School of Public Policy, Central European University
Academic Year 2016 -2017

Institut Barcelona d`Estudis Internacionals
Academic Year 2017-2018

The Digital Divide in China & India
-
A Comparative Case Study Analysis

15/07/2018

Dissertation submitted by
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in partial fulfillment of the requirements for the degree of
ERASMUS MUNDUS MASTER IN MASTER IN PUBLIC POLICY

Supervisors:

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Author´s Declaration

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Barcelona, July 15th 2018

Abstract

Information and Communication Technologies have spread in many parts of the world. In many cases they have entailed tremendous benefits for societies and individuals such as accelerated economic growth, new employment opportunities, and improved government services. On the other hand, not everyone could harness their benefits in equal ways, leading to digital divides within and across countries. This dissertation focuses not only on the often-failing promise of ICT appropriation leading to enhanced development for everyone, but it puts those into its center of focus that have been left behind.

In an effort to grasp the meanings und understandings currently existent in the digital divide concept, the dissertation elaborates the major pillars of the digital divide and make use of them later to analyze the ICT policies of the two cases: China and India. Then it introduces van Dijk´s "Resources and Appropriation Theory" as the theoretical framework for the analysis. By applying van Dijk's causal five-step model it is argued that structural analogue inequalities are the sources for upcoming digital inequalities. With the point of departure being the digital divide conceptual framework, two important cases from the group of developing countries and their governments' ICT policies from the beginning of the 21st century until 2020 have been subject to comparative analysis.

It has been found that the more digital divide or inequality focused an ICT policy has been the better the country has scored on digital divide indices. In essence, it was found that the variance in the comparison between China and India, China being clearly better off, can be explained in parts because of China's shift in policy approach in its 11th five-year plan that has much more centered societal inequality issues to be tackled.

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Abbreviations

Chinese Communist Party	CCP
Department of Telecommunications India	DTI
Five-Year Plan	FYP
Government of India	GOI
ICT Development Index	IDI
Information and Communications Technologies	ICTs
Information Technology	IT
International Telecommunications Union	ITU
Ministry of Communications & IT India	MCIT
Organization for Economic Co-operation and Development	OECD
Personal Computer	PC
World Summit on the Information Society	WSIS

1 Introduction

The beginning of the 21st century has brought about significant transformations for human kind and society. In a unique and fast pace that have never existed before technological innovations have taken over major parts of our daily lives. Through a constant process of digitalization new technology emerges on a daily basis and in some way or another impacts our lives. In this respect, the Internet provides a new sphere not only for digital innovations, but especially for human and economic activity. The lives of many people in this world have been greatly interlinked with the Internet. Many of these changes can already be observed, yet various others still remain out of our sight and imagination. What is certain is that information and communication technologies (ICTs) are the drivers of the process of digitalization towards significant and unprecedented change of human and economic life (Corrocher & Ordanini, 2002). Among the most prominent promises of ICT diffusion enthusiasts are increases in productivity levels, economic growth, and socio-economic development (ITU, 2017). There is definitely some truth in these predictions, sometimes even proven through extensive research and rigorous studies. However, this is not the full picture of digitalization and its consequences for society (van Dijk, 2005, Skaletsky et al., 2016).

Inequalities persist in all societies and it is only a relatively small number of people who are able to harness the benefits of ICT diffusion. On the one side, there are the ones who have the means to access and use ICTs, and to harness the benefits. On the other side, there are the ones who neither have the means nor the capabilities, thereby being even more marginalized. This phenomenon has been widely called the *digital divide.* Although it too simplistic to apply such a dichotomous understanding of "have´s" and "have not´s" onto such a complex issue, at this moment and for the sake of illustration, it helps to make sense of where this research is heading towards. Therefore, the point of departure for this dissertation is the digital divide in the two largest developing countries in the world: China and India.

Addressing the research question: *How can differences in policy approaches explain digital divide outcomes?* This study will proceed by firstly introducing the underlying understanding that leads us towards the path of further ICT appropriation, secondly, elaborating on the findings of digital divide research and presenting a conceptual framework of the digital divide, which will be used later for the comparative case study analysis. The next step will be to introduce the theoretical framework initiated by van Dijk (2005). The theoretical framework is necessary to provide a scheme how a potential explanatory path for the digital divides can look like. After presenting the research design, the actual case study analysis will shed light on the context-specific ICT policies of both India and China, and on

the similarities and differences in the respective national policy approaches. Moreover, the differences in the most important digital divide outcomes will be presented. As a last step in this research efforts will be made to use the causal model of van Dijk's "Resources and Appropriation Theory" which emphasizes the importance of analogue structural inequalities as a potential explanation for the digital divides. At the end, a short conclusion will give summarize the findings and give an outlook into the future in this field.

2 The Digital Divide

2.1 Our Path Towards the Global Network Society

We currently experience the potentially most significant structural transformation of human life[1] in history. This multifaceted and multidimensional change has started in the 1970s with the spread of new technologies, mainly information and communication technologies. By now, the diffusion of ICTs has exponentially increased with unprecedented consequences for human kind and society. This gradual transformation does not only impact our lives on this planet, but it has major impact on the overall organization of society (Castells, 2005). Many of the consequences cannot yet be observed. Though, we have seen major change through technological advancement in the past two decades already such as with the emergence of the smartphone as the central information and communications device, massive advancement in microchip processors power leading to even stronger and quicker ICT devices, the Google search engine as the central Internet platform where everyone finds information on basically everything, or the evolution of Social Media platforms such as Facebook or Instagram revolutionizing interpersonal communications. Obviously, these were some of the most significant accelerators of ICT-induced change in human life, but the actual list can go on and on. Thus, it is important to note that these innovative changes have established a tremendous focus on a new commodity: information. This is why many call our time the information age.

In his seminal work, Manuel Castells established an understanding on the transformation of human life from the analogue to the digital world. In his framework, he has replaced the widely used terms information society or knowledge society with his term *network society* (Castells, 1998). The network society is the form of society that human kind

[1]The term *human life* in the framework of this research refers to all activities of human beings such as interpersonal relationships, economic activities, etc.

is heading towards in gradual steps. It can be defined as a society that increasingly based on a combined infrastructure of social and media networks (van Dijk, 2012). Castells chose the term network society[2], because he believes that knowledge and information have always been at the core of all forms of human societies throughout time (Castells, 2005). Thus networks, although an old form of societal organization, reemerge due to "the interaction between the new technological paradigm and social organization at large" (ibid.). However, it is not a purely digital society, but it is one that becomes gradually global and relies in many aspects on ICTs to structure and reinforce its activities. Hence, ICTs structure how we communicate, how we interact, how we engage, how we organize, how we work, etc..In essence, this development has been rarely questioned and often it is even propagated for.

For example, in the frequently held fora's of the World Summit on the Information Society (WSIS), which brings together governments, business and civil society actors from all over the world to discuss all issues regarding the "beneficial use" of ICTs for development, and the unquestioned path towards the network society. Within the several commitments of the actors in the very first conference in 2003 many were aimed at providing access to those who have not yet been integrated into this process. The underlying understanding, nevertheless, was that every human being in this world needs to have access and make use of ICTs such as the Internet to really transform our societies, and to really harness the propagated benefits for everyone. In such engagements, the many potentials of ICTs in fields such as education, research, finance, government services etc. are upheld to persuade the already-convinced (Skaletsky et al., 2016; James, 2009). However, what was of major significance in the WSIS fora´s for the overall discourse was the ever-growing recognition that ICT diffusion needs to have a social objective integrated. It is this objective that enables governments and societies to prevent further marginalization of already deprived people and connect them to societal (digital) processes.

