Internet TV (adopters)[5] and one for those who had not yet adopted the technology (potential adopters). Identical wording was used in both versions wherever possible. For the dependent variable (i.e., behavioral intention), we specifically asked (1) potential adopters about their *intention to use* LITV and (2) adopters about their *intention to continue using* LITV. The instrument was pretested with 20 LaGrange residents, and minor modifications were made based on their feedback.

Economic capital, which was included as a control variable, was measured with a single item by asking residents the extent to which they felt that cable TV service was unaffordable. Internet PC ownership was measured by asking if residents had an Internet PC at home. To control for LITV training, we asked subjects to indicate the types of training (via cable TV or the public library) that they had received and assigned scores as follows: two types = 2, one type = 1, none = 0. We used this score to represent the extent of official training that each respondent received.

A cross-sectional study was conducted in LaGrange in the summer of 2003. Based on the city's records, 3,500 of the 9,000 eligible households had adopted LITV at that time. A population survey of these 3,500 adopter households was conducted. Because of resource constraints, an additional 2,500 copies of the survey were mailed to a random sample of households from the potential adopter population (5,500 households). Two waves of reminder postcards were mailed one week and three weeks after the initial survey. Nine-hundred residents responded to the survey, yielding a 15% raw response rate. After excluding incomplete responses, 784 surveys were usable for analysis. A wave analysis was conducted to examine nonresponse bias; construct items and demographics were compared across early and late respondents. The results were nearly identical across the two groups. A more extensive procedure (Appendix A, online supplement)[6] revealed no evidence of nonresponse bias. Based on this analysis, the adjusted response rate was 19.5%.

Table 2 Comparison of Demographics Between Socioeconomically Advantaged and Disadvantaged

	Socioeconomically disadvantaged	Socioeconomically advantaged
Household income		
<10k	31.9%	0.2%
10k–14,999	22.7	0
15k–24,999	24.7	4.9
25k–34,999	7.5	17.5
35k–49,999	2.0	21.0
50k–74,999	0	24.5
75k–99,999	0	14.6
≥100k	0	17.2
Education level		
Some elementary/high school	29.1	0
High school diploma	61.9	19.5
College degree	9.0	49.1
Postgraduate degree	0	31.4
Age		
18–30	14.2	11.4
31–40	15.2	14.1
41–50	16.0	26.1
51–60	17.0	23.2
>60	37.6	25.3
Gender		
Male	22.9	41.6
Female	77.1	58.4
Ethnic group		
White American	17.4	46.7
African-American	79.8	49.1
Other	2.8	4.2

3.3. Cluster Analysis

The 784 subjects were classified into SEA and SED groups using cluster analysis. As discussed earlier, income and education, which suggests one's socioeconomic status, have proven to be strong predictors for ICT use and nonuse (Jung et al. 2001, Lenhart 2002). We employed these two variables, each measured on an ordinal scale, to cluster[7] subjects

[5] Every subject was asked to confirm if he or she had actually used LITV to be qualified as an adopter. Among all responding adopters, 96% of them reported first using LITV at least one year prior to the data collection. The other 4% reported first using LITV between two and six months prior to the data collection.

[6] An electronic companion to this paper is available as part of the online version that can be found at http://isr.journal.informs.org/.

[7] Neither of the two variables showed any evidence of nonresponse bias.

as socio-economically advantaged or disadvantaged. Ward's hierarchical method was used to extract these clusters (Hair et al. 1998). The procedure classified 489 subjects into the SEA group and 295 subjects into the SED group. The demographic profiles of the two groups and the results of the nonparametric tests suggest significant differences between them (Table 2). Congruent with the profiles identified in most national surveys, the SED tended to have lower income and education level and consisted of more elderly, African-American, and female residents. In total, there were 151 SED potential adopters, 144 SED adopters, 182 SEA potential adopters, and 307 SEA adopters. We conducted two additional analyses using geographic information systems to assess sample representativeness (Appendix B, online supplement). The results of these analyses support the representativeness of the respondents and that of the clustered SEA and SED groups.

4. Results

4.1. Measurement Model

Table 3 presents the descriptive statistics, Cronbach's α, composite reliability, and average variance extracted (AVE) of the constructs for each of the four subgroups (i.e., SED potential adopters, SED adopters, SEA potential adopters, and SEA adopters). For multi-item constructs, internal reliabilities and composite reliabilities are all higher than 0.707 (Nunnally 1978), and the AVE values are all above 0.5, which suggests that explained variance is higher than unexplained variance (Segars 1997). For each subgroup, the squared correlation between any pair of constructs is lower than the AVE of each construct, thus establishing discriminant validity (Appendix II).

For each subgroup, multi-item constructs were further subjected to confirmatory factor analysis using AMOS 5.0. Given the model complexity and available sample size, a bootstrapping simulation[8] was used to ensure statistical reliability (Bollen and Stine 1992). Two thousand sets of samples were randomly generated with sample sizes set equal to the original sample sizes (144, 151, 182, and 307) and were then tested against the measurement model. The results showed acceptable fit of the measurement models for all four subgroups (Table 4).

Jarvis et al. (2003) note that a measure for a construct is formative if (1) the causal direction is from indicators to the construct, (2) indicators are not necessarily interchangeable, (3) covariation among indicators are not necessary, and (4) the nomological network of indicators may vary. Accordingly, the subdimensions that were used to measure habitus, cultural capital, and social capital were specified as formative indicators for their respective constructs. Multivariate unit means were created from the items used to measure each subdimension and were then used as scores for the formative indicators (Petter et al. 2007). When measurement items are internally consistent, linear composites derived using alternate weighting schemes exhibit high correlations (Rozeboom 1979). In such situations, as is the case here, the use of a linear composite based on unit means is recommended for being replicable across studies and for the simplicity of interpreting results (Hair et al. 1998).

4.2. Testing Hypotheses on Differences in Capital Between SEA and SED

4.2.1. Rationale and Procedure to Test Group Differences in Capital. For research question 1, we developed two hypotheses (H2A and H3A) as to the differences in cultural capital and social capital between SED potential adopters and SEA potential adopters. For research question 2, we theorized greater shifts in habitus, cultural capital, and social capital for the SED relative to the SEA from GDI participation. To formally state the extent of these changes, we specified three hypotheses (H1, H2B, and H3B) on the larger positive difference between SED adopters and SED potential adopters relative to SEA adopters and SEA potential adopters. These five hypotheses required the evaluation of (a) differences in capital between SEA and SED groups and (b) interactions between socioeconomic status and GDI participation.

We applied multivariate analysis of variance (MANOVA) to test the above hypotheses. We specified habitus, cultural capital, and social capital as dependent variables and socioeconomic status (SEA or SED) and innovation stage in the LITV initiative (potential adopters or adopters) as the two independent variables. As recommended by Hair et al. (1998), we computed unit means of the subdimensions for habitus, social capital (SC), and cultural capital (CC) to determine scores for these composite variables.[9] We also conducted a post-hoc analysis to examine whether economic capital, measured as perceived cost of basic cable TV, differed across innovation stages and/or economic statuses. Economic capital was thus specified as a dependent variable in the MANOVA analysis.

[8] Bootstrapping has the advantage of overcoming statistical challenges, such as relatively small sample size for complex models and nonnormal distributions (Bollen and Stine 1992).

[9] Note that social capital is formed by FRPF and Support. While FRPF ranges from 1 to 7, Support assumes a value of 0 or 1. We multiplied Support by 6 and then added 1 to compensate for this scale difference.

