

Mobile Phones versus Water Provision in Africa: What Explains the Variation in the Access and the Levels of Investment?

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Abstract

The objective of this exploratory study is to explore the differences in the regulatory frameworks of two African countries, Ghana and Kenya, related to water and the telecommunications industry. The most important factors influencing the willingness to invest in both industries and the percentage change in access to services have been identified and evaluated. The project contributes to the understanding of the contrast between the comparatively high rates of investment and substantial progress made in cellular service provision on one hand, and of the comparatively lower levels of investment and slower incremental change in the access to clean water on the other. The purpose is to ask whether it is possible to learn from the achievements made in the ICT sector in order to enhance the efforts in provision of services in water sector (and vice versa), both in terms of increasing investments and increasing access to improved water sources.

Keywords: Water provision; mobile telephony; investment; access; legislation; Africa

*To Louis and Allie
for your unwavering generosity and support*

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List of Acronyms

CCK	Communications Commission of Kenya
GIFEC	Ghana Investment Fund for Electronic Communications
GWCL	Ghana Water Company Limited
ICT	Information and Communication Technologies
IFI	International Financial Institutions
IMF	International Monetary Fund
ITU	International Telecommunications Union
LI	Legislative Instrument
MNOs	Mobile Network Operators
MWRWH	Ministry of Water Resources, Works and Housing [Ghana]
N/A	Not Available
NCA	National Communications Authority [Ghana]
NGO	Non-Governmental Organizations
NPWRMD	National Policy on Water Resources Management and Development [Kenya]
OECD	Organisation for Economic Cooperation and Development
PPP	Public-Private Partnership
PURC	Public Utility Regulatory Commission [Ghana]
UNICEF	United Nations Children's Fund
VAT	Value Added Tax
WASREB	Water Services Regulatory Board [Kenya]
WHO	World Health Organization
WRC	Water Resources Commission [Ghana]
WRMA	Water Resources Management Authority [Kenya]
WSBs	Water Services Boards [Kenya]
WSPs	Water Service Providers

1. Introduction

In Africa, the spread of telecommunication technology and mobile phones in particular proceeds at an unprecedented rate (Jack and Suri 2010, 3–4). According to the International Telecommunication Union (ITU) (2009a, 1), “the annual growth between 2003 and 2008 in both services [internet and mobile phones subscription] in Africa has been twice that of the world”, which increases the attractiveness of African markets to investors. ITU data shows that the levels of investments in telecommunications increased each year between 2000 and 2005 (ITU 2007, 19, 21), while the World Bank (Izaguirre 2011) reports that the telecommunications sector was more successful than all other sectors in attracting private investments in infrastructure with 84.1 billion dollars’ worth of investment between 2000 and 2010. The availability of mobile phones even among the poor allowed for the formation of various partnerships, which broaden the utility of these products by providing not only call and messaging services but also other value-added services, such as mobile money transfer services and use of various applications, e.g. for education and health care. This expansion led the President of Rwanda Kagame to declare that “in ten short years, what was once an object of luxury and privilege, the mobile phone, has become a basic necessity in Africa” (in ITU 2009a, 32).

Meanwhile, more than 4 out of 10 people worldwide who are not using an improved source of drinking water live in sub-Saharan Africa.¹ Globally, debates on improving access to water have been framed in the context of ‘public’ and ‘private’ goods. More recently, a human rights framework has been included in this debate. In July 2010, the UN General Assembly Resolution 64/292 recognized a human right to water in an effort to strengthen the commitments to improve access to and affordability

¹ This information was found at WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation website under the latest estimates. Accessed March 22, 2012, <http://www.wssinfo.org/data-estimates/introduction/>.

of safe drinking water globally. Notwithstanding these efforts, access to improved water source in sub-Saharan Africa is lagging behind other developing regions as large proportions of the population still rely on surface water and other unimproved sources (UNICEF and WHO 2012, 6–8). Investment in this industry is low as well, as only 187 million dollars were invested in infrastructure by the private sector between 2000 and 2010 (Izaguirre 2011). Water is vital to human survival and access to safe drinking water is fundamental for economic and human development of sub-Saharan countries, yet investments and accessibility of telecommunication services grow faster than investment in safe drinking water provision. Consequently, this project suggests that what is considered as a “necessity” may be relative in context, and may thus be compared.

1.1. Research Question

Keeping in mind the empirical differences across these two sectors, the project addresses the following research question: What is it about the nature of water and the telecommunications industries that explains the variation in both the rate of change in access to services and levels of investment in these industries?

1.2. Research Objectives and Justification

The objective of this exploratory study is to explore the differences in the regulatory frameworks of two African countries, Ghana and Kenya, related to water and the telecommunications industry. Although the water and telecommunications sector are different, they are comparable because development in each sector requires investment, whether from the public sector, private sector, or some combination. While cognizant of the broader debates over water access and allocation, the project does not directly address these debates but focuses narrowly on investment and the underlying regulatory framework. The most important factors influencing the willingness to invest in both industries and the percentage change in access to services have been identified and evaluated. The comparative study of the two industries and across African countries contributes to the understanding of the contrast between the comparatively high rates of investment and substantial progress made in cellular service provision on one hand, and

of the comparatively lower levels of investment and slower incremental change in the access to safe drinking water on the other. The purpose of the project is to ask whether it is possible to learn from the achievements made in the ICT sector in order to enhance the efforts in provision of services in water sector (and vice versa), both in terms of increasing investments and increasing access to improved water sources.

1.3. Central Argument

My central thesis is that the differences in levels of investment and percentage change in access between the mobile phone and water sectors can be traced to differences in the regulatory framework that governs the nature of the public-private partnerships (PPPs) operating in these sectors. This argument then leads to the following hypotheses: first, the levels of investment partly depend on the type of partnerships between the government and the private sector, allowed under the regulative framework for each industry. The level of investment will be higher where the private sector can be relatively autonomous, in terms of operational and investment decision-making, from direct government involvement and control. Second, the percentage change in the access to a service is greater where the prices are flexible and recognize the needs of the consumers, which is reflected in the variety of offered products and services.

1.4. Scope and Grounds for Comparison

The literature on both water and telecommunications is extensive, taking on a variety of issues at individual, group, national, and international level of analysis. The scope of this paper is much narrower. It focuses exclusively on the legislative framework regulating these two sectors and the major actors involved in the decision-making and distribution processes on the national level (namely relevant regulatory agencies, governmental ministries and departments, and the enterprises in each industry). This limitation enables a comparison between the water sector and telecommunications as both industries are subject to regulation by laws and governmental actors and the services are provided by separate enterprises (although some might be state-owned and

others private). The levels of investment and access to the services partly depend on factors other than those suggested in my central argument. They are briefly outlined below but they are not included in my analysis due to space constraints.

Some important aspects of the water sector have been omitted from the analysis. How water is allocated among different sectors (e.g. household use, agriculture, industry) is a contentious issue (McNeill 1998). Debate on water allocation among different sectors is closely related to the question of access to water in order to satisfy the basic needs. The core issues in that debate are who owns the water sources and how decisions to allocate water are made. Those decisions boil down to power relations between different users and the user who wields most power receives the bulk of resources at low costs. Usually, allocation of water for domestic use is not a priority due to its limited (economic) added-value (Gupta and Lebel 2010).² While access to safe drinking water depends on broader ethical issues underlying the highly politicized processes of allocation, this paper does not address those debates. It takes the amount of water allocated for household use as the focus of analysis and does not investigate how and to what extent uses by other industries affect the access of individuals. By limiting the scope of this study to household or personal water use, comparisons to mobile phones are possible.

Compared to telecommunications, water is much a more politicised topic with diverse stakeholders' views on how it should be managed and regulated. These positions are divided among proponents of public ownership and management on one side, who perceive water as a public, common, merit or social good. A merit good should be universally provided and because it is so fundamental for the society, the risk of market failure is offset through public management (Schouten and Schwartz 2006, 410–412). Moreover, the government has the final (default) responsibility of ensuring access to water (Movik 2012, 113). On the other side, the supporters of private sector water provision assert that water is a commodity or a private, economic good. Water, they argue, does not qualify as a public good because it is subtractable in use and consumers can be excluded from accessing it (Schouten and Schwartz 2006, 410–412).

² Allocating water to industrial sector or agriculture tends to increase production of goods for export and thus achieves higher financial gain than allocation of water to domestic use.

It is scarce, has several competing uses, and can be traded, bought and sold like any other commodity (McNeill 1998, 254; Movik 2012, 113). The analogy often made between water and air is misleading (Savenije 2002). Air is a public good – it is not scarce, not subtractable in its use, and people cannot be excluded. Being essential for human survival does not make water a public good. Food, after all, is also essential for human survival but food is not considered as a public good but rather as an economic good (ibid., 472). Therefore, under this interpretation, water is an economic good and like any other economic good (such as mobile phones), it is bought and sold. The recognition of water as an economic good was accepted at the UN World Conference on Water and Sustainable Development held at Dublin in 1992. However, the notion of water as an economic good is still controversial at the present time with the acknowledgement of access to water as a human right by the United Nations General Assembly in 2010, even though the right to water and private provision are not necessarily contradictory (Movik 2012, 114–115).

Most of the time, the pricing of water services receives the most attention. In the case of private providers, it is the problem of affordability – charging market prices that users are unwilling or unable to pay. With public provision, inefficient subsidies are problematic because the richer segments of the population are the main beneficiaries, among other reasons (McNeill 1998, 253; Page 2005, 295). Schouten and Schwartz (2006, 409) illuminate some delusions about “free” water since in both cases the consumers carry the costs for the services either by paying bills or by paying taxes. Page shows in a case study of a town in Cameroon that even in the 1940’s “it was socially unproblematic to sell water” (2005, 296). He argues that there was always a degree of commodification present in Africa and that charging for water services is not a new phenomenon. After the opening of the British-built water supply system in 1930 in Kampala, Uganda, the majority of ordinary locals were unable to afford water from standpipes because “full cost recovery from the consumers was the indisputable principle throughout the colonial period” (Appelblad Fredby and Nilsson 2013, 42). This example further demonstrates that water supply, which depends on piped infrastructure, necessitates a return on the investment by charging the consumer.

While these discussions are of importance, this paper is based on the empirical realities of water provision. As McNeill (1998) and Page (2005) show, water provision is

seldom free and thus, the perspective adopted in this paper is in line with viewing water as an economic good. Empirical examples of private and public water management show that both market failures and public failures occur and that in aggregate terms neither can be deemed as more successful in ensuring access (Perry et al. 1997; Schwartz and Schouten 2007). Water service providers (public and private) and the partnerships between them are investigated here to see their impact on access to safe drinking water and this project is *not* intended to contribute to the on-going discussion of the ethical dilemmas arising from classification of water as an economic good.

In terms of infrastructure, the water sector is again more complex than telecommunications. The World Bank definition of safe drinking source leads to the exclusion of the large informal sector involved in water provision. Dagdeviren and Robertson stress “the importance of informal, small-scale providers and communitarian initiatives, following the many failures of privatization” (2011, 485). Water street vendors play a substantial role in making access to water easier, especially in urban informal settlements (Thompson et al. 2000; Dagdeviren and Robertson 2011). However, the water provided through tanker trucks and carts is often of low quality and consequently, the World Bank does not consider water provided by street vendors as a *safe* drinking source. Meanwhile in the rural areas various humanitarian and other civil society organizations make efforts to improve access through building boreholes and wells. This type of localized water infrastructure and projects are not dealt with in particular detail in this paper due to unreliable information on their quality and (small scale) impact. As a result, only the bigger actors in the water sector and telecommunications have been analyzed.

Not all these aspects of water can be compared to telecommunications and not all aspects of telecommunications can be compared with water. Nonetheless, a comparison is possible when we establish a clear set of criteria, which point to commonalities and differences in both sectors. This set of criteria is presented in Operationalization of Variables section and Table 3.3 under Methods of Analysis.

2. Literature Review

There is ample literature on state involvement in economics. Given the specific context of this study, two larger bodies of literature have to be addressed. First, the roles of the private and public sector as well as the nature of markets and industries as mandated under neoliberalism are presented, since the success in telecommunications and failure in the water sector are commonly framed within the neoliberal discourse. A second body of literature examines state and market failures in bringing about development and emphasizes PPPs as the best solution to overcome these failures. Moreover, findings of existing research on telecommunications and water industries are outlined as well.

While some might see the water sector and telecommunications industry as hardly comparable, it should be stated that telecommunications started in a similar situation faced by the water sector. In 1994 ITU report (in Gebreab 2002, 7), lack of investment and investment inefficiencies, inadequate private sector involvement, and poor management incentives were considered as the reasons for underdeveloped telecommunications sector in Africa. Similarly in the water sector, the World Bank (2004, 1–2) identifies declining private investments, inefficient utilities, and reliance on public financing as indicators of a need for sector reform, which should focus on financial sustainability, strengthened regulatory framework, commercial and operational efficiency, better management, and the needs of the poor. Initially, a monopolistic state-owned operator controlled the service provision in both industries (World Bank 2004, 10; Estache and Goicoechea 2006, 2). Given these barriers and donor pressures (Gebreab 2002, 7), countries started to reform their markets in line with the neoliberal guidelines. It became vital that “public services must be delivered with more productive efficiency (by increasing productivity) and with more exchange efficiency (by maximizing the utility—consumer satisfaction—as measured by what the price consumers are willing to pay for such services)” (Dixon et al. 2004, 28), through greater involvement of the private sector and changes in the role of the state.

The dominant neoliberal debate in literature on the access to services and the levels of investment is focused on liberalization of markets. Djiofack-Zebaze and Keck (2009) observe that the drastic growth in telecommunications occurred in a time of widespread liberalization of the telecommunications market, greater competition with the entrance of new enterprises in the market and privatization of state-owned enterprises. “During 1995–2004, the share of African countries maintaining a state monopoly in the mobile segment has dropped from 70% to less than 10%” (Djiofack-Zebaze and Keck 2009, 920), whereas markets become more competitive only from 2000 onwards. Success in the telecommunications fits nicely in the World Bank finding that telecommunication markets grow faster in presence of competition than in case of monopolies (Gebreab 2002, 18). Similarly, Djiofack-Zebaze and Keck (2009, 928) show that competition and existence of several operators increase the access to mobile phones. Liberalization of the water sector has proven to be more difficult since water supply has “natural monopoly characteristics” (World Bank 2004, 10). Davis (2005, 158–159) argues that there is little room for competition due to regulation of profits and unlikely bankruptcy of the monopoly operator. Thus, while the water sector is struggling to attract investors, liberalization in telecommunications has led to the creation of new investment opportunities, either in selling off former monopoly operator or in new market entrants (Djiofack-Zebaze and Keck 2009, 921).

The transformation of state-owned enterprises to private companies highlights another feature of the neoliberal theory, privatization. Neoliberalism emphasizes the need to reduce state participation in the economic activities. Public sector “is constantly under suspicion of being inefficient, wasteful, and, thus, not giving value for money” (Dixon et al. 2004, 27). As a result, the private sector involvement was expected to bring about greater efficiencies in operations and investments (World Bank 2004, 7). This reasoning applies to both industries. In telecommunications, Gebreab shows that “the presence of an incumbent-owned cellular [operator] significantly slows down the growth of mobiles” (2002, 18) as a result of abuse of a dominant position. Furthermore, Estache and Goicoechea established that “countries with private capital have more subscribers, lower local call price, lower faults, and higher labor productivity” (2006, 17). Since the recognition of water as an economic good in 1992, greater emphasis has been put on efficiency in water use as well as on pricing water services to reflect their cost of

provision (Winpenny 2003, 1–2). However, privatization of the water sector raises several concerns “about transferring control over essential services to a for-profit company, incurring substantial price increases and poor service from a profit-maximizing monopolist, and ensuring environmental responsibility” (Davis 2005, 147). While privatization of water services is quite high in Western Europe and the United States, only 3 percent of water and sanitation service is privatized in Africa (Davis 2005, 153). Unlike the telecommunications industry, privatization in the water sector is a heavily politicized issue (United Nations 2006, 69), especially when economic efficiency comes before equity considerations.

