Understanding information inequality: Making sense of the literature of the information and digital divides

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This paper reviews related research since the early 1990s on the information and digital divides. It shows that, despite their shared concerns with illustrating social inequality through the lens of information resource distribution, the two areas in effect represent two overlapping research communities. The research focus and discourse of the former were primarily shaped by three different theoretical perspectives and were inspired by a fairly strong sense of ethical principles; those of the latter, on the other hand, were shaped primarily by four different political standpoints and were imbued with a fairly strong concern for political and economical interests. The co-existence of multifarious perspectives and standpoints has produced divergent, and sometimes contradictory, research findings and policy recommendations, which inevitably perplex researchers and policy makers. The paper concludes with some suggestions for future research and policy making.

KEYWORDS: digital divide; information inequality; information poverty

INTRODUCTION

In the world's scholarly literature, information inequality in the contemporary sense has become an issue of great concern since the 1960s (concerns with various precedents of 'information inequality' such as education inequality, literacy inequality and universal access date back much earlier), coinciding with the dawn of a post-industrial society in which the primacy of a product-based economy was said to have given way to an information-based economy. A literature survey of 1975 showed that up to the mid-1970s, over 700 documents already existed that were related to information inequality and information poverty (Childers, 1975). The majority of early studies came from the fields of library and information science and communication studies, and they covered a wide spectrum of topics ranging from imbalanced information production

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and distribution in society, to unequal information access and utilization by different social groups, and to differential information-processing capacities of individuals. The last of these topics was often called the 'knowledge gap' thesis, which hypothesized that 'as the infusion of mass media information into a social system increases, segments of the population with higher socio-economic status tend to acquire this information at a faster rate than the lower status segments, so that the gap in knowledge between these segments tends to increase rather than decrease' (Tichenor et al., 1970: 159). As the scope of these topics reveals, earlier research on information inequality concerned itself primarily with information as messages (in this paper, this type of research will be called 'information divide' research). A cursory search with major social science databases (ERIC, SSCI and LISA) shows that during the 1980s, 1990s and beyond, this tradition of research continued to be followed by many from LIS and communication studies.

The 1990s began to see great changes in information dissemination and access instigated by modern information and communication technologies (abbreviated as ICT henceforth). By the latter half of the decade, the Internet was already widely recognized as the most significant divider between the information rich and information poor. Accordingly, inequality in access to the Internet (loosely termed 'digital divide') emerged as the major embodiment of information inequality. By 2000 the issue of the digital divide was said to have already generated more than 14,000 related publications (Arquette, cited in Hongladarom, 2004). In comparison with the 'information divide' literature of the previous three decades, research activities on the digital divide came from a much wider area of disciplines, including: Economics, Sociology, Politics, Ethics, Education Studies, Computer and Telecommunication Studies and Communication Studies as well as Library and Information Science. Instead of carrying on with the dialogue already begun by earlier information divide research, the majority of digital divide studies tend to trace their intellectual antecedents to universal access research or technology diffusion research.

At the beginning of the current century, there exist two overlapping research communities concerned with information inequality in contemporary society: one that continues with the research tradition of the 1960s–1980s, whose discourse is built primarily upon a group of concepts prefixed with the term 'information' – 'information inequality', 'information divide', 'information gap', 'information poverty' and the like; and the other that emerged in tandem with the rapid development of the Internet, whose discourse is built primarily upon the concept of digital divide and universal access. Although both communities take it as their responsibility to look into social inequity as it relates to information resource distribution, their respective research traditions have inevitably bestowed on them dissimilar insights and analytical tools which, in turn, led them to disparate research discoveries and policy recommendations.

Based on published English literature from 1990 to the present, this study attempts to provide a comparative review of the above strands of research, with a view to promoting exchange of ideas between the two communities by highlighting their respective approaches to the same issue, their major contributions towards understanding the issue, and their respective offerings of policy solutions. Related literature is identified through a number of bibliographic databases – ISI's SSCI, OCLC's FirstSearch database set, and LISA. Bearing in mind that both fields have emerged and remained a heated area for debate, and have each produced massive literature, this study had to adopt a number of criteria/limitations for literature selection. These criteria/limitations were as follows: (1) scholarly papers (those published in peer-reviewed journals, including electronic-only journals) constituted the primary source for selection and were included wherever possible; (2) opinion papers that were frequently cited by scholarly papers were also selected, as their cited-rate seemed to indicate a degree of impact that warrants their inclusion; (3) related monographs, anthologies and research reports that were widely reviewed by scholarly journals were also selected for the same reason as the opinion papers; (4) studies dealing specifically with the knowledge-gap issue were only selectively reviewed because these studies form a relatively distinct sub-section of the information divide research which has already been very well reviewed (see Gaziano, 1983, 1997); (5) conference papers and papers disseminated on various non-journal websites were in general excluded, mainly due to their vastness in number and diversity in quality.

UNDERSTANDING THE INFORMATION DIVIDE AND POVERTY

Defining the information divide and poverty

In both scholarly literature and non-scholarly literature (e.g. mass media and government publications), there exist a variety of terms that describe the state of social division between those who are favourably placed in information resource distribution and those who are not. Examples of such terms include information inequality, information gap, information divide, information disparity, information inequity, information rich vs. information poor or information haves vs. information have-nots, knowledge gap etc. There also exist almost as many terms which describe specifically the deprived state of those who appear on the wrong side of the divide. Examples of these terms include information poverty, knowledge poverty, information poor, information have-nots, information disadvantaged, etc. Few of these terms have ever been rigorously defined and little distinction

between them has been specified. The definitional approaches of early studies (1960s–1980s) were primarily categorical, that is, to classify certain socio-economic sections of society (e.g. the aged, the economically poor, disabled people, ethnic minority groups and single parents) into the camp of information poor, and to refer to the disparity between these groups and mainstream society as information divide or information inequality. Little definitional effort was devoted to illuminating exactly how poor these groups were 'informationally'. Related research of the 1990s and beyond, therefore, inherited a conceptual foundation that was far from solid.

The 1990s nevertheless began to see more sophisticated elaboration of some of these related concepts (Britz, 1998, 2004; Goulding, 2001; Haywood, 1995; Sweetland, 1993; Van Dijk, 1997, 2000). Sweetland (1993), for example, defined information poverty as the following forms of information deprivation: lack of information access, information overload and self-imposed information deprivation (e.g. unwillingness to use libraries); Van Dijk (1997, 2000) defined information divide as the inequality in the possession and usage of information and communication sources in a particular society, contending that information inequality is multifaceted and some of its aspects may grow while others decline in importance; similarly, Britz and associates (Britz, 1998; Britz and Blignaut, 2001) defined information inequality based on a multifaceted conceptual framework of knowledge, information and information infrastructure; they then defined information poverty as 'that situation in which individuals and communities, within a given context, do not have the requisite skills, abilities or material means to obtain efficient access to information, interpret it and apply it appropriately; [it] is further characterized by a lack of essential information and a poorly developed information infrastructure' (2004: 194). Lievrouw and Farb (2003: 503), after reviewing other people's conceptualization of related terms, proposed one of their own. They first contended that 'information equity' was a more useful conceptual tool than 'information equality' for both scholarly research and pragmatic policy making; they then went on to define information equity as 'the fair or reasonable distribution of information among individuals, groups, regions, categories, or other social units, such that those people have the opportunity to achieve whatever is important or meaningful to them in their lives'; they finally proposed that any analysis of equitable information access and use would need to incorporate five primary elements of equity: access, skills, content, values and context. As manifested by these new definitions, recent conceptualization of the information divide phenomenon seems to have demonstrated two notable intentions of its research community: to grasp the complexity of the phenomena by conferring on it multifaceted connotations, and to encapsulate the ICT-exacerbated disparity by adding a technological dimension to the concept.