Table 3 Descriptive Statistics and Reliabilities of Constructs

	Potential adopters				Adopters			
Construct[a]	Mean (S.D.)	α[b]	C.R.[c]	AVE	Mean (S.D.)	α[b]	C.R.[c]	AVE
SED groups								
Extrinsic motivation (4)	4.21 (2.53)	0.98	0.99	0.98	5.37 (1.83)	0.98	0.99	0.98
Intrinsic motivation (3)	4.60 (2.54)	0.98	0.98	0.98	5.69 (1.85)	0.98	0.97	0.96
Knowledge (4)	5.04 (2.52)	0.97	0.97	0.89	6.08 (1.52)	0.94	0.96	0.86
Self-efficacy (3)	4.76 (2.46)	0.96	0.92	0.90	5.89 (1.68)	0.95	0.90	0.88
FRPF (4)	2.62 (2.11)	0.97	0.97	0.89	4.01 (2.18)	0.97	0.98	0.92
Support from acquaintances (1)	0.12 (0.33)	N.A.	N.A.	N.A.	0.25 (0.52)	N.A.	N.A.	N.A.
Behavioral intention (3)	2.93 (2.27)	0.98	0.98	0.95	4.91 (2.37)	0.97	0.97	0.93
Internet PC ownership (1)	0.21 (0.41)	N.A.	N.A.	N.A.	0.20 (0.41)	N.A.	N.A.	N.A.
Perceived cost of cable TV (1)	2.84 (2.47)	N.A.	N.A.	N.A.	3.19 (2.40)	N.A.	N.A.	N.A.
Official training program (1)	0.13 (0.42)	N.A.	N.A.	N.A.	0.58 (0.66)	N.A.	N.A.	N.A.
Trust in the government (7)	3.99 (1.89)	0.95	0.97	0.82	4.67 (1.61)	0.96	0.96	0.76
SEA groups								
Extrinsic motivation (4)	4.40 (2.12)	0.98	0.98	0.96	4.09 (2.18)	0.98	0.98	0.97
Intrinsic motivation (3)	4.46 (2.01)	0.98	0.98	0.98	4.27 (2.26)	0.98	0.97	0.96
Knowledge (4)	6.01 (1.68)	0.95	0.96	0.86	6.28 (1.24)	0.94	0.95	0.83
Self-efficacy (3)	5.56 (1.88)	0.95	0.90	0.88	5.76 (1.73)	0.95	0.90	0.88
FRPF (4)	2.10 (1.62)	0.96	0.98	0.91	2.84 (2.05)	0.98	0.99	0.95
Support from acquaintances (1)	0.02 (0.23)	N.A.	N.A.	N.A.	0.14 0(0.36)	N.A.	N.A.	N.A.
Behavioral intention (3)	1.83 (1.78)	0.98	0.99	0.97	3.31 (2.55)	0.98	0.98	0.95
Internet PC ownership (1)	0.68 (0.47)	N.A.	N.A.	N.A.	0.66 (0.47)	N.A.	N.A.	N.A.
Perceived cost of cable TV (1)	2.07 (1.97)	N.A.	N.A.	N.A.	2.14 (1.94)	N.A.	N.A.	N.A.
Official training program (1)	0.12 (0.38)	N.A.	N.A.	N.A.	0.75 (0.64)	N.A.	N.A.	N.A.
Trust in the government (7)	4.10 (1.62)	0.96	0.96	0.78	4.80 (1.57)	0.94	0.96	0.78

[a]Number of items in the scale.
[b]Cronbach's Alpha.
[c]Composite reliability.

4.2.2. MANOVA Results Related to Group Differences. The MANOVA results confirm the main effects of socioeconomic status and GDI participation and their interaction effect on habitus, cultural capital, and social capital, whereas only a main effect of socio-economic status on economic capital is observed. The graphics in Figure 2 and the information on the significance of interaction effects in Table 5 provide evidence of the greater positive mean differences in habitus, CC, and SC between SED adopters and potential adopters than for SEA adopters and potential adopters, supporting H1, H2B, and H3B. Further ANOVA analysis revealed that SED potential adopters, relative to their SEA counterparts, had lower CC and higher SC, thus supporting H2A and H3A.

Additional analyses (MANOVA and ANOVA) were conducted to examine whether the above results were stable across subdimensions for habitus, social capital, and cultural capital. To ensure that the subdimensions could be meaningfully compared across the different groups, we evaluated their measurement invariance, which was supported (Appendix D, online supplement). The results for the subdimensions are identical to those at the aggregate capital level with one exception: for social capital, the interaction effect between socioeconomic status and GDI participation is observed for FRPF but not for support from acquaintances.

Table 4 Goodness-of-Fit Indices for Measurement Models

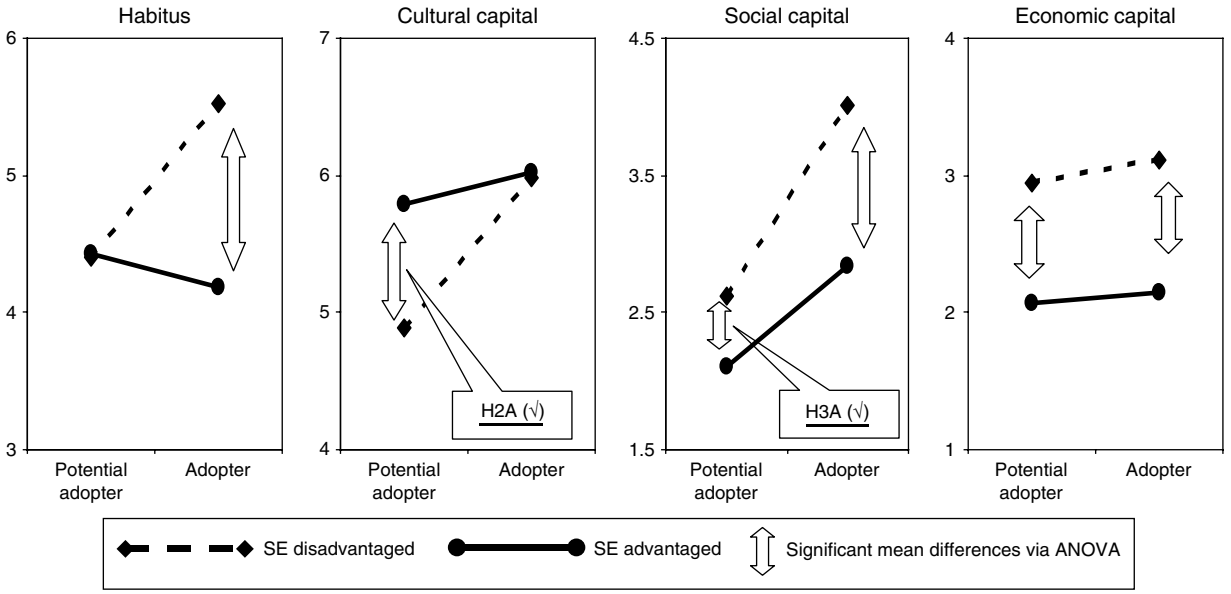
Goodness-of-fit indices	SED potential adopters	SEA potential adopters	SED adopters	SEA adopters	Desired level
Chi-square/DF	2.72	1.95	2.47	1.83	<5
No. of 2,000 cases converged	1,994	2,000	1,987	2,000	
Bollen-stine *P*-value	0.104	0.164	0.140	0.185	>0.05
TLI	0.941	0.944	0.946	0.981	>0.9
CFI	0.951	0.952	0.953	0.984	>0.9
SRMR	0.0409	0.0388	0.0395	0.0332	<0.08
RMSEA	0.078	0.071	0.068	0.051	<0.08

*Factor loadings of CFA are reported in Appendix C, online supplement.

4.3. Testing Behavioral Models for Socioeconomically Disadvantaged

To test H4A, H5a, and H6A, which map to RQ3, and H4B, H5B, and H6B, which map to RQ4, we applied partial least squares (PLS) (PLS Graph 3.0 Build 1126) to test the behavioral models for SED potential adopters and adopters. PLS is suitable for research focused on theory development and refinement and places minimal demands on measurement scales and the distributional assumptions of the data (Gefen et al. 2000). It is also capable of estimating

Figure 2 MANOVA Results



*The assessment of economic capital is limited to perceived cable TV cost.

complex models that include reflective and formative measures without the identification challenges that can occur when formative measures are included in covariance-based structural equation models (Jarvis et al. 2003). As described earlier, we specified multivariate unit means from the items for each subdimension as formative indicators for the constructs in the model. Next, a bootstrap analysis was conducted with 500 subsamples by setting the sample sizes equal to the original sample sizes ($n = 151$ and 144 for SED potential adopters and SED adopters, respectively).