The neoliberal views of superior business efficiency, privatization and liberalization carry implications on the price of a particular service and consequently, on its accessibility. ITU identifies “cheaper infrastructure and larger regional penetration, cheaper handsets, competitive markets and business models oriented to the needs of the poorer segments of the population” (2007, 2) together with “low subscription prices, prepaid services, and low recharging cards” (ibid., 11) as factors that contributed to the higher mobile phone usage in Africa. While prices of mobile phone services reflect the needs of various groups of final consumer and are steadily accepted, the pricing for water is more contentious. Since water has historically been available for free in the form of surface water and rainwater, disagreements arise whether costs associated with building safe water supply infrastructure should be financed through public funds and taxpayers or user charges and final consumers. The World Bank (2004, 4–5) argues that water is often priced below the costs of its provision. Thus, policy reforms demand changes in user fees, increasing the price of water provision for consumers, in order to generate revenues. These profits can be then reinvested in improved efficiency, which should over time reduce the price of service provision. On the other side, rising prices may cause social unrest and protests, which may lead to transferring the operations back to the public sector (United Nations 2006, 69). Water price setting is more delicate and carries greater social repercussions. Thus, it cannot be based solely on market principles.

Another neoliberal aspect, influencing investment levels as well as the final price of service provision, is the importance of good governance and regulatory framework. The levels of investment depend on investment risks, which are lower in a competitive

market structure and under “a consistent, fair, and predictable regulatory framework” (Djiofack-Zebaze and Keck 2009, 923). The World Bank (2004, 6) stresses “the separation of policy and regulation from functions such as asset ownership, corporate oversight, and service provision”. The separation of these functions between the public sector (policy-making and regulation) and service providers (either public, private or PPP) can enhance autonomy and accountability for service providers. Furthermore, independent regulatory agencies (IRA) and oversight mechanisms are very important (ibid., 10). According to Estache and Goicoechea (2006, 3), creation of an IRA for telecommunications indicated a commitment to end self-regulation and a shift in focus from political to economic consideration on the part of the government. This can stimulate greater private sector participation. In the water sector, mismanagement, corruption, inappropriate institutions and bureaucratic inertia impede the provision of services. The United Nations (2006, 45, 48–49) considers accountability, participation, transparency, equity, efficiency, legal frameworks, coherency, responsiveness, integrated approaches, and ethical considerations as the key criteria for effective governance of the water supply.

Some critics of neoliberalism point to market failures, arguing that there is no significant improvement in efficiency between public and private service providers (Davis 2005, 159–162). At the same time, public failures lead to the realization that governments in many developing countries did not have the capacity to spur economic development and that the public funding should be increased by private capital. As a result, the concept of PPPs emerged. Greater cooperation between state and various non-state actors in the form of PPPs was seen “as the key in achieving higher rates of economic growth” (Mitchell-Weaver and Manning 1991-92, 47) as well as in addressing failures and poor governance in developing countries, resulting in poor quality and inadequate access to various public services (Estache 2006, 5; Valente 2010, 56). According to Peters and Pierre, “the rationale of a public-private partnership rests on the combined assumption that the project is a legitimate collective project, which justifies political involvement, and that it has market potential, which creates incentives for corporate investment” (2010, 43). As the term PPP is loosely applied to different arrangements, it should be stressed at the beginning that PPPs are “primarily a set of institutional relationships between the government and various actors in the private

sector and civil society” (Mitchell-Weaver and Manning 1991-92, 48), where partners interact on a regular, medium- to long-term basis due to “anticipated opportunities for mutual value” (Valente 2010, 60). These partnerships focus on pooling knowledge, expertise and financial resources from the state, private sector and nongovernmental organizations (NGOs) in service provision, collaborative decision-making as well as sharing risks, responsibilities and benefits (Ibem 2011, 202, 204). Such cooperation between actors from various sectors would generate synergic effects in stimulating development and overcome the government and market failures.

The term PPP is used for a variety of arrangements. PPPs can take on a variety of forms with different degrees of public or private involvement. They are distinct from privatization because “the public sector *retains* ultimate accountability to the citizen for the provision of a public service, whereas under privatization, accountability for delivery is *transferred* to the private party” (World Bank et al. 2009, 7). Generally, PPPs entail a long-term contract between a private actor and a public sector body to provide public infrastructure. The World Bank database on private participation in infrastructure identifies four groups of projects, namely management and lease contracts, concessions, greenfield projects, and divestitures. In management and lease contracts, a private entity takes over the management of a state-owned enterprise for a fixed period, while ownership and investment decisions remain with the state (ibid., 81). According to Davis (2005, 148), management contracts entail a shift of operational decision-making to the private sector, while investment decisions, risks and ownership of assets remains with the state. In concessions, a private entity takes over the management, but not ownership, of a state-owned enterprise for a given period during which it also assumes significant infrastructure investment burden and commercial risks (Davis 2005, 148; World Bank et al. 2009, 82). In greenfield projects a private entity or a public-private joint venture builds and operates a new facility for the period specified in the project contract. In divestitures, a state-owned enterprise is sold or transferred to private sector through an asset sale, public offering, or mass privatization program (Davis 2005, 150; World Bank et al. 2009, 82–83).

Critics of the partnership approach to development have pointed to several limitations of PPPs, ranging from unequal distribution of services and democratic deficit to unbalanced power relations between partners. One contentious issue concerns

distributional effects and the affordability of services. Distributional effects are understood in terms of expanding access to a public service as well as the sharing of other benefits, which result from the PPP. As Estache argues, PPPs result in gains for the government and private sector, while the poorest segment of the population is excluded from accessing the services as they become more costly (2006, 11–13). Several studies have shown that services under PPPs benefit the upper classes of the society and are not affordable for the poor. Marin's study of various PPPs in the water sector showed that overall, "there is no evidence that PPP projects are necessarily more efficient than publicly managed utilities for expanding access" (2009, 65). In Brazzaville, Republic of Congo, water service provision in peripheral areas proved to be too expensive due to the need to construct new infrastructure. The anticipated demand, and in turn the company's revenues and investments, was consequentially lower as low-income residents were not able to afford it (Tati 2005, 321–322). Farlam (2005, 20–21) writes that high increases in water charges resulted in public opposition to PPPs and even though the quality of water in South Africa was improved, PPPs in the water sector were criticised for the absence of a pro-poor approach. Thus, PPPs raise similar problems as does the orthodox implementation of neoliberal policies.

Different recommendations can be found throughout the literature to improve the pro-poor provision of services. According to Estache (2006, 11), universal service obligations should be implemented in partnership projects in order for all segments of the population to benefit from PPPs. Alternative cheaper solutions and a wide range of service options should be offered in order to improve access to, for example, water for poorer consumers, by building external standpipes as opposed to indoor running water or subsidized connection programs (Farlam 2005, 45; Marin 2009, 67). The World Bank (2004, 12) proposes the use of subsidies, universal service obligations and entry liberalization to expand access and affordability in line with consumer preferences. Therefore, distributional effects and affordability, reflecting a government's poverty alleviation strategy, should be a priority when negotiating PPPs.

Concerns about PPPs also revolve around the role of the government in development strategies. PPPs are seen as reducing the role of the state because, as Ibem (2011, 202, 205) argues, the government is not capable of or is regarded as inefficient in providing services due to fiscal constraints, monopoly control and subsidies.

According to Biermann et al., the core supporting argument for partnership is that “they function when governments fail” (2007, 242). The role of the government should be limited to creating enabling environment by formulating the regulatory framework, with which they would provide incentives for private sector involvement (Dansereau 2005, 47; Iben 2011, 205–206). In this sense, PPPs function according to the same neoliberal way of thinking as discussed above, where “the private sector, freed from many of the political constraints imposed on public sector operators, was expected to unleash improvements in technological and technical efficiency and not just labor productivity” (Estache 2006, 10). Thus, both PPP and neoliberal approach argue that better efficiency and productivity would result in higher economic growth and development, the difference being that under PPPs the cooperation between the public and private parties is stronger and more profound.

Yet such cooperation is being criticized as PPPs present a move towards ‘private’ or ‘corporatist governance’, where the private sector or key stakeholders exert a strong influence over the government’s decision-making (Mitchell-Weaver and Manning 1991-92, 49–50). In such situations, private interests prevail as the governments “abandon their responsibility to govern in the public interest” (Meadowcroft 2007, 198). This is a clear contradiction with the purpose of public involvement in PPPs, where the public component should represent and safeguard public values and interests (Peters and Pierre 2010, 48). “Democratically elected governments are potentially alienating powers that should be used to promote the public good” (Meadowcroft 2007, 196) also by becoming more dependent on the external funding and more restricted by international norms. Decision-making moves away from elected domestic institutions towards non-elected transnational institutions as can be noticed in imposed conditionality on government loans from international financial institutions (IFIs) (ibid., 206).

Thus my research draws on these insights and a critical analysis of the neoliberal framework, with a specific focus on PPPs, to analyze the differences between regulatory framework of the telecommunications and the water sector as seen in the levels of investment and the rate of change in access to cellular and water services.

3. Conceptual Framework and Methodology

3.1. Operationalization of Variables

The two dependent variables are the levels of investment and the percentage change in access to service. The access to mobile services is measured by the number of mobile phone subscribers per 100 inhabitants. This number can be problematic because it is not possible to distinguish whether one person owns several phones or if one mobile phone is used by more people. This number can thus over or understate the actual use of mobile phones (Estache and Goicoechea 2006, 4–5). In the case of water provision, the World Health Organization (WHO) measurement was adopted. The access to an improved safe water source is measured by the percentage of population having access to and using improved water sources. Improved water sources are “defined as those that, by nature of their construction, are protected from outside contamination, particularly faecal matter” (UNICEF and WHO 2012, 4), which include piped water into a dwelling or to a plot, public tap, borehole, protected dug well or spring, and rainwater. Unprotected spring or dug well, cart with small tank, tanker truck, surface water and bottled water are classified under unimproved water sources. Because the information on the number of mobile phone subscribers in rural vis-à-vis urban areas is not available³ as in the case of access to an improved water source, only the national averages for both variables are included in the analysis.

Definition of the levels of investment in telecommunications is based on the World Bank Data Indicators, namely investment in telecom projects.⁴ This indicator includes private investment in facilities and investments in government assets but

³ Differences between rural and urban areas are more often referred to in terms of mobile network signal penetration, which does not offer much insight into how many people use mobile phones where signal is available.

⁴ *World Bank Data Indicators*. Accessed April 1, 2012 <http://data.worldbank.org/indicator>.

excludes small projects and movable assets. As the World Bank indicators are limited to only private participation, additional information on the level of public funding (if any) is added to the assessment of the levels of investment where such information is available in government reports. Since the World Bank indicator on private investment in water and sanitation excludes public and donor funding (the prevailing source of funding in the water sector in the developing countries), the data on investment in the water sector is based on bilateral official donor assistance as measured by OECD.⁵

The regulative framework as the explanatory variable influences the type of partnerships agreed between the private sector and government. More specifically, the characteristics of the legislative framework which could matter are adopted policies, which may include legal limitations to private ownership, licensing procedures, or other (dis-)incentives. According to the World Bank et al. (2009, 81), the most common contracts in ICT in Africa are made in the form of greenfield and divestiture investments, while in the water sector most investments involve management or lease partnership. In the latter case, the government control is greater as the state remains the owner of assets and makes the capital investment decisions, whereas divestiture means full or partial privatization of state assets (ibid., 81–3). Thus, investment and operational decision-making is transferred from the public to the private sector, giving greater autonomy to business managers to conduct their operations. Some of the specific regulatory provisions, which have been investigated, include, but are not limited to, the licensing arrangements, limitations to private or public ownership in the industry, taxes on the use of service, subsidies, price protection, universal service and access obligations,⁶ and infrastructure sharing. Regulatory framework affects the nature of the market structure within each industry, ranging from monopoly to free competition.

⁵ This measure is used because it presents the most systematic approach to estimating the investments in the water sector. No concrete information on public funding (based on budget allocations) is available for the selected case countries. Amount of investment in water is underestimated as investments made by non-DAC donors, NGOs, the government, the private sector, and multilateral organizations are not included in this measure.

⁶ It is important to distinguish between universal service and universal access. Universal access is a precondition for universal service as universal access entails the availability of service (for example, sufficient network signal coverage or existence of water mains or communal water points that are located nearby) while the universal service implies that every person can obtain or purchase these service at affordable rates (Mattoo et al. 2006, 7–12).

Furthermore, it defines the level of taxation on the service. Both market structure and level of taxation are factors that influence the final price of the service. In competitive markets, the service providers will have to set reasonable prices in order to secure and/or increase their market share, while in monopolies, the prices tend to be higher due to the lack of alternative providers. However, the prices under monopoly can be reduced through state subsidies or other initiatives, while the government can impose taxes on service users, which result in higher prices in a competitive environment.

The final price of the service provision carries the most weight to end-users in enabling access to the service. Flexibility in the prices of services is reflected in the options for various arrangements and products. In water industry, for example, a consumer or a community can choose among indoor piped water provision or a public tap. In the telecommunications industry the flexibility can be observed in marketing different brands and types of mobile phones, service arrangements (e.g. having only voice and text service, but no data plan) as well as in the payment methods (monthly subscription or prepaid). This reflects the needs of the consumers, who can decide for different options on the basis of their incomes, and personal needs and values. In theory, different prices and arrangements allow all segments of the population, even the poor, to gain access to a service.⁷

3.2. Case Selection

The target populations are the countries in sub-Saharan Africa, which excludes North African countries. Furthermore, the WHO does not provide complete information on the access to improved water source for Eritrea, Equatorial Guinea and Seychelles so these countries were excluded from the sample. Furthermore, countries where English is not one of the official languages were not analysed as well, due to the higher costs of translation and potential translation bias. With these limitations, two cases were

⁷ A study on buying power of the low-income earners ('the bottom segment of the pyramid') reveals that in Africa the poor, earning less than \$1000 per month, spend little of their income on water (1.6%) or ICT (0.5%). These customers might not be able to afford a mobile phone or clean drinking water despite of low prices and arrangements designed for the poor. Interestingly, those earning between \$2001 and \$3000 already spend a higher share of their income on ICT (2.8%) than on water (1.4%) (Guesalaga and Marshall 2008, 416).

selected from a pool of 21 countries. The final decision depended on availability of data on the dependent and independent variables and a degree of variability among the cases. In the end, Ghana and Kenya were selected for the analysis as a convenience and purposive sample⁸ due to their relatively similar arrangements in the telecommunications sector (in terms of market liberalization, regulation and price factors) and different market structures in the water sector (urban monopoly in Ghana, whereas the water sector in Kenya is decentralized). Because of the sampling bias, this paper cannot be generalized to all African countries even though the lessons learned in these two countries can be transferred to other countries with a similar context and arrangements in the water and telecommunications sector.

3.3. Required Data Sets and Data Collection

Regarding the two dependent variables, the change in levels of investment and access to services, the data was obtained from the following sources: Concerning the percentage change in the access to mobile phones, the information on mobile phone subscribers per 100 inhabitants was taken from the ITU Statistics website⁹ and where available, most recent data was collected from the official government websites. The percentage change was calculated by subtracting the number of subscribers in 2000 from the number in 2012, divided by the initial value in 2000 and multiplied by 100. Similarly, the WHO Global Health Observatory Data Depository¹⁰ was used to determine the percentage change in access to improved drinking water source. It was calculated by using the percentage of the population with access for years 2000 and 2011. Data on the investment in telecommunications was taken from the World Bank Data Indicators and Private Participation in Infrastructure Database websites. These websites also

⁸ The sample is convenient because the selection was made on the basis of availability of information (which is hard to access in most African countries). At the same time, the sample is purposive and “involves a selection of cases on the basis of the researcher’s own judgement about which will be the most useful” (Bloor and Wood 2006, 154) to demonstrate the differences among the sectors.

⁹ “ITU Statistics”, accessed March 31, 2012, <http://www.itu.int/ITU-D/ict/statistics/index.html>.

¹⁰ *WHO Global Health Observatory Data Depository – MDG 7: Water and Sanitation Indicators*. Accessed March 31, 2012, <http://apps.who.int/ghodata/?vid=590>.

provide information on the private investments in water and sanitation.¹¹ However, the major source of funding in the water sector comes from the external donors. Thus, the OECD statistics¹² on aid in the water sector and where available, the information on public funding from the government and corporate reports were used to supplement the information on the levels of investments.

Table 3.1. Data on the access and percentage change in service provision.