[2]The term *network society* with Manuel Castell´s understanding of it will be adopted in this dissertation. He uses it synonymously with terms such as "information age", "knowledge age", "digital age", "second machine age" (Brynjolfsson & McAfee, 2014), "fourth industrial revolution" (Schwab, 2016) etc. All these terms point to the same phenomenon.

2.2 Approaching the Complexity

This chapter aims at providing a conceptual framework for understanding the digital inequalties in a diverse set of contexts. The professional and academic community accurately refers to this phenomenon as *the digital divide(s).* The digital divide is a multifaceted, multidimensional and a highly complex phenomenon that originates from the growing importance of ICTs for human life and their effects on existing structural inequalities (Witte & Mannon, 2010). In essence, it refers to the uneven spread thereof and the subsequently emerging digital inequalities across and within countries. Although a dichotomous understanding of the digital divide does not serve well to the complexity of the concept, this paper makes a normative assumption of a "positive" side of the digital divide, which are those who have access and make use of ICTs, and a "negative" side of the digital divide, which are those without access. In reality, there is a wide field of other constellations between these two extreme poles (Corrocher & Ordanini,2002; Gunkel, 2003). Furthermore, digital divide research is often based on a number of inherent beliefs and assumptions that widely remain uncontested. For example, the belief that the use of ICTs actually makes a real positive difference in the lives of the people or the society in general. Or that ICTs bear the potential for developing countries to leapfrog specific stages of the development process, and gradually catch up with the developed countries.

Often scholars tend to approach the complexity of the digital divide with descriptive means (van Dijk, 2006; Skaletsky et al., 2016). These approaches often use "simple demographics of individuals who have more or less access to computers and the Internet and a different level of digital skills" and apply it in different contexts (van Dijk, 2013). The findings usually generate data on how socioeconomic and/or demographic characteristics affect or drive digital divides, but they are generally neither led by clear theoretical frameworks nor by substantive hypothesis testing (van Dijk, 2013). These so-called "individualistic" or "monotopical" approaches, thereby, tend to draw a specific set of conclusions (Barzilai-Nahon, 2006). They are usually problem-solving approaches with an understanding that as soon as the factor leading to digital divide has been identified, in the same time, one will know measures to "bridge" this divide. For example, if a study finds that access levels in one part of a country are relatively low, the conclusion would usually be that ICT infrastructure needs to be enhanced so that connectivity improves. It matters, of course, how you have measured the "problem", and if you have measured access levels by the indication of infrastructure availability and you found low density, it appears reasonable to argue that you need more infrastructure to close the divide. However, the problem with this

approach is that the actual complexity of the phenomenon is not accounted for, for the sake of research, it was massively oversimplified. In fact, the problem is twofold: you are not only looking into one heavily narrowed aspect of the digital divide, let alone "solving" it, but you miss out to understand the root of the problem: inequality.

Certainly, the descriptive approaches to digital divide have often delivered valuable data on facts on the ground and contributed towards a better understanding, but, in the same time, they lacked the necessary subsequent step: why do socioeconomic and/or demographic characteristics of certain individuals or groups within society have such significant influence on the likelihood of being on the negative side of the digital divide. Moreover, they lacked in contributing extensively to the development of a theoretical framework for understanding the complexity of the digital divide (van Dijk, 2005; Barzilai-Nahon, 2006). Thus, the picture of the digital divide after a conducted study still remains blurred and distorted (Corrocher&Ordanini, 2002). Corrocher and Ordanini (2002:9) propose to always base a digital divide study on a structured theoretical framework even though they are not developing one themselves. In her influential work, Barzilai-Nahon (2006) centers the importance of a context-based approach, which effectively changes from one context to another. As a starting point for informed digital divide research, she emphasizes that the contextual basis can be used to develop a proper methodological approach (ibid.). To make this process viable, Hilbert (2011:27) argues in favor of a flexible digital divide research approach with a focus on the desired ends. This is why this research adopts the conceptual underpinnings of the digital divide research to approach the objective of grasping the complexity of the digital divide. The complexity of the digital divide as well as its many outgrowth has posed a major challenge to scholars, who need to develop specific context-driven frameworks for approaching and measuring this diversity. In the next chapter, a conceptual framework of the key features of the digital divide will be provided.

2.3 The Conceptual Framework

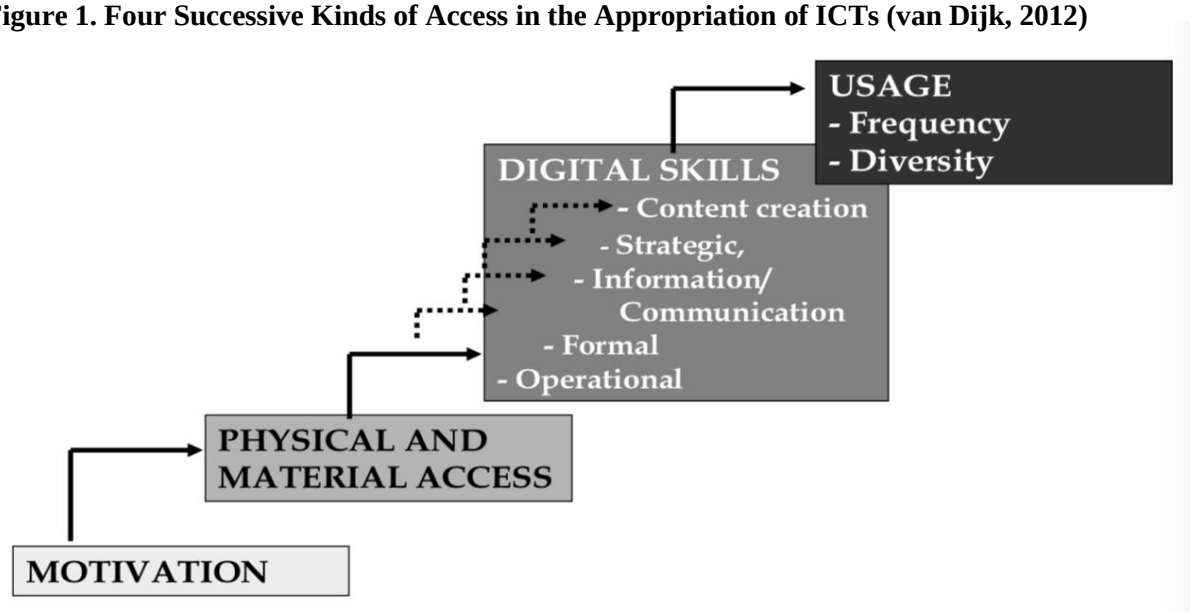
As a multifaceted and multilevel phenomenon, the digital divide is the negative consequence of human kinds path towards a global network society in the information age. As outlined-above, the common understanding of international and national policymakers as well as many academics is that technology in general and ICT development in particular is accelerating human and economic development. Though scholars such as Van Dijk (2005, 2006, 2013) or Avgerou (2010) contest this notion and its ambiguity, international organizations including

the OECD, United Nations, World Bank or IMF remain highly convinced and engaged. In the same time, these organizations are at the forefront in shaping the discourse to "bridge" the digital divide. In other words, to connect every human being on this planet to ICTs and the digital world. For this reason, it has been widely accepted that existing grievances and inequalities in societies transform into the digital world. In effect, significant parts of the world population remain at the very periphery of ICT diffusion. These individuals and groups cannot harness the full potential of ICT diffusion as their peers in the developed countries, or the more advantaged within their countries.