In addition to defining information divide and poverty concepts with a higher level of sophistication and greater awareness of technological impact than hitherto achieved, researchers of the 1990s and beyond have also attempted to understand these concepts in contrast with other related concepts. One pair of related concepts are socio-economic divide and economic poverty. It is recognized that information poverty does not tally entirely with economic poverty. For a person to be information rich, he/she does not only need adequate economic resources to ensure information access, but also intellectual capital for information retrieval, assessment and processing (Sweetland, 1993); in some circumstances, he/she will also need political resources that bring him/her close to the power centre (Schiller, 1998a; Sturges, 1998). Another pair of related concepts are 'information flow' and 'information overload'. It is recognized that massive information flow to persons or communities does not necessarily make them information rich; on the contrary, information overload can obstruct access to useful information and reduce a person's ability to process information; it therefore constitutes a form of information poverty (Goulding, 2001; Sweetland, 1993). In addition, Hongladarom (2004) has made a distinction between different categories of information and contends that a certain group of people (e.g. a nation) may be poor with one category of information but rich with another, and can capitalize on what they have in abundance. Developing countries, according to Hongladarom, despite being deprived of technical information, can capitalize on their cultural information and nature information.

Interpreting the nature of the information divide

While existing studies tend to agree on the need to conceptualize the information divide as a complex phenomenon, they become notably divided when they attempt to interpret information divide in the broad context of social relations: there exist, for example, different interpretations of the nature of the divide (economical, political or cultural), different explanations of the causes for the divide and different prescriptions of policy solutions to the divide. As revealed in the literature survey, these variations seem to be intrinsically connected to the theoretical perspectives that researchers adopt as their guiding lights for interpretation. Within the subordinate area of knowledge gap studies, Gaziano and Gaziano (1998) classified related theoretical perspectives into four categories – atomic naturalism, societal naturalism, individual voluntarism and collective voluntarism – according to (1) whether knowledge gap phenomena are represented as naturally occurring or as voluntary human constructions, and (2) whether these phenomena are best explained by analysing the propensities of individual

actors or those properties unique to collectivities. Within the broad information divide area (of which knowledge gap studies form a part), however, related studies seem to be best demarcated along four different angles of interpretation: ethics, political economy, social constructivism and cognitive science. Broadly delineated, the ethical perspective offers researchers a set of moral principles which explains the making of a just society and the role of information in it, enabling them to associate information inequality with the breach of liberty and social justice; the political economy perspective lends to researchers analytical insights which expose the logic of capitalism and the social relations within this logic, leading them to associate information inequality with class struggle and geopolitics; the social constructivist perspective provides researchers with a cluster of theories which defines knowledge (as well as knowledge acquisition) as socially constructed within certain cultural boundaries, leading them to associate information inequality with cultural segmentation and alienation; the cognitive science perspective bestows on researchers the theoretical lens which shows individuals' learning process, leading them to associate information inequality (or knowledge gap) to internalized individual differences.

Explicit or implicit application of the ethical perspective is visible in a significant number of studies, including, among others, Britz and associate's (Britz, 2004; Britz and Blignaut, 2001) studies of information poverty, Buchanan's (1999) study of information divide in the global context, and Lievrouw and Farb's (2003) critiques of related research. Buchanan (1999), for instance, identified a variety of global information inequalities from the perspective of ethical considerations, including the imposed provision to developing countries of information irrelevant to their needs, disregard of indigenous knowledge and culture, discrimination of developing country publications by the world's scientific communication system, etc. According to these analyses, information inequalities can be seen essentially as imbalanced distribution of information-related rights (the right to express, to know and to communicate) to different sections of society or different parts of the world. To the extent that such imbalance seriously undermines people's equal footing in social participation, it should be seen as a form of social injustice. Construed in this way, information inequality and poverty become not only an economic, political or cultural issue, but also a moral concern.

The political economy interpretation of the information divide is demonstrated in a very large body of literature from both LIS research and communication studies. Examples of this line of interpretation include Birdsall (1997); Doctor (1991, 1994); Golding (1993, 1996); Harris, Hannah and Harris (1998); Haywood (1995); Murdock and Golding (1999); Dan Schiller (1995, 2001); Herbert Schiller (1996, 1998a,b); Webster (1997, 1999, 2001). According to these studies, information inequality is inextricably intertwined with class struggle and geopolitics, whereby the advantaged section of society (including global society) controls the information production, exchange and dissemination through mechanisms of capital, policies, social discourse and market regulations. Information inequality, therefore, is neither new to the established power structure of society nor separate from it; it is in fact both determined by and contributes to the political and economic inequality already existent between classes and countries. This interpretation is succinctly summed up by Doctor when he remarks: '[a]vailable evidence indicates that there is a growing gap between the information rich and information poor; [t]hat gap is part of a larger struggle for control of information resources and for the societal power that accompanies such control' (Doctor, 1994: 9).

The social constructivist interpretation of the information divide phenomenon is exemplified by such studies as Agada (1999), Chatman (1996), Chatman and Pendleton (1995), Hersberger (2002), Sligo and Jameson (2000) and Spink and Cole (2001), although few of these studies explicitly acknowledged their intellectual connection to this theoretical perspective. What characterizes these studies is their apparent theoretical alignment with social constructivism in asserting that information (knowledge) is essentially socially and culturally constructed, and that information resources convey to their users not reality-anchored meaning but consensus-conferred messages. In line with this assertion, these studies claim that a community of people live in an information world that is defined by their shared culture: the way in which people acquire and use information and the way in which they make sense of the information are all ultimately shaped by this culture. Based on this contention, these studies further argue that it is difficult, if not impossible, for different cultures to share information resources. It follows then that information inequality is essentially a phenomenon associated with cultural segregation. Although scholars of this view do not usually deny the fact that political and economic forces play an important part in influencing the information behaviour of any culture, they nevertheless regard economic determination as too crude an explanation for such a complex phenomenon as information inequality.

The cognitive science perspective is particularly popular among researchers of the knowledge gap research group (Eveland and Scheufele, 2000; Eveland et al., 2003; Grabe et al., 2000; Hernstein and Murray, cited in Gaziano, 1997), although it occasionally also informs the discussion of other researchers (Goulding, 2001; Sweetland, 1993). In most cases, what distinguishes these studies from other studies is their focused interest in the information divide that manifests during an individual's learning process. The majority within this research group do not necessarily deny that differences in the learning

process (knowledge gap) often bear a profound impact from the socio-economic arena, but at least some of the researchers have gone so far as to interpret the knowledge gap in pure cognitive terms. These researchers – Gaziano (1997) cited Hernstein and Murray as an example – see the knowledge gap as essentially a difference of cognitive capabilities that is due mainly to inherited qualities, which has little to do with the socio-economic stratification.

Understanding the cause of the information divide and poverty

Most of the related studies identified by this review have taken it as one of their primary objectives to explain the formation of the information divide and poverty. In line with the theoretical perspective that these studies adopt, causes of information divide and poverty seem to have been sought in three different domains: the political economy domain, the culture domain and the cognition domain.

By far the largest group of studies are those that look to the political economy domain for reasons (Golding, 1993; Golding and Phil, 1997; Murdock and Golding, 1999; Schiller, 1995, 2001; Schiller, 1998a; Webster, 2001). These studies tend to take pains to examine the impact on information distribution of society's structural element, economic institutions, political power and corporate interest. They contend that, as information resources become increasingly critical to national development, organizational growth and individual welfare, the existing power structure has already begun to colonize the information domain to ensure that benefits from information resources are levied in accordance with established power relations between different countries and classes. They also argue that this colonization of the information domain has led to aggressive penetration of market forces in information dissemination, strengthened protection of intellectual property rights, and accelerated exploitation of indigenous knowledge by transnational corporations; all these constitute the primary causes for the exacerbated information divide in contemporary society and the deteriorated information poverty of some sections of the population.