		Year: 2000	Year	Percentage change
Ghana	Access to water	71%	86% (2011)	21.1%
	Access to mobile phones	0.68	100.3 (2012)	14,650%
Kenya	Access to water	52%	59% (2011)	13.5%
	Access to mobile phones	0.41	71.9 (2012)	17,436.9%

Note. The cases from sub-Saharan Africa were chosen because of dramatic differences in the percentage change in access to services and in investment levels between the two sectors. This table shows that the rate of change in access to mobile phones is substantially higher than the rate of change in access to water.

¹¹ For the selected case countries, no data was available on the private investments in water and sanitation for the time period 2000–2012.

¹² *OECD Statistics Database*. Accessed May 18, 2013, <http://stats.oecd.org/Index.aspx?DataSetCode=DACGEO#>.

Table 3.2. Data on the levels of investment.

Ghana			
	Investments in 2000 (\$US million)	Investments in 2011 (\$US million)	Aggregate total (\$US) and time period
Investments in water (donor funding)	N/A	6.52	283.84 million (2005-2011)
Investments in telecommunications	0	305.5	~ 3.7 billion (2000-2011)

Kenya			
	Investments in 2000 (\$US million)	Investments in 2011 (\$US million)	Aggregate total (\$US) and time period
Investments in water (donor funding)	N/A	117.31	~ 601 million (2005-2011)
Investments in telecommunications	130	518.6	~ 5.4 billion (2000-2011)

Note. A more detailed account of the levels of investment can be found in the Appendix A.

Regarding the explanatory variables, the overarching variable is the regulatory framework. Here, the relevant data can be found in law, regulating a particular industry. In cases where the policy provisions are dispersed across different legislative acts, a potential source of information may also be found in tax law as well as in financial reports of enterprises in each industry, which may list all the expenditures payable to the state. Official government reports and other documents can refer to the most important legislative factors as well as provide insight on implementation. Thus, the data sets on the regulatory framework for each industry consisted of laws and regulations, official government reports as well as reports sent to and written under the auspices of various international organizations. The last data set on flexibility in price required information on different service arrangements and products that are being offered as well as the prices charged for them. This information is available on their companies' or regulator websites. Data sets were gathered from available online sources, namely official websites of government agencies and official corporate websites. The list of relevant laws and other documents that was used for the analysis can be found in the Appendix B.

3.4. Methods of Analysis

Table 3.3. A list of variables analyzed in the case countries.

Regulatory framework variables	Water sector	Telecommunications sector
Public-private partnerships	Providers (public/private), ownership, and types of investments Level of competition Investment types (donor aid, management contracts) Licensing Regulatory authority Infrastructure sharing	Providers (public/private), ownership, and types of investment Level of competition Investment types (divestiture, greenfield) Licensing Regulatory authority Infrastructure sharing
Prices	Pro-poor approach and strategies, subsidies and taxes Tariffs and variation in service provision	Universal access and service obligations, subsidies and taxes Tariffs and variation in service provision

Content analysis of the regulatory framework was carried out by analysing the official discourse found in laws, government policies and strategies, reports and other relevant official documents, which concern each industry. In this official discourse analysis the presence (or absence) and content of regulatory provisions were examined. The content analysis is qualitative and the data gathered has not been encoded in numerical sense. Encoding reflects the main policy factors, namely the licensing arrangements, limitations to private or public ownership in the industry, taxes on the use of service, subsidies, price regulation, and infrastructure sharing. This is not a rigid set of categories. If other factors became apparent through the analysis, they were included and compared across industries as well. Content analysis of financial reports of enterprises from the industries was focused on the actual implementation of these policies, as they might identify the specific expenses that occurred due to taxes or licencing fees.

3.5. Limitations

One possible limitation of content analysis of policy related documents concerns the availability of data. In African countries, official government websites are not always functional or do not publish all the relevant legislation and recent government reports. Therefore, the available documents might not encompass all the relevant regulatory provisions, needed for a proper analysis of the policy framework. Similar problems arise in the analysis of financial reports. While some companies publish annual financial reports online, this is not always the case. If they are not published online or do not contain the necessary data, the companies operating in mobile phone and water industry had to be contacted and asked to provide this information. Potential error from non-response might occur if the management of an enterprise is not prepared to share this information with the public.

Other limitations were mentioned above under “Scope and Grounds for Comparison” section above. The exclusion of several factors from the analysis contributes to the unknown error – the effect these factors have on the change in access and levels of investment. It is possible that some of those factors have a significant influence on the dependent variables. Bias in selecting cases (on the basis of convenience and availability of information) further decreases validity of my findings. The paper therefore does not make claims of deterministic causes of differences in change in access and levels of investment. Instead, it speaks of a number of regulatory factors that may influence the dependent variables.

4. Results: Public-Private Partnerships

4.1. Service Providers, Ownership Limitations, and Types of Investment

4.1.1. Kenya

Already in 1998 with the Kenya Communications Act, the Kenyan government appealed to private investors to finance the telecommunications sector (Art. 23.2). According to the Private Participation in Infrastructure Database,¹³ four projects with private participation were carried out since 1999, corresponding with the four mobile network operators currently active in the sector. Only one project was a partial divestiture as the government sold a part of the equity in the state-owned Telkom Kenya to Orange (France Telecom), while others were greenfield projects. The National ICT Policy (2006, 6) was the first document to stress the need for PPPs in the ICT sector. The strategy to attract more investment is focused on further liberalization of the market (through licencing), infrastructure sharing and collocation, promotion of PPPs in infrastructure development, and other initiatives (ibid., 25).

Four mobile phone services providers are currently operating in Kenya (Communications Commission of Kenya). According to the Private Participation in Infrastructure Database, the government was the majority owner (60% of shares) of the largest mobile network operator Safaricom until 2007. Currently, 35% of the company is government owned, 40% is owned by Vodafone, and 25% is free float.¹⁴ Similarly, Telkom Kenya (Orange) is still 49% state-owned while another 40% is owned by France Telecom. Airtel Kenya and Essar Telecom Kenya are entirely privately owned (Private

¹³ *Private Participation in Infrastructure Database*. Accessed May 18, 2013, <http://ppi.worldbank.org/>.

¹⁴ Safaricom website, accessed May 15, 2013, <http://www.safaricom.co.ke/about-us/investor-relations/investor-dashboard/corporate-fact-sheet>.

Participation in Infrastructure Database). The National ICT Policy (2006, 26–27) calls for at least 30 percent Kenyan equity ownership. The mobile network operators do apply this policy recommendation as the Kenyan ownership ranges from 30% in Essar Telecom to 49% in Telkom Kenya (Orange) (Private Participation in Infrastructure Database). The legally mandatory minimum Kenyan equity share in telecommunications is less clear as ITU ICT-Eye¹⁵ states that there is a minimum 20% Kenyan ownership in all investments in telecommunications.

Compared to telecommunications, the arrangements concerning water service providers are less straight-forward. Since 1999, the water sector has undergone major decentralization reforms, resulting in fragmentation of water provision among several actors. The National Policy on Water Resources Management and Development (NPWRMD) (1999)¹⁶ makes the remark that approximately two third of the water was provided by public actors. The NPWRMD marks a policy change towards greater liberalisation of the sector through private sector participation. It redefines the role of the state to ensure an enabling environment with appropriate legislation and to coordinate all the actors in the water sector. The private sector and community groups were planned to be the “prime movers” in improving access to, quality and sustainability of water projects (*ibid.*, 10). Following the NPWRMD, the Water Act (2002) restructured the water services provision by licensing water services boards (WSBs) to perform water provision functions (management and operation) previously undertaken by the government (Art. 113). The WSBs are state-owned corporations (Art. 51) and are authorized for the provision of water services as determined in each licence (Art. 53.1). Furthermore, the Minister appoints the members of the WSBs (Art. 51). Water services are carried out through contracting other water service providers (Art. 55). According to Corporate Governance Guidelines for the Water Services Sector (n.d.), there are eight licenced WSBs.

¹⁵ “ITU ICT-Eye.” Accessed March 1, 2012, <http://www.itu.int/net4/itu-d/icteye/About.aspx>.

¹⁶ Also referred to as the Sessional Paper no. 1 of 1999.

Water may be compared to the frequency spectrum used in mobile telephony¹⁷ – falling under the exclusive authority of the State, while the facilities needed for the provision of services can be private property. According to the Water Act, “every water resource is hereby vested in the State, subject to any rights of use granted” (2002, Art. 3).¹⁸ Therefore, water is and remains state property even when given the authorization for water use by other actors (Art. 5). On the contrary, ownership of water supply facilities is conceptualized in the relation to proper operation and maintenance of water supply as “ownership of a water supply facility encourages one to apply proper operation and maintenance procedures” (NPWRMD 1999, 47). One of the most remarkable recommendations made in NPWRMD (1999, 38–39) is that the beneficiaries or users would take over the operation and maintenance of water schemes. Thus, it created a framework for decentralization as ownership in that context reflects the aspiration for deeper community participation and involvement. “The ownership of plans, equipment and other assets used by the Government” (Art. 113.2(b)) was transferred to WSBs. Transfer did not only entail physical assets but also responsibilities for efficient and economical water provision, increasing access to services, proper maintenance and adhering to standards (The Water (Plan of Transfer of Water Services) Rules 2005, Art 5.1 and I.B.1). Therefore, ownership also indicates a transfer of risks.

Compared to telecommunications, approach to increasing investment is fundamentally different in the water sector. The NPWRMD (1999, 7) identified lack of financial resources for development, operation and maintenance of water supplies as one of the main reasons for poor statistics on the access to safe drinking water. Up to 1999, the water schemes were financed mainly by external donor funding and budget allocation. The NPWRMD continued to rely on these investments, but aimed at enhancing cost-effectiveness of investments and mobilizing local financial resources (1999, 49). Agreements between WSBs and water services providers create the legal foundation for private sector involvement, establishing numerous public-private partnerships on the local level. The Draft of the National Water Policy (2012, 18) further

¹⁷ The National ICT Policy (2006, 41–42) states that radio frequency spectrum is a scarce public resource and that allocation of frequency does not infer ownership.

¹⁸ The new Constitution of Kenya enshrined in 2010 asserts that the water is vested in the people and considers water to be public land (Draft of the National Water Policy 2012, 1).

encourages private sector participation in the sector in the form of contractual arrangements or PPPs because of the beneficial effects of private sector disciplines and practices in water service provision. According to the Private Participation in Infrastructure Database, only one project (Malindi water utility contract) with private participation was carried out between 1999 and 2005 in the form of a management contract. Under this form of public-private partnership, the private company was paid to manage the water utility in Malindi city and no operational risk was transferred from the government to the private operator. Interestingly, most of the investments to improve service delivery came from donors, not the private sector (Balance and Trémolet 2005, 59).

The National Water Services Strategy points to several challenges concerning water service provision. Specifically to monetary concerns, these problems entail the lack of reinvestment of funds generated through water provision, poor commercial orientation, presence of many small-sized systems and insufficient economies of scale, and economically unviable tariffs (2007, 2 and 10). As a result, investors and donors are not willing to participate in the water sector, which generates an investment gap. The National Water Services Strategy (2007, 7) indicates a shift towards PPPs to finance capital project and asserts such partnerships as a guiding principle of the Strategy. However, more attention with regards to sources of funding is put on increasing development partner and government funding as well as self-financing through generated revenue (*ibid.*, 12). The Draft of the National Water Policy (2012, 2) states that the investments increased in the last 7 years but adds that donors and NGOs remained the largest investors (*ibid.*, 21–22).

The National Water Services Strategy 2007-2015 highlights the development of clusters, organized by commercially-oriented local private water companies, to achieve economies of scale and operate more efficiently in line with the private sector principles (2007, 11). The licensee is also required to devise a clustering strategy of the small-scale water service providers (Licence for Provision of Water Services, n.d., Art. 4.3) with the goal to have a maximum of 5–10 water providers in each WSB area (*ibid.*, Schedule J). WASREB Annual Report 2010/2011 (2012, 21–23) lists 71 contracted

water service providers¹⁹ in the eight WSBs, ranging from 5–13 providers in each WSB. The Draft of the National Water Policy identifies “fractured market for serviced provision with too many unviable small and medium sized service providers” (2012, 11) as a challenge. This indicates the presence of numerous water providers might not actually help achieve the goal of universal access and higher investment levels. WASREB found in 2008 that most WSBs and their providers were unsustainable due to poor corporate governance, rundown infrastructure, poor clustering and inadequate capacity (WASREB Annual Report 2008, 18–19). The WASREB Annual Report 2010/2011 (2012, 20) makes the observation that large providers offer water services at a lower rate than other providers due to lower operational costs, larger consumer base, and better ability to cross-subsidize their services to the poor.

4.1.2. Ghana

An Integrated ICT-led Socio-economic Development Policy and Plan Development Framework for Ghana recommended liberalization of the ICT sector and encouragement of private investment to create “investor friendly telecommunications environment” (2003, 120). These policies would help expand the telecommunications infrastructure and improve access to the telecommunications services (ibid.). The National Telecommunications Policy (2005, 14) outlined the strategy of increasing private ownership and control through divestment of state-owned operators. The type of investment in Ghana reflects the same trends as in the Kenyan telecommunications sector. According to ITU, “Ghana’s telecommunication sector had the highest investment-to-revenue ratio in 2009 and 2010, which shows that operators invested relatively heavily in fixed assets in order to maintain and enhance networks” (2012, 28). Since 1992, there were 10 projects with private participation in the telecommunications, six of which concern the current mobile network operators: Mobitel Ghana (Tigo), Espresso Telecom (Sudatel), MTN Ghana, Telecom Ghana (Vodafone), and Globacom.²⁰ In two corporations, the Ghanaian government kept a share in the equity and owns 25% of Airtel and 30% of Telecom Ghana (Vodafone). These two MNOs were

¹⁹ WASREB Impact Report 5 (2012, 4) states that there is a total of 104 WSPs, indicating a discrepancy within WASREB’s reports.

²⁰ Other projects concern fixed phone access and long-distance calling.

established through partial divestiture of state-owned Westel and Ghana Telecommunications Company, respectively. Other MNOs are 100 percent privately owned (Private Participation in Infrastructure Database). Thus, they carry the risks without any government guarantees. In Ghana, foreign companies can own 100 percent of the operators and investments in telecommunications (ITU ICT-Eye).

Contrary to the telecommunications sector and as in the Kenyan legislation on water, the ownership and control of all water resources is vested in the President (Water Resources Commission Act 1996, Art. 12). Currently, the fully state-owned Ghana Water Company Ltd. (GWCL) is the sole company responsible for urban water supply. However, the efforts of GWCL in water provision are complemented by secondary and tertiary providers, which buy water in bulk from GWCL. In rural areas, the district assemblies carry the responsibility for water provision (Social Policy and Strategy for Water Regulation 2005, 4). The transfer of water supply responsibilities to district assemblies is based on the principle of subsidiarity. Further decentralization is encouraged by the National Water Policy (2007) to ensure participatory decision-making, greater community ownership and local private sector participation as in Kenya. This policy also hints at the need to reform the regime to accommodate the inclusion of private entrepreneurs. Progress in attaining greater access to improved water sources has been made through decentralization and community management, even though the targets were not reached in most cases (Update on the Strategic Investment Plan 2008–2015 2007, 14).

In the water sector, a different approach to PPPs was applied in comparison to telecommunications by focusing on lease and management contracts. Private participation is promoted in the Social Policy and Strategy for Water Regulation (2005, 4) as means to increase efficiency in water provision and attract investments. The National Water Policy (2007) considers feeble financial position of GWCL as a challenge to attracting funds for investment. It sets an objective to improve asset management and brings up the opportunity to involve the private sector in the share-holding of the GWCL management. The incentive for such participation is centered on revenues gained from more efficient management, tariff setting and bill collection. While the water project in Kenya was implemented on a local level in one city, Ghana's PPP experience was on the national level. As in Kenya, management contract was agreed between the

government and a private company Aqua Vitens Rand Ltd (AVRL) in 2005 and commenced in June 2006 with the objective of installing 320 thousand water service connections. Furthermore, the PPP was possible due to a \$103 million loan from the World Bank and not because of private capital (Private Participation in Infrastructure Database, n.d.; Vitens Evides International, n.d.). The report made by Vitens Evides International (n.d.) indicates that GWCL remained responsible for investments and expansion of the water system while AVRL was responsible to improve the management and supply to existing connections. The actual number of new connections made during the contract was 74 thousand (ibid., 41). At the same time, the tariffs increased from 0.56 Ghanaian cedi per cubic meter in 2006 to 1.17 in 2010 (ibid., 43). Vitens Evides International (n.d.) also reports that the investments granted by the World Bank were delayed and only \$21 million out of \$92.5 million was released for network expansion. The Policy (2007) also recognizes the problematic dependence on donor aid and low internally-generated funds as a barrier to sustainable provision of water in rural areas. In the areas under CWSA mandate, the Update on the Strategic Investment Plan 2008–2015 states that donors financed over 88 percent of investments in rural water and sanitation facilities. The government contributed over 11 percent while less than half percent was covered by district assemblies (2007, 8). The National Water Policy (2007) suggests a greater allocation of funds from government budget as well as PPPs and tax incentives for private investors to ameliorate the situation.