In essence, the digital divide therefore refers to a number of persistent inequalities on different levels that have been transformed from the analogue into the digital world. It refers to differences in ICT adoption and diffusion within and between countries, regions, and socio-economic groups (ITU, 2017b). Already this broadness in the definition makes it complicated for the researcher to grasp the concept of digital divide without leaving important aspects behind. For this research and the sake of better understanding, the definition from Paul DiMaggio et al. is best suited since it connects sociological accounts of inequality with digital divide research and states that digital divides are "inequalities in access to the internet, extent of use, knowledge of search strategies, quality of technical connections and social support, ability to evaluate the quality of information, and diversity of uses".

The academic foundations for the concept of the digital divide has been laid two decades ago. It evolved "from more general concepts […] such as information inequality, information gap or knowledge gap and computer or media literacy" (Van Dijk, 2006: 221). Throughout the time, a considerable body of knowledge has been gathered by both academics and practitioners. Research has been contributed from different fields such as information technology, political science, psychology, sociology, policy studies, etc. These studies have shown the many facets and dimensions of digital divide research. In the following, the four major types of access within digital divide research will be outlined with empirical research contributions. There are different opinions about the actual order and the importance of each of them. This study applies the view of an individual´s ICT access and use.

Figure 1. Four Successive Kinds of Access in the Appropriation of ICTs (van Dijk, 2012)



2.3.1 Motivation

Motivation is the first major dimension of the digital divide. Thus, motivation analytically precedes all other dimensions. In the beginning of the 21st century, several surveys in Germany and USA have found that some parts of the population were not only on the "negative" side of the digital divide, but they actively refused to be on the "positive" side (ARD/ZDF, 1999; NTIA, 2000). Many people were averse towards ICTs and especially the Internet. In a study conducted by van Deursen and van Dijk (2011) a decade later, they found that 95% of the Dutch population was motivated to gain access to the Internet. This showed that the fast-paced increase of ICTs has quickly been adopted by the population, who understood its impact and importance as a necessary tool for daily life. However, it seems that there will always remain a small percentage of the population who refuses to take part in this development for a number of reasons (van Deursen& van Dijk, 2011). Rojas et al. (2014), for example, discovered the effect of working class lifestyles on the uptake of computers in poor communities in Austin, Texas. They found that especially middle-aged men rejected computers due to a specific traditional understanding by framing its use as "feminine" (ibid.). On the other hand, others have investigated anxiety and technophobia towards ICT uptake. Often, whether the people did not detect benefits of ICTs for themselves or they basically did not feel well with its use (Rockwell & Singleton, 2002). In general, study on the motivation for ICT uptake has been a minor part of digital divide research and the general assumption is

that the majority of the world population would be motivated to access and use ICTs because of its many benefits.

2.3.2 Physical Access

The very first cohort of digital divide researchers have widely focused on physical access issues. As mentioned earlier, this line of research developed knowledge with a monotopical focus and the subsequent conclusion that for the digital divide to be "bridged", the necessary infrastructure and connectivity needs to be provided (Norris, 2001; Warschauer, 2002; DiMaggio &Hargittai, 2001; Hoffmann et al., 2000). The investigations have mostly aimed at exploring the relationship of sociodemographicand socioeconomic categories such as income per capita (Sarkar et al., 2011; Chinn &Fairlie, 2004; Norris, 2004), education (van Deursen& van Dijk, 2014; Cornfield & Rainie, 2003; Abramson, 2000), age and gender (DiMaggio et al., 2004), language (Foulger, 2001), race and ethnicity (Hoffmann et al., 2000; Novak et al., 1997), employment status (Losh, 2004) and competition (Dutta & Jain, 2004; Abramson, 2000)withdigital access issues. These indicators have often proven to signify tremendous "gaps of access between people with high and low income or education and majority ethnicities as compared to minority ethnicities" (van Dijk, 2013). In effect, many have found that the digital access divide in the developed countries has been closing (Norris, 2001), and that the major focus of digital access divide research should be on developing countries (van Dijk, 2005). For example, on the contrary to developing countries, it was found that the digital access gender divide in most of the global north has disappeared throughout the beginning of the 21st century (DiMaggio, 2004). Moreover, it was discovered that especially rural areas in developing countries have been far from reaching saturation of ICT diffusion. Especially high connectivity costs are important factors contributing to the urban/rural access divide. Though cybercafés and libraries have proved to be frequently used public access institutions in rural areas, they exist in much larger numbers in urban areas (Proenza, 2015). Furthermore, Akca et al. (2007) discovered significantly lower access rates in the Turkish rural population. In this context, they also found that one determinant for these low access rates are language barriers. A very small percentage of the Turkish rural population speaks English, and there is relatively less Turkish content found in the internet. Sarkar et al. (2011) found that digital divide(s) in computer and internet access in the US exist along racial lines. Moreover, they also found that income and education are other important indicators for the digital divide in computer and internet access (Sarkar et al., 2011:320).

2.3.3 Digital Skills

In the same timeframe, more and more researchers have investigated digital skills issues (Steyart, 2000; van Dijk, 2003, 2005; Vicente & López, 2006; Robinson et al., 2003; Warschauer, 2002). What skills are needed so that somebody productively uses ICTs? Basically, the core skills refer to the handling of hardware and software as the means for reaching a particular goal. Even prior to that most ICTs, and especially the Internet, expects a decent level of English language. Most of the content in the Internet remains in English, making it impossible for non-English speakers to make use of it. This branch of research also includes the so-called "second-level digital divides", which basically account for the shift from unequal motivation and physical access to divides in skills and usage (Hargittai, 2002; DiMaggio et al., 2004; van Dijk, 2012). These digital skills divides deepen between those who develop content and those who consume it.Between those who have the necessary skills to make use of the internet and other ICTs by sharing their content, selling their products, finding new income opportunities, etc., and those observing the content, buying the products, or being only entertained themselves (DiMaggio et al., 2004; Hargittai&Hinnant, 2008; van Dijk, 2005; van Deursen& van Dijk, 2014). Basically, there is a normative assumption about some usage activities being more beneficial or advantageous than others (van Deursen& van Dijk, 2014). For example, some usage activities can help you to progress in your career etc. whereas others are mainly consumptive (ibid.).

2.3.4 Usage

After having the motivation and physical access to ICTs, the usage factor follows in line. Several academic accounts have concentrated on usage issues (van Dijk, 2005; Selhofer&Mayringer, 2001;Hargittai, 2002; DiMaggio &Hargittai, 2001; Abramson, 2000). "Even if differences in terms of physical access have diminished, significant differences may remain in terms of differential skills and […] use" (van Deursen& van Dijk, 2014). The fast pace of technological innovation in ICTs and the internet has led many scholars to often rethink their own approaches to the digital divide. Emerging devices, decreasing costs for connectivity, and individual need for fast access have been some of the factors contributing to the shift of focus away from access to more usage-specific issues. Even more, a shift from differences in access to differences in usage can be observed in mainly developed countries (van Deursen& van Dijk, 2014). Van Deursen and van Dijk in their study on Dutch citizens´ Internet usage behavior has found that "low educated Internet users spent more time online in

their spare time [whereas] those with higher social status use the Internet in more beneficial ways" (2014:521). In the same time, Zillien and Hargittai (2009:287) concluded that "those already in more privileged positions are reaping the benefits of their time spent online more than users from lower socio-econommic backgrounds". Hence, it can be concluded that social, economic and cultural relationships including inequalities are reflected in the usage patterns of ICTs (van Deursen& van Dijk, 2014).

