# 1 Introduction

On 8 November 2006, the Ethiopian Telecommunication Corporation and the Chinese telecom giant ZTE signed the largest agreement in the history of telecommunications in Africa. Backed by the China Development Bank, ZTE offered a loan of $1.5 billion to overhaul and expand Ethiopia's telecommunication system. Six years later, another $1.6 billion was entrusted to ZTE and Huawei, one of China's most successful multinational corporations, to continue the expansion, bringing Chinese government support for Ethiopia's Information and Communication Technology (ICT) sector to over $3 billion.

Despite the unprecedented investments, however, Ethiopia has continued to score at the bottom of regional and global rankings in terms of access to ICTs. In 2014, less than 3% of the population was regularly using the Internet and only 31% had a mobile phone. In neighbouring Kenya, the same figures were 43% and 74% respectively (ITU, 2015). While Chinese support has somehow contributed to expanding access (in 2006, when the contract with ZTE was signed mobile connectivity was at 1.1% of the population, making Ethiopia the country with the least access to mobiles in Africa), the quality of the service provided to customers has remained appalling, so bad in fact that even tightly controlled official government media in Ethiopia have been allowed to criticize technical glitches and incompetence.

And yet, the Ethiopian government has developed some of the most ambitious projects in Africa employing ICTs to support development and improve service delivery, even in the most remote parts of the country. Woredanet and Schoolnet, the two projects that are at the core of this book, have employed satellite connectivity and the same protocol the Internet is based upon, to expand the reach and capacity of the state over Ethiopia's vast territory. Woredanet, which stands for 'network of district (woreda) administrations' has been used to improve and straighten communication between the centre and the peripheries, enabling ministers and cadres in Addis Ababa to videoconference with regional woreda offices and instruct them on what they should be doing

and how. Schoolnet has used a similar architecture to ensure that every secondary school student in the country, in urban and in rural areas, has access to education of the same quality, even if this had to come in the form of pre-recorded classes broadcast through plasma TV screens.

In a country well known to the world for its food insecurity, the state has profoundly innovated how food demand and supply are matched, creating the first commodity exchange in Africa. The Ethiopian Commodity Exchange (ECX) has used ICTs to link the trading floor in Addis Ababa with grading centres, warehouses, and display sites all around the country, as well as to allow inventories to be updated in real time, payments to be made the day after purchase, and information to be provided to different audiences through the web, the radio, and mobile phones.

This commitment to investing in new technologies for development, however, has been matched by an equally strong resistance towards uses of ICTs that could challenge central power and destabilize the country. In 2005, Ethiopian protesters challenging the results of the parliamentary elections made use of new and traditional media in ways that closely resemble those that would later be reported during the 'Arab Spring', when new media received significant attention as tools for circulating slogans and coordinating protests. Similar to their peers in Tunisia and Egypt in 2011 (Wilson & Dunn, 2011), Ethiopian protesters often resorted to 'media relays', communicating information through a medium other than the one on which they had received that information from, often with the aim of reaching those who had little or no access to the newest communication technologies. Before and after the 2005 elections, commentaries and political manifestos published online were printed and turned into leaflets. Mobile phones, especially SMS, were used to mobilize people in real time and disseminate calls for action posted in web forums. Despite these types of uses of the media attracting very little international attention, they caused very harsh responses within the country. Ethiopia is now the nation in Africa that most pervasively filters the Internet and surveils communications. Most opposition websites are not accessible in Ethiopia and the use of proxies and anonymizers have been made increasingly difficult (Opennet Initiative, 2007). Companies headquartered in China, Italy, and the United Kingdom have offered equipment and expertise to the Ethiopian government to surveil communication and even spy on opposition leaders living abroad (Human Rights Watch, 2014). In April 2014, six bloggers were arrested with the accusation of 'plan[ning] to destabilize the country using social media'.