4.1.3. Discussion

Comparison of number of providers, ownership limitations and investment types raises several points in connection to the levels of investment and changes in access to both water and mobile phone services. First, we can see that the number of providers varies substantially from a monopolistic urban water supplier in Ghana to 4–6 mobile phone operators in both countries to over 100 water service providers in Kenya. The experience in the telecommunications sector may suggest that the economies of scale might only be achieved through a small number of larger providers on a national level.²¹

²¹ Fuest and Haffner (2007, 173) reiterate the World Bank argument that small service providers cannot exploit economies of scale and are therefore less attractive for private investment.

The literature is unanimously against restricting market entry in telecommunications, however, it does not offer much insight on whether there is an optimal number of MNOs that can maintain competition, economies of scale, network expansion and profitability of the sector. As long as service providers meet the requirements for a licence, the resolution of the optimal number should be left to the market forces. The operators, who are unable to effectively provide services to large enough consumer base to remain viable, simply go out of business. The survival of the most capable in the telecommunications market is in stark contrast to the survival of the most connected in the water sector, where WSPs survive on the basis of their political connections. However, even in Kenyan water sector the latest reports recognize that larger water providers are in a better position to provide their services to under-served areas. While communal stewardship of water management allows for greater participation and involvement of community members, it does not necessarily lead to an increase in investment levels due to limited financial resources in (especially rural) communities in both countries.

The source of investment points to the second distinction between the water sector and telecommunication. Private sector is the largest contributor in the telecommunications and after initial (mainly foreign) investments, the operators are expected to finance further network expansion through their revenues and cost saving measures (such as infrastructure sharing). On the contrary, water provision is to a large (unsustainable) extent dependent on donor and multilateral funding and not on the financial, operating or management efficiency as in telecommunications. In fact, donors determine what they are willing to invest in regardless of the objectives of the governments (Fuest and Haffner 2007, 186). Under such conditions, the development of strong local private sector in water provision is limited when NGOs supply water often free of charge. While private investments are encouraged, arrangements where water management is entrusted to communities and NGOs do not offer sufficient incentives to attract private entrepreneurs. Because of the low, subsidized tariffs offered by these alternative providers (resulting in the unwillingness to pay higher rates), private entrepreneurs cannot charge prices on the basis of full cost recovery and consequently, do not have an interest to invest or participate in the water sector.

Third, this section also showed a clear dissimilarity between partnerships formed in the water sector and those formed in telecommunications. The partnerships in telecommunications take the form of divestments and greenfield projects. Greenfield projects are preferable by private investors to protect their investment against the risk of appropriation by the state as well as having complete control over management and operations (Doh et al. 2004, 239). However, in both Ghana and Kenya, the governments retained relatively large (although seldom majority) share in some mobile network operators. Government active corporate participation in telecommunications (through state-owned monopolistic enterprises) has gradually declined but not yet completely disappeared from mobile phone service provision. Such relationship may be the key for incorporating public interest (consumer protection) in commercial activities and at the same time attract investments (ibid.). Such arrangement may be seen as attractive by foreign investors because they may assume that the government shares their interests in making profits (Sidak 2002, 289) and may even lead to greater influence on adoption of favorable legislation (Doh et al. 2004, 239; Frempong 2007, 18). The role of the government and its level of their interference should be further investigated to understand the general impact of such arrangements on access to mobile phones and levels of investment. If such arrangement generates positive results and a balance between social objectives and profit-making goals, a similar model may be considered in the water sector.

The main partnership orientation in water sector focuses on the relationship between the government, the development partners and underserved communities targeted to receive donor aid. When private sector is involved, a private company negotiates a management contract with practically no transfer of risk. The incentive for such participation is limited to revenues gained from more efficient management and tariff collection as opposed to a share in equity as in the telecommunications sector. PPPs focusing only on management, without ownership, result in lesser improvements in the level of access, although the capital for investments might increase due to the support from donors and international financial institutions of private sector participation. Michel (2008, 5–6) explains that under management contracts, the management positions in a public utility are taken over by the private company in order to improve technical capacity and efficiency of management. Thus the private company has no

obligations to make investments and does not take on any commercial risk (and has no requirements to meet performance targets). The examples of management contracts in Ghana and Kenya show that the success of such PPP depends on the ability of the government to mobilize external funding (Michel 2008, 10). A study done by Bel and Fageda (2010) on mixed water companies in Spain suggests that such mixed corporations are a middle way between purely public and purely private service provision that reconcile the different interests of both public (social considerations, quality) and private actors (profit maximization). In mixed companies, the government can influence (or even set) the strategic goals, monitor performance and gain managerial know-how, while the private actor (usually a well-established water service firm) conducts the day-to-day operations (ibid., 130–137). Mixed companies are adopted as a result of fiscal constraints but when the public actors prefer to retain some control over the water utility (especially if they previously experienced a PPP contract failure) (ibid., 144).

Nonetheless, an OECD and the World Bank study covering telecommunications, water and sanitation, financial and electricity sectors however concludes that “the big gains [in improving access] come, not from a transfer of ownership – from public to private, or national to foreign hands – but from the introduction of competition” (Mattoo et al. 2006, 20).

4.2. Level of Competition

4.2.1. Kenya

Competition in mobile telephony has existed since 1999 (ITU ICT-Eye). Article 23.2(b) of the Kenya Communications Act (1998) nicely illustrates that competition was perceived by Kenyan law-makers as a way “to ensure efficiency and economy in the provision of such services” (Kenya Communications Act 1998, Art. 23.2). The Act explicitly prohibits issuing monopoly or duopoly licence for the provision of communication services and limits the powers of the Communications Commission of Kenya as well as of the Minister responsible for communications (Art. 5.5). In reality, there were only two mobile network operators at the time of writing of the National ICT Policy (2006, 2) indicating that the provision against duopoly carried little *de facto*

significance. The National ICT Policy (2006, 25) emphasized the importance of competition and liberalization of the telecommunications market as a means to boost the levels of investment. The Kenya Communications Regulations (2001) do not focus on the number of licences issued by the authorities as in article 5.5 of the Kenya Communications Act (1998). Instead, the 2001 regulations deal with the acts of unfair competition committed by the licenced network operators, such as any abuse of a dominant position, engaging in cartel agreements, and anti-competitive mergers and acquisitions for example (Art. 5). While article 5.5 was deleted with the Kenya Information and Communications Act (2009)²², this piece of legislation incorporated a whole new part on fair competition. It adds to the list of acts of unfair competition in the Kenya Communications Regulations (2001) by including fixing prices, limiting production or investment, or applying dissimilar conditions on other operators (Kenya Information and Communications Act 2009, Art. 84S). The Communications Commission of Kenya (CCK) can investigate a licensee on the basis of its own suspicions or a received complaint (Kenya Communications Regulations 2001, Art. 7; Information and Communications Act 2009, Art. 84T). The Information and Communications Act (2009, Art. 84T) also modifies the monetary penalty for anti-competitive practices from low 6,000 shillings²³ to not more than 10 percent of the annual revenue of the licensee.

Despite of all this regulation, the CCK found that the mobile telephony market segment (includes voice and SMS services) is not effectively competitive (Communications Commission of Kenya 2011, 8). It designated Safaricom as the dominant provider because of their market share (around 70 percent of subscriber base), their economies of scale that make new operators uncompetitive, high costs of switching to other operators, advantages in advertising and branding, as well as the ability to charge prices above the competitive level (sustaining high on-net off-net price differentials) (ibid., 8–10). Safaricom is able “to behave, to an appreciable extent, independently of its competitors, customers and ultimately consumers” (ibid., 10). Safaricom services were labelled as regulated services and as a result, the CCK controls its tariffs in order to ensure competitive market.

²² The Kenya Communications Act (1998) was amended with the Communications (Amendment) Act in 2009 and renamed to the Kenya Information and Communications Act.

²³ As set in the Kenya Communications Act (1998, Art. 7.6).

In the water sector, it is more difficult to ascertain the level of competition than in telecommunications. The presence of numerous actors involved in water provision could indicate a very competitive environment. However, the NPWRMD envisions the need for coordination between these actors to avoid duplication of effort (1999, vi). Thus, it seems more appropriate to talk about the decentralization and fragmentation of the sector into more manageable geographical areas, serviced by one (monopolistic) water provider in each area. The Water Act (2002) allows that the WSBs at the local level “enter into agreements with more than one water service provider in respect of its area of supply” (Art. 55.5). These agreements may include provisions on “the concurrent performance, by the water services board and the water services provider, of the same functions in different parts of the area defined by the board’s limits of supply” (Art. 55.4(a)). Moreover, WASREB may also allow joint provision of water services by two or more licensees (Art. 63.1(a)). These provisions are more likely to create a monopolistic environment since service provision is rarely offered by more than one provider in a specific area. The restriction contained in the Model Water Services Regulations (2007, Art. 20) which grants the right to an exclusive service area to a water service provider indicates a firm backing for a monopolistic provider within a limited geographical area.

Nonetheless, several documents emphasize the need for competition in the water services sector. Corporate Governance Guidelines for the Water Services Sector (n.d.) attempt to implement the principles of corporate governance, which include ensuring long-term competition in the sector. The Licence for Provision of Water Services (n.d., Art. 4.1) states that the services of water providers have to be competitively acquired in an open-bidding process. Furthermore, the construction companies involved in building water-related infrastructure have to be chosen on a competitive basis (ibid., Art. 6.3). The same is said in NPWRMD (1999, 31) since the private sector-led drilling initiatives to tap groundwater reservoirs should also be promoted through competitive tendering procedures. The National Water Services Strategy (2007, 4) hints to goal of eventual growth of competition among different service providers as the strategy is being implemented.

4.2.2. Ghana

An Integrated ICT-led Socio-economic Development Policy and Plan Development Framework for Ghana suggested policy initiatives geared towards greater competitiveness to address poor access to telecommunications services. A stable and competitive investment climate would encourage the participation of foreign and domestic investors in the sector (2003, 143). Furthermore, more competition among the operators diversifies consumer choice and enables provision of affordable communication services (Ghana ICT for Accelerated Development Policy 2003, 64). The National Communications Authority Act (1996, Art. 2) lists promotion of fair competition and protection from unfair conduct of operators as two of several functions to be carried out by the National Communications Authority (NCA).²⁴ The National Communications Regulations offer a detailed description of actions that violate the principle of free competition, for example, “subsidizing competitive services by revenues obtained from non-competitive services” or obstructing “the financial commercial growth of competitors” (2003, Art. 4). The National Communications Authority Act (2008)²⁵ reaffirms the commitment to competition in telecommunication services and the Electronic Communications Act (2008) no longer contains a provision on potential exclusive licence.

Dominant mobile network operators are not of concern only in Kenya but also in Ghana. In Ghana, MTN Ghana holds the largest market share with approximately 45 percent of subscriber base. MTN is referred to as being the dominant mobile operator on the NCA website even though no official document explains or determines its position as dominant. Furthermore, only The National Communications Regulations (2003) make special reference to operators in a dominant position under article 4 on fair competition, but do not enact any special regulation for dominant provider as is done in Kenya with price regulation.

²⁴ At the same time, NCA was permitted to grant a licence exclusively to one operator if that is in public interest (Art. 13.1).

²⁵ The National Communications Authority Act of 2008 repealed the National Communications Authority Act of 1996.

Unlike in telecommunications, the discussion of competition in Ghanaian legislation on domestic water provision is virtually non-existent. Only the Public Utilities Regulatory Commission Act (1997, Art. 3) lists promotion of fair competition among public utilities as one of the functions of PURC. However, under the influence of international financial institutions the debate on water sector restructuring and greater private sector involvement in Ghana included the idea that GWCL operated water supply systems should be divided into two business units and their management leased to private companies. While such lease arrangement was not implemented, the reasoning was to improve efficiency through competition between these two business units (Fuest and Haffner 2007, 176–177).

4.2.3. Discussion

From the regulations in each sector, it appears that the governments are more concerned with the competition in the telecommunications sector than they are in the water sector. While the strategies to increase investment and access depend on mimicking private sector management, a step towards increasing competition to promote investment and improve access to water provision is largely absent from the official discourse. The main concern in the water sector is duplication of efforts, where several providers would serve the same area. Both in Kenya and Ghana, the aim is to establish one provider servicing an area while others should focus on other under-served areas to increase access for all. In Kenya, emphasis is put on ‘competition for the market’, meaning that several water service providers compete in an open-bidding process. The winner is then granted an exclusive right to operate in an area. However, corruption persists in procurement of water service providers (Rampa 2011, 6). According to Rampa (2011, 5), however, Kenyan water service providers operate in fiercely competitive environment where formal service providers compete with informal providers even though the weak commercial and financial viability of providers results in rampant market failure to provide affordable water in efficient manner. One potential solution could be to open the sector to competition through ‘third party access’ (further discussed under ‘Infrastructure Sharing’ section), legally based on the article on joint provision of water services.

Competition is commonly viewed as the way to encourage innovation and greater efficiency to decrease costs of service provision as well as the driver for spreading the operations to under-served areas to increase profits. It drives down the prices which makes a service more affordable to a larger number of consumers (Manner 2004, 97). A positive effect of competition on the levels of investment and mobile network coverage was shown by Li and Xu (2004, 408–409). According to Deloitte and GSMA, the competition among mobile operators “contributed to a price drop of over 70 percent in the last four years” (2011, 26). The consistent tightening of the anti-competitive legislation in Kenya and Ghana’s telecommunications sector shows the awareness of the benefits of competition in improving mobile network coverage and affordability to consumers. According to ITU, introduction of competition in the telecommunications market plays a significant role in “increasing the availability of telecommunications services, decreasing prices and encouraging private sector investment” (ITU 2002, 7). Furthermore, “the successful management of competition can be a catalyst to obtaining lower prices, new and better services, greater consumer choice and increased investment in telecommunications markets” (ibid.). The success of the Ghanaian and Kenyan mobile telecommunications sectors in comparison to their respective water sector can therefore be highly influenced by the degree of competition among providers.

4.3. Licensing

4.3.1. Kenya

The Communications Act (1998) forbids provision of any telecommunication services without a valid licence (Art. 24.1). Article 25.3 enacts the conditions that may be attached to a licence, including the type of permitted services, interconnection, licence fee and any other fees. These conditions are specified and determined in each individual licence granted. In article 82, the Communications Act (1998) give the CCK the power to occasionally modify conditions attached to a licence. The Kenya Communications Regulations (2001, Art. 10.4) include a licence condition on providing services efficiently and at reasonable costs. The regulations also include revocation of the licence as a penalty for contravening licence conditions (ibid., Art. 31). Based on the reviewed legislation, the CCK has a high level of discretion to modify the licence process since the

grant of a licence is based on CCK's satisfaction with the application (Communications Act 1998, Art. 79; Kenya Information and Communications Act 2009, Art. 6) without competitive bidding by public tender as in Ghana.