Most of these studies examined the working of political and economic forces in the information field within the context of one country. Herbert Schiller (1996, 1998a), Dan Schiller (1995, 2001), Birdsall (1997) and Doctor (1991), for example, based their analysis mainly in the American context, while Golding and Murdock (Golding, 1993, 2000; Murdock and Golding, 1999) and Webster (2001) based theirs in the British context. Sturges (1998), from an outsider's point of view, examined the control of information by political power in the specific context of Malawi under Banda. Of these studies, Herbert Schiller, Golding and Murdock have arguably offered the most critical analysis of the impact of corporate interests and market principles. Schiller (1996), for example, notes that during the past half century, the information sector of the US has become increasingly commercialized, with most libraries being forced to introduce fee-based services and the public school system adopting market mechanisms (e.g. vouchers). He also notes that during the past few decades, corporate control over information production and dissemination has become notably more stringent owing to the expanding mergers between mass media corporations, publishers and other information producers and vendors. He points out that while the private sector aggressively defines the information market, it has also actively sought allies in governments and the academia, who are able to advance private interests in seemingly public voices through information policies, consultations and research reports (Schiller, 1998a). In Schiller's view, all these forces working together have caused American society to be increasingly divided in of harnessing the benefits of the information. In a similar vein, Murdock and Golding (1999) have shown that the ascendancy of market principles in government policies and the convergence of media industries have accounted, to a great extent, for the social exclusion faced by the information poor in British society.

In the case of political economy theories, a significant number of studies (Buchanan, 1999; Haywood, 1995; Persaud, 2001) also examined factors that contribute to the information divide in a global context. These studies contend that the disparate stage of development and imbalanced geopolitical relations are the primary causes for information divide between countries. Within the science and technology information sphere, Arunachalam (2003), Gettelman (2003), Meadows (1998) and Persaud (2001) note that in the scientific communication system, developed countries not only provide the predominant amount of primary information, they also produce the dominant share of secondary information (bibliographic and factual databases, directories, and so on); both are exchanged in a global information market in which developing countries have little stake. Within the mass media communication system, both Webster (1997) and Haywood (1995) note that international news coverage and the way in which the world's events are reported are often highly biased against developing countries' interests; and within the culture and creative industry, Golding and Phil (1997), Petras (1993), Schiller (1996, 1998a) and many others note that the overwhelming flow of cultural information from developed countries to developing countries amounts to a kind of cultural oppression (some, including Petras, call this cultural imperialism). As critically shown by these researchers, all categories of information need to be purchased by developing countries with their hard-earned foreign currencies through the global information market, complying with increasingly stringent intellectual property rights. Haywood (1995) further shows that even in the non-informational arena, international relations undertakings

can often have profound repercussions on the information divide between countries; international aid and cooperation schemes, for instance, are often attached to conditions that require developing countries to open their telecommunication market, introduce competitive mechanisms, reinforce intellectual property rights, reduce public expenditure, etc., all threatening to further harm the information capacity of developing countries in the long run.

Next to the political economy of information studies, the second major group of studies are those which examined the cause of information divide and poverty from the perspective of social constructivism. According to this group of studies, individuals of each community share the same social norms, customs and even languages. These norms and customs determine how individual members within their small world make sense of the information they receive; they also determine these members' preference for information channels and access method, and their perception of information value. Therefore, cultural differences between the disadvantaged communities and mainstream society often lead to informational disconnections of the former from the latter: members of deprived small worlds seldom seek information from the outside world, and information emanating from the wider society seldom finds its way into the small world due to its middle-class oriented content and package. In the long run, these researchers argue, this disconnection inevitably causes information poverty for the disadvantaged section of society.

This approach to unearthing the cause of information inequality and poverty is demonstrated most clearly in studies of Agada (1999), Chatman (1996), Chatman and Pendleton (1995), Hersberger (2002), Jeager and Thompson (2004), Spink and Cole (2001), and Viswanath et al. (2000). The small world in one of Chatman's studies (1996) consists of janitors, single mothers, the elderly and other people who rely primarily on social benefits for living. Interviews and observations of this small world show that information exchange between this world and the wider society conforms to the pattern of interaction between insiders and outsiders: lack of risk-taking, secrecy, deception in communicating information and the primacy of situational relevance. Chatman notes that these stances towards information exchange and use reinforce information poverty of the poor (insiders) by leading them to neglect sources of information created by others (outsiders). In another Chatman-led study, Chatman and Pendleton (1995) highlight the phenomenon that people do not always access information that is beneficial for them and that major discrepancies exist in the ways in which the information poor access and utilize information compared with the information rich. Both of these studies place particular emphasis on the isolated life experiences of the urban poor. In Spink and Cole's (2001) study, the small world is an African American society located in a newly developed area of Texas. Questionnaire survey of households within the area shows that except for employment information, community members seldom seek information from outside the community or from formal communication channels; the more casual the information needs are, the less likely it is that people would go beyond their closest life circle (family and neighbourhood) to seek information. Like Chatman, Spink and Cole also emphasize the isolation of the deprived community as the cause for their information poverty. In Hersberger's (2002) study, the small world consists of homeless parents in need of housing information. Unlike the communities in Chatman's and Spink and Cole's studies, the community in Hersberger's study had very specific information needs (i.e. house-related information), and were fairly well looked after by the staff at their temporary housing estate and other social workers. They were therefore the targets of purposefully delivered information from the outside world. These people therefore did not feel deprived of information. Instead, they felt that they might be suffering from information overload due to the propensity of service providers to share information with them.

A small but notable number of studies (e.g. Eveland and Scheufele, 2000; Gaziano and O'Leary, 1998; Kahlor et al., 2004; Grabe et al., 2000) examined the reason for the information divide and poverty from the cognitive science perspectives. In comparison with the previous two groups of studies, this group focuses on the cognitive differences of individuals in information processing and acquisition. These studies show that personal interest, information skills, media preference, participation in community affairs and interpersonal communications all affect the efficiency of information processing and the effect of information assimilation. This, in turn, decides where on the information-rich and information-poor spectrum a person will be located. As noted by these studies, the information poor are primarily characterized by the lack of information awareness, lack of motives for information access and inadequacy in information skills.

The majority of this group of studies are from the knowledge gap research group. Grabe et al. (2000), for example, examined the cognitive difference between people with higher education and those with lower education and the impact of this difference on information assimilation. The study shows that participants from both groups pay equal levels of attention to television news reports, but they do not display the same recognition memory of facts. Moreover, participants in the higher education group appear to be physiologically more aroused by news (which means they were more biologically alert in preparing for information processing) than those in the lower education group. Although the study has not ascertained whether people's cognitive capacity is innate or consequent of their development process, it nevertheless shows that people's position in the knowledge gap is contingent upon this capacity.

Kahlor et al.'s (2004) study examined the difference between people in information acquisition when faced with a particular life crisis (the outbreak of a parasite in the water supply). The study shows that both the socio-economic status of individuals and their experience with and worry about the parasite serve as predictors of their acquisition of knowledge about the causes of the crisis.

As evident from the above overview, research efforts which attempt to identify the causal factors for information divide and poverty seem to have addressed potential factors at three different levels: the macro (societal) level, the middle (community) level and the micro (individual) level. At the macro level, political economy research shows that information inequality and poverty are inextricably related to society's institutional components which allocate information resources to different sections of society in accordance with the economic and political power that each section can harness; at the middle level, studies based on social constructivism show that communities, particularly disadvantaged and marginalized communities, live in isolated information worlds defined by shared social norms, and that people inside their own world seldom venture to seek information from the outside world, leading to reinforced information poverty of disadvantaged communities; at the micro level, cognition-based studies reveal that people differ in their ability to process and assimilate information and consequently differ in how much they can benefit from the information they receive.

Not surprisingly, when taken to extremes, these different theoretical perspectives can sometimes give rise to contradictory explanations about information divide and poverty; for example, in attributing knowledge gap to personal cognitive difference, some people (Hernstein and Murray, cited in Gaziano, 1997) have gone so far as to preclude the impact of political and economic factors of the wider society. However, as these perspectives deal with the same issue at essentially different levels, they can actually (and in fact they largely do) complement each other to form a fuller understanding of the issue. The compatibility and complementariness between these perspectives are clearly demonstrated in Britz's (2004) and Kim and Kim's (2001) studies of the information divide. Britz freely adopted all three level explanations to support his ethical discussions; Kim and Kim (2001) applied all three perspectives to illuminate how the information divide gets deeper and harder to tackle as it changes from one form to another.

