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CONCEPTUALIZING A CONTEXTUAL MEASUREMENT FOR DIGITAL DIVIDE/S: USING AN INTEGRATED NARRATIVE

Authors¹: Karine Barzilai-Nahon, Ricardo Gomez, Rucha Ambikar.

**Center for Information & Society, The Information School, University of
Washington.**

Abstract:

Measurements for the digital divide/s have often engaged in simplified, single factor measurements that present partial and static measurements of the digital divide/s. The following chapter encourages policy makers to choose appropriate tools and programs to measure digital divide/s according to three dimensions: (1) the purpose of the tool; (2) levels of observation; and (3) methods of approaching the data. Then it describes an Integrated Contextual Iterative (ICI) approach suggested by the authors as an effective way to assess digital divide/s including perspectives of different stakeholders. The approach is illustrated with examples from a research project studying public access venues in 25 countries around the world.

¹ Contact Author: Karine Barzilai-Nahon (karineb@u.washington.edu).

Introduction

The digital divide is a concept that has broadly come to signify a range of phenomena referring to disparities of access, use, skill, background and environment in the context of information and communication technologies (ICT). First introduced by the Clinton-Gore administration in 1996², the digital divide quickly gained popular acceptance as a concept that highlighted the importance of access to ICT in society among different populations and countries. The digital divide, it was feared, would exacerbate the gap between rich and poor communities as well as nations. Early interventions aiming to narrow the gap between the digital haves and have-nots focused on *access* to computers and technologies, in the hope that such access would bring about more equitable distribution of resources, knowledge and solutions to people's problems.

This simplistic approach has long been criticized, with growing voices insisting that access alone is not enough to promote social inclusion or bridge the digital divide (Gómez and Martínez 2001; Yu 2001; Gómez and Casadiego 2002; Fink and Kenny 2003; Gurstein 2003; Wilson 2004; Barzilai-Nahon 2006; Bryne Potter 2006). These voices are aimed towards broadening the conceptualization of digital divide and overcoming the dichotomous interpretation the word 'divide' might entail. Barzilai-Nahon (2006) suggests that the digital divide is multifaceted and offers the label "digital divide/s" as a way to highlight the multiple dimensions included in it. Digital divide/s are understood

² <http://www.clintonpresidentialcenter.org/legacy/101096-remarks-by-president-and-vp-in-knoxville-tn.htm> quoted in Digital Divide, Wikipedia. Available at http://en.wikipedia.org/wiki/Digital_divide#cite_note-gore_sp-2 Accessed on June 4, 2008.

as a concept that reflects inequalities derived from the digital environment, but that should be studied in a continuum with other socio-economic inequities.

This chapter briefly introduces the concept of the digital divide/s. Next, it provides a roadmap for policy makers which helps them assess how appropriate each methodology is to their particular decision making scenarios by suggesting three stages of evaluation: first, the purpose of the tool or method; secondly, the level of observation implicit in this tool; and third, the method of approaching the data. We then propose a framework for assessment and measurement of the digital divide/s that is contextual, integrative and iterative - the Integrated Contextual Iterative Approach (henceforth, ICI). By proposing the ICI we provide decision makers with a tool to arrive at comprehensive and contextual measures of the digital divide/s. We then discuss the pros and cons of this approach and illustrate it through examples of an ongoing research project that is being carried out in 25 countries across the world.

Background

The definition of the digital divide/s and the empirical analysis of its components have been much debated in existing literature on the subject (James 2008, Zennaro 2006; Sciadas 2005; Dewan and Riggins 2005; Warschauer 2003; Hargittai 2003). Traditional thinking around the issue of digital divide/s revolved around the issue of access. Policy makers attached overriding importance to the physical availability of infrastructure and connectivity – a function, perhaps, of the reality of resource allocation to address the digital divide/s in the 90s. However, as Warschauer (2003) argues, *“a digital divide is marked not only by physical access to computers and connectivity, but also by access to the additional resources that allow people to use technology well. However, the original sense of the digital divide term - which attached overriding importance to the physical availability of*