3 Theoretical Framework

3.1 The Relational Approach to Inequality

This chapter is largely based on the elaborations of Jan van Dijk in his seminal book "The Deepening Divide" (2005) and the theoretical contributions he developed for a more rigorous digital divide research. Although inequalities have always existed within societies, the emergence and uneven diffusion of ICTs have initiated an even stronger division between groups of society (van Deursen& van Dijk, 2014). "The higher status members increasingly gain access to more information than the lower status members" (ibid.). In effect, this makes ICTs not only to a beneficial chance for those able to access and harness it, but also to an accelerator of already existing inequalities in society (Witte &Mannon, 2010; Norris, 2001; van Dijk, 2005).

In an effort to build an explanatory theoretical framework, van Dijk (2005) emphasizes the importance onthe social positions of individuals and groups in society. He argues that social positions of the people actually influence and explain the differences in the uneven access to ICTs.Based on Charles Tilly´s work "Durable Inequality", van Dijk follows Tilly´s line of argument that major persistent inequalities "correspond mainly to categorical differences such as black/white, male/female, citizen/foreigner, or Muslim/Jew rather than to individual differences in attributes, propensities, or performances" (Tilly, 1998:7). This is why the focus must be on the actual social positions and the relationships between people (van Dijk, 2012). Thereby, he adopts Tilly´s definition which states that "inequality is the unequal distribution of resources in society as a result of the competition of categorical pairs" (ibid.; Tilly, 1998:7-9). "Although this competition and the resulting distributions are changing continually, the categorical pairs reproduce themselves through mechanisms of

social closure, exploitation, and control. In this way, inequality becomes a systematic or structural characteristic of societies" (van Dijk, 2012).

In essence, his theory relates the digital divide "to a distribution of resources (temporal, mental, material, social and cultural) that in turn is explained by personal categories such as age, sex, intelligence, personality and ability and positions in society (of labor, education and household position)" (van Dijk, 2013). This is why he calls it "Resources and Appropriation Theory" stemming from a materialist and relational theory background (van Dijk, 2012). By this, he aims to shift from the more descriptive approaches in digital divide research that focused on individual or group attributes to a more relational network approach centering social positions and relations (Wellman & Berkowitz, 1988). He categorizes these positions and relations as follows:

> "employers and (un)employed, management and executives, people with high and low levels of education, males and females, the old and the young, parents and children, whites and blacks, citizens and migrants. At the macro level of countries, sometimes indicated as countries from the North and countries from the South of the globe. In every case, the first of these pairs is the dominant category in almost every part of the world, the white-black distinction excluded" (van Dijk, 2012:58).

The theoretical assumption of this framework is that due to existent social stratifications, there is a different point of departure for each category of people in the appropriation process of ICTs. In effect, this means that there is most likely also a different point of arrival (Norris, 2001). Hence, people starting off their "own" path towards the network society departing from a low category will end up in a lower arrival point compared to those departing from a higher category, who eventually will end up at a higher arrival point. Moreover, the dominant group (or category) are the ones who adopt new technologies much earlier and thereby using this advantage to increase their power in their relationship to the subordinate category (van Dijk, 2012). He argues that the differences in the appropriation of technology in general start very early in life and are being reinforced on a daily basis (ibid.).

The advantage of van Dijk´s theoretical framework "Resources and Appropriation Theory" lies in its objective to unpack existing social inequalities that throughout the path towards a global network society transform into digital inequalities. The relational network approach helps to explain the digital divide by pointing to the structural aspects of inequality in society, thereby accounting for the immense complexity of this problem (van Dijk, 2005). In this way, the relative importance of one or more specific categories is subject to the

empirical observation in a study. Effectively, the observation is context-specific and potentially changes from one context to another. However, the rigorous application of the theoretical framework can help to point out similar patterns across cases.

3.2 Van Dijk's Causal Model of the "Resources and Appropriation Theory"

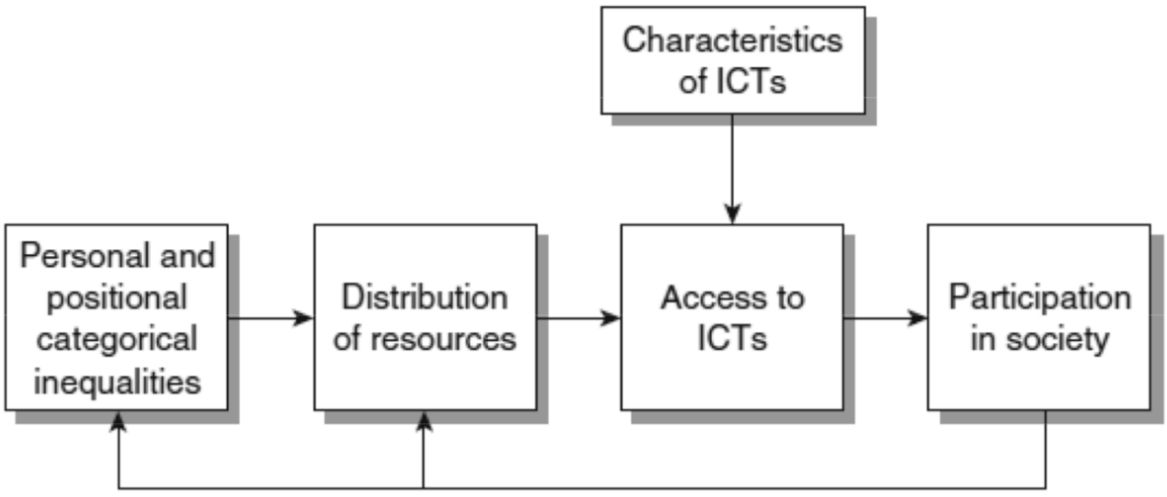
The above-outlined relational network approach serves as a basis for van Dijk´s "Resources and Appropriation Theory of the diffusion, acceptance and adoption of new technologies" (van Dijk, 2005). In this chapter, the theoretical framework will be introduced with the specific model developed by van Dijk.

The main four concepts of his causal model of his theory are the following:

"1. A number of personal and positional categorical inequalities in society
2. The distribution of resources relevant to this type of inequality
3. A number of kinds of access to ICTs
4. A number of fields of participation in society" (van Dijk, 2005).

He established that number 1 and number 2 are the causes whereas number 3 is what is aimed to be explained. Moreover, number 4 is not only a potential consequence of this process, but needs also to be explained (van Dijk, 2012). In effect, changes in number 4 will also impact number 1 and two (ibid.). As a side factor, the characteristics of ICTs also influence the actual type of inequality that is aimed to be explained (ibid.).

Figure 2. Van Dijk´s causal model (van Dijk, 2005)



Based upon this model van Dijk specifies his line of arguments as follows (van Dijk, 2005). The categorical inequalities within a society bring about unequal distribution of resources. This, in effect, causes the disadvantaged individuals or groups to end up on the "negative" side of the digital divide, because of unequal access. The unequal access to ICTs, in turn, always depends on their specific characteristics. In the same time, the unequal access to ICTs leads to unequal participation in the society, which in turn reinforces the categorical inequalities as well as the unequal distribution of resources (van Dijk, 2012). Coming back to the in chapter 2 outlined successive types of access to ICTs starting from motivation to physical access to digital skills to usage, it is important to note that these are the core part of van Dijk´s model. In essence, their order illustrates the process of appropriation of a new ICT. The next step in this research will now be to introduce the research design in the following chapter.

4 Research Design

4.1 Research Objective

The objective of this study is to, in the first place, understand how ICT policies have addressed actively or passively the digital divide and its related issues, and second, to examine if the "analogue" inequalities in society derived from the theoretical framework by van Dijk can explain these context-specific divides. This line of research, the interconnection of ICT appropriation through policy objectives and digital divide, is important because it provides us with the negative aspects of the path towards a global network society and helps us to appropriately inform policy to tackle the "roots" of the problem.