Like the telecommunications sector, the water sector in Kenya is organized through issuing licences and permits. Permits are issued for works related to water resource allocation and water infrastructure. For example, if a person wants to build a well, he must obtain a water permit (4th schedule of the Water Act, Art. 2). While permits are given to those who construct infrastructure for water provision,²⁶ WSBs are licenced to provide water services to consumers (Art. 58.1). The conditions set in the licence apply not only for the specific boards, but also for the individual water service providers (Art. 57). Licences are issued by WASREB. In order to obtain a licence, an applicant has to show its technical and financial capacity as well as that of any contracted water service providers, the plan for an economic and sustainable provision, performance targets, planned improvements, and a suitable tariff structure (*ibid.*). While in telecommunications a licence can be revoked if conditions in the licence are not met, the consequence of a default by a licensee in the water services provision is a transfer of functions to another licensee or the Minister and not a revocation of a licence (Water Act 2002, Act. 68 and 69). The National Water Services Strategy (2007, 12) introduces a requirement to assign the responsibility to implement pro-poor initiatives (extending and managing services) to a person or a department within a water service provider. In the Licence for Provision of Water Services (*n.d.*, Art. 3.2), licence obligations include minimum service level requirements. Impact Reports published by WASREB for years 2005-2006 onwards show that performance is being monitored, although enforcement is poor (e.g. not all WSP are reporting their data). Furthermore, it shows that WSB do not effectively enforce compliance with the regulations on their WSPs (WASREB 2010, 65; WASREB 2011, 86; WASREB 2012, 82).

²⁶ In exceptional cases, one-year water permits can be issued without public consultation and sometimes even without conditions (Water Act 2002, Art. 33). What constitutes exceptional circumstances is not elaborated upon in the Act.

4.3.2. Ghana

According to the National Telecommunications Policy (2003, 7), a licensing regime eases the entry into the telecommunications market. As in Kenya, a mobile network operator has to obtain a licence (National Communications Authority Act 1996, Art. 9). Conditions, which can be attached to a licence, include, but are not limited to, requirements for interconnection to other operators, specifications on setting tariffs and charges, licence fees, and approved equipment (*ibid.*, Art. 14 and 18). The National Communications Regulations (2003, Art. 115) reiterate the importance of technical and financial capacity to provide services as a condition for granting a licence. A licensee is obligated to expand its communications infrastructure, provide the services on a continuous basis, deliver evidence of good financial standing, and publish the method of determining user charges, among other obligations (*ibid.*, Art. 138). If the operator does not comply with the licence conditions (including expansion requirements), the licence is revoked or suspended (*ibid.*, Art. 118). The Electronic Communications Act (2008)²⁷ asserts a set of mandatory conditions to be included in a licence. Some of these conditions, relevant for this paper, include: geographical and subscriber targets for service provision; provision of services to uneconomical areas (rural and sparsely populated areas); provision of universal access and service; infrastructure sharing obligations; prevention of anti-competitive practices; and publication of user charges (Art. 4.2). While under the National Communications Authority Act (1996, Art. 13) licences were awarded by the NCA on the basis of technical suitability, the changes enacted in the Electronic Communications Act (2008, Art. 128) allow for competitive bidding for licences, which are granted by public tender.

In the water sector, provision of adequate services and sufficient maintenance and improvements of equipment are the duties of a licenced public utility (Public Utility Regulatory Commission Act 1997, Art. 11). According to article 13.2, if a public utility

²⁷ The National Communications Authority Act (1996) provisions were repealed with the National Communications Authority Act of 2008 and reintegrated into the Electronic Communications Act (2008).

does not meet the performance standards, it has to pay compensation to PURC.²⁸ The legislation is unclear whether a water utility has to be licenced or what the licencing process looks like. In the Water Use Regulations (2001, Art.1), a person is to obtain a permit for domestic water use. However, the regulations only indirectly imply that the purpose of a permit is infrastructure works. Indeed, it is unclear how the water permit differs from water rights. The Drilling Licence and Groundwater Development Regulations (2006) refer to a drilling licence as a permit needed for construction of wells for ground water abstraction, granted by the Water Resources Commission (2006, Art. 1). Combined with the weak enforcement of regulations and permits as mentioned by the National Integrated Water Resources Management Plan (2012, 5), the ineffective licencing (and poor legislation in general) can negatively affect access to and investment in water service provision.

4.3.3. Discussion

Common to the telecommunications and water sectors is the practice of issuing licences for service provision. Levy and Spiller argue that the regulatory framework “should make specific the process by which regulatory decisions are to be taken” (1994, 210) to be considered as credible by the investors. Issuing licences is one means of signaling that credibility. In all explored sectors, the conditions set in the licence may vary from one licensee to another. This creates a lot of bargaining room and possibly disparate and unequal arrangements among different service providers. This can be seen in Kenyan telecommunications licencing process. Kerretts (2004, 58) illustrates how the licencing application of the third MNO Econet in 2004 was influenced by the government’s desire to finance free education policy from the licence bidding process. The priority was given to increasing the government’s financial gains instead of the applicant’s ability to provide services. In water sector, Rampa speaks of the tendency for

²⁸ In PURC Annual Reports (2001; 2002; 2003; 2004; 2005; 2008), there is no mentioning of penalties being imposed on GWCL/AVRL for failing to meet performance targets (which do not include water coverage improvement targets). 2007 Annual Report threatens with sanctions but does not state what sanctions PURC would impose for not meeting the performance targets. Instead, “Enforcement” is in the 2008 report equated with monitoring and publishing results, but no actions were indicated that would impose any sort of sanctions on the under-performing water utilities.

“a proliferation of the boards to create more opportunities for political appointments and regional projects” (2011, 6). K’Akumu (2007, 538–540) agrees since the Minister is defining WSB’s geographical limits and even chooses the board members. All five WASREB Impact Reports emphasize WSBs’ weaknesses in financial and investment planning, although the licensing process necessitates such plans as part of the application. Politicization is tamed in Ghana as Frempong argues that “transparency and efficiency in issuance of licences” (2010, 14) creates favorable market entry conditions. Compared to Ghana, Kenyan licencing process might not be as credible due to a high degree of politicization. This affects both the levels of investments and the access to services.

Licensing arrangements and the conditions they set are also significant for increasing access. In Kenyan and Ghanaian legislation, performance targets and obligations for mobile network operators are stated in the licence conditions and penalties are imposed if an operator does not satisfy these conditions. While Frempong (2010, 2) mentions the inability of the NCA to ensure compliance with all licence conditions, NCA has made efforts to enforce the licence obligations as early as 2002 when it imposed monetary penalties on Westel and Ghana Telecom for not reaching their roll-out targets (Frempong 2007, 52). In Kenya, all operators met and exceeded the coverage targets in their licences (Deloitte and GSMA 2011, 30). Also in Kenya, specific implementation requirements or intermediate targets for water providers have been decided and the penalties for non-compliance are imposed. WASREB Impact Report 5 (2012, 17) claims that penalties were imposed on 15 WSPs for breaching licence conditions by not charging approved tariffs.²⁹

Licencing establishes concrete conditions and performance targets that providers have to adhere to, which are absent in the Ghanaian water sector. Nonetheless, all licencing regimes elaborated here suffer from weak enforcement and inability to collect fines. Thus the better achievements in terms of access and investments in

²⁹ Imposing penalties on only 15 WSPs seems quite arbitrary as the report states that many WSPs operate on non-approved tariffs and 4 WSPs did not submit data for performance evaluation. Furthermore, the least performing WSPs are not penalized in any way.

telecommunications compared to the water sector do not appear to be highly dependent on the obligations and penalties enacted in the licencing regime.

4.4. Regulatory Authority

4.4.1. Kenya

The Kenya Communications Act (1998) established the Communications Commission of Kenya (CCK) to issue licences and to regulate telecommunications (Art. 5.1 and Art. 23). Until amendments were made in 2009, article 5.5 indicated that both CCK *and* the Minister are forbidden from issuing monopoly and duopoly licences, even though issuing licences should have been the exclusive function of the Commission. Article 5.5 was deleted with the Kenya Information and Communications Act (2009). The new article 5B states that “the Commission shall exercise its functions independent of any person or body”. Article 5.5 implied that both the Commission and the Minister have the power to issue licences and thus has contradicted the autonomy envisioned in Article 5B. Looking at the structure of the CCK Board, appointments to the positions are made by the Minister and in some cases the President (Kenya Communications Act 1998, Art. 6). The Kenya Information and Communications Act (2009) increased the number of members who are not public officers from at least 5 (out of 11) to at least 7 members out of the total minimum 12 members. While the Minister still makes the appointments, he is instructed to consider the will of relevant registered societies (*ibid.*, Art. 6). If a member of the CCK Board has personal interest in any proposed contract, he has to remove himself from the deliberations and voting (Kenya Communications Act 1998, First Schedule – clause 5). The budget consists of revenue generated through the functions of the Commission, funds allocated by the Parliament and other financial sources (Art. 17). Any investments made by the CCK have to be approved by the Treasury (Art. 21.1). Up to the financial year 2006/2007, little information was offered on the level and source of income of the CCK. Since then, the annual reports state that frequency spectrum management fees represent the main source of income (over 80 percent since 2007/2008), followed by annual operating licence fees and income from interest (Communications Commission of Kenya Annual Reports).

Similarly to telecommunications, the water sector is regulated by regulatory authority separate from the Ministry. However, instead of one authority, the Water Act (2002) established two – the Water Resources Management Authority (WRMA)³⁰ and the Water Service Regulatory Board (WASREB) for water supply and sewerage. The former has the powers to issue permits for water use, to monitor the conditions attached to the permit, and to impose charges for water use from any water resource (Art. 8.1). However, unlike the Communications Commission, it is “subject to such directions as may be given from time to time by the Minister” (Art. 8.4). Thus, WRMA is not completely autonomous as the Minister may “direct” (or more bluntly interfere in) the work of the Authority in all aspects except concerning the contents of reports and recommendations (ibid.). In comparison, the Board issues licences for the provision of water, enforces licence conditions and standards, develops guidelines for fixing water tariffs, determines fees, levies, premiums and other charges for service delivery (Water Act 2002, Art. 47.1). WASREB should follow the directions given by Minister (ibid., Art. 47.4) in the same manner as the WRMA, which restricts the independent functioning of the both authorities. The members of the board in WASREB and WRMA are not usually allowed to participate in deliberations and decision-making in matters of their personal interests. Yet contrary to other regulatory authorities mentioned here, the Minister has the power to decide on such exclusion and may even allow such member to participate in a matter of her interest (Water Act 2002, First Schedule, Art. 7). IN WRMA and WASREB, the chairman is appointed by the President and the other 10 members are appointed by the Minister (Water Act 2002, Art. 7 and Art. 46). The Draft of the National Water Policy (2012, 3) highlights the inconsistent performance of sector institutions as a result of insufficient autonomy. Two aspects of autonomy that are emphasized in the Draft are the need for greater managerial autonomy and optimization of self-financing (ibid., 18).

In terms of funding, both WRMA and WASREB receive revenue from charges payable under a permit or from licence fees. The amount they retain, however, depends on the approval by the Minister and the Treasury (Art. 79). The Minister may also give

³⁰ Rampa (2011, 8) wrote that the WRMA is financially weaker (receives less funds from the government and from issuing water permits) than WASREB and lacks skilled staff. As such, its role in water service provision and the general management of water resources is very weak.

grants, loans or subsidies to both authorities (Art. 81). Last, financial resources may come from the Water Services Trust Fund, which was established to assist in provision of water services in underserved areas (Art. 83). From the WASREB Annual Report 2008 (2008, 33), it is reported that in 2007 approximately 66 percent of its budget came from regulatory levy collections while 32.5 percent was funded by government grants. The budget for WASREB in 2009/10 was largely funded by regulatory levy (79.3%), followed by government grants (12.5%) and donor funds (7.6%). In the next financial year, WASREB was almost entirely financed through the regulatory levy, which amounted to 96 percent of its budget (WASREB Annual Report 2010/2011, 33).

4.4.2. Ghana

As in Kenya, telecommunications are regulated by the NCA as founded by the National Communications Authority Act (1996). NCA has the power to issue licences, enforce regulations, issue guidelines on charging tariffs, assign spectrum frequencies, and other functions (Art. 3 and 26). NCA is also allowed to make regulations on these topics (Art. 41). The functions and powers of NCA are broadened and more explicit in the National Communications Authority Act (2008), such as giving more emphasis on attaining universal access. The Minister is allowed to give “directions of a general character” (Art. 4). That is changed in the National Communications Authority Act (2008) as the Minister can give written directions that concern policy (Art. 14.1).

The National Telecommunications Policy established the framework for political interference as the Ministry of Communications was mandated to “participate in a consultative capacity in all NCA public regulatory proceedings” (2005, 13), including public hearings that are part of licence applications. All interested parties may offer their opinions and participate in the public proceedings to ensure transparency of the regulative processes (ibid., 15). At the same time, under the National Communications Authority Act (1996, 5) the President appoint all 7 members of the board. The new National Communications Authority Act from 2008 changed the number of members to 9 and enacted a provision to make those with managerial, financial or commercial interest in a particular communications entity ineligible for board membership (2008, Art. 6). Yet somewhat contradictory, the members of the NCA board have to disclose their interests in a particular contract and are not allowed to participate in deliberations on that

particular matter or they cease to be a member (National Communications Authority Act 2008, Art. 10 and 11). Alhassan's (2003) account of *de facto* autonomy of the NCA in the first few years after its creation portrays a high degree of political interference. Until 2000, NCA was operating only with acting director-general without a board of directors followed by two ministers of communications that consecutively appointed themselves as the chairmen of the NCA board (ibid., 4).

NCA is funded through the state budget as decided by the Parliament, government and/or other loans, fees collected from licensees, and donations and other funds from any other source (National Communications Authority Act 1996, Art. 31). Under the National Communications Authority Act (2008), Article 24 states that loans can be obtained from financial institutions determined by the Minister of Finance. Financial autonomy is weakened as NCA only retains a portion of the licence fees as determined by the government (National Telecommunications Policy 2005, 17). The NCA 2008 Annual Report indicates that some changes were made in 2008 that changed the income available to NCA by changing operating fees from a fixed amount to 1 percent of gross revenue of operators as well as increased number of licences issued for which NCA received 20 percent of the amount collected by the government (NCA 2008, 50). The report does not specify the major sources of income.

As in Kenya, more than one regulatory agency can be found in the water sector unlike in the telecommunications. The Water Resources Commission (WRC) was established in 1996 with the Water Resources Commission Act. WRC is responsible for water resource management and data collection as well as granting water rights (Art. 2). The membership of the board is appointed by the President and consists of members of various government agencies (e.g. the Environmental Protection Agency) and also includes a member from GWCL (Art. 3). This Act does not contain any provisions to prevent members with personal interest from participating in decision-making. The WRC is funded through government grants, loans and resources generated by its activities (Art. 25). According to their only published annual report from 2011, approximately 26.4 percent of their income came from internally generated funds while the rest came from unspecified 'other' income (WRC Annual Report 2011, 38).

Almost at the same time, Public Utility Regulatory Commission Act established PURC to offer guidelines and approve rates for water provision, provide consumer protection, encourage fair competition, and gather information (1997, Art. 3). In terms of regulatory powers, PURC is especially intriguing. In fact, PURC “may investigate and determine whether any expenditure incurred by the public utility is justified or reasonable” (Art. 17.1), which implies a great degree of interference in the operations of public utilities. In the Urban Water Tariff Policy (2005, 4), this oversight enables the detection of inefficiencies in the operations of public utilities and their elimination. PURC Act contains a provision that “the Commission shall not be subjected to the direction or control of any person or authority in the performance of its functions” (1997, Art. 4), even though the members of PURC are appointed by the President (Art. 2). The political interference is limited as the members with personal interests in a particular matter are forbidden to participate in deliberations and decision-making (Art. 9). PURC, however, still receives its funds from the government and charges for its services (Art. 35). PURC Annual Report (2008, 64) states that PURC is mainly funded from the government budget. The report illustrates the persistent lack of available financial resources in PURC results from insufficient allocations from the state budget as well as from the absence of independent source of revenue through a regulatory charge.

Last, the Community Water and Sanitation Agency (CWSA) was created by the CWSA Act (1998). It offers assistance to district assemblies to provide safe water in rural communities and small towns, coordinates NGO efforts, and sets quality standards (Art. 2). As in the case of NCA, the Minister can give directives of general nature that the CWSA has to act upon and he also appoints the members of NWSA board (Art. 3 and 4). The same rule for members with personal interests applies as in PURC (Art. 9). Funding from the government budget is allocated to it by the Parliament in addition to the resources obtained through its functions (Art. 15). According to the Update on the Strategic Investment Plan 2008–2015 (2007, 25), the largest sources of CWSA budget in 2001 in receding order were the government, the donor funding, and internally generated funds. By 2006, the external donors contributed around 71 percent of their budget, followed by the government and revenues collected from the 2 percent water levy (*ibid.*). The National Water Policy (2007) illustrates the effect of dependency on donors on reduced autonomy and role of the CWSA. Numerous development partners

that finance the water projects impose their own sector norms instead of CWSA's guidelines.