computers and connectivity, rather than to issues of content, language, education, literacy, or community and social resources - is difficult to overcome in people's minds." In recent years, this traditional access-oriented thinking moved beyond technology to focus on people and communities to understand for example the influence of skills, usage patterns and influence of the environment such as political and economic development (Bridges.org 2005; Wilson III 2006). The focus of funding and the resulting practical implications also exemplify this shift of focus from issues of access to other factors. (Colle and Roman 2001; Dagron 2001; Gómez and Ospina 2001; Jensen and Esterhuysen 2001; Proenza 2001; Delgadillo, Gómez et al. 2002; Gómez and Reilly 2002; Etta and Parvyn-Wamahiu 2003; Bossio 2004; Simpson, Daws et al. 2004; Parkinson 2005; Alampay 2006; Maeso and Hilbert 2006; United Nations 2007).

Within the field of the digital divide/s then, attention has shifted from first degree questions such as "what is the digital divide" to more contextual, second-degree questions such as "what components should we add to measure/conceptualize a more refined understanding of the digital divide in a certain context?" While this shift occurs, research and practices are still characterized by single-factor, *monotopical*, relations as explicating digital divide/s (Barzilai-Nahon 2006). Such monotopical measurements examine how certain factors have an impact on a certain aspect of the digital divide – for example - how does low income affect the use of technologies? This chapter does not address the debate of whether such monotopical indices actually measure digital divide/s (James 2008). Instead, it focuses on the ICI as a means to arriving at robust, comprehensive and comparable data that illustrates the contextual nature of data gathered to measure the concept of digital divide/s.

A Three-Step Roadmap for policymakers for Assessing Digital Divide/s

In addressing issues surrounding digital divide/s, various methods, tools and programs are used. It can be difficult for policy makers and other stakeholders to understand and analyze what tool is appropriate in what circumstances. To help them assess the appropriateness of such methods and tools, Barzilai-Nahon (2006) recommends looking into the following important steps in any tool/program/method that measures the digital divide/s:

- 1) **Purpose of the tool:** determining the characteristics of the tool according to its goals. The goals are reflected through four dimensions:
 - a) Monotopical vs. integrative measures
 - b) Fixed vs. contextual or mixed factors
 - c) Fixed vs. contextual or mixed weights
 - d) Fixed vs. iterative

Essentially, we argue that it is most important to utilize tools that are as complex as the area of the digital divide/s under consideration. We also recommend that these measures be applied in an iterative process, to add the fourth dimension of time to our measurements of the digital divide.

- 2) **Level of observation:** Identifying the appropriate level of study/focus of the tool – measurement of the digital divide can occur on international, national, community and sector levels. The level of observation impacts directly the method of approaching the data. A detailed zooming-in at the level of observations (e.g., examining a particular community) will in most cases involve mixed method research combining qualitative and quantitative and therefore methods which fit such analysis.

- 3) **The method of approaching the data:** this includes the use of methods such as 'ready-to-use' indices/questionnaires, case studies, third party surveys etc and determining which method of data collection is appropriate.

This chapter focuses on a particular approach: An Integrated Contextual Iterative (ICI) approach originally discussed as part of a global study on public access to ICTs (Coward, Gomez and Ambikar 2008). We recommend that the measurement of the digital divide/s consider integrative factors along with their varying weights in varying situations; the use of tools that are contextual and integrative. To ensure a complex understanding of the measurement, we propose an iterative method that revisits the measurements over set periods of time to document the changing factors and their weights in the ways that they affect the digital divide/s.

To illustrate this approach, we cite our experiences at a national level of observation using mixed methods of approaching the data. However, the ICI framework can be applied to different levels of observations and methods of approaching the data. Let us consider each step in the assessment of digital divide/s measurements in turn.