First, the comparative analysis findings may provide a basis for the broad understanding of digital divide, and if digital divides are actually reduced when not tackled directly through policy, but only indirectly through ICT development policy. Potentially the results will lead our understanding to conclusions that actual targeted digital divide policies are much more needed, if the context-based divides in our case countries want to be really tackled.

Secondly, ICT development and digital divide should not be understood only in the national but in international terms as well. Hence, the development of one country to the network can be accelerated if its neighbors are not left behind. Innovation and competition can spur the region to higher levels of ICT development.

4.2 Case Selection

As major developing and emerging economies, China and India serve as significant and interesting but distinct cases for understanding the importance of digital divide in our future society. They both stand in competition to each other for the regional power, though China has by far taken over the greater global role, India remains a regional power. India and China are also interesting because for innovation to take place and to have direct effects, a skillful labor force and the right environment for innovations are needed. This already needs massive investments and bears long-term costs and time until it really produces fruitful results (Bilbao-Osorio, 2013). Not many developing countries provide this kind of environment. Both have worldwide known cities such as Bangalore or Nanjing where world-class leading ICT-hubs exist. Certainly, conducting a cross-country comparison increases the problems associated with gathering and analyzing the data. Especially, when the objective is to understand differences in outcomes and try to build upon a causal model that seeks to explain why a specific phenomenon exists. Differences between policies or strategies and their subsequent outcomes are often complicated to evaluate. However, the appreciation of the actual differences in the policies and under what conditions and to what extent lessons from one setting is applicable to the other one shall help to grasping the complexity.

4.3 Mixed-Method Approach

In a two-staged research design, quantitative and qualitative methods are used to achieve the objectives in a deductive manner. The objective of this research can best be reached by such twofold methodological approach. On the one hand, gaining quantitative evidence "from the ground" and put them into context for enabling a comparison between the two cases will be reached by descriptive statistics with data from widely accepted and used sources such as the World Bank Open data or ITU data. This can especially contribute to providing evidence for the extent of the phenomenon and some of the conclusions that will be drawn from the comparison of the policies, because it is nearly impossible to conclude that different policy outcomes are the result of differences in the policies, in the complexity of the phenomenon or in the contextual specificities, or in a combination of all these factors. Hence, the quantitative data shall help to strengthen the internal validity of the policy comparison and the conclusions. Moreover, it shall function as a baseline leading this research´s qualitative lens.

On the other hand, this digital divide research needs a more qualitative in-depth and nuanced analysis to not only grasp the complexity of the context but deliver empirical evidence on its potential causes and find comparable patterns to draw conclusions from.

4.4 Data

To answering the research questions, extensive literature research in the fields of digital divide, ICT appropriation and digital inequality has been conducted. In addition to that, the major ICT policies of China and India (see Table 1) will be analyzed in an interpretative manner to examine how they were aimed at tackling the specific dimensions of the digital divide (see chapter 3), digital inequalities, and analogue inequalities that lead to digital divides.

Table 1. ICT policies of China and India since the beginning of the 21st century

China	India
10th Five-Year Plan (2001-2005)	New Telecom Policy 1999
11th Five-Year Plan (2006-2010)	Broadband Policy 2004
12th Five-Year Plan (2011-2015)	National Telecom Policy 2012
13th Five-Year Plan (2016-2020)	Draft National Digital Telecommunications Policy 2018

National data on digitalization issues and especially on issues linked to inequalities in society are unfortunately rarely found and often not accessible. This certainly constitutes a fundamental problem for this research. Especially for China since the reported data not only usually comes from the government authorities, which in itself is not popular for its decency and accuracy in its statistics, but for many issues there is simply no data available (REAP, 2016). In India, the story is of different kind. India certainly has many data sources and data is easier accessible, but the same problem with actual accuracy exists. However, this is a common problem with all nationally-reported statistical data. Unfortunately, the data on provincial-level in both India and China is even harder to find and to access. This is why this research needs to rely heavily on commonly accepted indices and data from well-known and often-used international organizations such as the World Bank or ITU. The large part of this research is built upon an extensive literature review for the theoretical underpinnings of the digital divide as well as for the case-study analysis. Extensive research of former quantitative

and qualitative studies have been made to construct a hopefully full picture of not only the complexity of the concept of digital divide, but also its actual application, the reasons behind it, and its cases.

5 Comparative Case Study Analysis

This chapter has several aims: Firstly, it aims at providing a digital divide perspective on the Chinese and Indian national ICT policies. For this reason, it will be analyzed how these policies directly or indirectly address digital divide issues in general and the four successive kinds of ICT access in particular (see Figure 1). Second, the context-specific digital divides as well as the change within the common key digital divide indicators will be elaborated to examine to what extents change can be traced back to policy objectives of the government authorities. Third, van Dijk's causal model of the "Resources and Appropriation Theory" will be applied in an effort to explain why digital divides persist. All this will be addressed in a comparative design to identify important factors that may account in the differences of the two cases.

5.1 The Case of China

5.1.1 ICT Policies in China (2001 - 2020)

The Chinese ICT policies are widely formulated within the framework of the Chinese governments five-year plans (FYP) (see Table 1) which can be understood as the Chinese Communist Party's (CCP) "most authoritative strategic vision on the direction of the country's economic and social policies" (Kennedy & Johnson, 2016:8). For a long time, the CCP's objective was not only to sustain internal economic development through a number of protective policies, but especially to catching up with international peers. ICT-induced human and economic development in China has first gained major significance with the formulation phase and initiation of the 10th FYP in the beginning of the 21st century (Kennedy & Johnson, 2016). Throughout the 1990s the CCP has been busy on transforming the monopolistic economic and governance system to a more internationally-adjusted but still state-centered environment of regulation and competition (ibid.). In this regard, the participation of the national private sector within a competitive environment have been widely promoted to prepare China for harnessing the benefits of globalization and improving the

local conditions. However, the CCP still owns the significant parts of the process and the FYPs are a symbol of that. As mentioned above, ICTs and ICT-induced potential human and economic development have been put on the agenda already in the 1990s, but from the beginning of the 21st century the CCP had put it on the very top of the agenda.

Therefore, the 10th FYP (2001-2005) can be seen as the first major policy effort by the CCP to upgrade ICTs within their core national strategy. In its very preamble it states that "the information industry will become the leading industry among all other industries in the economy" and that promoting the national economic and social "informatization" is at the core its approach (CCP, 2001). In essence, the 10th five-year plans reads like an industry policy with very little acknowledgment of other important aspects of this development such as arising digital inequalities. However, provision 3.1.3 does directly refer to a widening of the digital divide on the global as well as on the national level (CCP, 2001). It also points to the importance of narrowing this gap, however, as a potential medicine "competition among different companies in the communications industry" is proposed (ibid.).

The 11th five-year plan has introduced a new paradigm in China's approach to national development in general, and ICT appropriation in specific (Fan, 2006). A special emphasis has been put on the inequalities within China's society and the need to focus more on the disadvantaged groups to prevent further grievances (CCP, 2006). It introduced the new vision of "common prosperity" to integrate the disadvantaged and deprived into the substantive positive economic developments that have been taking place. Significant enablers for this change in vision were President Hu Jintao and the Premier Minister Wen Jiabao, who certainly also aimed at marking the paradigm with their own visions and inputs for China's development (Fan, 2006). Although still at the core of the policy, ICT appropriation moved somewhat to the background while emphasis shifted clearly on how to tackle societal inequalities (ibid.).