Table 6 presents the results of the structural model, including the weights[10] of the formative indicators, the path coefficients (beta) between constructs, and the explained variances of the dependent variables. Although the path coefficients of all three forms of capital were significant for the potential adopters, only habitus and cultural capital were salient for the adopters; the weights for their subdimensions also varied across innovation stages. For habitus, intrinsic motivation (IM) was the only significant subdimension and was indeed more important than extrinsic motivation (EM) for potential adopters to initiate ICT use, thus supporting H4a. In contrast, both IM and EM were important elements of habitus for continued ICT use, but IM was not found to be more critical than EM. As a result, H4B was not supported. Regarding cultural capital, self-efficacy (SE) was the sole significant subdimension for potential adopters, thus partially supporting H5A. Consistent with our expectation, both SE and knowledge (KNOW) were salient components of cultural capital for continued use, thereby supporting H5B. For social capital, normative influence (FRPF) and support from acquaintances were both important for potential adopters. H6A was therefore supported. For adopters, although FRPF was the salient subdimension, social capital did not affect continuance intention. Thus, H6B was not supported.

Some scholars have suggested that different forms of capital may complement or substitute for each other (e.g., Coleman 1990, Bourdieu 1984). Thus, we performed a post hoc analysis to examine whether there is any interaction effect among various forms of capital by including six two-way interaction terms for both SED's intention to initiate ICT use and to continue ICT use. The results revealed one significant positive interaction between cultural capital and social capital for potential adopters (Appendix E, online supplement).

[10] The weights of the formative indicators in PLS are similar to the beta coefficients in a regression model.

Table 5 MANOVA Results for Group Differences in Capital

Socioeconomic status		Innovation stage		Interaction effect between socioeconomic status and innovation stage		
	Sig.		Sig.		Sig.	*r*-square
Main effect	0.000	Main effect	0.000	Interaction	0.000	0.030
Habitus	0.000	Habitus	0.005	Habitus	0.000 **H1** (✓)	0.025
Cultural cap.	0.000	Cultural cap.	0.000	Cultural cap.	0.000 **H2B** (✓)	0.014
Social cap.	0.000	Social cap.	0.000	Social cap.	0.048 **H3B** (✓)	0.005
Economic cap.	0.000	Economic cap.	0.249	Economic cap.	0.486	0.001

Table 6 Structural Model Results for SED Potential Adopters and SED Adopters

	SED potential adopters	Control model	Full model	Hypothesis supported?	SED adopters	Control model	Full model	Hypothesis supported?
	Path	Beta	Beta		Path	Beta	Beta	
Control variables	Internet PC	−**0.18***	−**0.18***		Internet PC	−**0.18***	−0.09	
	Cable TV cost	0.01	0.02		Cable TV cost	0.01	0.03	
	Participation in GDI training	**0.18***	0.01		Participation in GDI training	**0.28****	**0.16****	
	Trust in gov.	0.14	0.02		Trust in gov.	0.14	0.04	
Structural paths	**Habitus → BI**		**0.29****		**Habitus → BI**		**0.32****	
	Cultural → BI		**0.29****		**Cultural → BI**		**0.36****	
	Social → BI		**0.21***		Social → BI		0.08	
			Weight				Weight	
Habitus	Extrinsic		0.07	**H4A** (✓)	**Extrinsic**		**0.56****	**H4B** (x)
	Intrinsic		**0.94****		**Intrinsic**		**0.49****	
Cultural Capital	Knowledge		0.38	**H5A** (✓)	**Knowledge**		**0.24****	**H5B** (✓)
	Self-efficacy		**0.65****		**Self-efficacy**		**0.72****	
Social Capital	**FRPF**		**0.70****	**H6A** (✓)	**FRPF**		**0.82****	**H6B** (x)
	Support		**0.54****		Support		0.27	
	Δ *R*-square (%)	**Δ7.9**	**Δ 36.5**		Δ *R*-square (%)	**Δ14.6**	**Δ 30.7**	
	R-square (%)	**7.9**	**44.4**		*R*-square (%)	**14.6**	**45.3**	

For the control variables, the training program did contribute to the adopters' continuance intention (Table 6).[11]

Perceived cost of cable TV and trust in the government did not affect either group. Internet PC ownership had a dampening effect for SED potential adopters, but it did not reduce SED adopters' intention to continue using LITV (Table 6). One possible explanation for this is that there might be high demand for Internet access among adopters' household members; thus, they welcomed the Internet TV even though they already possessed an Internet PC.

5. Discussion

The results reveal interesting differences in habitus, cultural capital, and social capital between the socioeconomically advantaged and disadvantaged both prior to and after using LITV. They also provide insight into the factors that are instrumental in promoting initial and continued ICT use among the SED. We summarize the findings in Table 7 and discuss their implications for theory, practice, and future research in the following sections.

5.1. Implications for Theory

To begin with, this study makes a significant contribution to the literature on digital inequality, as it is one of the first works that has attempted to operationalize the capital perspective to gain insight into the digital inequality problem. It also answers the call for managerial research into critical public policy issues (Lytras 2005), including government initiatives for digital inequality (DiMaggio et al. 2004). Our application of the capital perspective for studying ICT use has important implications for both digital inequality and IS research. While technology acceptance research has identified a variety of factors that promote ICT use, the literature on various forms of capital and on their distribution in society enabled us to (1) identify the relevant forms of capital that impact how individuals respond to a GDI, (2) theorize how these forms of capital differ across the SEA and SED and how these differences change because of participation in a GDI, and (3) provide insight on the specific elements of each form of capital that is necessary for the SED's initial and continued use.

Digital Inequality Before and After GDI Participation (RQ1 and RQ2). This study contributes to our understanding about digital inequality by identifying the forms of capital for ICT use that differ across socioeconomic classes. We detected systematic differences in access to the forms of capital for a basic ICT across the socioeconomically disadvantaged and advantaged potential adopters (Table 7, RQ1). Disparities in cultural capital for ICT use, specifically, in terms of self-efficacy and operational knowledge, are distinct points of disadvantage for the SED relative to the SEA. Moreover, affordability of the residual costs to use a subsidized ICT offering (i.e., perceived cost of cable TV) is also a point of disparity between the SEA and the SED. Thus, economic capital may need to be conceptualized to include not only technology costs but also ongoing access costs. Interestingly, our

[11] We also split the training control variable into two dummy variables (TV training and library training). The results in Table 6 were robust and did not change qualitatively.

Table 7 Summary of Findings

	Research questions			
	RQ1	RQ2	RQ3	RQ4
Construct	Inequality in capital between SEA and SED potential adopters?	Change in capital for the SED relative to the SEA GDI participation?	Importance of capital and subdimensions for the SED's initial use?	Importance of capital and subdimensions for the SED's continuance?
Habitus Extrinsic motivation (EM)	*No hypothesis developed* **No** significant difference in EM between SEA and SED potential adopters.	**SED > SEA: H1 (✓)** Greater positive difference in EM between adopters and potential adopters for SED than SEA	**Significant path** IM important subdimension of habitus for initial use by SED potential adopters **H4A** (✓)	**Significant path** **Both** EM and IM important part of habitus for continued use by SED adopters
Intrinsic motivation (IM)	**No** significant difference in IM between SEA and SED potential adopters.	**Greater positive difference** in IM between adopters and potential adopters for SED than SEA		IM **not found to be more** important than EM **H4B** (X)
Cultural cap. Knowledge	**SED < SEA : H2A** (✓) **Lower knowledge** for SED potential adopters than SEA potential adopters	**SED > SEA : H2B** (✓) **Greater positive difference** in knowledge between adopters and potential adopters for SED than SEA	**Significant path** Self-efficacy important subdimension of cultural capital for initial use by SED potential adopters **H5A (partial ✓)**	**Significant path** **Both** self-efficacy and knowledge important part of cultural capital for continued use by SED adopters **H5b** (✓)
Self-efficacy	**Lower self-efficacy** for SED potential adopters than SEA potential adopters	**Greater positive difference** in self-efficacy between adopters and potential adopters for SED than SEA		
Social cap. Family, relatives, peers, and friends' influence	**SED > SEA : H3A** (✓) **Higher FRPF** for SED potential adopters than SEA potential adopters	**SED > SEA: H3B** (✓) **Greater positive difference** in FRPF between adopters and potential adopters for SED than SEA	**Significant path** **Both** FRPF and support by acquaintances important part of social capital for initial use by SED potential adopters **H6A** (✓)	**Insignificant path** FRPF important subdimension of social capital, but social capital was not important for continued use by SED adopters **H6B** (X)
Support from acquaintances	**Higher support from acquaintances** for SED potential adopters than SEA potential adopters	**No significant difference** in support by acquaintances between adopters and potential adopters for both SED and SEA		
Economic cap.	*No hypotheses developed for economic capital as LITV was offered free of charge*			
Perceived cost of cable TV	**Lower** residual economic capital for SED potential adopters than SEA potential adopters	No significant change in perceived cost of cable TV for either SEA or SED	Basic cable TV cost not critical to initiate use by SED (waiver available from local government on request)	Basic cable TV cost not critical to continue use by SED (waiver available from government on request)

results also provide counterinsight into the broad generalization that the advantaged, in general, tend to have more resources toward using ICT (DiMaggio et al. 2001, De Haan 2004), When considering functionally limited ICT like LITV, although cultural capital is *lower* for disadvantaged potential adopters, their social capital for ICT from a GDI is actually *higher* than the advantaged.