Explaining the adoption, evolution, and re-shaping of ICTs in Ethiopia therefore presents a challenging puzzle. Ethiopia has very low levels of

Internet penetration and yet some of the most severe measures in Africa to contain its destabilizing potential. It has charted new avenues of collaboration with emerging donors, especially with China, but also continues to be Africa's largest recipient of development aid from traditional, Western donors. It has championed uses of ICTs that have later appeared elsewhere in Africa, including videoconferencing for government communication in Rwanda, and ICT-enabled commodities exchanges across the continent, and yet it is considered backward when it comes to innovation and ICTs.

This book offers some solutions to this puzzle and, by examining the case of Ethiopia, sheds light on some of the complexities that have characterized the evolution of ICTs in Africa. How, and to what extent, have the visions championed by international organizations, technology entrepreneurs, and philanthropists – that ICTs could transform development processes and be a force for progress – found realization in Africa? Why have some of the discourses characterizing 'ICT for development' policy and practice been embraced while others have been actively resisted? And, more broadly, how can the innovations that have emerged in Africa, making original uses of ICTs to address local challenges, be studied and understood in their own terms?

Answers to these questions will be provided not only by engaging with the empirical material collected in Ethiopia, but also by emphasizing the role of politics in shaping technology and development. In development circles, ICTs have too often been treated as neutral tools that can optimally contribute to a set of pre-defined indicators, including supporting economic growth, enlarging the educated population, or democratizing institutions. This book challenges the assumptions that ICTs are simply passively received in African countries and act as a force for development. It suggests instead that ICTs should be analysed as sites of multiple conflicts, and understood for their ability to embed values and visions, which can be accepted or contested, and can serve to quietly, but not less effectively, enact political plans.

## Development and Politics

The optimism that emerged in the 1990s that ICTs would redefine politics has been partially eroded by the realization that traditional forms of politics are still able to shape or re-shape technology, even in countries with limited technical capabilities. The reasons for this change in attitude are both conceptual and historical. Despite having been proclaimed dead on multiple occasions, techno-determinism has consistently proven its ability to come back to life every time a new technology recognized as a

game changer appears. Techno-determinists tend to shape the terms of early debates, until their faith that social problems can find technical solutions is challenged by the much slower pace at which technologically enhanced change actually occurs and by the ways in which old systems and logics adapt and thrive in new scenarios.[1]

The historical roots of this shift have been well summarized by Milton Mueller. As he has pointed out, 'the explosion of ideas, services, and expression associated with the Internet's growth in the mid-1990s happened because states weren't prepared for it and because states weren't in charge' (Mueller, 2010: 185). Since then, however, states seem to have learned their lessons and have been fighting hard to assert their control in the digital era.

While the 1990s were dominated by the 'digital divide' rhetoric, framing the new global challenge as a matter of access to the same technologies that were driving the digital revolution in parts of the Western world, the 2010s are characterized by the astonishing diversity of ways in which different countries have blended old and new technologies.

This unique combination of ICTs, politics, and culture is not new. It rather represents one of the latest incarnations in a long series of technological innovations that, despite being celebrated for their revolutionary potential, have been reshaped to fit in sociopolitical networks that are different from those of their origin, becoming both the objects and the subjects of change. Just as the configuration of electric grids in nineteenth-century Europe depended less on technical constraints than on political ideologies (Hughes, 1983), and the design of nuclear reactors in post-war France was determined by the tensions between Cold War politics and energy efficiency (Hecht, 1998), so have ICTs in the new millennium been caught up in multiple conflicts between competing conceptions of the role of technology in society.

Most studies that have examined these conflicts in developing countries, as this book does, have relied on categories and dichotomies of global relevance, such as authoritarianism vs. democracy, corruption vs. transparency, or closure vs. openness to chart this diversity. Indices ranking countries according to their e-readiness and Internet freedom

[1] Ithiel De Sola Pool (1983), Alvin Toffler (1980), and Nicholas Negroponte (1995), for example, have been instrumental in shaping the imagery of the information revolution before empirical evidence could offer an indication of the actual impact of ICTs. For a more critical account of techno-determinism see, for example, Hindman (2008) and Morozov (2012).

have proliferated.[2] This approach has allowed comparisons to be made across nations and regions (Groshek, 2009; Howard, 2010), and the mapping of new trends, including correlations between diffusion of ICTs and political behaviours (Bratton, 2013; Nisbet, Stoycheff, & Pearce, 2012). Privileging these typologies, however, has also meant overlooking what is unique in the interactions between specific political cultures and new communication technologies: for example, how a government's conception of citizenship or of the nation may influence the adoption and adaptation of ICTs; or how 'democratic' change may occur through processes and institutions that are different from those characterizing Western democracies but express other conceptions of governmentality.