The 12th FYP puts further emphasis on the objectives of the previous years' plan. In this regard, it also proceeds to once again stipulate the significance of the ICT sector and its development. However, it does not address the digital divide per se, but continues to observe the issue from an overall inequality perspective (section 2, 8, 12, 14). In essence, the 12th FYP seeks to develop an equitable environment in which all Chinese citizens can prosper with a special emphasis on the rural citizens (CCP, 2011). However, as expectable in a national policy framework, the significant part of the 12th FYP, similar to its predecessors, addresses issues such as industrial competitiveness (section 3), research and development, and

investment enhancement in ICTs (ibid.). On the other hand, it aims also at expanding consumption capabilities of Chinese citizens in its aim for "sustainable growth".

The 13th FYP is a strong continuum of the previous two ones. It emphasizes greatly on the enhancement of ICTs, and especially on harnessing its benefits for society. Inequality issues within the Chinese population remain at its core (CCP, 2016). The CCP further elaborates on how its vision for the future of the Chinese society shall look like. In this regard, it is stressed that without proper ICT appropriation human and economic development will not achieve its full potential. However, as in the previous policies the 13th FYP also entails a big range of industrial policy provisions. In essence though, the 13th FYP continues to further formulate on the "sustainable development" for all citizens as it was initiated by the 11th FYP (CCP, 2016).

Although some of the above-mentioned findings point to a indirect account for digital divide issues, most of the Chinese FYPs clearly lack direct provisions tackling the digital divide or related issues. One could argue that initiating a boost in e-government services directly addresses issues of motivation and usage, because citizens not only feel the motivation to easier access government services, but also learn about the different ways how ICTs can be used for their own sake and development. More specifically, the FYPs address physical access issues. In the 10th FYP, the Chinese government for example had initiated several ICT provisions to provide access through infrastructure enhancement to all of its citizens. The CCP detected a digital divide between the more advanced and connected Eastern provinces and the more backward Western ones (CCP, 2001). It could be argued that this is why provision 3.6.8 especially focuses on expanding the ICT infrastructure such as fibre-optic technology and satellite telecommunication systems in the Western parts of the country (ibid.). This especially was implemented through the CCPs "Go West" program. One popular program in this regard is the "One phone for each village" project where networked telephones have been deployed to a large number of rural regions to provide connectivity. All FYPs in one way or another have aimed at providing universal access through such programs also connecting those in rural areas (CCP, 2006).

Moreover, many internet cafés have popped up throughout the time everywhere significantly reducing the costs for access, especially for the poorer people.

Furthermore, digital skills development has also not been addressed directly. Although, for example, the 10th FYP in its provision 3.6.4 refers to "Human resources development", the goal is more to adjust human resource development to the needs of industry. Certainly this does not mean that the industry is usually seeking for non-beneficial skills for the individual,

but it means that the focus of the policy is not to enhance the digital skills from the perspective of the need of the individual. In general, the FYPs remain very unspecific when mentioning skills or human resource development.

5.1.2 China's Digital Divides

China´s most densely populated areas are those in the East whereas the West is much less populated. Often, China´s regions are illustrated in geographical categories of Eastern provinces, Western provinces, and Central provinces. In many cases, the Eastern provinces are by far the most developed than the other two. This has made geography a significant indicator for the digital divide within China. Around 62% of China´s population live in rural areas, while the rest live in urban areas, however, the trend points upwardly to urbanization which is also supported by CCP. The most significant digital divide, hence, is the gap between the rural and the urban population. Urbanization has been one of the most significant trends in China for the past several decades impacting heavily not only on the population density in metropolitan areas, but also on the overall demographics. Many users of ICTs such as the Internet are largely allocated in urban cities. There, the access possibilities are on a constant rise and connections are fast and steady. For the rural population, on the other hand, ICT infrastructure is not only lesser accessible, but it is also costlier to be built because of the low population density and geographic disadvantages due to mountainous terrain etc. In rural areas where there potentially is access, the speed of the connections is quite low. Another significant digital divide is the gender divide in China. Chinese women are much less likely to being connected to the digital world than Chinese men. However, the figures show that Chinese women are catching up. The digital divide within China can largely be allocated to the imbalance of diffusion of ICT infrastructure in its regions, high costs for being online, and not enough content in the respective Chinese languages. In addition, income levels as well as education levels massively contribute to the possibility if one ends up on the negative side of the digital divide. As in many other countries, Chinese citizens with low income are at much higher risk of not being connected to the digital world. For example, the 10th five-year plan states that IT needs to be widely spread in society and computer and network penetration should be increased (CCP, 2001). Other more specific targets are to reach 200 million Internet subscribers, increase fixed telephone capacity to 300 million or to increase the number of mobile subscribers to 290 million (ibid.).

5.2 The Case of India

5.2.1 ICT Policies in India (1999 - 2018)

The Indian national ICT policies (see Table 1) are not introduced on a regular basis every five years such as the ones in China. However, being developed by the Ministry of Communications & IT (MCIT) they also address ICT appropriation on the national level. Similar to China's overall objective of economic growth, it is important to note that the developments in India´s growth and development in general and the evolution of its ICT policy in particular need to be all observed within the broader frame of India´s wide-ranging economic policies to liberalize the markets, enhance competition, etc., which were initiated in the 1990s.

The very first Indian ICT policy was the National Telecom Policy of 1994, though this specific name, it can be regarded as a complementary economic policy in the first place. In its formulation and recognition of ICTs it remained on very basic terms and was mostly aimed to liberalize the telecommunications market and provide the ground for private sector competition (GOI, 1994). Because of its lesser significance for actual ICT and digital divide-related issues, this policy is not subject to this analysis. Thus the following New Telecom Policy of 1999 (NTP-99) can be regarded as the very first national ICT policy framework of the Indian government with the special acknowledgement of ICTs being potential key drivers for future development. In this regard, it had aimed at boosting the number of telephone connections as well as the growth in the mobile segment.

The next policy in line is the Broadband Policy of 2004 (BP-04) which was aimed to putting a major focus on setting the stage for further specifying the broadband diffusion and its technicalities. This policy can be perceived as a step that was, for a large part, forced through the trends in Internet and personal computer diffusion in the world. Thus it established the “Right to Broadband” scheme and framed it as a basic necessity similar to education and health. Moreover, the BharatNet program, a major government initiative to increase broadband penetration in rural India, has been initiated because of the focus of BP-04. In specific, it aimed to connect 600.000 villages to the broadband network. In the same time, it also elaborated on other ICTs such as cable TV networks or satellite media (MCIT, 2004).

The current National Telecom Policy 2012 (NTP-12) has not only broadened the government's approach to ICT appropriation, but it set the stage for the first time for a vision towards a “empowered and inclusive knowledge-based society” (MCIT, 2012). As its main mission, the National Telecom Policy of 2012 (NTP-12) has the “availability of affordable

and effective communications for the citizens" (MCIT, 2012:1). Moreover, a special emphasis has been on providing broadband access to rural and remote areas in an "open, non-discriminatory and technology-neutral" path towards the network society (MCIT, 2012:8). The government, hereby, directly acknowledged the digital divide between the rural and the urban population, and seeked provisions to bridge it (MCIT, 2012:4).

The most recent development within the ICT policy field is the newly proposed draft for the National Digital Communications Policy 2018 (NDCP-18). The DTI has introduced a fully-fledged digital strategy that entails a wide range of issues all pointing towards strengthening India's digital position globally and further prepare the country for the future. In the NDCP-18 the Indian authorities once again stress the need to make the "new technologies accessible to all equitably and affordably" (DTI, 2018:2). However, for the first time, it specifically refers to a number of important aspects that potentially lead to digital divide such as literary rates, economic conditions and urbanization (ibid.). "It is important for India to remain sensitive to these factors and promote policies that increase opportunities for their social and economic development" (ibid.).