4.4.3. Discussion

Regulatory agencies, considered to be separate and independent from the executive branch of the government, have been created for various purposes, including tariff-regulation, consumer protection, and quality control. However, they are more often incorporated into sector reforms “as a way to signal credibility to attract investment” (Dubash 2008, 46). Levy and Spiller (1994, 202–203) emphasise the importance of mechanisms to restraining arbitrary action of the administration (through an appropriate regulatory framework) in order to attract private investment and network expansion. In the presence of high uncertainty concerning the actions a government would undertake, the investors are less likely to participate in a market with long-term investment plans but instead seek highly profitable short-term opportunities (ibid., 204, 239). Manner (2004, 98) argues that independent regulatory authority is important for a fair imposition of licence conditions on service providers. Regulatory agencies are then expected to ensure that the process of licensing and regulation is not easily manipulated, which is achieved with limited administrative discretion through very specific legislation (Levy and Spiller 1994, 232). This entails both the autonomy of the regulatory authority from political interference as well as clearly outlined mandate.

Savas claims that the public authorities in both the water and telecommunications sector are being reformed to incorporate managerial and financial autonomy, separate budgets based on user charges, and legal company personality (2000, 242). Financial autonomy entails a high degree of discretion in managing a budget and the budget structure indicates the level of dependence on the government for financing the budget. It appears that CCK has the highest level of financial autonomy among the investigated agencies as their main source of income comes from charges for its activities. Only investments require approval from the Treasury. In comparison, the autonomy is greatly reduced in WASREB and NCA. WASREB's budget is mainly financed by the regulatory levy and the amount received has to be approved by the Minister and the Treasury. In the case of NCA, it was granted by the government only 20 percent of funds collected through issuing licences, indicating that the minister of finance

has substantial influence over the budget. Thus, their funding seems to depend on the good will of the government. The worst in terms of financial autonomy and budget structure are PURC and CWSA because of their heavy reliance on government and donor funding (up to 85 percent of CWSA budget). There is a lack of transparency concerning WRC's financial statements due to which conclusions about the autonomy of these agencies cannot be made.

The autonomy of all mentioned agencies is greatly reduced because of the board appointment process. While minister is supposed to take into consideration the will of relevant registered societies when selecting CCK board members, appointments in other authorities are chosen exclusively by the government. Often, the appointments sustain the patronage system prevalent in both Ghana and Kenya. Authorities suffer from poor credibility and autonomy because of the patronage culture, where the government officials in charge of appointments make their selection on the basis of loyalty and contributions to the ruling party and not on the basis of competence (Akech 2007, 21–22). However, the politicization is much more pronounced in the water sector (Akech 2007, 21; Fuest and Haffner 2007, 181; Rampa 2011) not only because of domestic political interference but also because of interference by donors and international financial institutions.³¹ The level of possible political interference in WASREB and WRMA is increased with the power of the minister to allow board members with personal interest in a particular matter to participate in the deliberations.

Looking at these factors, the 'independent' regulatory authorities (together with the licensing procedures discussed above) in water sector can generally be perceived as less credible to the private investors than is the case in the telecommunications. According to Levy and Spiller (1994), this can partly explain the higher levels of investment and access in telecommunications than in the water sector.

³¹ For example, IMF conditioned its loans on PURC's adoption of automatic tariff adjustment mechanisms (Fuest and Haffner 2007, 183).

4.5. Infrastructure Sharing

4.5.1. Kenya

Already in the Kenya Communications Regulations (2001, Art. 43) collocation was named as an option to provide points of interconnection among the mobile network providers and share the costs of building and maintaining that infrastructure. Infrastructure sharing and collocation has been further promoted in the National ICT Policy (2006, 25) to stimulate investment. However, the Policy demands that only fixed line operators and broadcast networks must share infrastructure and collocate equipment, while for mobile operators decision to share infrastructure is voluntary (*ibid.*, 28–30). In the Information and Communications Act (2009), article 85A permits shared sites and facilities upon prior agreement of the licensees. If they cannot reach an agreement, they may refer the issue to the Commission to make a decision.

Other regulations suggest that infrastructure sharing is needed in particular when no other alternatives are available (Kenya Information and Communications (Interconnection and Provision of Fixed Links, Access and Facilities) Regulations 2010, Art. 19). Compared to Ghana's regulation below, infrastructure sharing seems to be encouraged on the basis of necessity and not on costs or environmental concerns. In the (voluntary) Code of Practice for the Deployment of Communications Infrastructure in Kenya, the preamble states that site and facilities sharing was endorsed by all operators if such sharing is practical and constitutes the best option for operators as well as consumers (*n.d.*, 4). Under this Code, environmental and health considerations, technical capacity, and the costs to operators have to be taken into consideration before site sharing agreement is reached (*n.d.*, 7–8). In Kenya, news about tower sharing can be found from June 2011 onwards when Safaricom and Telkom Kenya (Orange) signed a tower sharing agreement (BizTechAfrica 2011). Safaricom also reports that it has been sharing infrastructure with Essar and Telkom and is in the process of reaching an agreement with Airtel (Safaricom 2012, 35). According to Deloitte and GSMA (2011, 30), over 25 percent of total number of sites were shared in 2011.

While in the telecommunications sector the infrastructure sharing is well-regulated, in the water sector only one article addresses the possibility of infrastructure

sharing. The Water Act (2002) provides the legal basis for infrastructure sharing similar to the telecommunications sector. Article 63 of the Act allows joint provision of water supply services by two or more licensees if authorized by WASREB and if such joint provision guarantees a more efficient supply of water. However, the possibility of joint provision is not clearly outlined and does not offer details as to what such arrangement would entail.

4.5.2. Ghana

The National Communications Regulations (2003, Art. 110) dictate that telecom operators “shall share space on their radio towers” (Art. 110.1) and that sharing infrastructure cannot be denied except on technical grounds. The National Telecommunications Policy gives the following reasons for infrastructure sharing: “to ensure fair competition, to minimise cost and public inconvenience, and to protect the environment” (2005, 21). While the owner is responsible for maintenance, all operators who share a facility equitably cover the costs of use and maintenance (The Electronic Communications Act 2008, Art. 27). Guidelines for the Deployment of Communications Towers (2010) put a strong emphasis on tower sharing. Before a new tower can be constructed, the operator has to show that the possibility of tower sharing was fully explored (Art. 1.1.1). Operators are expected to “collaborate in negotiating co-location agreement issues relating to site access, security access, damage insurance and compensation, and fair rate” (Art. 1.2.1.2) and whenever possible, jointly use a new tower (Art. 1.2.1.3). Despite earlier legislation, it was only after the adoption of the Guidelines for the Deployment of Communications Towers in 2010 that mobile network operators opened up to tower sharing. Tigo sold its towers to Helios Towers Ghana, Vodafone outsourced them to Eaton Towers, and MTN in cooperation with American Towers Corporation transferred ownership to their joint venture TowerCo Ghana. All these corporations aim to enter into agreements with other operators to facilitate infrastructure sharing (Gale-Zoyiku 2010).

Even in the water sector, provisions for sharing of facilities can be found in the legislation. In the PURC Act, article 25 states that equipment and facilities can be jointly used by two or more public utilities for a reasonable compensation to the owner when it is necessary or convenient.

4.5.3. Discussion

Infrastructure sharing in the water and telecommunications sector is viewed from different perspectives. Mobile operators are increasingly aware of the benefits of infrastructure sharing as it results in lower costs for service provision. Furthermore, they recognize the lesser harmful effects of infrastructure sharing on the environment. In fact, the high capital costs of infrastructure expansion make infrastructure sharing not only convenient and necessary but also desired, especially by new entrants. In water sector, infrastructure *can* be shared and rare articles in the legislation allow that possibility. However, the extent of benefits of infrastructure sharing, which may include faster expansion of water provision to underserved areas at affordable prices (thus higher access), is not yet fully realized or investigated.

Infrastructure sharing can be implemented as a cost saving mechanism. By sharing facilities, sites and other infrastructure, the costs for infrastructure development and expansion can be reduced to a large extent. According to GSMA (n.d., 16), site sharing or co-location as well as mast sharing facilitates fast network roll-out of new mobile network operators at a lower cost and at the same time increase the revenue of incumbent operators. Furthermore, it drives the expansion into previously underserved, unprofitable areas by reducing capital and operational costs and acts as an incentive for greater access to mobile phone services. Thus, the infrastructure sharing positively influences coverage, service quality and pricing to consumers (ibid., 20–21). Since infrastructure sharing is still relatively new and limited in Ghanaian and Kenyan telecommunications sectors, it is more likely that any increase in access to mobile phone services resulting from infrastructure sharing has a lagged effect and can explain a partial rise in cell phone use only in the most recent years.

In Kenyan and Ghanaian water sector, few provisions on joint water provision exist although to the author's knowledge, no attempt to share facilities has been made so far. While water is considered to be a natural monopoly, the reforms in England, Wales and South Australia sparked the debate on 'third party access' in an attempt to provide access to existing water infrastructure to new service providers (Gee 2004, 38–40; Government of South Australia, n.d.) and open the water sector to competition:

Third party access regimes seek to increase competition by allowing businesses, other than the owner of a water supply network, to utilize those infrastructure services of the network which are crucial for achieving competition in another market. Access can generate real competitive pressure in upstream or downstream markets. This pressure will encourage water supply companies to minimize their costs and charge competitive water tariffs. (Asian Development Bank 2000, xvi)

The South Australian government sees such arrangements conducive to more efficient investment in and use of infrastructure (Government of South Australia, n.d.). Concerns have already been raised “about quality standards and liability if these standards are not met” (Gee 2004, 39) but more importantly, it is questionable whether such approach could work in developing countries that lack essential water infrastructure. In comparison to telecommunications, tower sharing is only a recent strategy after mobile operators already made substantial investments in infrastructure to roll-out their networks. Implementing third party access might actually decrease incentives to invest in infrastructure assets if proper regulation is not put in place to prevent collective action problem (Asian Development Bank 2000, 62).

5. Results: Prices

5.1. Universal Access Obligations, Subsidies and Taxes

5.1.1. Kenya

The Kenya Communications Act (1998) did not contain any provisions on universal access to telecommunication services. The service provision was based on reasonable feasibility (Art. 23.1) and not universal access. The Kenya Communications Regulations (2001, Art. 10.5) made a step towards universal service obligations by creating a legal basis to provide services in less profitable areas. While the decision to include such obligation in the licence agreement rests with the Commission, the article suggests that mobile network operators do not always have a clear profit incentive to service rural or sparsely populated areas.

Universal access to ICT was strongly and explicitly supported by the National ICT Policy (2006, 6). The strategy to attain this goal is based on development of infrastructure, higher investments, incentives, and the establishment of Universal Service Fund. The policy suggests the creation of universal access mechanisms to improve access and make services available at an affordable price. The target to increase mobile phone user base was set to reaching 10 million users by 2015 (*ibid.*, 25–26). Besides affordable prices, universal access is also to be achieved through creation of tele-centers (*ibid.*, 44–45), analogous to community water points. The Kenya Information and Communications (Universal Access and Service) Regulations (2010) expand the discourse on universal provision of communications services by incorporating both universal access and universal service obligations. Thus the focus is not solely on being able to access mobile telecommunications but also being able to privately subscribe to and use a mobile phone (*ibid.*, Art. 2).

In order to achieve universal access, the government promised to provide incentives through the creation of the Universal Service Fund and financing from PPPs “to subsidise the cost of ICT infrastructure rollout and expansion to un-served and underserved areas by operators in the sector” (National ICT Policy 2006, 46). The Fund is used for provision of loans (Information and Communications Act 2009, Art. 84L and 84M). Article 84J introduced a universal service levy imposed on the licensees to finance the Universal Service Fund. According to the Kenya Information and Communications (Universal Access and Service) Regulations (2010, Art. 4), the levy charged will not exceed one percent of the gross revenue of the licensee. In 2011, this levy was set to 0.5 percent (Deloitte and GSMA 2011, 29).

High taxation increases the costs of mobile use and restraints the achievements of universal access and service obligations. Besides licence application fees, frequency spectrum assignment, and annual operating fees as set in the licence (Kenya Communications Regulations 2001, Art. 4) that MNOs pay to the Commission,³² customers also pay the excessively high sales and mobile specific taxes. These taxes amounted to approximately 65 percent of all taxes paid by operators, which encompass import duty, excise duty on usage and 16 % value-added tax (VAT)³³ (GSMA 2008, 35; Deloitte and GSMA 2011, 3, 21–22). Mobile phone users have to pay a 10 percent mobile specific usage tax, also called airtime tax (GSMA 2011, 23). Other taxes mobile network operators have to pay include corporation tax (30%), income tax, and annual frequency spectrum fees, which increase with the increase in the number of sites by an operator (*ibid.*, 27–28).

While the universal obligations developed gradually in the telecommunications sector, provision of water for all was a national priority since independence (NPWRMD

³² Annual frequency spectrum fee is set at 5000 shillings per station while MNOs pay a licence application fee of 10,000 shillings and annual operating fee at 0.5 percent of audited annual gross turnover (Kenya Communications Regulations 2001, Second Schedule; Kenya Information and Communications Act 2009, Second Schedule). Safaricom annual report (2012, 7) states that the CCK announced that in July 2012 the annual frequency spectrum fee to be reduced for around one half and the annual operating licences fees to be reduced to 0.4 percent.

³³ This VAT applies to airtime cards purchase and accessories. Mobile handset VAT has been removed in June 2009 and has resulted in increased sales and access (Deloitte and GSMA 2011, 3, 21–22). Before June 2009, the VAT tax on handsets was around 16 percent.

1999, 2). In the National Water Services Strategy (2007, 6), the general objective is to provide access to potable water to all Kenyans. The target set for the 2007-2015 corresponds with the Millennium Development Goal 7 target to have the proportion of the population without access to safe drinking water. In Kenya, the goal is to provide water to 80 percent of urban dwellers and to 75 percent of rural population. The goal to reach universal (100%) access is only to be achieved by 2030 (ibid., 10).³⁴ One of the obligations contained in the Licence for Provision of Water Services (n.d., Art. 8.7) requires the WSBs to formulate pro-poor strategies with the water providers in order to implement low-cost technology such as water kiosks to disadvantaged un-served consumers. The Draft of the National Water Policy (2012, 4) maintains the pro-poor approach as one of the guiding principles in the sector and add the principle of socially responsive commercialization for service delivery. This policy aims to achieve universal access by 2030 by investing in low-income areas and increasing formalization of the sector (ibid., 12).

Water Act (2002) also established the Water Services Trust Fund (WSTF) “to assist in financing the provision of water services to areas of Kenya which are without adequate water services” (Water Act 2002, Art. 83). The fund is mainly focused on financing low-cost technology and channeling pro-poor investments (National Water Service Strategy 2007). It is financed by government budget allocations, donor contributions, and other sources of funding (Water Act 2002, Art. 83). National Water Services Strategy 2007-2015 (2007) envisages the role of WSTF as offering information on best practices and best investment opportunities, implementing projects utilizing low-cost technologies, and expanding its range of activities from focusing solely on rural water supply to also reaching urban poor.³⁵

While subsidies are relatively limited in telecommunications, the water sector is commonly seen as heavily subsidized by the Kenyan government. While the National Water Services Strategy (2007, 7) aims to attain cost-recovery through appropriate tariff

³⁴ The Model Water Services Regulations (2007, Art. 7) adopted the provision of 20 liters per person per day or six cubic liters per household per month as the minimum service requirement.

³⁵ The Draft of National Water Policy (2012, 2) indicates in a footnote that 750 thousand people in urban low income areas were reached since 2009 due to WSTF operations.

structure, the targeted subsidies to the poor continue to be the exception to the rule. In addition, it encourages cross-subsidization of water provision (ibid., 11). WASREB Impact Report 1 (2008, 31) discloses the level of subsidies for each WSB. Subsidies account for 13.7–96.1 percent of their income. The Ministry of Water and Irrigation, donors and WSTF spent over 244 million Kenyan shillings on subsidizing operational costs of WSBs (ibid.). According to WASREB Impact Report 5 (2012, 9, 80) most WSBs and many small WSPs still rely on unsustainable subsidies and are not financially self-sufficient. Concerning subsidies for operation, the Draft of the National Water Policy (2012, 3) argues that since they are not linked to performance and sustainability, the funds are mismanaged and consequently hamper the progress in increasing coverage. Therefore, it shifts the policy towards subsidizing investments in rural systems instead of subsidizing operations and maintenance of rural and urban water providers (ibid., 3 and 22).