In addition, our study provides insight into the impact that GDI participation has on digital inequality. The differential gains in capital realized by the SEA and SED are evidence of the effectiveness of free ICT access policies in leveling the playing field, at least with respect to basic Internet connectivity. Through participation in the GDI, the socioeconomically disadvantaged compare more favorably than the advantaged (Table 7, RQ2) in terms of accruing cultural capital for the ICT that was offered. Moreover, their habitus, both in terms of internal and external motivation, is enhanced to a greater degree than the SEA from such participation. Finally, social capital, which was greater for SED potential adopters than SEA potential adopters, is further increased for the SED. Thus, we have evidence that a GDI not only reduces the constraints associated with the economic capital needed to initiate ICT use but also can yield constructive changes in capitals for the SED through their use of ICT. Unfortunately, the SED adopters still had less economic capital than the SEA, as reflected by their higher perceived cost to access cable TV

(Figure 2 and Table 5). It is possible that over time the relative differences in general resource conditions (between the SEA and the SED) may narrow if the SED can extend the impact of their ICT usage to advance their life opportunities and conditions.

Forms of Capital for the SED to Initiate and Continue ICT Use (RQ3 and RQ4). Our study also sheds light on the different forms of capital that lead to the SED's intention to initiate ICT use (Table 7, RQ3). Interestingly, the intention to initiate ICT use by the SED is influenced by specific aspects of each form of capital: internal motivation for habitus; self-efficacy for cultural capital; and both expectation from family, relatives, peers, and friends and support from acquaintances for social capital. Importantly, as we detected through our post-hoc analysis, social capital and cultural capital complement each other in promoting initial use intention. This finding is consistent with Bourdieu's (1994) view that the behavioral effect of cultural capital could be affected by social capital i.e., the impact of potential adopters' cultural capital on their intention to initiate ICT use is augmented when they perceive a higher level of expectation and support from their personal networks.

Finally, our study offers fresh insight into the forms of capital that lead to the SED's intention to continue ICT use (Table 7, RQ4). In terms of habitus, while the SED's initial use intention is influenced only by internal motivation, their continued use intention is also influenced by external motivation. Thus, beliefs about both hedonic and utilitarian values are critical to promote the SED's continuance intention. In terms of cultural capital, both self-efficacy and knowledge about the *specific* ICT are important for the SED's continued use. While self-efficacy facilitates initial use, operational knowledge emerges as another important aspect once they start using the technology. In contrast, neither of the two investigated subdimensions of social capital, which are important for the SED's initial use, affects their continued use. Thus, relative to social capital, habitus and cultural capital play an expanded role in sustaining ICT use.

5.2. Implications for Practice

For practitioners, particularly policymakers and ISPs who intend to spur the initial and continued use of ICT among the socioeconomically disadvantaged, this study has important implications. The findings here challenge assumptions guiding typical ICT policy formulation that technology access alone is enough and provide actionable recommendations for addressing digital inequality. Our findings suggest that policymakers should (1) acknowledge the complexity and dynamics of the phenomenon; (2) discard the idea that digital inequality is simply a technology access problem and instead focus on disparities in forms of capital for ICT; (3) recognize the key aspects of the behavioral models that characterize SED potential adopters' and adopters' behavioral intention; and (4) design policy interventions to address identified gaps in capital and to leverage each form of capital to trigger initial and continued use of ICT.

Specifically, *for socioeconomically disadvantaged potential adopters,* focusing on intrinsic motivation, self-efficacy, FRPF's expectations, and support from acquaintances can stimulate this group's initial use intention. Digital inequality interventions should include a *persuasive communication strategy* that conveys the enjoyment and satisfaction that can be derived from technology usage. To enhance their confidence in using technology prior to initial usage, according to Bandura (1986), practitioners should consider promoting positive trial experiences, vicarious-learning environments (e.g., classrooms or technology centers), and verbal encouragement whenever appropriate (e.g., from assistants or advisors). In addition, policymakers should devise interventions that leverage expectations from key referents and support from acquaintances among individuals' personal networks. Policymakers should also pay attention to the synergistic effect between cultural capital (self-efficacy) and social capital (FRPF and support). The costs of misperceiving key resources to be substitutes when they are actually complements are very high and can result in the outright failure of major initiatives (Sigglekow 2002). Thus, these two forms of capital should be developed simultaneously to reinforce each other in terms of their impact in promoting initial use of an ICT.

For socioeconomically disadvantaged adopters, focusing on extrinsic motivation, intrinsic motivation, self-efficacy, and knowledge may sustain ICT use. During the post-adoption stage, policymakers should assume an *experience strategy* that centers on (1) creating a positive *experience* for users and (2) providing convenient access to required operational knowledge for use of the technology's functionality. Another valuable lesson learned from this investigation regards the choice of technology for digital inequality interventions. First, the choice of a low-cost ICT financially allows the government to support a large-scale intervention. Second, the selection of a user-friendly ICT greatly reduces the knowledge required to use the technology. These factors are critical, for they allow policymakers to market the ICT directly toward SED potential adopters. They also promote an encouraging experience for adopters, which is critical for positive outcome evaluations and confidence for continued usage. The low-cost and easy-to-use aspects have rendered LITV an ideal candidate for the intervention. Nevertheless, its limited functionality might eventually present difficulties for the disadvantaged to

develop more advanced skills. Policymakers and service providers should be aware that "one size may not fit all" and that they will need to optimize their technology choice for the targeted audience, while providing a growth path for those who acquire relevant skills and are ready to move to a more sophisticated technology platform (such as a PC).

Moreover, policymakers should view economic capital more broadly than just technology access, as one often needs additional economic resources before s/he can effectively apply the sponsored technology. In the case of LITV, such additional resources include the TV set, electricity, and the time to use the technology. The sponsored technology was still beyond the reach of those who could not afford a TV set, could not pay the electricity bill, or did not have the time to learn and use LITV because they were working multiple jobs to make ends meet. Finally, policymakers should also monitor the general economic conditions of the disadvantaged to trace if their application of the offered ICT leads to any significant improvements in their life conditions.

5.3. Limitations and Future Research

As with all empirical research, this investigation has limitations. Digital inequality involves the disadvantaged at all levels, including individual, community, organizational, national, and even regional (DiMaggio et al. 2004). Although the proposed models help explain the phenomenon, the theoretical focus of this paper inevitably confines our findings to the individual level. Furthermore, the research design involved a cross-sectional survey that gathered quantitative data for statistical analysis. Inevitably, some of the richness of the capital constructs is difficult to capture with such a positivist methodology. While additional insight might be gained by using a qualitative or interpretive approach, both qualitative (e.g., Kvasny 2002) and quantitative (e.g., Dumais 2002) methods have proven useful in advancing our understanding of habitus, cultural capital, and social capital for human behaviors (DiMaggio 2004). Given the complexity associated with digital inequality, a multilevel longitudinal study combining qualitative and quantitative data, as conducted by Bennett and Silva (2006), should generate insight that cannot be achieved using a variance-based approach such as the one employed here.