This book advances a different set of tools to study why ICTs are being re-shaped across the globe and focuses on national politics and discourses, those arousing people's passions and informing national debates, to explain the adoption and adaptation of technology. This does not mean suggesting other dimensions or approaches should be dismissed as irrelevant. As the Ethiopian case makes clear, the authoritarian nature of the country's government can explain why it has been able to realize its vision of ICTs and marginalize alternative ones, but, alone, can say little of the specific shape ICTs have taken at the national level.

## Ethiopia as a Laboratory

Contemporary Ethiopia offers challenging puzzles not just to those studying technology adoption and adaptation, but to any researcher interested in understanding the relationship between development and politics. Since the Ethiopian People's Revolutionary Democratic Front (EPRDF) took power in 1991, after almost two decades of civil war, the country has embarked on a series of ambitious experiments at the economic, political, and institutional levels that have produced dramatically divergent views on the failures and successes of the new regime.

Similar to post-genocide Rwanda (Fisher, 2015; Hintjens, 2014), it has become increasingly common to come across articles, reports, and commentaries on Ethiopia that seem to be referring not to the same, but to two different countries. One is a closed, authoritarian state, governed through fear by an ethnic minority. The other Ethiopia is a

[2] See for example Freedom House's *Freedom on the Net* Index (https://freedomhouse.org/issues/internet-freedom) or the World Economic Forum's Networked Readiness Index (www.weforum.org/reports/global-information-technology-report-2014). Last accessed 21 December 2014.

developmental state that has achieved sustained 'double digit' growth and has significantly improved access to basic services.[3]

The discourses on 'ethnic federalism', 'revolutionary democracy', and 'developmental state', which are discussed at length throughout the book, have been one of the sources of this polarization. They each define a different aspect of the EPRDF's complex state- and nation-building strategy, informing Ethiopia's institutional set-up, mode of government, and economic policy. But they all share a similar origin as locally driven attempts to adapt development strategies derived from other countries considered similar to Ethiopia, displaying a tendency towards emulation that has characterized many Ethiopian regimes in the past (Clapham, 2006). Framed by the EPRDF as non-negotiable principles informing its complex plan of state transformation, they have produced strong resistance at the national level, and scepticism among international observers.

Different from other governments in Africa, whose policies have more amply swayed to follow the trends that have characterized the international development agenda, the EPRDF-led government has aggressively protected its independence in defining core aspects of its political and development strategy. This does not mean Ethiopian leaders have been deaf towards all donors' demands and international pressures. The Ethiopian government has shown, for example, significant commitment towards the United Nations' Millennium Development Goals, and has been praised for its progress in attaining most of them by or before the agreed deadline (UNDP, 2015). What the EPRDF has sought to achieve is a delicate balance between loyalty to the principles that have shaped the guerrilla war that eventually led it to power, many of which are rooted in Marxist-Leninist doctrine, and adaptation to pressures deriving from its status of one of the largest recipients of development aid in the world.

This effort has produced a distinctive development trajectory, but has also led to dramatic contradictions. The evolution of the EPRDF's strategy towards the media is a striking example. When the EPRDF first

[3] While in the case of Rwanda, polarized views have dominated both policy and scholarly debates (Fisher, 2015; Hintjens, 2014), in Ethiopia this divergence has affected more the former than the latter. Exchanges like those that followed the death of Prime Minister Meles Zenawi suggest competing views do exist among scholars also (de Waal, 2013a, 2013b; Lefort, 2013), but a middle ground has emerged among those who have been writing about Ethiopia, or at least a willingness to engage with the many contradictions that have characterized the project pursued by the EPRDF. Many authors that have sought to build this common terrain are mentioned throughout the book, belonging to different generations, from Christopher Clapham, to Sarah Vaughan, Paulos Chanie, and Jean-Nicholas Bach.

came to power it committed what could retrospectively be identified as the 'original sin' in the contemporary history of communication in Ethiopia: it opened the space for debate but refused to engage with the very debates it had allowed to bloom.