Like in telecommunications, several documents address setting appropriate regulatory levies. In the National Water Services Strategy (2007, 26), such regulatory levy is paid by the consumers and amounts to around 1 percent of provider's revenue from water provision. The Water (Water Services Levy) Regulations (2008, Art. 3) enact the 1 percent water services levy on all sales of water services by a provider in order to finance the operations of WASREB. Customers are also charged for operation of WSBs by charging licensee remuneration fee (ibid., Art. 8.3). According to WASREB Impact Report 1 (2008, 30), the percentage of the licensee remuneration is negotiated between the WSB and each WSP. The costs of a licence entail an application fee and a licence fee, determined by WASREB at its sole discretion (Water Act 2002, Art. 60, Licence for Provision of Water Services, n.d., Art. 2.2). Depending on the obligations in a service provision agreement between a WSB and a water provider, a water provider may also be obligated to remit connection fees to the WSB (Model Water Services Regulations 2007, Art. 33).

5.1.2. Ghana

While the National Communications Authority Act (1996) did not include any universal access provision, An Integrated ICT-led Socio-economic Development Policy and Plan Development Framework for Ghana identifies “the development, expansion

and the modernization of the nation's communications infrastructure to achieve universal service and access to basic and value added telecommunications services" (2003, 58) as one of the key development challenges. National Communications Regulations (2003) firmly establish the principle of universal coverage, especially in "rural and remote parts of its geographical market and other areas of low population density" (ibid., Art. 2). The National Telecommunications Policy points to the limitations of free market to provide access to marginalized groups and implements detailed affirmative action policy (2005, 24). It determined two targets with regard to universal service and access. In particular, this Policy aims at attaining universal access for all communities and providing universal telecommunications service to 25% of the population by 2010 (2005, 24). Furthermore, the objective is to offer telecommunications services at affordable prices, even for low income earners (ibid.).

Commitment to universal access and service provision are further reaffirmed in the Electronic Communications Act (2008, Art. 23 and 24), which entails the creation of Ghana Investment Fund for Electronic Communications (GIFEC) to offset start-up costs in rural areas (Art. 32, 45 and 46). As in Kenya, operators make financial contributions to the fund (Art. 33), amounting to 1% of their net revenue (Licence for Mobile Cellular Operations in Ghana, n.d. 24). The differences between Kenya and Ghana arise in the management of the fund since in GIFEC the management includes all telecom operators (Frempong 2010, 8). The National Communications Authority Act from 2008 also mandates the NCA to consider the needs of the marginalized segments of the population, such as persons with disability, the elderly and the poor, as well as of the rural dwellers (Art. 5).

One of the strategies devised in the Ghana ICT for Accelerated Development Policy is to "put in place special ICT promotion packages, policy instruments and incentives to facilitate the expansion of the information and communications infrastructure" (2003, 64). One incentive can be found in the National Telecommunications Policy (2005, 17) as it recognizes the possibility that the new licensees would pay lower licence fees than the earlier entrants to the market. The Policy states that the NCA may implement interim measures to give temporary benefits to existing licensees as compensation for their higher licensing fees. Another incentive, in particular for the provision of services in rural communities, is a partial waiver of the

frequency fees on the recommendation of GIFEC to the NCA (Electronic Communications Act 2008, Art. 49.2 and 82.4). The projects utilizing GIFEC funding are considered to be subsidized projects (Art. 51).³⁶

Overall, mobile network operators are charged several distinct fees. The Electronic Communications Act (2008) encompasses provisions on the following fees payable to the NCA: licence fees (Art. 4.2), frequency authorization fee (Art. 10), contributions to GIFEC (Art. 33), and the rates for the assignment and transfer of numbers (Art. 65.2). The NCA 2008 Annual Report states that the regulatory fees changed from fixed amounts to 1 percent of the gross revenue of major operators (NCA 2008, 50). In comparison to the levels of taxation in Kenya, Ghana has a higher tax burden on mobile phone users. The airtime tax on mobile phone usage is 6 percent (Deloitte and GSMA 2011, 24–25), which increased from 2.5 percent in 2008 (in addition to 12.5 percent VAT) (GSMA 2008, 35).³⁷ Customers pay around 27.5 percent in handset taxes, namely for import duties, VAT and additional handset specific tax (ibid., 33–34).

While improving access to safe drinking water is a priority of the Ghanaian government, the legislation and policy persistently avoid the use of ‘universal service obligations’ terminology as it happens in telecommunications. Instead, the terminology used is ‘pro-poor’ approach, activities and criteria. Social Policy and Strategy for Water Regulation stresses the need to improve access to potable water for unreached urban poor defined as “those (i) without direct access to regulated piped supplies, (ii) who depend on secondary and tertiary suppliers and (iii) who buy by the bucket” (2005, 2). Pro-poor targets have to be addressed in investment plans for water supply projects (ibid., 13). The strategy to increase access entails strengthening community management, defining the role of formal and informal private sector, encouraging PPPs and cooperation between private utilities and small-scale independent providers, and

³⁶ MNOs directly benefited from GIFEC subsidized projects. In 2008, 39 Common Telecom Facilities were constructed that enabled MNOs to expand their services to 273 communities (Frempong 2010, 9).

³⁷ Communications Service Tax Act 2008 enacted the 6 percent airtime tax on all mobile services payable by consumers. 20 percent of the revenue collected from this tax is to be used to finance national youth employment programme.

ensuring proper pricing mechanisms. The prevailing target is more about reaching the Millennium Development Goal 7 target to halve the proportion of people without access to water than it is about universal access and service. GWCL target was set to achieve 85 percent coverage by 2015 and CWSA aimed to reach 76 percent coverage target (MWRWH 2009, 35). The universal access to potable water target is determined in the new National Integrated Water Resources Management Plan to be achieved by 2025 (2012, 11). The National Water Policy (2007) recommends the creation of Social Connection Fund to ease the access of low-income consumers. Unfortunately, it has not yet been established (African Ministers' Council on Water 2009/2010, 17).

As in telecommunications, taxes and other charges are raised both on utilities and consumers in water sector.³⁸ The Urban Water Tariff Policy (2005, 11) states that GWCL does not generate profits and therefore does not pay any corporate taxes. According to Fuest and Haffner (2007, 180), GWCL is not bankrupting only due to government subventions.³⁹ While government subsidies were removed by 1986 (MWRWH 2009, 20), the government continues to finance the water sector.⁴⁰ The National Water Policy (2007) stresses the necessity of transferring rural water development levy on urban water use to CWSA and the communities it serves. The Update on the Strategic Investment Plan 2008–2015 indicates that a 2 percent water levy has been charged in the 2001–2006 period. The amount raised with this levy amounts to around \$0.5 million per year and is used to finance the rehabilitation of non-functioning facilities (African Ministers' Council on Water 2009/2010, 17). Such use of capital accrued from rural water supply levy thus acts as incentive in rural water provision. Otherwise, no incentives are offered in Ghanaian legislation that would stimulate private sector participation and decrease the dependency on donor funding.

³⁸ Water permit holders for domestic water use pay approximately 2 million cedi for administrative and processing fees (Schedule A). Under the Drilling Licence and Groundwater Development Regulations (2006, Art. 2.3 and 6 First and Second Schedule), a person has to pay to WRC 5 million cedi as an administrative and application processing fee and 5–15 million cedi in licencing fees to obtain a drilling licence for ground water abstraction.

³⁹ GWCL financial viability is weak due to inadequate tariffs, poor revenue collection and severe burden of debt (aggravated by inflation and depreciation of Ghanaian cedi).

⁴⁰ Allocation to the water and sanitation sector dropped from 1.52 percent in 2006 to 0.52 percent in 2010 (MWRWH 2009, 37).

5.1.3. Discussion

Both water providers and mobile network operators lack incentives to provide services in remote, sparsely populated and low-income areas. Universal access and service obligations are relevant because such provisions force a service provider to operate in less-profitable areas. Since these areas are less attractive in profit-driven industry, such licence conditions contributed to improved access to telecommunications in rural areas. Manner (2004, 87–102) argues that the universal access policy in telecommunications is successful when there is strong political support and a regulatory regime, encompassing competition, an independent regulator, technology neutrality, consumer education, and enforcement. Such regulatory framework creates incentives for investments by private sector without the need for public funding or subsidies. If the same ingredients are applied to the universal access to water policies, the most apparent differences which may be undermining the efforts for universal access in the water sector are lack of competition, poor enforcement, and also lack of strong political will. The term ‘obligation’ is absent from the water services provision and instead the ‘pro-poor’ terminology is used to encourage (instead of coerce) water providers to increase access. It is worrisome that the targets set for universal access to improved water sources are to be achieved by 2030 in Kenya and 2025 in Ghana, indicating that both governments have low expectations and lack political will to attract the necessary investment and extend the service.

Perhaps, low expectations are correlated with the ineffective measures currently in place to increase investments and access in the water sector. First, mobile network operators make financial contributions to the GIFEC and the Universal Service Fund in telecommunications, whereas the WSTF is financed from public and donor funds. According to Manner (2004, 102), the goal of universal access is best achieved through the operators and other private actors pursuing business opportunities without government subsidies. Especially important is financial sustainability of universal access programs (*ibid.*, 105). Mobile network providers are both the contributors to and the beneficiaries of the funds, whereas in the water sector the WSTF is one source of income for the WSP. Thus, the MNOs are more cautious about how the money should be spent and tend to be involved into decision-making to prevent unwise government intervention in infrastructure investment. They already expressed concerns about the

non-transparent management of the Universal Service Fund in Kenya and the Fund's investment decisions (Deloitte and GSMA 2011, 29–30), while part of the success of GIFEC is attributed to the inclusion of MNOs in the management (Frempong 2010, 8–9). The review of legislation disproves the assumption that telecommunications are not subsidized yet the examples here show that MNOs are far from relying on subsidies. In Ghana, MNOs often enter the underserved areas before action is undertaken by the GIFEC (Frempong 2010, 8). In the case of WSTF, the fund is used to sustain the patronage system (K'Akumu 2007, 538; Rampa 2011, 12) and the discontent regarding its investment decisions is influenced by rent-seeking behavior of WSPs and not by the concept of stewardship.

Second, MNOs have clearly defined performance targets to expand their services to more consumers in their licences which they already managed to surpass. They are driven by profit maximization interests that focus their actions on enlarging the numbers of user (increasing their market share) including to the poor. In the water sector, performance targets are set but rarely attained (as shown under “Licensing” section, see WASREB Impact Reports and PURC Annual Reports). Subsidies are used to cover operational costs of WSBs, WSPs and GWCL. They are vital for survival of these water providers as social and political factors prevent adoption of tariffs at full cost recovery level. Yet mere survival does not generate the conditions for expansion of services. Hence, new incentives have to be formulated in the water sector to improve financial viability of WSPs. Cross-subsidization through taxes, such as rural water development levy in Ghana, can serve as an incentive for improving rural provision, although charging such tax on all urban water purchases harms the urban poor. Concerning other water taxes, financing of WSBs may also unnecessarily increase the prices of water service as the WSBs are not performing their functions according to their mandate. In Kenya, Rampa (2011, 6) illustrates how the WSBs are highly politicized bodies, criticized not only for inappropriate appointments but also their influence on WSPs and regional investment decisions. Akech argues that “the introduction of the WSBs adds an unnecessary layer of bureaucracy that in all likelihood will hinder efficiency in the provision of water and sanitation services” (2007, 24).

While taxes are relatively small in the water sector, used to finance water institutions or subsidizing rural water supply, telecommunications sector is heavily taxed.

Several reports emphasise the negative effects taxation has on access to mobile phone services, especially among the poor, and advice against any policies aimed at increasing the tax burden as that could lead to lower levels of investment (GSMA 2008; Deloitte and GSMA 2011). Higher taxes make mobile phones less affordable and thus services become unattainable among the poor (GSMA 2008, 5). They indicate that airtime tax discourages consumption and restricts access to mobile phones especially among the poor. Furthermore, import duties and spectrum fees, which increase with the number of sites/towers in Kenya, discourage investment in infrastructure (Deloitte and GSMA 2011, 4). GSMA estimates that “\$13 billion more would be invested between 2008 and 2012 if governments in sub-Saharan Africa lowered regulatory risk and removed mobile-specific taxes” (2008, 4). Regardless of the high taxes, the consumers and MNOs are able to withstand the consequent higher prices and in some cases provide funds for other social programs such as national youth employment program in Ghana.

5.2. Variation in Services, Tariffs and Other User Charges

5.2.1. Kenya

Concerns about the prices and the need for consumer protection can be seen in the Kenya Communications Act (1998) as the role of the CCK was to protect the users from exorbitant prices or poor quality of services (Art. 23.2(a)). The Communications Regulations (2001) state that “licences granted shall contain an obligation to provide services efficiently and at reasonable costs” (Art. 10.4) and establish a complaint mechanism for subscribers to investigate allegations of unauthorized or high charges (Art. 8.2). The tariffs for mobile network operators are determined on the basis of market forces and are not regulated by the CCK, although the licensees still have to file the tariffs with the CCK and the CCK can scrutinize any tariffs (Art. 95 and 96). The exception is Safaricom, which is subjected to greater tariff control due to its position as a dominant telecommunications service provider. Its large market share and other advantages give Safaricom the ability to charge prices above the competitive level (CCK 2011, 8–10). In this case, the CCK has to approve the tariffs and not only keep a record of them. It can recommend changes in tariffs, review them, and even set new tariffs (Kenya Information and Communications (Tariff) Regulations 2010, Art. 6).

ITU is a good source of information on the aggregate changes in the price basket of mobile services, measured in percentage of GNI per capita. The report from 2012 records a large decrease in the costs of mobile phone services from 17.8% in 2010 to 6.8% in 2011 (ITU 2012, 77). In 2008, the same set of mobile phone services cost 23.7% of GNI per capita (ITU 2009b, 57). The prices were thus high until recently. Currently, Safaricom charges from 2–4 shillings per minute for calls and 1 shilling per text message.⁴¹ There is also an option of prepaid SMS bundles for 10 and 20 shillings that greatly reduces the costs of text messages to 0.05 and 0.04 shillings respectively.⁴² Airtel Kenya charges 3 shillings per minute for calls (with the option of purchasing bundles that reduce the price down to 1.2 shilling per minute) and 1 shilling per text message.⁴³

Compared to telecommunications, tariffs in the water sector are more regulated and monitored. NPWRMD from 1999 identified (public) budgetary constraints and charging tariffs below the operational costs as the explanation for poor water provision (NPWRMD 1999, iv). The policy recognized the need to protect the more vulnerable groups, especially the rural poor, and has called for development of such a tariff structure that addresses the needs of the poor while still ensuring adequate cost recovery (1999, 51–52). The National Policy called for introduction of necessary levies and fees for utilization of water from all public water sources (*ibid.*, 12). “All water consumers should pay for water on the basis of the user-buys” (*ibid.*, 50–51) and thus the NPWRMD signaled the end to the cost sharing and below-cost tariffs for water use. The Licence for Provision of Water Services (n.d., Art. 8.1) states that the customer tariffs for each service provider are set by the WSBs and approved by WASREB.

The National Water Services Strategy (2007, 2–3) reveals that regardless of the codification of the principle of cost-recovery in setting tariffs, the tariffs remained below the operational costs. This further deteriorated the provision of water to the poor due to lack of finances for infrastructure extensions. At the same time, the Strategy supports as

⁴¹ One Kenyan shilling is around 0.01 US dollars on the July 17, 2013, exchange rate.

⁴² Safaricom website, accessed July 17, 2013, www.safaricom.co.ke.