Purpose of the tool

When analyzing policy decisions that were made in the last decade, one can observe that policy makers have a tendency to address digital divide/s issues through monotypical or single-factor indicators of the digital divide/s. Often decision-makers consider 'access' as the most important factors to measure digital divide/s. Following this they implement policies that increase access of people to information and communication technologies. This facilitates measurement and enables them to point at visible outcomes in a rather short term time - an effective tool to sway public opinion.

Furthermore, decisions based on monotypical measurements, may address some components of the digital divide/s successfully, but fail to address the complexity of the multiple levels reflected and contributing to digital divide/s. For example, if a certain government agency wants to implement a program of ICT proliferation aimed at increasing use of ICT by youth - then usage is the only indicator that needs to be considered and monotypical measurement would be the appropriate method. But if what is needed is to understand the situation of digital divide/s in general than the integrative approach would be the one that fit best.

The second and third dimensions while considering the purpose of the tool take into consideration are whether to use fixed, contextual or mixed factors and their weights. Most comparative international indices tend losing the contextual dimension in favor of the comparison. This happens both in terms of which factors to use and what weight to assign to these factors. Sometimes, this strategy leads to absurd situations: for example, when looking at usage of ICT in a country where connectivity is almost non-existent; or analyzing the affordability of ICT usage where access to ICT is free. While usage and affordability are important factors to consider when addressing digital divide/s, they are meaningless without the context in which they are factored.

Finally, a contextual approach to measuring the digital divide/s suggests deciding upon the relevant factors and weight according to the particular context. An iterative approach promotes repeating this process time and again for refinement and to understand the changing relationship of each of the factors that are used to measure the digital divide/s. The iterative component entails two questions

- i) should the same list of factors in every measurement of research project/policy decision be used?

- ii) should each of the chosen factors in this list carry the same particular decided upon weight for each iteration of measurement?

This chapter promotes a contextual approach. While a fixed factor list addressing key areas of social, economic, cultural and political life that affect digital divide/s in any context is important – it may not be common in all contexts, and it may distort the actual state of affairs in the eyes of decision makers. For example, while religion may be an important aspect to be studied in a country with a fundamentalist government, it may not be important in a situation where religion is not a significant part of the country's culture. Instead of having a fixed list of factors for each case, this chapter endorses developing unique factors which will be utilized as applicable in the individual case.

Similarly in the case of using a list of factors with a same fixed weight in each decision may not provide the most comprehensive picture of the digital divide/s. It is necessary to assign weights for each of the factors used for analysis in a contextual manner. For example, education and literacy might be a factor that is commonly considered across nations. However, it may be most significant in a country where the level of literacy of the general population is extremely low, and therefore assigning a strong weight for such a factor will be crucial to understand the situation.

Level of observation

Most existing indices measure digital divide/s at the international and national level. Nevertheless, digital inequalities exist in variety of other levels: sector, community, and individual levels (Dewan and Riggins 2005). The current focus on these higher levels of analysis shortchanges detailed and vitally important data collection and analysis at more micro levels. For example, many communities within

nation-states are far removed from the rest of the country with regard to information and communications technology (ICT) access and use. Such communities reshape ICT to their culture and norms. Barzilai-Nahon and Barzilai refer to it as *Cultured Technology* (Barzilai-Nahon and Barzilai 2005). We cannot disregard the discrepancies at local levels and the variance in digital use in access, even if such variance is below the nation-state threshold, since in many cases this level of resolution is more meaningful than the national and international levels that tend to be more popular.

The claim forwarded in this chapter is not to include all possible levels in one index, but rather use a similar contextual index design for all levels while the importance/weights of the different factors are altered according to the specific context. This would allow maximum flexibility in the level of measurement, whether it is at sector, communal, national or international level and at the same time maintain homogeneity inside the unit of analysis that is examined. For example, an index measuring digital divide/s in an immigrant community will emphasize weights that reflect language factors over other factors in the index.