Responding to international pressures and to the determination to signal, nationally and internationally, its difference from previous regimes, the EPRDF initiated a significant liberalization of the press. This process, however, created opportunities for individuals who used to work for the previous regimes or belonged to other political movements the EPRDF had excluded from power, to attack the new leaders and advance alternative political agendas. Although the criticism took on an increasingly adversarial tone, the EPRDF leadership stuck to its policy, ignoring dissenting voices and labelling them as 'anti-peace' and 'anti-constitution'.[4] This polarization and unwillingness to seeking engagement would later poison also the debates emerging on the Internet, leading 'old politics' to capture 'new media'.

## A History of the Future

ICT for development scholars and practitioners are generally interested not only in the current applications of ICTs but also their future potential. They tend to begin with an assessment of a set of challenges and consider how technology can offer a possible solution (but in some not too exceptional cases it can also work the other way around, and technology becomes a solution in search of a problem). Or they may start from a normative standpoint – e.g. the need for an unrestricted flow of information – and envision how technology may help enforcing it. This tendency has had the advantage of offering citizens, both in developed and in developing countries, new ways of imagining the future. It has similarly had the disadvantage of overlooking the friction created by existing imbalances of power and the influence of the communication ecology in which new artefacts become immersed.

To keep past, present, and future together, this book combines insights from three scholarly traditions that take into account both how experiences with previous technologies influence the adoption or rejection of later ones and how new technologies enable individuals and groups to envision and shape their world. First, it is grounded in the work of historians of technology who have examined technologies of national relevance and scale and the systems of relations in which technology is

[4] See, for example, *The Ethiopian Herald*, 'Editorial', 6 June 1991, p. 7.

immersed. The concepts of *large technical systems*, *technopolitics*, and *technopolitical regimes* are incorporated in the study of ICTs to counterbalance the lack of attention paid by ICT for development studies to the systemic nature of new technologies; to their being a component, often the most visible, of larger networks of national and international institutions, corporations, laws, political parties, and information carriers, which are strongly influenced by existing imbalances in the distribution of power and resources. These notions help to take the dialectical understanding of the relationship between technology and organizations developed by information system theorists (Orlikowski, 1992; Suchman, 1994) to a level that analyses interactions among technology, governments, and other political actors who are attempting to influence technology adoption and adaptation nationally and internationally.

A second building block in the analysis of the relationship between technology, politics, and development is constituted by the studies of networks carried out by scholars of international relations. Miles Kahler (2009), Margaret Keck and Kathryn Sikkink (1998), and Milton Mueller (2010), among others, have explored how ideas diffuse at the international level and how they are embraced or resisted by national actors. Examining the discourses embedded in new technologies and how groups or institutions advocate their selection is an essential step in understanding why and how ICTs are accepted, rejected, or reshaped. Looking at these discourses shows how technology is a means not only to do new things or do things differently, but also to promote new forms of imagination.

Finally, the African studies literature provides the instruments to take into adequate consideration the dynamics that characterize political competition and processes of state and nation building on the continent. The literature on contemporary Ethiopia constitutes a cornerstone for the analysis of how a political project became embedded into technical artefacts (Aalen, 2002; Assefa & Tegegne, 2007; Gudina, 2003; Ottaway, 2003; Pausewang et al., 2002; Stremlau, 2008; Tegegne, 1998; Turton, 2006; Young, 1997), but other studies on the role and behaviour of the state in Africa help explain the relationship with donors, the international community and other stakeholders competing for power, and for the hegemony of their ideas. The concept of extraversion elaborated by Jean Francois Bayart (2009; 2000) is adopted to understand how the Ethiopian government has been able to exploit the contradictions characterizing the development agenda to support its own political ambitions. Similarly, the literature on developmental states in Africa (Booth & Golooba-Mutebi, 2012; De Waal, 2012; Kelsall, 2013; Leftwich, 1995; Mkandawire, 2001) offers a critical framework to understand how Ethiopia, but also other

countries on the continent, Rwanda in particular, have progressively elaborated a state-centric vision of the information society.