While digital inequality is a serious issue, there remains little IS research on this topic. Here we provide a research agenda that would further extend this work. *First and foremost*, although digital inequality initiatives essentially aim to improve the socioeconomically disadvantaged's quality of life relative to the advantaged (Bleha 2005), there remains little evidence that this objective has been successfully achieved. Thus, one of the most important directions for future research is to understand the ways through which the SED can effectively convert their ICT use into economic, health, social, and educational benefits. Such benefits should be assessed not only from an absolute basis (i.e., whether the SED's life conditions have improved) but also on a relative basis (i.e., whether differences in living standards between the SEA and SED are significantly reduced).

Second, as mentioned in the theory and implication sections, these forms of capital permit room for expansion. Future research should identify additional dimensions of these forms of capital that would be important for ICT use. In the case of habitus, for instance, one's aspirations and perceived opportunities for a specific activity (e.g., ICT use) may affect his/her behavioral choices (Kvasny and Keil 2006, Dumais 2002). For cultural capital, particularly embodied cultural capital, one's direct experience and familiarity with the activity (Kvasny and Keil 2006, Reay 2004a), literacy, numeracy, and informancy to appropriate an artifact (e.g., ICT) (De Haan 2004) and his/her participation in related activities (Dumais 2002, Silva 2006, Sullivan 2001) may all influence his/her behavior. With regard to social capital, Lin (2000) argued that network characteristics affect one's ability to mobilize available social resources and should be considered as an important aspect of social capital. As for economic capital, a broader conceptualization will be useful to understand the role of disposable time; the affordability of electricity, technology, and infrastructures; and the affordability of training. The above suggestions are promising directions for future studies on these forms of capital for ICT.

Third, one unique property of capital theories is the conversion and interaction between forms of capital (Bourdieu 1984, Coleman 1990). Like currencies, one form of capital can be transformed into or can facilitate the development of another form of capital (Silva 2006). It would thus be valuable to study how to help the SED to convert their existing resources into the forms of capital that are particularly instrumental for ICT use. Moreover, sociologists indicate that different forms of capital do not work in isolation and can interact with the others (Coleman 1990, Bourdieu 1984, Silva 2006). Social capital, for instance, may enhance the effect of economic capital by reducing transaction costs (Adler and Kwon 2002) and may also affect the value of cultural capital (Bourdieu 1984). Although not the focus of this study, our identified interaction between social capital and cultural capital warrants further research. More effort is needed to investigate the nature of interaction to understand which forms of capital are complements or substitutes for different social groups and for different stages in the innovation process. Such understanding will enable policymakers to direct GDI resources effectively to develop the appropriate mix of capitals for different social groups at the right time.

Fourth, in the context of information systems, intrinsic motivation is typically associated with hedonic ICT use (Brown and Venkatesh 2005, Venkatesh and Brown 2001). As hedonic ICT usage tends to be viewed as noncapital-enhancing (Shah et al. 2001), playfulness (Webster and Martocchio 1992), enjoyment, or satisfaction derived from the ICT use process are usually not the emphasis of digital inequality interventions. However, the importance of intrinsic motivation in shaping the SED's behavioral intentions across innovation stages implies that the value of entertainment in ICT use deserves further investigation in the context of digital inequality. Researchers should evaluate aesthetic, technical, and implementation factors that can elevate the SED's hedonic perception and should examine their unique impact, if they have any, on the SED's initial and continued use of ICT. Meanwhile, the recreational use of various kinds of technologies has been proven to deliver tremendous educational value (Egenfeldt-Nielsen 2007). Researchers in digital inequality should tap into the educational aspects of ICT entertainment and seek to connect recreational use to skills and/or opportunities that can improve the SED's living conditions.

Finally, many ICT-related societal issues, such as digital inequality and unintended ICT use and consequences (e.g., Internet crimes including identity theft, exploitation of children, etc.), are actually the reflection of deep-rooted social, political, educational, or economic problems that characterize the structure of modern societies (Norris 2001). Sociologists have invoked capital theories to investigate various kinds of social disparities (Coleman 1990, Bourdieu 1984) because capital theories allow for researchers to bring the macrostructure underlying these issues into analysis. We believe this unique aspect of capital theories over prior technology acceptance theories will enable IS scholars to approach ICT-related societal issues and open a new stream of research. We also hope that our study encourages future IS research to complement technology acceptance research by applying, extending, and examining a variety of social theories for ICT-related phenomenon.

6. Conclusion

Our study revealed key differences in the forms of capital for using ICT between the SEA and SED potential adopters, as well as differential changes for each from GDI participation. The results also highlight the forms of capital that explain SED potential adopters' initial use intention and adopters' continued use intention for ICT from a GDI. While the differences in capital between the SED and SEA inform the nature of digital inequality, the behavioral models uncover what policies should be emphasized to initiate and sustain ICT use by the SED. To conclude, formulation of effective digital inequality interventions requires that policymakers understand the gaps in capital and the behavioral models of SED potential adopters and of adopters. Implementation of these strategies requires well-informed practitioners and policymakers who are sensitive to the dynamics and complexity embedded in the digital inequality phenomenon.

7. Electronic Companion

An electronic companion to this paper is available as part of the online version that can be found at http://isr.journal.informs.org/.

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Appendix I. Survey Items

Dependent variable: Behavioral intention		
For potential adopters		
Behavioral intention for initial use (Potential adopters)	I intend to use the Internet TV 1. During the next three months. 2. For email, browsing, or searching during the next three months. 3. Frequently during the next three months. (Strongly disagree/Agree) (1–7 scale)	Taylor and Todd (1995), Karahanna et al. (1999)
For adopters		
Behavioral intention for continued use (Adopters)	I intend to continue using the Internet TV 1. During the next three months. 2. For email, browsing, or searching during the next three months. 3. Frequently during the next three months. (Strongly disagree/Agree) (1–7 scale)	Taylor and Todd (1995), Karahanna et al. (1999)

Appendix I. (Continued)

Construct	Items	Sources that inform the construct
Forms of capital (Adopter version)		
Extrinsic motivation	Using the Internet TV (Strongly disagree/Agree) (1–7 scale) 1. Improves my performance for communication and information search. 2. Improves my productivity for communication and information search. 3. Enhances my effectiveness for communication and information search. 4. Is useful for my communication and information search.	Venkatesh and Davis (2000)
Intrinsic motivation	Using the Internet TV (Strongly disagree/Agree) (1–7 scale) 1. Is enjoyable. 2. Is pleasant. 3. Is fun.	Venkatesh et al. (2002)
Knowledge	I have the ability and knowledge to (Strongly disagree/Agree) (1–7 scale) 1. Use a keyboard. 2. Switch back and forth between the Internet and TV channels. 3. Follow a link from a TV channel to an Internet Web page. 4. Use a mouse or cursor.	Youtie et al. (2004), Meader et al. (2001)
Self-efficacy	(Strongly Disagree/Agree) (1–7 scale) 1. I feel comfortable using the Internet TV on my own. 2. I can easily operate the Internet TV on my own. 3. I feel comfortable using the Internet TV even if there is no one around me to tell me how to use it.	Taylor and Todd (1995)
Family, relatives, peers, and friends' influence (FRPF)	(Strongly disagree/Agree) (1–7 scale) 1. My family thinks that I should use the Internet TV. 2. My relatives think that I should use the Internet TV. 3. My friends think that I should use the Internet TV. 4. People I work with think that I should use the Internet TV	Taylor and Todd (1995), Venkatesh and Brown (2001)
Trust in government	(Strongly disagree/Agree) (1–7 scale) 1. Based on my experience with the city government in the past, I know they are honest. 2. Based on my experience with the city government in the past, I know they care about the residents. 3. Based on my experience with the city government in the past, I know they will not take advantage of me. 4. Based on my experience with the city government in the past, I know they provide good services. 5. Based on my experience with the city government in the past, I know they are predictable. 6. Based on my experience with the city government in the past, I know they are trustworthy. 7. Based on my experience with the city government in the past, I know they know the city and the residents well.	Gefen et al. (2003)
Support from acquaintances	Did you receive any help about using the Internet TV from your friends or other? (Check Yes or No)	Coleman (1990), Runyan et al. (1998), Wu and Rudkin (2000)