Complementing each other, explanations at different levels together seem to suggest that, in contemporary society, the flow of information from society's information resource pool to disadvantaged communities and individuals seems to be obstructed by layers of factors: first by political and economic factors, then by cultural and social factors and eventually, by personal factors. The resulting information-impoverished worlds tend to be inhabited by those who are disadvantaged in all these aspects and who, paradoxically, are in great need of information to improve their conditions (see Figure 1).

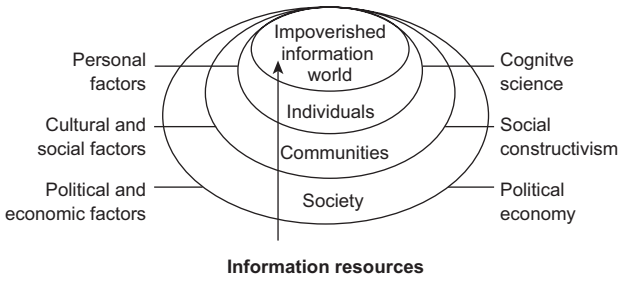

Figure 1. Information poverty and related theoretical perspectives

Policy recommendations for the issue of the information divide and poverty

Given the significance of the information divide and poverty issue in an information society, it is hardly surprising that most of the related studies would conclude by proposing policy recommendations for tackling the issue. Nearly all related studies agree that the fundamental solution lies beyond a mere consideration of information availability and infrastructure; they call for governments to interfere with the deep-rooted factors which have directly or indirectly caused this situation. Studies from the ethical or the political economy perspectives (Britz, 2004; Buchanan, 1999; Hongladarom, 2004; Schiller, 1996) tend to propose that, to bridge the gap between the information rich and poor, information production and dissemination need to be underpinned by social justice principles and guaranteed by corresponding social institutions; knowledge and information should retain their nature as public goods; government should increase public expenditure on education and promote open access to human knowledge; and the global society should pay more attention to preserving the cultural heritage of developing countries. Studies from the social constructivist point of view (Chatman, 1996; Jaeger and Thompson, 2004; Spink and Cole, 2001) tend to propose that, to remove the barrier between the information rich and poor, communication between different sections of society needs to be underpinned by awareness of cultural difference; information emanating from the middle-class mainstream society needs to be repackaged before being delivered to deprived sections of society; and disadvantaged communities need to encourage their younger generations to receive education and training from the outside world and then return to their communities.

UNDERSTANDING THE DIGITAL DIVIDE

Defining the digital divide

According to related literature (Hoffman et al., 2001), the term 'digital divide' entered public discourse at around the mid-1990s. From the outset, the term has been loosely used to express either the disparity between people in their access to information and communication technologies (ICT) or more specifically, the disparity in their access to the Internet.

From the end of the 1990s onwards, attempts to accurately define digital divide are frequently seen in scholarly literature (Bertot, 2003; Clark and Gorski, 2001; Corrocher and Ordanini, 2002; Gunkel, 2003; Hargittai, 2002; Kim and Kim, 2001; Lentz, 2000; Mossberger et al., 2003; Selwyn, 2004; Van Dijk, 1997, 1999; Van Dijk and Hacker, 2003; Warschauer, 2002, 2003a, 2003b). Most scholars contend that the divide should be defined in terms of both access and use. Some (Van Dijk, 1999; Van Dijk and Hacker, 2003) also contend that neither the divide of access nor that of use should be conceptualized as a bipolar division on a single dimension; instead, they should be conceptualized as continuums on multi-dimensions. A number of scholars (Bertot, 2003; Davison and Cotten, 2003; Hargittai, 2002; Lentz and Oden, 2001; Van Dijk and Hacker, 2003; Wilhelm, 2001) have pointed out that disparity of access should be seen as a range of differences along hardware, software, mode of Internet connection, and the amount of relevance and accessible content, etc.; and disparity of use should be seen as a range of differences along the dimensions of skills, literacy, mental access and types of usage (information retrieval vs. entertainment vs. communication). One of the most elaborate and complex conceptualizations along this line of thinking is proposed by Kim and Kim (2001). According to this, the digital divide should be seen as a multi-dimensional (media accessibility, information mobilization and information consciousness) and multi-staged (opportunity divide, utilization divide, reception divide) disparity; as such, it goes beyond the digital sphere to encompass many of the non-digital elements that help to delineate people's position in the increasingly digitalized information world.

In addition to the attempts to define the digital divide as continuums of disparity along multifaceted dimensions, there have also been attempts to define the concept accurately in a quantitative manner. Corrocher and Ordanini's (2002) and Sciadas's (2005) studies are exemplary of such effort. In Corrocher and Ordanini's study, a composite index was developed to measure the digital divide in a society. The authors first defined a series of elementary indicators that could be used to measure the ICT development of a society, drawing on related indicators from the NTIA (US) reports and OECD statistics; they then grouped these indicators into six factors of digitalization through factor analysis; finally they obtained a single measurement from these factors and named it the synthetic index of digitalization. They defined the digital divide as the dispersion in the distribution of the synthetic indexes of digitalization in a society. In Sciadas's study, a similar index called infostate was developed to measure the digital divide between countries.

As part of the conceptualization process for digital divide, there have also been attempts to categorize the digital divide phenomena. Norris (2001) has defined three categories of the digital divide: the first is called global digital divide, referring to ICT disparities between countries; the second is called social divide, referring to the gap in access to ICT between different sections of a nation society; and the third is called democratic divide, referring to the inequitable exploitation of the virtual space by different political groups. While most related studies deal with the first and second categories of the digital divide, a small but significant number of studies (Colby, 2001; McPherson, 2000; Norris, 2001) are concerned substantially with the third category.

Interpreting the nature of the digital divide

Unlike the interpretation of the information divide and poverty, which is, as the previous section has shown, largely rooted in different yet complementary theoretical perspectives, the interpretation of the digital divide has been an area of much explicit debate. This does not mean that these debates are without any theoretical illumination. At least some of them, particularly those advanced by researchers across the information divide research community (Buchanan, 1999; Cartier et al., 2005; Golding and Murdock, 2001) are clearly guided by theoretical awareness. However, taken as a whole, the interpretation of the digital divide does not seem to diverge along theoretical divisions as much as along political ideologies. As a number of studies (Colby, 2001; Hacker and Mason, 2003) have already noted, different interpretations about the digital divide often align, to a varying degree, either to the political right or the political left. This alignment should perhaps not surprise us too much, because whatever the interpretation is, it is likely to have immediate ramification for a series of critical questions: Is the digital divide just? Does it need to be bridged? Who gains and who loses in bridging it? Where should the resources to bridge the digital divide come from?

Interpretations of the digital divide, hence answers to the above questions, seem to divide the related literature into four categories. The first category (Compaine, 2001; Foster, 2000; Mueller, 2001; Powell, 2001; Thierer, 2000; The United States General Accounting Office, cited in Clark and Gorski, 2002) contends that there indeed exist disparities between people in their access to ICT; such disparities, however, are as normal and unavoidable as inequalities in health care, job opportunities, working conditions, clothing, food, housing transportation and so

on. They argue that inequalities of various types have always accompanied human life; technologies, in particular, have never been diffused evenly in society, especially at the early stage of their development. It follows that the digital divide, like any other technological divide, does not have a special ethical or political meaning. This category of interpretation also contends that just as the existence of the digital divide is a natural phenomenon, its decline will also be a natural process, because in a normal market economy, ICT producers will undoubtedly seek to expand their market and reduce the cost; this will eventually bring down the price of ICT products and make them affordable for the vast majority of society. Perhaps due to its ostensible negation of the deep-rooted humanist tradition of the scholarly world, this school of interpretation does not as often find its way into scholarly publications as other schools, there are nevertheless some explicit articulations. Compaine (2001), for example, contends that the existence of the digital divide is actually a necessary process in which the early consumers of the technologies subsidize the latecomers. Both Cawkell (2001) and Lentz (2000) critically cited a number of remarks that refuted concerns with the digital divide as 'self-righteous, pompous, overwritten and underargued' and efforts to bridge the gap as a misuse of public money. It is obvious that this view aligns, at least to a certain degree, with the political right who in general accept inequalities in wealth and social status as a positive feature of an ordered society.