Method of approaching the data

Integrative approaches are proposed and implemented by various institutions and scholars. Nevertheless, not many “ready-to-use” integrated indices, or even reviews of assessment tools, exist, yet these integrated indices are widely used (Bridges.org, 2005a; Grigorovici *et al.*, 2002). Prominent among the integrated indices are Statistical Indicators Benchmarking the Information Society (SIBIS), DIDIX (Digital Divide Index) (Dolnicar *et al.*, 2003; Husing *et al.*, 2004), NRI (Network readiness index) (Dutta *et al.*, 2004), The Digital Index, and other more traditional inequalities measures such the Gini

Coefficient (Riccardini *et al.*, 2002). Bridges.com (2005a) offers a comparison of the various assessment tools to determine e-readiness while looking at

- a) ready-to-use questionnaires (e.g. CID (Center for International Development)).
- b) Case studies (e.g. USAID (US Agency for International Development))
- c) Third party surveys and reports (e.g., KAM (Knowledge Assessment Methodology)).

Ready to use questionnaires such as the CID while providing a uniform standard for measurements does not allow for flexibility and easy transition from one context to another. On the other hand, case studies present interesting, detailed context of digital divide/s in various situations but findings from these are not easily scalable. Third party surveys and reports such as the KAM have taken great strides in creating a framework for contextual measurements that offer some level of flexibility that allows for its use in various contexts.

We present the ICI with a view to emphasizing concepts that are referred to in some of these tools mentioned above while providing a unique combination of flexibility and iteration in contextual measurements that produces robust and scalable results.

Integrated Contextual Iterative Approach for assessment: How does it work?

The main purpose of this chapter is to elaborate and explain in depth how an integrated contextual iterative methodology (the ICI) should be approached. The main idea behind a comprehensive contextual approach is that the comparison is not between the elements which comprise digital divide/s but between the dependent variable which represents the whole. Figure 1 exemplifies the proposed methodology.

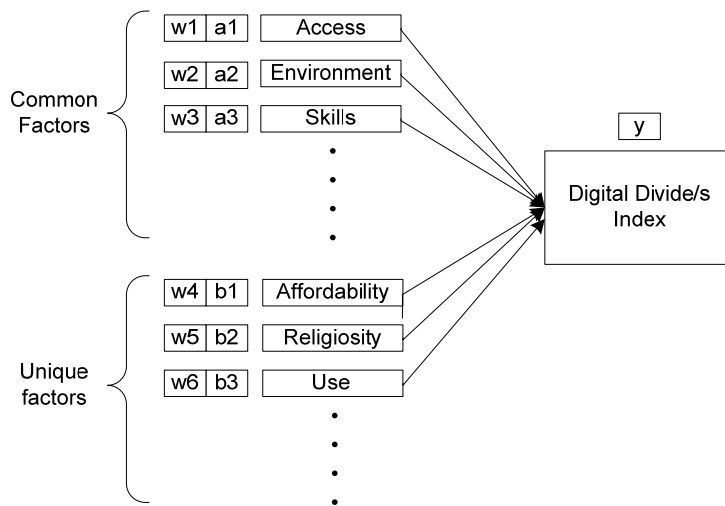


Figure 1. Differential factors and weights in Digital Divide/s Index.

The ICI methodology endorses four critical elements:

- i) **Integrative** – We argue that measurements for the digital divide should consider an integrative approach to measurement; i.e. considering the whole (y) for comparison purposes. Most methodologies compare the components (a, b) rather than the whole (y). For example *access* in Guatemala will be compared to *access* in Portugal, and *affordability* in Peru will be compared to *affordability* in Philippines. Some indices such as the KAM do compare the whole, and provide an ability to compare between components. However, even in these cases the whole is reflected by a number which is sometimes meaningless to the policy maker who is expected to interpret these results. It is clear that one number, bereft of its context does not provide the policy maker clear guidance as to where the challenges are, and where the next investments would accrue the maximum benefit for bridging the digital divide. Here the ICI proposes an integrated narrative as the variable that is compared,

providing the policy makers with not only numbers that are easily understood and compared, but also with local contexts within which these numbers are situated. Undertaking analysis and comparison using the integrated narrative as a unit of analysis provides a richer, more complex picture for policy makers – where differential weights and levels of analysis can be transparently applied to measurements - allowing them to strategize in more meaningful ways.