Appendix II. Squared Pairwise Correlations and Average Variance Extracted

Table AII.1 SED Potential Adopters and SED Adopters

	1	2	3	4	5	6	7	8	9	10	11
1. Extrinsic motivation	**0.98\0.98**	0.64**	0.10**	0.14**	0.34**	0.02	0.26**	0.06**	0.00	0.02	0.04*
2. Intrinsic motivation	0.64**	**0.98\0.96**	0.11**	0.17**	0.32**	0.01	0.26**	0.06**	0.00	0.06**	0.04*
3. Knowledge	0.20**	0.31**	**0.89\0.86**	0.59**	0.01	0.00	0.13**	0.00	0.00	0.04*	0.03*
4. Self-efficacy	0.27**	0.38**	0.72**	**0.90\0.88**	0.03*	0.01	0.29**	0.01	0.00	0.05**	0.07**
5. FRPF	0.35**	0.23**	0.11**	0.13**	**0.89\0.92**	0.05**	0.12**	0.07**	0.01	0.02	0.05**
6. Support f. acquaintances	0.01	0.11**	0.07**	0.09**	0.08**	N/A	0.02	0.01	0.00	0.02	0.00
7. Behavioral intention	0.23**	0.34**	0.23**	0.25**	0.18**	0.14**	**0.95\0.93**	0.05**	0.00	0.09**	0.03**
8. Internet PC ownership	0.01	0.00	0.06**	0.04*	0.00	0.02	0.02	N/A	0.01	0.01	0.05**
9. Perceived cable TV cost	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	N/A	0.00	0.01
10. Official training program	0.06**	0.05**	0.04*	0.06**	0.04*	0.05**	0.03*	0.01	0.03*	N/A	0.03
11. Trust in government	0.03*	0.05**	0.00	0.01	0.03*	0.06**	0.02	0.01	0.01	0.01	**0.82\0.76**

Notes. Squared correlations for the SED adopters are above the diagonals and for SED potential adopters are below the diagonals. AVEs for multi-item constructs are shown on the diagonal. For discriminant validity, diagonal elements should be larger than off-diagonal elements.

$^{**}p < 0.01$; $^{*}p < 0.05$.

Table AII.2 SEA Potential Adopters and SEA Adopters

	1	2	3	4	5	6	7	8	9	10	11
1. Extrinsic motivation	**0.96\0.97**	0.76**	0.01	0.06**	0.39**	0.01	0.43**	0.08**	0.00	0.02**	0.08**
2. Intrinsic motivation	0.64**	**0.98\0.96**	0.02*	0.08**	0.33**	0.01	0.43**	0.08**	0.01	0.01	0.06**
3. Knowledge	0.04**	0.06**	**0.86\0.83**	0.43**	0.00	0.00	0.02*	0.01	0.01*	0.01	0.00
4. Self-efficacy	0.16**	0.14**	0.62**	**0.88\0.88**	0.01	0.00	0.08**	0.00	0.01	0.00	0.00
5. FRPF	0.16**	0.13**	0.00	0.01	**0.91\0.95**	0.02*	0.30**	0.13**	0.02**	0.03**	0.12**
6. Support f. acquaintances	0.00	0.00	0.00	0.01	0.00	N/A	0.03**	0.02**	0.01	0.00	0.01
7. Behavioral intention	0.19**	0.16**	0.02	0.03*	0.10**	0.03*	**0.97\0.95**	0.26**	0.01	0.01	0.08**
8. Internet PC ownership	0.01	0.00	0.06**	0.06**	0.03*	0.00	0.05**	N/A	0.01	0.00	0.03**
9. Perceived cable TV cost	0.01	0.00	0.00	0.02	0.02	0.00	0.01	0.04**	N/A	0.00	0.00
10. Official training program	0.03*	0.04**	0.00	0.00	0.01	0.00	0.00	0.00	0.02	N/A	0.02**
11. Trust in government	0.04**	0.03*	0.01	0.04**	0.09**	0.02	0.05**	0.01	0.01	0.00	**0.78\0.78**

Notes. Squared correlations for SEA adopters are above the diagonal and for SEA potential adopters are below the diagonal. AVEs for multi-item constructs are shown on the diagonal. For discriminant validity, diagonal elements should be larger than off-diagonal elements.
$^{**}p < 0.01$; $^{*}p < 0.05$.

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ONLINE SUPPLEMENT

Addressing Digital Inequality for the Socio-Economically Disadvantaged through Government Initiatives: Forms of Capital That Affect ICT Utilization

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APPENDIX A: Additional Non-Response Bias Analysis

Following Ravichandran and Rai (2000), a more extensive procedure was performed to examine non-response bias further. Two-hundred-thirty-three non-respondents were randomly called and asked why they did not respond. The reasons identified were generally not specific to the topic of this study, with over 91% indicating reasons such as non-receipt, distaste for surveys in general, incorrect address, and death of the addressee. Only a small fraction of non-respondents gave reasons specific to the topic being investigated, such as "did not know anything about computers" (6%), "not using LITV" (2%), and/or "did not like LITV" (1%). Thus, non-response bias does not appear to be a serious concern.

The result of the telephone interviews also indicated some inaccuracies in the LITV installation list and the water bill list provided by the LaGrange city government that were used to mail the surveys. These inaccuracies may be attributed to migration of residents or imperfect data recording that compromised data quality. By taking these issues and the number of non-deliverable surveys into consideration, the overall adjusted response rate was 19.5%.

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APPENDIX B:

Geographic Information Systems (GIS) Analysis of Sample Representativeness

We subsequently conducted two additional analyses to ensure (1) the representativeness of respondents in terms of income and education level relative to the overall population of LaGrange residents and (2) the representativeness of the SEA and SED extracted from the survey data. According to the U.S. Census Bureau, LaGrange consists of 30 block groups.[1] For each block group, median household income[2] and average education level from the census data and survey data were compared using the geographic information system, ArchView 8.3. The high correlation of household income (0.86) and education level (0.88) computed using the census data and survey data suggest sample representativeness.

To evaluate the representativeness of the SEA and SED clusters, we conducted the following analysis. First, the proportion of SEA respondents to SED respondents, which serves as an indicator of the overall socio-economic status of residents, was calculated for each block group. Next, the correlation between this ratio and census data for (a) median household income and (b) average education level were calculated across the 30 block groups. The resulting high correlations (income: 0.90, education: 0.73) strongly suggest that the ratio of SEA to SED respondents in our sample is consistent with the income and education level of the block groups. These results support the validity of the cluster analysis and the representativeness of the clustered SEA and SED groups.

[1] Block group is the smallest census unit in which data about income and education is available.
[2] Only median household income, rather than average household income, was available from the census data.

APPENDIX C: Item Loadings

Construct	Item	SED Potential Adopters	SED Adopters	SEA Potential Adopters	SEA Adopters
Extrinsic Motivation	EM_1	0.990	0.992	0.992	0.991
	EM_2	0.981	0.990	0.978	0.978
	EM_3	0.990	0.990	0.989	0.979
	EM_4	0.990	0.984	0.961	0.984
Intrinsic Motivation	IM_1	0.990	0.980	0.985	0.976
	IM_2	0.985	0.986	0.990	0.980
	IM_3	0.993	0.979	0.991	0.986
Knowledge	Know_1	0.907	0.925	0.861	0.899
	Know_2	0.990	0.950	0.958	0.935
	Know_3	0.993	0.890	0.952	0.912
	Know_4	0.888	0.948	0.942	0.899
Self-Efficacy	SE_1	0.909	0.953	0.937	0.932
	SE_2	0.970	0.929	0.918	0.933
	SE_3	0.970	0.924	0.957	0.942
Family, Relatives, Peers, and Friends' Influence	FRPF_1	0.968	0.974	0.947	0.973
	FRPF_2	0.975	0.989	0.972	0.990
	FRPF_3	0.919	0.975	0.950	0.978
	FRPF_4	0.899	0.886	0.949	0.964
Behavioral Intention	BI_1	0.952	0.990	0.989	0.976
	BI_2	0.986	0.957	0.985	0.990
	BI_3	0.986	0.941	0.980	0.953
Trust in Government	Trust_1	0.972	0.947	0.963	0.935
	Trust_2	0.901	0.913	0.908	0.954
	Trust_3	0.907	0.877	0.901	0.885
	Trust_4	0.909	0.881	0.838	0.861
	Trust_5	0.843	0.751	0.803	0.760
	Trust_6	0.977	0.926	0.949	0.947
	Trust_7	0.810	0.780	0.790	0.820
Support from Acquaintances	Support	1.000	1.000	1.000	1.000
Internet PC Ownership	IPC_Own	1.000	1.000	1.000	1.000
Perceived Cable TV Cost	Cost	1.000	1.000	1.000	1.000
Official Training Program	Training	1.000	1.000	1.000	1.000

Goodness-of-fit measures are reported in Table 4 of the manuscript. The above factor loadings for multi-item constructs are from covariance-based confirmatory factor analysis (CFA) conducted using AMOS 5.0. To ensure the comparability of the latent constructs across corresponding sub-groups further, a multi-group measurement invariance analysis was performed. The procedure and the results of the invariance analysis are reported in Appendix D-2.