As opposed to the Chinese policy framework, the Indian ICT policies are much more specific in their provisions. Although, motivation as an important dimension of the digital divide is not addressed directly, the AADHAR program, a unique electronic authentication system, was very successful in motivating a tremendous majority of the Indian population to sign up for it. Hence, this program did indeed motivate the citizens to make use of its several beneficial features in regards of government service provision, financial services, etc. As to the dimension of physical access, many provisions of the ICT policies consistently aimed at the provision of necessary infrastructure for enabling physical access. The further penetration of Internet and PCs in the country had led the government to greatly enhance penetration rates of "broadband, Internet and Personal Computer" and provide the necessary connectivity (MCIT, 2004). Thus, especially for big cities and commercial areas optical fibre technologies were aimed to be built (ibid.). All the policies also aimed at providing a more cost-effective system and pushing private actors into competition in an effort to decrease costs for the citizens. For this reason, NTP-99 even included a license fee reduction for infrastructure providers of end-to-end bandwidth in the hope that the bandwidth infrastructure further expanded (ibid.). Moreover, it can be said that the fundamental part of the NTP-12 is access-oriented in a way "through ubiquitous network connectivity of mobile technology, broadband internet, fiber penetration in all villages, high-technology low-cost affordable devices and software solutions" (MCIT, 2012:2). This why the Indian government has initiated several

nation-wide programs to deliver on their objectives. For example, the JanWiFi program aims at establishing 2 million public Wi-Fi hotspots in rural areas or the GramNet program targets to connecting all key rural development institutions with 10Mbps upgradable to 100 Mbps. Moreover, through several programs public libraries and internet cafes in rural areas were supported to provide a minimum of connectivity (Proenza, 2015). Adding to the previous policies, the NDCP-18 once again emphasizes the need to further boost and grow broadband penetration as well as the technical capabilities of other technology such as satellite communication. Thus in provision 1.4 it directly states the objective to "ensuring inclusion of uncovered areas and digitally deprived segments of society" (DTI, 2018: 10). This provision indeed centers not only deprived areas such as the Himalayan region, but it also directly refers to "marginalized communities, women and persons with differential capabilities" (ibid.). In the latter, one may even detect a reference to the digital skills as well as usage dimension of the digital divide framework.

However, the digital skills and the usage dimension of digital divide issues remain more at the periphery of these policies. Being focused mainly on the role of the actors in the field and on setting the stage for access development, for instance NTP-99 had only emphasized “human resource development and training” in a short passage of the policy. Though it is stated that “human resources are considered more vital than physical resources” the paragraph lacks any further specific content (GOI, 1999). Although "skills development" is one major pillar of NTP-12, besides its provision on enhanced capacity building for the economic sectors' human resources needs, quite less specificities actually refer to digital skills. NTP-12 mentions the enhancement of human capital as well as capacity building in general as a means to further strengthen the rapid growth of the ICT-induced sectors (MCIT, 2012). Its 11th provision focuses on digital skill development as a complementary to ICT appropriation through building the creative and technical potentials of the younger generations (ibid.).

5.2.2 India's Digital Divides

India's diversity certainly impacts also its digital divides. Besides its world class technological hubs such as Bangalore, India's geographical diversity does not only entail very remote areas, but it also leads to a significant rural/urban division, which can also be detected as its main digital divide. Its rural areas have significantly lower ICT appropriation rates (DATA). Often even basic infrastructure and technology remains absent. In many distant villages, power

supply is often unreliable. Moreover, in India a massive gender divide exists. The number of female ICT users are in nearly all features significantly lower. For example, 41% of the females are reported to have very limited access to the Internet.

Although, one could infer that due to India's colonial past English should be a widely-spoken country, however, the opposite is the case. A significant part of the population does not speak or read English. Officially 216 mother tongues were grouped under 114 different languages (Mallikarjun, 2004). This is why people often only speak and read their indigenous language in which usually very little content can be found in the Internet. This language divide poses a severe barrier for those not affluent in English since the major part of software, websites, information resources, etc. can only be found in English language.

Furthermore, there is a tremendous digital skills divide in India which can, in the first place, be traced back to comparatively low literacy rates. Coming from 61% overall literacy of people aged over 15 years old in 2001, the most recent statistic from 2015 acknowledges a literacy rate of 71.9% (Statista, 2018). The men's literacy rate is at 80.9% whereas female literacy rate is significantly lower at only 62.9%. Though one can detect clear improvements in the female literacy rate coming from 47.8%, this factor definitely also impacts the above-mentioned digital gender divide. Moreover, the literacy divide also affects the rural/urban divide since the urban population scores significantly higher.

5.3 Comparison

The following comparison shall, on the one hand, point out the differences between the two policy approaches that were detected in the analysis in the previous two sections. On the other hand, it shall also clarify the actual differences in the outcomes of the two context-specific digital divides by pointing to important ICT appropriation figures.

5.3.1 The Similarities and Differences in Policy Approaches

The governments of India and China have throughout the past two decades put a major focus on ICT appropriation as a means towards further human and economic development. They have both accepted that increased ICT appropriation is the common path towards a global network society that human kind is taking. In this respect, both claim a global leadership role for themselves (MCIT, 2012; CCP, 2016).

This is why the policies in essence do not differ very much. In fact, many objectives and provisions are similar as are the targets: increasing ICT infrastructure, providing full access, constantly improving technical abilities, provide a healthy environment for industrial competition and development, etc. are among the aspects most often stressed. The strong focus lies definitely on how to improve the environment to strengthen the industry's efforts, subsequently it is always hoped that this will be leading to a boost in economic growth. In effect, digital divide issues fall significantly short in most of the policies of both countries. However, as outlined above both governments have not only mentioned the digital divide from time to time, but they initiated several programs directly tackling digital divide issues (Sheykh, 2017; Panda et al., 2013; Coleman, 2014). However, since the aim of the study was to identify direct and indirect addresses of digital divide issues, it was possible to elaborate important aspects.

In essence, India's policies and programs are for its major part focused on establishing or strengthening ICT access and connectivity. The main ingredients are usually the improvement of technological capacities and providing the ground for competition and ICT-induced human and economic development. However, the pillar on human development falls comparably short. The Indian policies give the impression that the sake of the marginalized and deprived is important and should be at the center of the overall activities, but all substantial parts of the policies are focused on whether boosting investments for the ICT sector or strengthening the technical capabilities, which obviously is also aimed at strengthening the ICT industry.

Certainly, the analysis and findings of China's and India's policies should not be overstated since policy implementation can often not be fulfilled as intended due to a number of reasons such as context, financing issues, etc. However, especially in the case of China this factor could be a significant difference. Different than in India, the CCP has full autonomy on formulating the policy and instruct its implementation on all levels. Although the CCP has significantly softened its power and responsibility approach in the past three decades, it still owns the process much more than in India, where not only policy development but especially its implementation is subject to much more debate, conflict between integrated actors, and power sharing of national and local governments.

5.3.2 The Differences in Digital Divide Outcomes

The following chapter shall shed light on how ICT appropriation and digital divide indicators have developed in the past two decades to examine in what ways the ICT policies changed the situation "on the ground".

In the ICT Development Index (IDI) of 2017, a cross-country index that measures a country's ICT performance and digital divide status, China significantly scored better than India (see table 2).

Table 2. IDI 2017 Ranking China & India (ITU, 2017)

	China	India
IDI total rank	80	134
IDI Access rank	69	137
IDI skills rank	81	121
IDI usage rank	69	144

Especially in the fields of access and usage, there are major differences between the two countries. Only in the skills ranking India ranks somewhat nearer to China. In fact, in cross-country comparisons of ICT appropriation indicators China is clearly leading most of the indicators such as total Internet users and Internet hosts (ITU, 2017). India only scores better in e-readiness (ibid.).