The second category of studies (Antonelli, 2003; Campbell, 2001; Chowdary, 2002; Gleave and Al-Hawamdeh, 2002; Lentz and Oden, 2001; Sehrt, 2004; Sidorenko and Findlay, 2001; Wong, 2002; Yunus, 2001; Zhang and Wolff, 2004) contend that the digital divide is real and that it has become one of the most acute developmental problems both in a global context and within individual countries. According to the explicit and implicit interpretation of these studies, the existence of the digital divide has blocked a large segment of the ICT market, constraining further expansion of technology producers, content and service providers, as well as the development of electronic commerce. To these scholars, therefore, bridging the digital divide is tantamount to removing market constraints and creating opportunities for economic growth and development. A notable number of studies (Wong, 2002) within this category have gathered evidence to show that with the rapid development of ICT, existing digital divide between developed and developing countries, and the divide between different sections of society within a country have been deteriorating; such trends become even more evident when the divide is measured in a multifaceted way rather than by access to the Internet alone. Because the gap is seen as widening rather than narrowing, this group believes that the digital divide will not disappear through market forces, and that a certain degree of government interference is needed to bridge the gap. In comparison with the previous category of views, such an interpretation is apparently more critical of the existence of ICT inequalities, but because its stance towards this inequality is primarily driven by economic concerns, it still arguably aligns with the conservative political ideologies.

The third category of studies (Birdsall, 2000; Cartier, et al., 2005; Clark and Gorski, 2002; Colby, 2001; Golding, 1996, 2000; Golding and Murdock, 2001; Hacker and Mason, 2003; McSorley, 2003; Mitchell, 2002) agrees with the second one in that they also contend that the digital divide is real in contemporary society. However, informed particularly by the ethical and political economy theories, researchers of this school repudiate the idea that the digital divide is merely a developmental problem; rather, they understand it as more a political and social issue than an economic one. To these scholars, the most profound impact of the digital divide does not lie in its constraints for the market expansion of technologies, but in the fact that while some sections of the society enjoy greater liberties – education, job and political participation – enabled by the Internet, some are excluded. For this reason, this category of studies also rejects the conceptualization of the digital divide as a mere technological gap, contending that such conceptualization will likely mislead government to focus upon technological solutions (providing networked facilities at public venues) which, when delivered alone, often bring more benefit to technology providers than to disadvantaged people. Such an understanding of the digital divide is well illustrated in Golding and Murdock's (2001) paper when they comment that the techno-based conceptualization of the digital divide as mainly a development issue inevitably produces a discourse entrenched with commercial interests.

The fourth category of studies (Alden, 2003; Burkett, 2000; Luyt, 2004; Menou, 2001; Sorman, cited in Cawkell, 2001; Wade, 2002) agrees with the third one that the digital divide is more than a development gap and points in effect to the existence of much deeper social injustice. However, these studies reject any ideas which see the digital divide as a strategic political or developmental issue. Some go further to contend that there is not a digital divide issue per se. 'The inequality that does exist is social, not digital' (Warschauer, 2003a: 297). They contend that defining and dealing with the digital divide as an independent strategic issue may mislead the world into a path of development that causes further deterioration in the condition of the disadvantaged. Reasons for this contention are twofold: firstly, the effort to bridge the digital divide is a costly undertaking and may shift people's attention and society's resources away from more pressing issues such as diseases, starvation, environmental issues and political unrest; secondly, efforts to bridge the digital divide seem to benefit the advantaged section of society more than they do the disadvantaged

section – in the global context, for example, the undertaking to bridge the divide is in effect a process where developing countries import technologies from developed countries, hence a process that addresses not so much the developmental issue of developing countries as the market expansion issue of developed countries.

Understanding the magnitude and related factors of the digital divide

Starting from the mid-1990s, there have been numerous empirical studies which survey the scale of existing digital divides both between countries and between societal sections within a country. In the US, NTIA undertook a series of studies from 1994 to 2002 (the first four studies are commonly referred to as the 'Falling through the Net' series), investigating the feature and trajectory of the digital divide in American society; in the UK, the Social Exclusion Unit, the Prime Minister's Strategy Unit, the Department of Trade and Industry (DTI) and the British Market Research Bureau have conducted various surveys on the digital divide in British society. A variety of international organizations and initiatives such as the United Nations Development Programme, the UN Conference on Trade and Development, OECD, the World Bank and the International Labour Organization have also been involved in investigating the digital divide in global and national contexts. There have also been a large number of studies from research institutes all over the world.

Nearly all studies concur that marked (in some circumstances, striking) disparities exist in the use of ICTs between countries and between different sections of society within countries. What these studies disagree on is the magnitude and trend of such divides. Some studies (Wong, 2002; Yunus, 2001) contend that the divides are often underestimated by international, governmental, research institutions, and the media, while others (Foster, 2000; James, 2004, 2005) contend they are, in one way or another, exaggerated. Similarly, some studies (Whaley, 2004; Wong, 2002) show that the divides are perpetual or widening, while others (Fink and Kenny, 2003; Nie and Erbring, 2001) show that they are narrowing or disappearing. The fact that these studies often adopt different definitions and indicators for the divide makes the comparison between different research findings almost impossible. In comparing ICT diffusions between countries, for example, some studies apply the percentage of population that ever used the Internet as the indicator, while others use a more complex set of variables including the number of ISPs per capita, the coverage of broadband networks etc.; in comparing Internet uses between sections of society, some studies measure use by the number of related people who have access to the Internet regardless of where the access takes place, while others measure use by the number of related households that have Internet access at home. The possibility that the preference for different variables and measurements is consciously or unconsciously driven by the researchers' political views makes the comparison and evaluation of different conclusions even more complex.

Tables 1 and 2 show respectively the factors related to the digital divide between countries and the factors related to the digital divide within individual countries, which have been identified by related literature. Global digital divides are found to be related to economic development, education, information infrastructure, culture, policy orientation, costing structure for Internet access, openness of the telecommunication market, level of urbanization, the official language and the charging arrangement for Internet interconnection, by all or at least some of the related literature. Societal digital divides are found to be related to income, level of education, age, race, family structure, social participation, community culture and personal interest. Earlier research also identified gender as an influential factor in Internet access. Recent studies (Rice and Katz, 2003), however, have shown that the digital divide between men and women is diminishing.

Policy recommendations

Based on their interpretation of the nature of the digital divide and their findings on factors associated with the divide, the majority of studies surveyed by this research went further to offer policy recommendations for tackling the issue. These recommendations cover a wide array of policies and actions, ranging from information infrastructure construction, choices of technologies, information literacy training, institutional reform and cultural transformation, to use of foreign investment, market opening, reinforcement of intellectual property rights, international cooperation, and public–private sector cooperation.

Apart from a number of studies (Camp and Tsang, 2000; James, 2001a,b, 2003; Wareham et al., 2004) which propose their recommendations from a focused technical perspective (i.e. by comparing the features of different technologies and their conduciveness to universal services in particular contexts), the majority of recommendations seem to be explicitly or implicitly underpinned by the political ideologies and strategic interests with which the researchers align. The connection between proposed solutions and the strategic interests of the proposers is clearly demonstrated in Houston and Erdelez's (2002) content analysis study which shows that a significant difference exists between proposed solutions by the education sector, the digital industry and the non-digital business sector. In this study, four clusters of policy recommendations seem to have emerged, corresponding to the aforementioned four political views.