APPENDIX D: Analyses for Sub-Dimensions of Each Capital for ICT Use

The MANOVA and ANOVAs were conducted at the sub-dimension level for each capital to examine if the observed results at the aggregate capital level are stable for the sub-dimensions. We first report the results in section D-1. In addition, to ensure the comparability of the multi-item reflective item construct means between SEA and SED potential adopters as well as between SEA and SED adopters, a complementary measurement invariance analysis was also performed to examine (1) whether the multi-item constructs are comparable across their corresponding sub-groups and (2) the robustness of the ANOVAs mean comparison results. The results of this analysis are reported in section D-2.

D-1: MANOVA and ANOVA Results for the Sub-Dimensions

We applied the same MANOVA and ANOVA analyses at the sub-dimension level for each form of capital. Figure D1 and Table D1 show the results of extrinsic motivation and intrinsic motivation, the sub-dimensions of habitus. Figure D2 and Table D2 illustrate the results of self-efficacy and knowledge, the sub-dimensions of cultural capital. Figure D3 and Table D3 show the results of normative influence from family, peers, relatives, and friends and of support from acquaintances. In short, these results of the sub-dimensions are almost identical to those at the capital level, except we *did not* detect an interaction effect for support from acquaintances.

FIGURE D1: Sub-Dimensions of Habitus: Extrinsic Motivation & Intrinsic Motivation

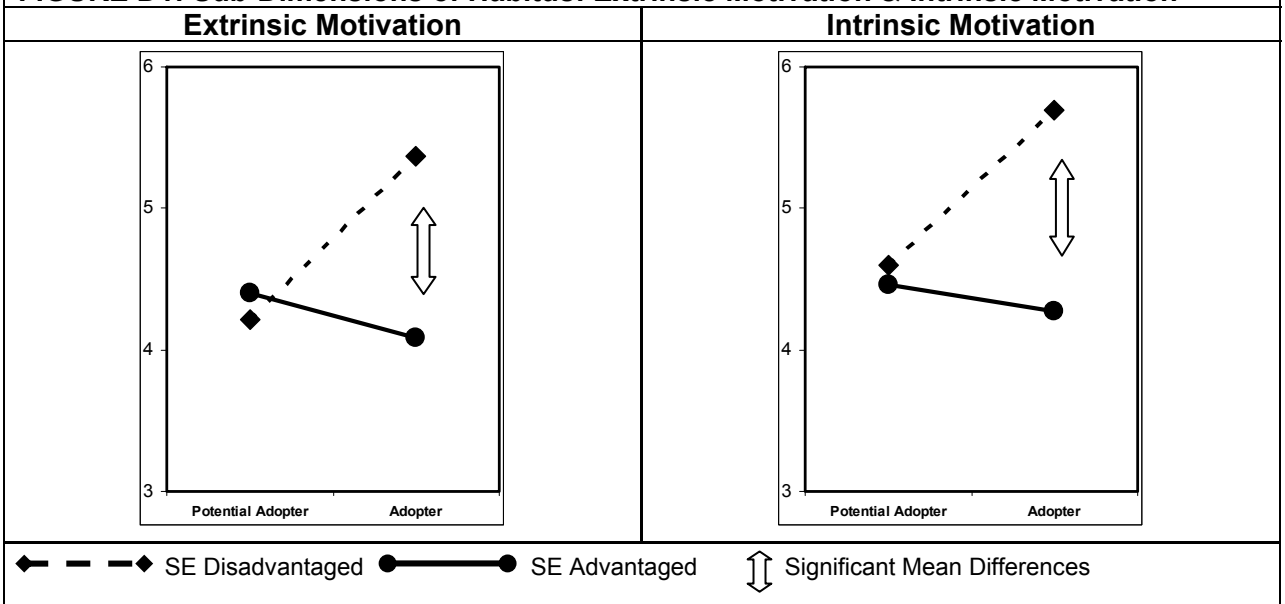
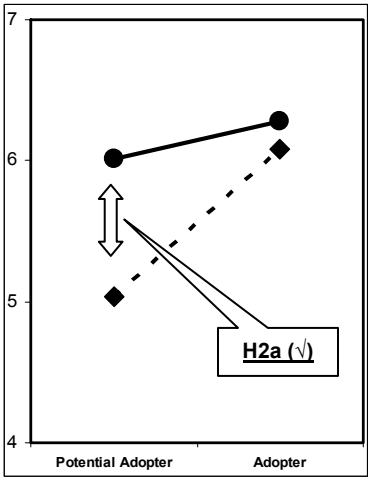


Table D1: MANOVA Results for the Sub-Dimensions of Habitus

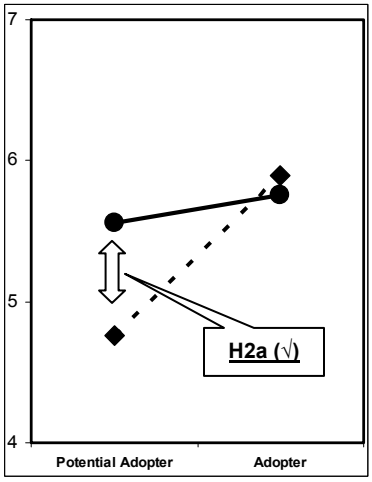
Socio-Economic status		Innovation Stage		Interaction Effect		
	Sig.		Sig.		Sig.	r-square
Main Effect	0.000	Main Effect	0.018	Interaction	0.000	0.026
Extrinsic Motiv.	0.001	Extrinsic Motiv.	0.008	Extrinsic Motiv.	0.000 H1 (√)	0.026
Intrinsic Motiv.	0.000	Intrinsic Motiv.	0.006	Intrinsic Motiv.	0.000 H1 (√)	0.019

FIGURE D2: Sub-Dimensions of Cultural Capital: Knowledge and Self-Efficacy

Knowledge



Self-Efficacy



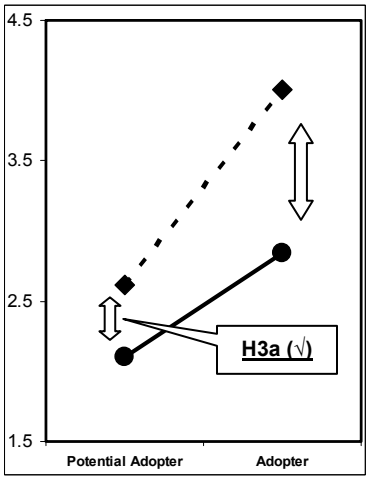
SE Disadvantaged — SE Advantaged ⇳ Significant Mean Differences

Table D2: MANOVA Results for the Sub-Dimensions of Cultural Capital

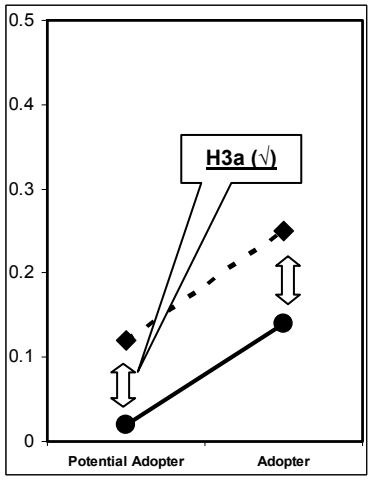
Socio-Economic status		Innovation Stage		Interaction Effect		
	Sig.		Sig.		Sig.	r-square
Main Effect	0.000	Main Effect	0.000	Interaction	0.000	0.021
Knowledge	0.000	Knowledge	0.000	Knowledge	0.002 H2b (√)	0.012
Self-Efficacy	0.001	Self-Efficacy	0.017	Self-Efficacy	0.000 H2b (√)	0.014

