

Preface

The adoption, diffusion, and utilization of information and communications technologies (ICTs) have increased steadily in many parts of the world, notably in developed countries. In other parts, especially in developing nations, ICT adoption and utilization started late, and has exhibited leapfrogging, in other words, bypassing certain parts of the adoption-and-diffusion cycle. By the end of 2013, the world was estimated to have almost 6.8 billion mobile cellular subscribers, almost equal to the world's global population, and 2.7 billion internet users; yet almost 4.4 billion people were estimated as not being online by the end of 2013 (ITU 2013). Irrespective of whether a country is highly developed, or is lagging in socioeconomic development, examining digital divides has been a continuing endeavor of policy planners and researchers in government and in other domains such as academia.

The term “digital divide” refers to the “gap between individuals, households, businesses, and geographic areas at different socio-economic levels with regard both to their opportunities to access ICTs and to their use of the Internet for a wide variety of activities” (OECD 2001). Digital divides are now at the heart of many conversations involving ICT use, socio-economic development, public policy, ICT policy, macro- and microeconomic outcomes, infrastructure development, and ethics. Digital divides have been studied from a variety of perspectives. Numerous studies have focused on quantifying digital divides, in other words, estimating the adoption and use of ICTs, and how they vary over time, place, communities, socioeconomic attributes, public sector involvement versus private enterprise, and economies. Quantifying digital divides and use of ICTs have been the primary focus of organizations such as the International Telecommunications Union, which publishes its annual reports titled “Measuring the Information Society” (ITU 2013). Quantification is enabled by the expanding reach of accurate census-taking and surveys, and the creation of sophisticated indices such as the ITU's ICT Development Index. The advantage of such approaches is the longitudinal tracking of key variables that measure a country's ICT adoption status.

The literature on ICT availability, adoption, and diffusion, and the digital divide is extensive. While adoption/diffusion theory provides nuanced explanations of

how technologies are adopted and diffused, its applications in the digital divide literature have been rather limited. Digital divides have been studied for diverse geographies—at the world, country, state, provincial, and city levels. Comparative digital divide studies are common between nations, but less so between developing and developed economies and for specific agglomerations such as the OECD. Digital divides have also been examined through diverse lenses such as social, economic, demographic, political, regulatory, to name a few, and in the context of specific indicators of ICTs such as internet, broadband, and mobile wireless technologies. The body of empirical literature that has attempted to understand influences of various factors on ICT adoption and utilization is vast. Sometimes this literature adopts frameworks of social reproduction (Agarwal et al. 2009) and institutional factors (King et al. 1994) as theoretical foundations; while several other studies are atheoretical and employ a variety of empirical techniques.

Most of the existing literature has two gaps. (a) While digital divide studies often compare ICT adoption between multiple nations, or focus on a single nation, a specific province, or community, systematic studies that examine digital divides at the subnational (for example, state- or provincial) level are scarce. One may wonder, why is that relevant? Subnational examination is important since there is increasing evidence in the digital divide literature that digital divides are simply not about digital haves and have-nots, the local context matters (Cecchini and Scott 2003). (b) Digital divides pertain to people and where they live—for example, in large urban agglomerations, referred to in this book as megacity or megalopolis, versus rural areas, within a state, within a province, or within a nation. The common undercurrent is geography. Surprisingly, aside from a small set of spatial scholars who have studied digital divide such as Tony Grubestic (Grubestic and Murray 2005), and Barney Warf (Warf 2013), the geography of digital divides is largely ignored. This book fills these two critical gaps.

In this book, we first examine the global digital divide at the country level, and then proceed to investigate the digital divide between the states/provinces of three of the world's most populous nations in 2013, China, India, and the United States, as well the tenth most populous nation of Japan. Together, China, India, the US, and Japan accounted for 43 % of the world population and 44 % of the World GDP in 2013 (World Bank 2014). We also examine the digital divide between countries in the African continent, which is home to more than one billion. A common theme of this book is to tease out and understand the impact of geography on ICT utilization—whether it is for the nations of Africa, or the provinces of China, using spatial statistical methods. While analyzing digital divides, most of the existing empirical research fails to account for geographic forces that might cause high technology adoption or low technology adoption nations/states/provinces to agglomerate together. If that is the case, there is a distinct possibility that the true impact of the nonspatial endogenous factors may be overestimated, sometimes leading to entirely fallacious conclusions. This book attempts to understand—does geography matter to digital divides, and if so, how?