The first cluster (Compaine, 2001; Compaine and Weinraub, 1997; Foster, 2000) contends that ICTs, like any other technological inventions in the past, will be diffused by market forces to the vast majority of society, and

Table 1. Factors associated with the global digital divide

Factors	Related literature
Economic development	Norris (2001), for example, conducted a regression analysis looking into the relationship between the percentage of population with access to the Internet and the GDP per capita, based on statistics from 179 countries. The result shows that the two variables significantly correlate ($r = 0.77$). Other studies that examine the effect of economic development on digital divide include Gleave and Al-Hawamdeh (2002), Hao and Chow (2004), Hawkins and Hawkins (2003), Quibria et al. (2003), Wong (2002).
Education	Quibria et al. (2003), based on a set of cross-country regression, examine the relationship between education and the use of computer, the Internet, telephone and mobile phone. The study finds that education, together with income and infrastructure, plays a critical role in shaping the digital divide. Other studies that examine the effect of this factor include Norris (2001).
Information infrastructure	Both Afullo (2000) and Quibria et al. (2003) find that information infrastructure significantly affects the use of the Internet. Other studies that examine the effect of this factor include De Boer and Walbeek (1999), Hao and Chow (2004), Oyelaran-Oyeyinka and Lal (2005).
Culture	Drori and Jang (2003) note that it is the cultural features of a country, more than its political and economic characteristics, that determine its IT connectedness. Other studies that examine the effect of this factor include Berman and Tettey (2001), Norris (2001).
Public policy	Afullo (2000) notes that the factors influencing Internet penetration in Africa include infrastructure, pricing, policies, literacy, income and education. Other studies that examine the effect of this factor include Norris (2001), Hawkins and Hawkins (2003), Hawkins (2005).
Cost of access	Tiene (2002), for example, finds that use of ICT is negatively correlated with the cost of access. Other studies that examine the effect of this factor include Afullo (2000), De Boer and Walbeek (1999).
Market structure	De Boer and Walbeek (1999), for example, note that the level of technology is influenced by such factors as regulation and infrastructure. Other studies that examine the effect of this factor include Dasgupta et al. (2005), Guillén and Suárez (2005), Huang et al. (2003), Tiene (2002).
Level of urbanization	Hao and Chow's (2004) study, using secondary data for 28 sampled Asian countries, shows that Internet penetration is related to a country's wealth, telecommunication infrastructure, urbanization and stability of the government, but not related to the literacy level, political freedom and English proficiency.
Official language	Roycroft and Anantho (2003) find that among African nations, the strongest influences on subscription are whether English is an official language, monopoly ISP market structure, overall economic development and the amount of international bandwidth.
Charging arrangement for Internet interconnection	As Roseman (2003) notes, many developing countries suffer from the current charging arrangement for Internet interconnection, where developing countries have to pay a high cost to Internet backbone providers for their international data transaction.
Other factors	Using data on 118 countries from 1997 through 2001, Guillén and Suárez (2005) find that Internet use increases with the country's status in the world-system (political-economic dependency), privatization and competition in the telecommunications sector, democracy and cosmopolitanism; Crenshaw and Robison (2006) find that Internet diffusion correlates with foreign investment, major urban agglomerations, manufacturing exports, non-governmental organization presence and tourism, as well as democratic openness, property rights and income.

Table 2. Factors associated with social digital divide within a country

Factors	Related literature
Income/socio-economic status	Rice and Katz's (2003) national representative telephone survey of Americans in 2000 shows that there exist several digital divides with respect to both Internet and mobile phone usage. Each divide is predicted by somewhat different variables, but income is one of the factors associated with all types of divide. In a recent study by Chaudhuri et al. (2005), income and education are shown to be the strongest predictors of Internet purchase. Other studies that examine the effect of this factor include Akhter (2003), Bucy (2000), Demoussis and Giannakopoulos (2006), Eamon (2004), Gibson (2003), Hacker and Steiner (2002), Holloway (2005), Larrison et al. (2002), Mills and Whitacre (2003), Mossberger et al. (2003), Rice and Katz (2003), Wilson et al. (2003).
Education	Using data from the 2001 US *Current Population Survey Internet and Computer Use Supplement* and a logit estimation approach, Mills and Whitacre's (2003) study reveals that differences in household attributes, particularly education and income, account for 63 percent of the current metropolitan/non-metropolitan digital divide. Bonfadelli's (2002) study shows that between 1997 and 2000, the Internet in Switzerland was dominated by well-educated, affluent, young males and the gap between the haves and have-nots widened not narrowed. Other studies that examine the effect of this factor include Akhter (2003), Bucy (2000), Demoussis and Giannakopoulos (2006), Shelley et al. (2004).
Family structure	Bucy's (2000) study based on data from two US states shows that socio-economic status, demographic characteristics and family structure are important social determinants of online access. Demoussis and Giannakopoulos (2006) also find that family composition is one of the significant determinants for home computer ownership in Greece.
Age	Loges and Jung's (2001) study shows that age is associated not just with access, but also with Internet usage and pattern of connecting. Other studies that examine the effect of this factor include Akhter (2003), Bonfadelli (2002), Bucy (2000), Demoussis and Giannakopoulos (2006).
Race	Using data from the US, Wilson et al.'s (2003) study shows that, controlling for socio-economic variables, the effects of rural residence and gender disapper but African Americans are still less likely to have home computers or Internet access. However, the Pew Internet and American Life Project surveys (citied in Rice and Katz, 2003) find that both racial and gender differences in Internet use disappear after other socio-economic variables are taken into account statistically. Other studies that examine the effect of this factor include Chakraborty and Bosman (2002, 2005), Hacker and Steiner (2002), Hoffman and Novak (1998), Hoffman et al. (2001), Jackson et al. (2001), Mack (2001), Snipes et al. (2006).
Geography/rural–urban location	Hwang (2004) finds that in South Korea, the divide in Internet access shows a clear three-layered structure: Seoul, other cities and rural areas. Moreover, these layers are also found to differ with regard to activities performed with the Internet. Other studies that examine the effect of this factor include Hindman (2000), Howell (2001), Hwang (2004), Kuk (2003), Mills and Whitacre (2003), Nicholas (2003), Warf (2001).
Culture	Borgida et al.'s (2002) study finds that communities with high social capital, emphasizing collective participation, public goods, are more successful in reducing the disparity between computer use and internet access than communities which emphasize market principles. Other studies that examine the effect of this factor include Norris and Conceicao (2004).

(continued)

Table 2. Continued

Factors	Related literature
Social participation	Based on a 2002 Midwest (US) urban random sample survey and a path analysis approach, Shelley et al. (2004) find that interest in developing computer skills is positively associated with digital citizenship; viewing technology as a source of informational power is positively related to support for digital government and to support for computer access equity. Other studies that examine the effect of this factor include Norris (2001).
Psychological factors	Crump and Mcllroy's (2003) study shows that lack of interest is an important reason for non-use of Internet access. Other studies that examine the effect of this factor include Katz and Aspden (1997), Kang et al. (2005), Ishii (2005).
Other factors	Chaudhuri et al.'s (2005) study examines how the price of Internet subscription, among other factors, affects people's decision to become an Internet subscriber. The result shows that the simple subscription decision is only modestly sensitive to price; Demoussis and Giannakopoulos (2006) find familiarity with technologically advanced durables, together with age, education, family composition and income, affect the probability of computer ownership. In addition, a significant number of studies have examined factors which affect the digital divide within a relatively homogenous social group, e.g. carers (Blackburn et al., 2005), patient (Kalichman et al., 2002), disabled people (Guo et al., 2005) etc. Blackburn et al. (2005), for example, surveyed 3014 adult carers in the UK and found that age, gender, socio-economic status and caring responsibilities shaped Internet use of this group in particular ways.

the current digital divide, if any, will only exist as a transient phenomenon; there is no need for government intervention. It further contends that, as ICT has been developing at a speed that makes any other technologies before it pale in comparison, policies to bridge the current digital divide will likely lag behind the development of technologies; these policies will therefore become pointless at best and cause a waste of public money at worst. Besides, as this cluster of recommendations argues, government interference with the digital divide means that government will have to shift the cost of using ICT from one section of the population to another; this in itself causes social injustice, rather than removing it. Based on these contentions, the first cluster of recommendations proposes that the role of government is to facilitate the working of the market and promote competition; developing countries, in particular, need to speed up the deregulation of their telecommunication sector and open up their internal market for foreign investment; they also need to tighten up their protection of intellectual property rights. With regard to existing policies, this cluster endorses the policy direction of the Bush Administration but devalues the policies of the Clinton Administration in the US and those of the Labour Party Government in the UK.