FIGURE D3: Sub-Dimensions of Social Capital: FRPF and Support from Acquaintances

FRPF



Support



SE Disadvantaged — SE Advantaged ⇳ Significant mean Differences via ANOVA

Table D3: MANOVA Results for the Sub-Dimensions of Social Capital

Socio-Economic status		Innovation Stage		Interaction Effect		
	Sig.		Sig.		Sig.	r-square
Main Effect	0.000	Main Effect	0.000	Interaction	0.000	0.021
FRPF	0.000	FRPF	0.000	FRPF	0.027 H3b (√)	0.006
Support	0.000	Support	0.000	Support	0.373 H3b (X)	0.001

D-2 Measurement Invariance Analysis

To evaluate further the appropriateness of comparing the means of the sub-dimensions, which are multi-item constructs, across corresponding sub-groups, we applied multi-group measurement invariance analysis (Doll et al. 1998; Steenkamp and Baumgartner 1998). Using AMOS 5.0, we performed configural, metric, and scalar invariance analyses to determine if the measurement models are invariant between SEA and SED potential adopters as well as between SEA and SED adopters. Configural invariance means item loading patterns are congeneric across groups. When modeling configural invariance, no restrictions are imposed on metrics between groups (Doll et al. 1998). Next, metric invariance concerns whether items have equal loadings across groups. Item loadings are constrained to be equivalent across groups when modeling metric invariance. Finally, scalar invariance checks the consistency between cross-group differences in latent construct means and the cross-group differences in observed means. Scalar invariance is evaluated by constraining the intercepts of measures to be the same across groups.

These three invariance models assume a hierarchical order: configural invariance precedes metrics invariance, and metric invariance precedes scalar invariance. Comparison of the latent constructs mean across groups is not meaningful unless scalar invariance, the most complex model among the three, is supported (Doll et al. 1998; Steenkamp and Baumgartner 1998). Since these invariance models are nested, the difference between two nested models can be assessed by evaluating changes in CFI. If the change in CFI between two nested (e.g., configural and metric) models is smaller than the suggested threshold 0.01 (Cheung and Rensvold 2002), then more complex invariance is supported.

We first applied the analytical procedure described above to assess measurement invariance across the SEA and SED potential adopters. Configural invariance analyses showed acceptable measurement model fit and revealed that the item loadings' pattern was congeneric across the two sub-groups (Table D4). From configural to metric and then scalar invariance, CFI decreased from 0.955 to 0.953 and then 0.946, respectively. The changes in CFI of the nested models were all smaller than the recommended 0.01 (Cheung and Rensvold 2002). Scalar invariance is, therefore, established between potential SEA and SED adopters. A similar process was then performed for SEA and SED adopters. The results also supported scalar invariance between the two sub-groups. In addition, a simultaneous comparison of all four groups supported measurement invariance across them.

Table D4: Measurement Invariance Analysis

Goodness of Fit Indices	SEA versus SED Potential Adopters			SEA versus SED Adopters			Desired Level
	Configural Invariance	Metric Invariance	Scalar Invariance	Configural Invariance	Metric Invariance	Scalar Invariance	
X^2 / D.F.	2.85	2.84	2.96	2.12	2.26	2.41	< 5
TLI	0.945	0.944	0.941	0.971	0.968	0.964	> 0.9
CFI	**0.955**	**0.953**	**0.946**	**0.976**	**0.972**	**0.967**	> 0.9
SRMR	0.0431	0.0458	0.0578	0.0331	0.0392	0.0550	< 0.08
RMSEA	0.075	0.075	0.078	0.050	0.053	0.056	< 0.1

Under scalar invariance, the means of multi-item constructs were compared by constraining the construct means as zero for the SED potential adopters and allowing construct means of the SEA potential adopters to be freely estimated. If an estimated construct mean of the SEA potential adopters is significantly different from zero, this pair of construct means is different across the two sub-groups (MacKenzie and Spreng 1992). Four pairs of multi-item constructs are found to be different across SEA and SED potential adopters (Table D5). These results are the same as those of the ANOVAs between

SEA and SED adopters at the sub-dimension level. SED potential adopters had significantly lower self-efficacy and knowledge (the sub-dimensions of cultural capital) than their SEA counterparts, supporting H2a. On the other hand, SED potential adopters had higher normative influences from family, relatives, peers, and friends as well as support from acquaintances than SEA potential adopters, supporting H3a.

Table D5: Mean Comparison of Constructs between SEA and SED Potential Adopters

Constructs	SED Potential Adopters		SEA Potential Adopters	Support Hypothesis?
Self-Efficacy	0	<	0.85 **	H2a (√)
Knowledge	0	<	0.80 **	H2a (√)
Family, Relatives, Peers and Friends'	0	>	- 0.59 *	H3a (√)
Support from Acquaintances	0	>	- 1.04 **	H3a (√)

significant at (**: p <0.01, *: p<0.05)

Next, an identical analysis was conducted between SEA and SED adopters. SED adopters, relative to SEA adopters, had higher extrinsic and intrinsic motivations (the sub-dimensions of habitus) and FRPF and support from acquaintances. The results (Table D6) provide additional support to those of the ANOVAs between SEA and SED adopters at the capital level.

Table D6: Mean Comparison of Multi-Item Latent Constructs between SEA and SED Adopters

Constructs	SED Adopters		SEA Adopters
Extrinsic Motivation	0	>	- 1.29 **
Intrinsic Motivation	0	>	- 1.41 **
Family, Relatives, Peers and Friends' Influence	0	>	- 1.21 **
Support from Acquaintances	0	>	- 1.56 **

significant at (**: p <0.01, *: p<0.05)

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APPENDIX E: Post-Hoc Analysis of the Interaction Effects among Forms of Capital

		SED Potential Adopters			SED Adopters		
	Models	**Controls**	**Direct Effects**	**Interaction Effects**	**Controls**	**Direct Effects**	**Interaction Effects**
	Path	**Beta**	**Beta**	**Beta**	**Beta**	**Beta**	**Beta**
Control Variables	Internet PC	**-0.18 ***	**-0.18 ***	-0.09	**-0.18 ***	-0.09	-0.08
	Cable TV Cost	0.01	0.02	0.07	0.05	0.03	-0.02
	Participation in GDI Training	**0.18 ***	0.01	-0.03	**0.28 ****	**0.16 ****	**0.15 ****
	Trust in Gov.	0.14	0.02	0.02	0.10	0.04	-0.02
Structural Paths	Habitus --> BI		**0.29 ****	**0.27 ***		**0.32 ****	**0.21 ****
	Cultural --> BI		**0.29 ****	**0.33 ****		**0.36 ****	**0.42 ****
	Social --> BI		**0.21 ***	**0.19 ***		0.08	0.11
Interactive Effect	Habitus * Cultural Capital			-0.02			0.03
	Habitus * Social Capital			-0.17			-0.15
	Cultural Capital * Social Capital			**0.34 ***			0.06
	Economic Capital * Habitus			-0.01			-0.13
	Economic Capital * Cultural Capital			-0.13			0.06
	Economic Capital * Social Capital			0.13			-0.10
	Δ R-Square	**7.9%**	**36.4%**	**5.8%**	**14.6%**	**30.7%**	**4.6%**
	R-Square	**7.9%**	**44.3%**	**50.1%**	**14.6%**	**45.3%**	**49.9%**

Using PLS, we conducted a post-hoc analysis to examine if there are interaction effects between habitus, cultural capital, social capital, and economic capital. Specifically, we included six two-way interaction terms between the four forms of capital and tested the models for SED potential adopters and adopters. The results in the above table reveal a significant positive interaction effect between cultural capital and social capital for SED potential adopters. Similar results were obtained with multiple regression analysis. The variance inflation factor (VIF) scores of all entered predictors were lower than the threshold of five suggested by Hair et al. (1998), suggesting no serious threat of multi-collinearity.

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