A major difference is the infrastructure penetration. Although India's economic growth since the 1990s has been remarkable and its ICT sector has made a major contribution to it, its telecommunications infrastructure is very underdeveloped compared to China (Sheykh, 2017). The technological standards apparent in most of China can only be found in India's better developed cities and regions. Moreover, the rapid growth of internet cafes and ICT-equipped public libraries in both urban and rural areas have certainly provided physical access to some extent, however, they often still cost some money, be it the actual usage cost in internet cafes or the transportation costs to the next public library, which poor people simply cannot afford (Sheykh, 2017; Proenza, 2015). This is also why the number of internet users in India has been only 481 million by December 2017 whereas in China the total number increased to 771.9 million (statista.com, 2018). In this realm, an estimated 186 million account for Indian rural population using the internet. This is approximately 20% rural Internet penetration. Moreover, only 30% of the total Indian Internet users are female pointing to the significance of the digital gender divide. On the other hand, 55.8% of the Chinese population use the

Internet. However, also in China the rural/urban divide in Internet penetration can be observed since urban users account for 73% of the total use. Most of these users from both countries connect to the Internet via mobile devices. However, Smartphone uptake in India is accounted to 125 million people whereas in China already 500 million people use Smartphone's regularly (Sheykh, 2017).

Table 3. Education data China & India

	China	India
Primary Education*	108.73	110.58
Secondary Education	95.03	68.91
Tertiary Education	31.46	23.89
Literacy Rate	95.1	69.3

*Primary education figures can exceed 100% due to enrollment of over- or underaged citizens.
** The Education figures are reported from 2013

Source:World Bank Data, 2018

Furthermore, as outlined in table 3 although many children in India enjoy primary education only a lesser amount takes up secondary education. Moreover, even much less go on with undergraduate level studies (Panda et al., 2013). This can be accounted to the very high costs for education in India, which many cannot afford. Moreover, the most recent reported literacy rate in India have been 69.3% in 2011 whereas China reported 95.1% in 2010 (statista.com, 2018). The share of women in the literacy rate of India is also remarkably high. Meanwhile, in China women have tremendously caught up and there is no significant difference anymore. In effect, in the factor education as one of the most significant determinants for ICT appropriation India scores remarkably low (van Dijk, 2005).

5.4 Inequality Focus Pays Off

As was outlined in the previous chapter, significant differences in digital divide outcomes between China and India are apparent when it comes to infrastructure and education. This chapter aims for a potential explanation why these divides exist in the first place: Inequality. As proposed in van Dijk's causal model (see figure 2) personal and positional categorical inequalities (for example: urban/rural, men/women, higher cast/lower cast, ethnic majority/ethnic minority) determine how resources (for example: education) are distributed. This, in effect, determines who is able to access ICTs and make use of it (van Dijk, 2005). As outlined in the previous chapters especially disadvantaged groups such as the rural population

have higher ICT uptake costs and, in the same time, other significant barriers such as language, relevant content or lack of technical support (Chen & Wellman, 2004). For example, the cast division in India signifies an to ICT appropriation and subsequently to digital divide outcomes. Lower cast citizens in India are systematically disadvantaged in all parts of societal processes. Many studies have proven how people from lower casts are not only significantly poorer than those from higher casts, but they occupy unpopular jobs, are seen from a negative perspective, etc. On the other hand, ethnic minorities in China score significantly lower than the ethnic majority on ICT appropriation indicators. Thus to understanding why digital divides exist in society one should observe the social positions and relationships within society (van Dijk, 2012). In the two cases analyzed in this research, the most significant digital divide continues to be the rural/urban divide. The rural population in both countries severely lack similar digital opportunities. Not only access to ICTs, but also connectivity and power cuts are among the "basic" problems for the rural population. The costs for connectivity are by far higher than in urban areas and often there is not sufficient content in the local languages. These factors make the already disadvantaged rural population even more marginalized and dependent on third persons, who speak English and have the necessary skills to handle computer, internet, etc. In effect, the often-stated promises of ICT-induced development positively impacting poverty, increasing societal participation or improving social conditions in general, in these cases have not proven to be true. On the contrary, already disadvantaged and marginalized groups within society are even more left out of the whole development and in many instances completely dependent on the help of others. The picture here is very simple: if you live in rural areas of China or India, you are very likely to neither have sufficient access to ICTs nor the needed electricity and connectivity. Moreover, you are also unlikely to speak English, which often is a necessary precondition for ICT usage. In addition, being a woman or poor still puts you at higher risk to being on the "negative" side of the digital divide.

Throughout the past several decades both India and China have become highly unequal countries. In China, not only income inequality has surpassed significantly, but also regional inequality between especially the Eastern and the Western provinces. This was one major factor why the CCP with its 11th five-year plan shifted its focus in general to tackling these inequalities, but also in specific for the field of ICT appropriation. Hence, it can be inferred that this shift could potentially be observed in the digital divide outcomes as well. Especially because this shift could not be observed in India. Although, the Indian national policies often referred to providing equitable and affordable access for all its citizens, it has

not shifted its focus away from an industry-focused policy to a more citizen-centered policy that entails clear provisions to tackle societal inequalities and improve the lives of the disadvantaged and deprived groups in specific.

5.4.1 Alternative Explanations

The objective of this paper was not to provide *the* explanation for the digital divides in India and China. The aim was more to direct the readers view to a potential root cause which may even prevent that digital divides can be "bridged" or "reduced" at all, and to a potential measure that may actually be a valid way in tackling the digital divides: policy. However, certainly there may be other explanations among which, in this very comparison of China and India, the economic strength of China seems to be the strongest. China's economic strength and its growth in the past decades have established it as a global economic power with the means to not only invest and equip its ICT sector tremendously, but also to invest in reducing the massive inequalities persistent in the country.

However, it is not always economic strength that enables the enhancement of ICT appropriation within a country. Some countries such as Belarus, Serbia or Moldova have lower levels of economic development, but still manage to score high at the indices such as the IDI index (ITU, 2017b). This can often be traced back to the policy choices that have been made at some point of time. In this regard, every country has different challenges when it comes to its infrastructural requirements, geography, and its socio-economic structure. To cope with these challenges, policy interventions in different contexts have proved to enable ICT appropriation and outperformance of expectations derived from their economic development (ITU, 2017b). This is why definitely the policy choices that China have made through its focus on tackling inequality and focusing on "sustainable development" play a significant role in their context-specific digital divides, and especially in the differences to India.

6 Conclusion

This research tackled one of the most striking inequality issues of our recent time: digital divides. Our path towards a global network society is a process which entails not only an uneven appropriation across countries, but also within countries. On this path it is key for

every society and every individual to get access to the digital world and make use of its tremendous opportunities. Throughout this path people need to enhance their digital skills which will enable greater usage. Digital divide research has shifted from previously emphasized digital access issues to such skills- and usage-related issues. However, in the context of developing countries this shift has rightly not taken place. In this realm, this dissertation has provided an understanding about the interconnection of analogue and digital inequalities, and how policy can address these issues. It can be concluded that policy remains vital and important to create not only the conditions for technology uptake and industrial development, but especially to put focus on societal inequalities and tackle them directly or indirectly. The case of China has proven that their change in policy approach towards a more citizen-centered and inequality approach has resulted in much better digital divide outcomes. In conclusion, the digital divide will remain an important phenomenon of the analogue and digital world, which effectively will lead to even further academic elaboration in its complex underpinnings.

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