The second cluster (e.g. Chowdary, 2002; Cooper and Kimmelman, 2001; Dasgupta et al., 2005; Genus and Nor, 2005; Hill and Dhanda, 2004; Mariscal, 2005; Mathur and Ambani, 2005; Nicholas, 2003; Parker, 2000; Roycroft and Anantho, 2003; Wong, 2002; Zhang and Wolff, 2004) contends that the digital divide will not diminish without governmental and societal interference and that a widening of the digital divide presents a serious hindrance to development. This cluster agrees with the first cluster in that it also espouses the role of market forces in eliminating the digital divide and proposes such policies as promotion of competition, reinforcement of copyright protection, tax incentives/reduced tariffs on ICT goods and services, development of technology parks etc., all with a view to facilitating the functioning of the market. However, unlike the first cluster, this cluster believes that a certain degree of government interference, international aid, business sector re-orientation and societal support are needed to bridge the gap. It therefore recommends such governmental and non-governmental actions as improving information infrastructure in remote areas, providing ICT centres in deprived communities, sponsoring libraries and schools to provide free or low cost Internet access, and providing the appropriate level of technologies and services that fit the economic capacity of different markets. With regard to existing policies, this cluster endorses the Clinton and New Labour government policies, i.e. to rely on the private sector for providing national and international information

infrastructure on the one hand, and to provide subsidies to public institutions and deprived sectors for Internet access on the other hand.

The third cluster, represented by studies of Berman and Tettey (2001), Birdsall (1997, 2000), Bishop et al. (2001), Buchanan (1999), Carvin et al. (2001), Clark and Gorski (2001, 2002), Clark et al. (2004), Colby (2001), Couldry (2003), Golding and Murdock (2001), Hacker and Mason (2003), Hongladarom (2004), Houston and Erdelez (2002), James (2005), Korac-Kakabadse et al. (2000), Kvasny and Keil (2006), Lentz (2000), McSorley (2003), Meredyth (2000), Mitchell (2002), Molina (2003), Parayil (2005), Servon and Nelson (2001) and Shuler (1999), is critical of both the first cluster's conservative conviction that the digital divide will eventually disappear through the working of the market and the second cluster's technological optimism that the digital divide can be diminished by providing technologies to the disadvantaged. Recommendations proposed by studies of this group, therefore, tend to emphasize the need to address social, political and cultural issues associated with the digital divide. They urge government to take greater responsibility in ensuring equitable Internet access through, for instance, public sector involvement in infrastructure and services provision, education of citizens for ICT skills, exploitation of the Internet for citizen information (as opposed to commercial information), etc. They also urge the international communities to develop a just and inequitable information exchange mechanism between developed and developing countries, to respect and preserve cultural heritage and traditional knowledge, and to consider the particular development needs of developing countries in their own cultural and political context. With regard to existing information policies, these studies criticize not only the conservative policies of the Bush Administration, but also those of the Clinton Administration in the US and the Labour Party Government in the UK for a variety of inadequacies: dependence on the private sector for infrastructure/service provision, narrow economic perspective in assessing the digital divide impact, and passivity in regulating the commercial contents of the network. They are particularly critical of the digital opportunity discourse, contending that the rise of the digital opportunity in lieu of digital divide discourse puts a deceptively positive spin on the impact of ICT for all nations and all sectors of society (Couldry, 2003; McSorley, 2003; Meredyth, 2000; Strover, 2003). This criticism forms a sharp contrast with those that commend US policies as honest and having a sense of urgency (Muir and Oppenheim, 2002).

The fourth cluster of policy recommendations is demonstrated in studies like Alden (2003), Light (2001), Menou (2001) and Wade (2002). These studies are against any activities or policies that hype the digital divide, contending that it will distract governmental attention from more pressing matters, cause misuse of public resources and increase technological dependence of developing countries on developed countries.

DISCUSSION: THE NEED FOR DISCOURSE TRANSFORMATION AND POLICY REAPPRAISAL

Discourse of information inequality research

As already noted, information inequality has been an area of great interdisciplinary concern since the 1960s. During the past one-and-a-half decades, this concern has manifested prominently in the research of two related yet distinct research communities: the information divide research community and the digital divide research community.

The information divide research community continues mainly with the research tradition of the 1960s–1980s and has centred its discussion on such key concepts as information poverty, information inequality (disparity, divide), knowledge gap and the information poor (have-nots). From the earlier research of these previous decades, this community has inherited a fairly strong theoretical awareness that enabled its researchers to apply a variety of theoretical perspectives in their study, including the political economy perspective, social constructivist perspective and cognitive science perspective (although there have always been critiques that these theories contain more ideological manipulation than social science research; see Compaine, 2001: 107–8). Together, these perspectives have revealed an impoverished world that is deprived of information resources through layers of political, economic, cultural and personal disadvantages. They have also conferred on the concept of information inequality fairly rich meanings, making it a term to denote multifaceted divisions of information access, information retrieval, information processing and use. Furthermore, they have connected the concept of information inequality to a semantic network in which one finds such concepts as information control, information deprivation, information inequity, social justice and so on. The discourse of the information divide research community therefore embodies a notable sense of social responsibility and ethical concerns.

The digital divide research community, on the other hand, concerns itself mainly with the newly emerged gap between the information rich and poor in accessing the Internet and other ICTs, and has centred its discussion primarily on the key concept of digital divide. Related research began to proliferate during the later half of the 1990s in the context of rapid ICT development and the rising political ambition across the globe to capitalize on ICT for economic growth. This political context in which the digital divide concept entered academic discourse led the research community to pay particular attention to the political and economic implications of the digital divide

from the onset. It is hardly surprising, therefore, that the concept of the digital divide would be connected closely to a semantic network in which one finds such concepts as universal access, information infrastructure, economic growth, development opportunities, development strategies and so on. Neither is it surprising that various political ideologies would find their way into the research community to shape the digital divide discourse. In spite of the fact that many researchers (Cartier et al., 2005; Golding, 2000; Golding and Murdock, 2001; Gunkel, 2003; Hacker and Mason, 2003; Moss, 2002; Schiller, 1998b; Vadén, 2004) have attempted to instil into the digital divide debate explicit theoretical or ethical underpinnings, discussions about the digital divide have been directed, to a large extent, by political ideologies – the entrenchment of political ideologies has been pointed out by researchers from both the group aligning with the political left and that aligning with the political right (Foster, 2000; Lentz, 2000; Meredyth, 2000; Thompson, 2004).

The lack of solid theoretical foundation and the influence of political ideologies appear to have adversely affected the digital divide research and discourse in a number of ways. Firstly, in comparison with the concepts of information divide and information poverty, digital divide appears to have a narrower and shallower meaning. Earlier usage of the term referred by and large to the gap between those who had access to the Internet and those who had not. Although later research has broadened its referent, under most circumstances, the singular connotation still dominates people's understanding of the term. Secondly, the concept of the digital divide is often used to advance political interests rather than to improve the understanding of the issue: the left uses the term to reveal social inequity and to promote social reform while the right uses it to express development disparity and to seek market expansion; the radical uses the term to demonstrate social injustice in the information age while the conservative uses it (or more likely its counterpart digital opportunity) to conceal conflicts of interest in the deployment of technologies. These hidden agendas in promoting the digital divide concept seem to have imbued the term with a rather slippery connotation. Thirdly, because political interests are often expressed implicitly, the digital divide discourse can sometimes become rather deceptive: in the national context, it may be driven by certain political interests to direct people's attention from the injustice of resource distribution to the imbalanced diffusion of technologies; in the global context, it may be driven by the interests of developed countries to shift peoples' attention from developing countries' information potentials (cultural heritage and traditional knowledge) to their technological dependence, or from developed countries' exploitation of the international market to their technological contribution to wiring up the globe. Fourthly, political impacts have been found to undermine the rigour of the digital divide research at least on some occasions. As a number of researchers (Couldry, 2003) have already pointed out, the existence of many contradictory conclusions in this area is, at least to a certain degree, due to the entrenchment of political views during variable selection, definition and analysis. Couldry (2003) observed that in the 2002 US NTIA report *A Nation Online* which was accomplished in the context of the Bush Administration's policies, the investigation adopted a number of variables or measurements that were conducive to forming a picture of diminishing divide. One of these variables was 'access', which was defined as access to the Internet from home, work place and public venues, with no regard to the difference between home access and public venue access. Couldry contends that such measurement greatly augmented the number of people online, which in turn supported the plan of the Bush Administration to cut off the budget for community ICT projects. For these reasons, the concept of digital divide is increasingly criticized as a problematic concept and the digital divide discourse as overladen with vested interests (Couldry, 2003; Hacker and Mason, 2003; Light, 2001; Thompson, 2004; Warschauer, 2002).