- ii) **Contextual factors** – Each index should comprise common factors (a1-a3), basic factors which may be similar in other contexts, and unique factors (b1-b3), factors that are unique to the particular context. Contextual factors may differ not only on the existence or non-existence of factors, but on the contextualized ways to measure a factor. For example, the study of race, gender, class, education can be recommended for the study of digital divide/s across the board (a1-a3). At the same time unique factors such as war affected regions or regions affected by recent natural disasters (b1-b3) would be unique factors to be considered in the case of particular situations. It is clear that unless one engages the context within which measurements are being conducted the measurements may not prove to be accurate. To take a hypothetical case, if a country with high literacy rate is measured soon after its schools are severely impacted by a large scale earthquake; it might register a low literacy rate while disaster affected.
- iii) **Contextual weights** - within a given set of factors (common and unique) the proposed weights should be contextual to the particular case (w1-w6). For example a common factor such as religion may receive a higher weight in a country which was known to be fundamentalist.
- iv) **Iterative** – when repeating the process of measuring digital divide/s refinement of the contextual factors and weights should be undertaken. An iterative process of research design, implementation and analysis that regularly revisits the research

questions, findings and other insights to identify trends and patterns as they emerge in the research process is always crucial in indices like that. Such iterative design allows for the changing co-relation between different factors and weights. To revisit the example of the earthquake affected country with a dysfunctional schooling system in the wake of the disaster; there may be a marked rise in attendance and literacy as the schools regroup in the course of the future.

Our next section gives examples of the application of the ICI drawn from a research project that is currently underway at the Center for Information & Society at the University of Washington. This methodology was adopted for a research project conducted for the Center for Information & Society at the University of Washington in order to map public access³ to ICT in 25 countries within developing economies around the world. As part of the research process, an evaluation of digital divide/s in these countries concentrating on public access as the most important factor highlighted in the study was conducted.

A Study of 25 countries: Implementing ICI Approach

The 25 countries project provides an illustration of how the Integrated Contextual and Iterative Framework (ICI) can be applied. This research study was designed as an iterative process in which different levels of participation were sought from multiple stakeholders. We committed to approaching the process of research design and implementation in multiple steps; with input from different stakeholders to

³ This particular project studies the use of public access venues such as public libraries, telecentres and cybercafés in twenty five countries. The intention for undertaking such research is to understand the different contexts within which the conditions of digital divide/s occur and through an integrated iterative and comparative analysis, arrive at policy recommendations to improve people's participation in information societies.

ensure that all key categories and dimensions of analysis were addressed and to make sure that the most meaningful questions were asked in the most meaningful way during the research. Our aim, through this process has been to arrive at findings that are useful, credible, dependable and trustworthy. (Denzin & Lincoln, 2005; Lincoln, 1995; Villiers, 2005).

We formalized our approach to research in the ICI: Integrated, Contextual, Iterative approach. The ICI emphasizes a multi-disciplinary approach to any research study and presents two important guidelines to ensure that the research is meaningful and useful – (1) An integrated approach where each stakeholder is represented and (2) An iterative process of research design, implementation and analysis that regularly revisits the research questions, findings and other insights to identify, probe and validate trends and patterns as they emerge in the research process.

The selection of our sample countries embodied the first iterative step in this research as we utilized a systematic approach with well documented criteria to arrive at our sample of 25 countries; our next step was to recruit expert local research partners in all our sample countries and to undertake a series of research planning workshops (details on country and researcher selection are discussed in Coward, Gomez and Ambikar 2008). The Real Access/ Real Impact (RA/RI) framework was chosen as a starting point for the research design during these workshops. Developed by Bridges.org in South Africa, this framework proposes a list of twelve social, economic, political, educational, cultural and environmental factors that influence public access.