Another consistent theme of this book is the incorporation of societal openness as it relates to the digital divide (Qureshi 2012). We live in a world today that is

ravaged by conflict, civil wars, violation of national sovereignties, clampdowns on civil liberties and freedom of the press in many regions, while some other regions are largely peaceful. How does this impact ICT adoption and utilization? We attempt to answer this question within our broader empirical framework.

The book is comprised of 12 chapters, from an introduction and history of digital divides, to developing our conceptual model of ICT utilization, followed by empirical analysis of digital divides for world nations, the provinces of China, India, Japan, the US, and the countries of Africa. We present our results of comparative analysis of digital divides, along with policy recommendations, that are specific to each region/country studies, as well as generic policy implications. Finally, we outline the future of the digital divide, contextualized by our findings and the state of information and communication technology today. To elucidate our findings, to illustrate key policy recommendations, and sometimes to provide contextual information, each chapter of this book has at least one case study; a total of 19 case studies across 12 chapters. The cases are qualitative, sometimes provide secondary data, and along with our quantitative analysis of the correlates of ICT utilization offer a holistic overview of digital divides in specific contexts and specific geographies.

The case studies discussed in the book chapters are listed in Table 1. They range from case examples of ICT adoption and related policies at the country level, to specific firms that are highly regarded as enablers of innovation using ICTs, to applications of ICTs to solve socio-economic problems and foster prosperity and well-being. Also, the cases are rather evenly distributed among world regions and zoom into nations that are at various points on the human development spectrum as classified by the United Nations.

The book is intended for several audiences. It is keyed toward knowledgeable readers about telecommunications, ICTs, and the digital divide. Such knowledgeable individuals may exist in industry, government, academia, independent policy planning institutions, and other places. Each of the country-specific chapters as well as the chapter on Africa has an accompanying policy section. In addition, an entire chapter of the book is dedicated to policy. Therefore, the book is of significant interest to policymakers, notably in government, especially in the areas of telecommunications, information technology, infrastructure development, and public policy.

At a broader level, the societal implication findings are of interest to government executives, administrators, and specialists. The book is also intended for academics and students in various disciplines such as business and management, information technology and management information systems, public policy, planning, and last but not the least, geography. Professionals in the private sector, especially in technology-oriented enterprises are also going to find the book of interest. Participation by the private sector in ICT infrastructure development has often been reported in the digital divide literature, especially in developed nations. However professionals, whether in developed or developing nations, will find the findings

Table 1 Case studies in Global Digital Divide

Chapter #	Chapter title	Name/title of case study	Continent/ World region	Level of human development index (UN 2014)
1	Introduction	Singapore	Asia	Very high
		Mexico	Latin America	High
2	Historical background	Azerbaijan	Asia	High
		South Korea	Asia-Pacific	Very high
3	Theoretical model of ICT utilization	Estonia	Europe	Very high
4	Global Digital Divide	Mauritius	Africa	High
5	Digital divide in China	Alibaba	China, Asia	High
		Google China (Hong Kong)		
6	Digital divide in India	DakNet and Bhoomi	India, Asia	Medium
		Warana village project		
7	Digital divide in Japan	FTTH network in Nishiokoppe village	Japan, Asia	Very High
		Kyoto poultry traceability system		
8	Digital divide in United States	Georgia Enterprise Technology Services	United States, North America	Very high
		ICT adoption by micro- enterprises in Nebraska		
9	Digital divide in Africa	Internet diffusion in South Africa	Africa	Medium
		Mobile telephony for Nigerian micro-enterprise development	Africa	Low
10	Comparisons of countries	Lenovo	China, Asia	High
11	Roles and policies of governments	Rwanda	Africa	Low
12	Future of the digital divide	Leadership in Poland	Europe	Very high

of the book insightful as they and their organizations explore possibilities to engage in public–private partnerships toward ICT capacity development in their immediate communities, home countries, or other parts of the world. Lastly, the book is of interest to a general audience that takes interest in the global expansion in technologies.

We recognize that ICTs by their very nature are dynamic. Technology changes, and so does its impacts. It is our hope that the *Global Digital Divides: Explaining Change* book will stimulate and provoke readers, pique their interests, enable them to ask questions and propose solutions, leading to information and networked societies at global and regional levels, as well as empowered local communities.

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