For those who are concerned about the inequality of information resource distribution in contemporary society, this brief review has revealed great value and potential for research undertakings to cross the boundary of the two communities and to construct a united discourse by drawing strength from both fields. The existing information divide research can learn from the digital divide community its interdisciplinary openness, technological awareness and strong influence on government and business sectors; the existing digital divide research, on the other hand, can adopt from the information divide research community its ethical underpinning and theoretical awareness. By drawing strength from both fields, the new discourse of information inequality research should aim at enhancing both its power to depict social inequities in the embodiment of information inequality and its power to influence policy making in addressing this inequality.

So far, very little synergetic research exists to unite the two fields for more solid theory building and policy support, but attempts to develop overarching frameworks for both information divide and digital divide can still be identified. A good example of such attempts is the framework proposed by Kim and Kim (2001). According to this framework, the connotation of the digital divide concept should be broadened to mean a state of multi-dimensional and multi-staged information divide. Dimensionally, the digital divide concept in this framework consists of three aspects of disparity: media accessibility, information mobilization and information consciousness; progressively, it consists of three stages: the opportunity divide, the utilization divide and the reception divide. As Kim and Kim further explained, while the first dimension and the first stage are closely linked to the economic conditions under which users can

access information technology, the second dimension and the second stage are ultimately linked to the social environment where users can obtain and process information as well as create added value using information technology; the third dimension and third stage are linked to users' ability to use information to enrich their own lives intellectually and culturally.

It seems possible then to connect Kim and Kim's conceptualization of digital divide to existing theoretical components in information divide studies. It can also be argued that the first dimension and stage in Kim and Kim's conceptualization correspond to the political economy consideration of information divide; the second dimension and stage correspond to the social constructivist elaboration of information divide, and the third dimension and stage correspond to the cognitive consideration of information divide. By adding these links to Kim and Kim's conceptual framework, it might be possible to develop an extended model to unite the two fields. This is certainly an area that merits further investigation.

Policy choices

Feather (1998) notes that information inequality is one of the principal political issues of the information society. An issue of such significance is likely to place itself at the centre of government policies. The 1990s and the first few years of the new century have, indeed, witnessed a surging political interest to address the issue, culminating in the holding of the World Summit on the Information Society, particularly the establishment of the Digital Solidarity Fund Task Force during the first phase of the summit, and the ensuing drafting of the 'Financial Mechanisms for Meeting the Challenges of ICT for Development' section of the 'Tunis Agenda for the Information Society' during the second phase of the summit.

However, if policy makers and the general public look to the research community for intellectual support during policy making and consultation, they will probably become even more baffled, for the differing interpretations of information inequality, the contradictory appraisals of its magnitude and trajectory, and the varied conclusions about its causal factors have produced assorted policy recommendations, each pointing to somewhat different policy directions. Disagreement in policy recommendations exists first of all between the two research communities, with the information divide community placing more emphasis on information delivery and uses, and the digital divide community more on information infrastructure and access. Further disagreement also exists among different theoretical perspectives or points of views, with some recommending larger market roles and some recommending greater government intervention. How to evaluate and blend different recommendations to form effective working policies poses great challenges for governments and other players in the information society.

The research communities' disagreement on policy issues manifests nowhere so clearly as in their responses to the World Summit on the Information Society. While some researchers commend the summit for enlisting civil society participation (Selian, 2004) and for allowing poor countries a leading role in articulating mechanisms and action plans to tackle the digital divide (Klein, 2004), others criticize it for its technology-driven notion of social progress, its glossy discourse which conceals the complicated and unequal power relationships between the various 'partners' and 'stakeholders' in the global political economy (Zhao, 2004), and for its overlooking of the existing political and economic context of information and communication (Hamelink, 2004). Not surprisingly, the political economy of information scholars are among the sternest critics of the summit.

In addition to collectively offering different and sometimes contradictory policy recommendations, the two research communities and the different theoretical perspectives and points of view therein also have their own intrinsic disadvantages as far as exerting impact on policies is concerned. The information divide community, albeit being underpinned by a strong tradition of social responsibility and participated in by a group of distinguished activist researchers (some of whom are known supporters of information-focused international movements, e.g. 'the New World Information Order'), does not seem to be able to attract as much government and business sector attention as its digital divide counterpart. Governments tend to ignore policy recommendations from this community partly because its researchers often offer recommendations that are not very pleasing to government ears. The political economy of information group, for example, being particularly critical of information policies based on capitalist logic, often offers recommendations that oppose rather than complement or amend current government policies of western countries; the group also frequently calls for institutional changes to information exchange that fundamentally threatens the current structure of the world's power relations. The social constructivist group, on the other hand, tends to propose recommendations concerning cultural change and therefore often fails to offer a quick fix to problems as required by governments. The business sector is perhaps even less interested in policy recommendations from the information divide community, given the fact that many, if not most, of its researchers are inclined to propose recommendations that espouse public sector roles and simultaneously warn against private sector control of society's information resources.

In comparison with the information divide community, policy recommendations from the digital divide community have had apparently greater impact on governments and the business sector. However, as already briefly mentioned, this community has its own weakness when it comes to policy making. There exist within this community far more contradictory policy recommendations than

within the information divide community. Consider, for example, Compaine's (2001) recommendation that government should step back and let the market remove ICT-have-nots gradually, Wong's (2002) recommendation that there should be greater public and private sector cooperation, and Golding and Murdock's (2001) recommendation that government should take a greater regulatory and financial role in tackling the real digital divide. Each of these recommendations appears to originate from empirical research of the digital divide phenomenon and yet each points to a policy direction that uncompromisingly excludes the possibility of the other. In addition, as the connection between the Bush Administration's community ICT policies and some of the digital divide research (see Couldry, 2003 for in-depth analysis of this) shows, due to the heavy political ideology influence on this research community, at least some of its policy recommendations are likely to be geared to endorsing government favoured policies rather than to informing the government of policy choices.

A transformed discourse for information inequality research discussed in the previous section may not yield full remedy to either the disadvantage of the information divide community, or the weakness of the digital divide community; it is, however, reasonable to expect a renewed capacity for it in formulating policy recommendations. Firstly, by laying a more balanced emphasis than either of the communities hitherto achieved on the message and the media, the human and the technology, the social and the economic aspects, the new discourse will more likely lead the research community to formulate policy recommendations on the basis of holistic thinking; secondly, by drawing strength from the information divide community's ethical awareness and its close relationship with the public sector on the one hand, and the digital divide community's technological awareness and its close relationship with the information industries on the other hand, the new discourse may facilitate policy debate and mutual understanding between a greater variety of stakeholders. Take the previously mentioned framework by Kim and Kim (2001) again as an example. Although the framework is far from being a perfect model of the new discourse, it already helps Kim and Kim to see that as information inequality changes from one form to another, policies need to take a correspondingly different focus (Kim and Kim call these foci respectively 'instrumental, interactional and symbolic') to allow different aspects of the divide (the message vs. the media) and different sector roles (the public sector vs. the industrial sector) to come to the fore.

The World Summit on the Information Society has decisively moved the issue of information inequality further up the world's political agenda. There is no doubt that the issue will continue to be discussed on a wide range of platforms; policies to address the issue will be prescribed in a wide range of national and international settings. It is important that these discussions and policies are underpinned by solid understanding of the issue. As this review shows, there is still a long way to go achieve this.

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