While the RA/RI framework provided a large list of factors influencing access and use of ICT, we critiqued the static nature of this list. Through the ICI approach we determined that a more dynamic approach was needed to measure these factors – examining historical factors as well as future implications of public access to ICT. Another important point of consideration was also the uni-directional approach to

information and communication within the RA/RI framework. In our study, we wished to examine not only what was provided by different venues in terms of ICT, but also the use and appropriation of technologies by the people which reflected their particular information and communication needs. With an intention of mapping unintended uses of technology, we added the category of social appropriation of technology to our list of factors influencing public access and use of ICT. The regional and international environment as an influencing factor was added to our list based on the advice of our research partners. We divided these factors into three larger themes – *Equitable Access*, *Human Capacity & Relevance and Enabling Environment* (or Access, Capacity and Environment in short) to arrive at this final list of factors (the ones in bold are our additions to the original list of factors in the RA/RI framework):

Access

- *Physical access to technology*
- *Appropriateness of technology*
- *Affordability of technology & technology use*

Capacity

- *Human capacity and training*
- *Locally relevant content, applications and services*
- *Integration into daily routine*
- ***Social appropriation of technology***

Environment

- *Socio-cultural factors*
- *Local and macro-economic environment*
- *Political will & public support*
- *Legal & regulatory framework*
- ***Regional & international environment***

These fourteen factors formed the basis of a research design that was adapted to local contexts. Field research was divided into two phases of research, to allow for preliminary results and analysis to inform the next phase of research.

The ICI approach exemplifies our recommendations to utilize a contextual and comprehensive framework to assess digital divide/s. The list of fourteen factors determined the research design that was independently further developed in each country. This gave us a common basis for comparison. However, relevant factors were added or removed as was relevant in case of each country. For example, while socio-cultural factors were considered important in all countries, Sri Lanka, added also another factor, the tsunami. The tsunami is an important factor in understanding inequality and access issues in this country. Additionally, since the components reflected a certain reality which was particular to each country, the weights given to each factor (e.g., *Socio-cultural factors*, *Local economic environment*) was calculated differently. For example, *Gender* which was studied as part of the social and cultural factors was a component that was studied in each country. In countries like Egypt or Algeria, however, gender received additional weight since the cultural environment of these countries prohibited the free movement of women outside the home, and therefore affected also their usage and access patterns of ICT. Finally, each country developed a narrative, integrative index which was meaningful to external audience. By framing our research design in such a way, we could be mindful of new and emergent findings that did not form from the basic research design but were nevertheless important factors to consider in the digital divide/s of particular countries. Figure 2 illustrates how such a narrative looks like, and reflects the results of the first round of analysis of the 25 countries project.




Combined Access, Capacity & Environment rankings (based on preliminary findings)	
 <p>Low barriers</p>	Brazil Egypt South Africa Sri Lanka Turkey Costa Rica
 <p>Medium barriers</p>	Argentina Colombia Kyrgyzstan Peru Algeria Ecuador Philippines Uganda Georgia
 <p>Stronger barriers</p>	Bangladesh Honduras Mongolia Namibia Nepal Kazakhstan Moldova

Figure 1: Access, Capacity and Environment rankings

Through such a contextual and comprehensive framework, our aim has been to develop a unique narrative about public access in each country and to engage in a comparative analysis based on this narrative as a whole. For example, instead of comparing monotypical indicators such as *Physical access* of the ICT, we consider the whole narrative. By being contextual and comparative at the same time, this methodology has some advantages that may help overcoming some shortcomings of existing methodologies. It allows one to compare different entities (for example – a country) while protecting the independent ability of that country to tell its unique story.

Furthermore, it enables policy makers to understand what issues need to be addressed.