Benefiting from debates in different disciplines, this book also aims to reach different audiences. ICT for development scholars are the primary target but, by using lenses developed by Africanists, historians, and International Relations (IR) scholars, this book aims to engage them on a new terrain, where there are fewer concerns about what technology can do for development, and more attention is paid to understanding the conflictual process through which ICTs are already shaped and re-shaped by a variety of actors in developing countries. The analysis of technologies of international relevance can also offer new insights to IR scholars concerned with understanding the interactions between international and local norms and ideas. The focus in this area has largely been on the reasons that motivate a successful or unsuccessful socialization of local actors to new ideas, but fewer questions have been asked about how these ideas can be reworked in practice. Looking at how discourses are embedded into technical artefacts allows a better understanding of which aspects of these artefacts are magnified, which are marginalized, and how they integrate with existing ones in more or less coherent ways. Historians of technology, for their part, have provided powerful tools to study what at different times have been called *new* technologies (Wu, 2010), but, despite some exceptions, their research has often been limited to processes of innovation rather than the transfer of technology. Studying the relationship between international and national actors when implementing a 'new technology' can open new scenarios to understand which forces are at play when a technology is inserted into contexts that are profoundly different from those of its origin. Africanists, apart from few exceptions (Hyden, Leslie, & Ogundimu, 2002; Nyamnjoh, 2005; Stremlau, 2012), have kept their distance from ICTs, and when they have included them in their analysis they have tended to treat ICTs as something to be understood through frameworks that are different from those that have been successfully adopted to explain the politics of the continent.

## Exploring Technical Artefacts and Technological Visions

This book has taken shape over almost ten years. My first visits to secondary schools where Schoolnet had been installed date back to the early months of 2005. The conversations with the Ethiopian bloggers who have been seeking to use the Internet to create a space for engagement in an otherwise very polarized environment have continued until the very last draft of this book. Overall, more than one hundred

interviews were carried out with the politicians and technocrats who envisioned and realized Woredanet and Schoolnet as well as with journalists, opposition leaders, and members of national and international NGOs and of international organizations who practiced and advocated uses of ICTs that tried to oppose, patch, or complement those advanced by the government of Ethiopia. Over time new actors started to appear in the complex ecosystem created by ICTs in Ethiopia. From Chinese engineers working on the ZTE and Huawei expansion projects, to experts of cybersecurity trying to detect the techniques used by the Ethiopian government to spy on Ethiopians in the country and abroad, and disenchanted technocrats who had grown progressively tired of the centralized approach towards developing Ethiopia's information society. I sought to include all their voices in the narration of the evolution of ICTs in Ethiopia; but I also had to leave some of them anonymous, given the sensitivity of some subjects.

I conducted numerous field visits to Woredanet and Schoolnet sites in the regions of Tigray, Amhara, Oromiya, and the Southern Nations Nationalities and People (SNNPR) to understand how the two systems operated in practice and how their users perceived them. This evidence was complemented by the collection of archival material in the form of policies, project documents, newspapers articles, and blog entries.

The most challenging and fascinating component of the research has been reconstructing how certain visions of technology's potential and its risks influenced technology adoption and adaptation. This was achieved through a process of iterative comparison between concepts emerging from interviews and other textual material (e.g. field notes, project documents), and observations of how technical artefacts actually took shape. This going 'back and forth' between the technical and the discursive not only allowed capturing the conflicts emerging throughout the process of technological appropriation, how technology could incorporate specific political plans despite the frequent claims of its neutrality, but also forced political actors to reconsider their visions and ambitions.

## Plan of the Book

The book is divided into eight chapters. The next chapter introduces the concepts of technopolitics and technopolitical regimes, and explains how they can offer innovative lenses to understand the relationship between development, technology, and politics. Chapters 3 and 4 examine the discourses that influenced the appropriation and adaptation of ICTs in Ethiopia. Chapter 3 analyses the discourses