Here are some examples of the advantages of the ICI approach:

- i. Highlighting the importance of unique factors which may be ignored or underestimated under fixed factor index. For example, in each country we considered the issue of regional and international policy regarding ICT. However, the issue of leadership was not explicitly addressed. In Egypt, however, we found that much of the increase in ICT can be credited to the championship of one single person – the First Lady of Egypt. By allowing unique factors from each country to emerge in the framework of measurement, we were able to highlight this important factor that is instrumental in bridging the digital divide/s in Egypt.
- ii. Highlighting the importance of a factor over others through assigning weights differently in one context, may reduce distortions in the state of affairs. Most indices use fixed weights which can cause a distortion in the situation reflected to the decision maker and therefore mislead policy makers as to where to focus on and what challenges to address. An example of this would be the Philippines, where political environment becomes the single most important factor holding back increase in access to ICTs. While people use existing technologies, engage in innovation and locally relevant content is present, the country does not have universal access to ICT because the political environment does not support a systematic proliferation of ICTs. Using a fixed weight for the political environment factor like any other country while comparing will distort the impact this factor has.
- iii. Common Factors: For all the 25 countries in the sample for this study, we studied the fourteen factors outlines in the access, capacity and environment categories above. Undertaking this in the first iteration of study allowed us to develop a common ground for comparison and also allowed for the relative difference in the

weights of each factors to emerge in their unique contexts. For the next iteration of study then, we were able to anticipate the different weight of factors in each context.

Challenges to utilizing the ICI

The ICI presents a complex narrative of the digital divide/s in each unit of analysis (country, city, region etc). However, it presents certain challenges that may prove to be a drawback in particular situations as well:

1. Time consuming: The ICI approach can be a time-consuming process by the very nature of its formulation. The approach does not provide a ready-made list of questions that are applicable in each and every situation. Utilizing this approach requires the development of unique factors and weighting such factors every time this approach is deployed. Despite this, as the 25 country research has demonstrated, it is possible to do solid research in relatively short periods of time if research is well organized and research teams make the right choices and are effective researchers.
2. Costly: Along with being time consuming, conducting field research based on at least fourteen variables can be a costly process; special care needs to be given to make sure the available resources are used in the most efficient way.
3. Messy, bottom-up processes: A significant part of the CIS approach is a bottom-up, participatory process for both the development of the research design and for the analysis of the data collected. While such an endeavor provides the most robust results, it necessitates a solid commitment to the process on behalf of the involved stakeholders.

4. No shortcuts: To get to a comprehensive picture, the researchers undertake a rigorous process that does not provide robust results if any of the suggested steps are omitted.

Future Trends

In the beginning of the chapter we discussed how many digital divide/s measures have been simplistic, focused on access alone, and relying on single factors to describe complex phenomena. The good news is that this is changing, and in some cases, changing dramatically. More sophisticated approaches, tools and methods are being designed and implemented in the field, and valuable new insight is emerging from them to provide a better understanding of the complexities of digital divide/s than we have ever had before. The ICI approach suggested here is a valuable step in that direction, and other initiatives are under way to make further progress in that direction. An exhaustive literature review on methods, impacts and ICT (CIS, 2008, unpublished) confirms this trend: there is more sophistication in the research, and more depth in the analysis than 10 years ago. Nonetheless, there is no silver bullet, no magic solution to the complex issues of digital divide/s and social inequalities: hard work is still required to better understand the role of ICTs in social and economic development.

The digital divide as a concept must be understood to be a part of the continuum of socio-economic inequities; not simply as a discrete phenomenon restricted solely to issues of access, use and benefit derived from ICT.

Conclusion

The digital divide/s that exists around the world have long been an issue of concern for policy makers, governments and proponents of development around the world. We

have seen various tools and methods of measurement that present interesting insight into the phenomenon of the digital divide/s. In many cases, however this measurement is partial and does not present a complex view of the socio-economic realities in which such digital divide/s are situated. To address some of these lacunae, we present a framework within which policy makers can assess the relevance of tools and methods used to measure the digital divide/s. We propose three levels of consideration that evaluate the purpose of the tool, the level of observation and the method of approaching the data. We then propose the Integrated Contextual Iterative Approach (ICI) to measuring digital divide/s in order to present a complex understanding of the context, within which such digital divide/s occur.

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