⁴³ Airtel Kenya website, accessed July 17, 2013, <http://www.africa.airtel.com/wps/wcm/connect/africaairtel/Kenya>.

a guiding principle the social water tariffs for the minimum needs of the poor together with the principle of cost-recovery for other water users (ibid., 7). The Strategy argues in favor of incremental increases in tariffs (ibid., 11). It further suggests that tariffs can be adjusted in negotiations with water service providers to serve as an incentive to expand their operations into urban slums (ibid., 18). In the end, the Strategy envisions an increase in tariffs as the performance of water service providers improves (ibid., 26). WASREB Impact Report 5 (2012, 17) lists the approved tariff rates of 30 urban WSPs. The average tariff for a cubic meter of water is 94 shillings. Kiambere Mwingi has the highest tariff at 240 shillings per cubic meter while Mathira has the lowest one at 39 shillings per cubic meter. In Nairobi with over 400 thousand connections, customers pay on average 46 shillings per cubic meter. The average social (lowest block) tariff for 0.6 cubic meters is 48 shillings. The lowest social tariff is charged in Nairobi at 18 shillings while the highest social tariff is set at 127 shillings in Mavoko.

A lot of attention is given to formulating different service and tariff arrangements for specific customer groups. Model Water Services Regulations (2007, Art. 6) state that the WSBs determine the types of services they are able to deliver to different types of customers and in diverse geographical and socio-economic areas. The lifeline (social) tariffs should be approximately the same for both public outlets and household connections and the public/communal outlets should be implemented where the private connections cannot be sustained by the poor (National Water Services Strategy 2007, 8). Corporate Governance Guidelines for the Water Services Sector mandate that the WSBs “use appropriate technology in construction of the different water service facilities to differentiate quality of service levels for different categories of consumers” (n.d., 15). A connection fee is charged for installation and connection to water supply service as approved by WASREB (Model Water Services Regulations 2007, Art. 33). Furthermore, before water is provided consumer have to pay a deposit which is returned only when the service is terminated and the customer has no outstanding bills (ibid., Art. 35). In rural areas, communal outlets (wells and boreholes) are prioritized (National Water Services Strategy 2007, 8). However, communal water supply services, which are provided by non-profit groups, are to be offered at a minimal rate or free of charge (Model Water Services Regulations 2007, Art. 6.3(a)).

5.2.2. Ghana

According to the National Telecommunications Policy (2005,3), “the interests of consumers in obtaining high quality, accessible, and affordable telecommunications services shall be the primary objective of all policy and regulatory decisions”. The article 25.1 of the Electronic Communications Act (2008) enshrined the free market principle of supply and demand for determining tariffs. As a safety guard, the NCA may regulate the prices in the case of monopolistic service provider, anti-competitive practices, or network operator with significant market power (Art. 25). The same article mandates fair and reasonable rates. Nevertheless, the Minister of Communications retains the power to regulate fees and tariffs (Art. 97.1), which could undermine tariff setting on the basis of demand and supply. Since 2008, mobile price basket dropped from 12% of GNI per capita (ITU 2009b, 57) to 6.9% in 2011 (ITU 2012, 77). Referring to the mobile-broadband options, ITU emphasized the importance of low prices and variety of tailored offers for attracting customers (ibid., 28). In the information on mobile pre-paid tariffs gathered by NCA (2012), the price of a call on the same network averages at approximately 0.09 cedi per minute and to other local network 0.12 cedi per minute. The cost of sending a SMS to local networks is approximately 0.04 cedi. Some options offered by MTN Ghana include: Pay4me, which does not require any airtime credit as the receiver pays for the call; different value call plans with call prices as low as 0.06 cedi per minute; and monthly subscription at 5 cedi per month⁴⁴. Ghana Telecom (Vodafone), for example, sets its prepaid tariffs at 0.14 cedi per minute during peak hours (compared to off-peak calls at 0.09 cedi) and at 0.04 cedi per SMS, and offers prepaid top-up cards that are paid for in 1, 2, 5, 10, and 20 cedi sums.⁴⁵

In contrast to the free market principle guiding the setting of prices in telecommunications, the water utilities have to strictly follow the guidelines for fixing rates given by PURC, which also gives the final permission to charge a particular rate (Public Utilities Regulatory Commission Act 1997, Art. 16 and 18). It can also determine a uniform rate throughout the country (Art. 20), which has been the strategy set in place

⁴⁴ MTN Ghana website, accessed May 19, 2013, <http://www.mtn.com.gh/Default.aspx?pageid=298>.

⁴⁵ Ghana Telecom (Vodafone) website, accessed May 19, 2013, <http://www.vodafone.com.gh>.

by the Urban Water Tariff Policy (2005, 4). The GWCL uniform tariff rate regardless of the differences in the costs of supply are said to allow cross-subsidisation from more prosperous to poorer areas (ibid., 6). In urban areas, the types of services offered are direct private connections, yard taps, communal sources and standpipes, and water by the bucket from secondary suppliers, including that delivered by tanker trucks (ibid., 7 and 12). Those with direct water supply use more water but pay approximately the same amount of money as those collecting by the bucket for much smaller amount of water (ibid., 7). The poor pay 9 times more per bucket of water from a tanker truck, 3-4 times more from secondary providers, and 2 times more from standpipes than those with direct water supply (ibid., 12). The Social Policy (2005, 18) set the grounds for determining a lifeline tariff for water allowance necessary for basic needs at a level that is affordable but still covers the operational costs. The Urban Water Tariff Policy (2005, 6) reiterates the need for a lifeline tariff and recognizes the inadequacy of such block tariff structure when the poor who should benefit from the lifeline tariff lack access to direct water supply. In addition to the tariff for the water supplied, a customer is also expected to pay a connection fee at full cost-recovery price for a direct water supply (ibid., 8). In 2010, the metered domestic use tariff was set at approximately 0.8 Ghanaian cedi per cubic meter of water for up to 20 cubic meters. For over 20 cubic meters, the normal tariff applies at 1.2 cedi per cubic meter. If a house is not metered, a flat rate of 5.2 cedi is imposed per household. At public standpipes, a cubic meter of water costs 0.8 cedi (PURC 2010).⁴⁶

The Social Policy and Strategy for Water Regulation (2005, 5) notes that PURC does not fix the tariffs of the community managed systems. Instead, the district assemblies determine their prices. In the Social Policy, the prices in these rural areas range from 50 to 200 cedi per bucket. With the average around 100 cedi, the rural prices compare to the lifeline (social) tariff in urban areas set at 80 cedi per bucket in 2004.⁴⁷ The Update on the Strategic Investment Plan 2008–2015 explains the higher tariffs in

⁴⁶ For better understanding, 0.8 Ghanaian cedi was approximately US\$0.4 at the Ghanaian Cedi to US dollars exchange rate on May 27, 2013.

⁴⁷ Contrary to the information offered in the Social Policy and Strategy for Water Regulation (2005, 5), WaterAid (2005, 6) reported that by 2005, lifeline tariff was not yet put in place.

some rural communities reflect the desire to prevent any disruption of services due to lack of funds (2007, 8).

5.2.3. Discussion

The interests of consumers and affordability play an important role in both sectors. Legislation and the regulatory authorities are in place to ensure the provision of affordable mobile and water services. Differentiation of products and services provided in telecommunications and the water sector gives more options to the consumers to choose a service that best fits their needs and means (Manner 2004, 98). Both in telecommunications and water sector, private participation and PPPs indicate the goal of full cost recovery and elimination of subsidies that would cover the costs of operation, maintenance and network expansion (Fuest and Haffner 2007, 170). However, the full cost recovery in water sector often entails rising tariffs, resulting in a high degree of politicization in water tariff setting and consequently tariffs set below full cost recovery.

Indeed, the appropriate tariff setting depends on the understanding of causal relationships. The legislation on mobile telephony suggests the influence of market forces. According to Deloitte and GSMA, “the consumption behaviour of much of the Kenyan population is likely to be highly responsive to changes in price” (2011, 26). Thus, the number of consumers increases as the prices fall. The initial higher prices paid by a smaller base of consumers enable investment in and expansion of network coverage and as more consumers have access to the network, the prices decrease while still generating sufficient revenue to recuperate the costs of investments. On the contrary, the historically low tariffs on water services below operational costs created financially weak WSP. Now these WSPs are expected to expand their coverage (by relying on donors and loans from IFI) and maintain low tariffs to attract more customers. In Kenyan water sector, tariff adjustments are used as incentive for extension of services. Higher tariffs are approved for those WSPs that improved their score on performance targets. Similar in Ghana, tariffs are kept below the full cost recovery by PURC “in order to create incentives for the reduction of inefficiencies” (Fuest and Haffner 2007, 182) and as a result of political motivations in the electoral campaigns. Only after the elimination of inefficiencies can tariffs be increased. Levy and Spiller (1994, 232) illustrate the problem of utilising tariff adjustments since they act as a disincentive for investment on the case

of Jamaica. The Jamaican Public Utilities Commission designed a policy of promising higher tariffs based on the levels of investment and quality improvements. Under this time period, investment programs were suspended and no improvements in access were made (ibid.). Both in Ghana and Kenya, the current policy of tariff setting has not generated the desired results in increasing access to water services and the levels of investment.

At the same time, it is questionable whether the *laissez-faire* approach in the mobile telephony can be applied to the water sector. The problem is that “increasing tariffs before extending supply network creates more poverty” (Fuest and Haffner 2007, 184) and thus, the provision of water services to the poor by profit-seeking companies seems to be possible only through substantial public subsidies (ibid., 185). Cross-subsidization might be necessary and could potentially replace public subsidies (Chitonge 2010, 602). While cross-subsidies are forbidden in telecommunications because of anti-competitive consequences of such subsidies, the water sector with limited competition could benefit from such practices. According to Savenije and van der Zang, cross-subsidies “on the one hand satisfy social and equity criteria and guarantee financial sustainability on the other” (2002, 104) as long as they cover the full cost of operation. Chitonge (2010, 607) argues that cross-subsidization policy relies on a balance between the beneficiaries and payers of the cross-subsidization, suggesting that sufficiently large number of wealthier consumers (mainly in better-off urban areas and from non-domestic water users) is needed to subsidise the poor. Again, this might present a problem in all but the largest WSPs in Ghana and Kenya due to a relatively small number of metered private connections and inability to cross-subsidize among numerous providers in Kenya.

Consequently, the current tariff setting policies in water sector are insufficient to expand access to safe drinking water or create investment capital from domestic, private sources. Since poverty restrictions have to be taken into consideration when determining tariff rates, water tariff policy cannot follow market forces as in telecommunications. Nevertheless, a possible solution may be found greater emphasis on the introduction of competition in the water sector.

6. Conclusion and Recommendations

A comparative analysis of the water sector and telecommunications in Ghana and Kenya shows that the regulatory frameworks share some similarities and differences that influence the levels of investment and the rate of change in access to mobile services and water provision. Several lessons can be drawn from this comparison that answer what is it about the nature of water and the telecommunications industries that explains the variation in both the rate of change in access to services and levels of investment in these industries.

First, numerous small providers might be as inefficient in improving access and attracting investment as is a monopoly provider. A middle ground should be strived for with several larger providers that are able to benefit from economies of scale. Second, whether a MNO or WSP or their management is private or public does not make much difference, since in both sectors corporatization and adherence to sound business practices is becoming the dominant form of management. Third, looking at the partnerships formulated in telecommunications, a combination of private and public equity in MNOs seems to be working well in terms of drawing investors and serving customers, while management contracts in water sector do not positively affect access to water or the level of investment in the sector. While greenfield investment and full privatization as in telecommunications is highly unlikely to occur in the water sector due to the strong emphasis on protecting public interest, other forms of public and private cooperation should be tested in attempting to reduce the reliance of donor loans, attract private investors and expand services to the poor. Partial divestiture could be attempted in the water sector as an incentive to potential investors while the government would retain a role in guaranteeing the incorporation of social equity concerns in the management of such mixed water provider. Furthermore, this could reduce the unsustainable dependence on donor funding.

However, the most convincing lesson in explaining the success of mobile telephony compared to the water sector is the positive effects of competition in reducing prices, increasing efficiency, network expansion, and the levels of investment. Both Kenya and Ghana maintain the monopolies of their WSPs due to concerns about duplication of efforts. The fifth lesson on infrastructure sharing in telecommunications is valuable here as it shows that it is possible to avoid duplication of efforts when several providers share the infrastructure.

Lessons on licencing and regulatory authorities show that both sectors in both countries face problems of poor governance, weak enforcement and a degree of politicization. Especially in the water sector, the high level of politicization decreases the levels of investment and impedes the implementation of appropriate tariffs. Improvements in the regulatory environment would generally benefit the investment climate in both sectors. The achievement of universal access obligations in part depends on the formulation of legal requirements (as in licences), good governance (monitoring of performance) and enforcement (effectively imposing penalties) as well as on the recognition of the benefits of network expansion among the managers. Universal access funds can only be successful when WSPs and MNOs participate in funding and are involved in the decision-making.

Another lesson is that consumer protection and affordability of services play an important role in both sectors, even though tariffs on water services cannot be determined in the same way as in telecommunications. Full cost recovery must be the guiding principle. While it can be achieved in telecommunications and some WSPs due to economies of scale, the prevalent small WSPs and public discontent with increasing tariffs in the water sector in both Kenya and Ghana prevent adoption of appropriate tariffs. One (and potentially only) solution is to implement well-targeted cross-subsidies to transfer the costs of private connections installed in low-income areas to the wealthier and industrial water users. So far, prices of mobile services are still high but the customers are willing to pay for them. Thus, the MNOs are able to expand and invest in their network while the WSPs do not currently generate enough internal revenues to invest in network expansion. Finally, government and donor subsidies in the water sector and taxes in the telecommunications sector aggravate the financial burden of respective

service providers as well as of consumers. Taxes on water, airtime, handset, etc., have a negative effect on consumption and make services less affordable and accessible.

Considering these lessons and keeping in mind the specific context of water and mobile services provision, the following recommendations can be made:

1. Conduct a detailed analysis of the decision-making dynamics in mixed companies in both the water and telecommunications industries: Understanding the interplay between the interests of the government (including social consideration and government self-interest to increase its budget) and the private sector (profit-maximization) in mixed companies can provide a valuable insight as to whether partial privatization of water providers could attract investments and generate profits while at the same time maintain the pro-poor objectives and expand the provision in remote, sparsely populated and low-income areas. If such analysis supports the seemingly positive experiences in telecommunications and research conducted on mixed firm water providers in Spain, an attempt of partial privatization of one or two water providers in Kenya could provide serve as a test of viability of such arrangement within Kenyan and potentially African context.
2. Conduct a comprehensive analysis of consumer preferences: MNOs know very well when a potential consumer or an existing subscriber will purchase their services and they cater to the needs of all segments of the market. Their use of various arrangements (e.g. Pay4Me) and price packages (e.g. low value airtime cards) enable a consumer to utilise their services any time at an affordable rate. In water sector, however, the needs of consumers are not well understood, particularly by the formal sector. Registered water providers are more concerned with attracting donor funding (meaning that they formulate their goals to fit the demands of donors) than they are with generating revenue by focusing of consumer preferences and needs. Instead, it is usually the informal (secondary and tertiary) water providers that implement innovative approaches to supply water, although such water provision methods (e.g. tanker trucks) are often considered to have a higher risk of contamination. Price comparison indicates that poor consumers often pay more for their water than those with piped connection. This suggests tariffs are not the main barrier to water access but instead, it is the lack of innovative approaches to water provision that would match the particular needs of Kenyan and Ghanaian consumers. A detail analysis of consumer preferences, needs and values, and formulating matching water provision methods could substantially contribute both to expanding access and generating revenues for formal water service providers.
3. Adopt a different market entry approach: In addition to the formulation of water service provision that caters to the specific needs of the consumers, the water sector regulation should adopt the market entry

approach in telecommunications. As in telecommunications, there should be a few water service providers that would be large enough to take advantage of economies of scale. An issuance of a licence must be based on proven technical and management expertise while the political interference in licensing application process and regulatory authorities should be greatly reduced. Such conditions would lead to financial viability of water service providers and enable them to be more self-reliant in generating funds for investment in network expansion.

4. Introduce competition: Competition for the market should be introduced in the water sector. Transparent public tendering process is one way to ensure that the water providers entering the market meet the minimum conditions mentioned above. Furthermore, the performance of the providers should be periodically evaluated (e.g. every 5 years) and if the performance does not meet specific targets, the provider should be replaced through a new tendering process. This would mimic the arrangements in telecommunications sector when a MNO goes out of business. Another possibility is to implement pilot projects to investigate the possible effects of joint water provision (third party access based on infrastructure sharing) on competition, network expansion and investment levels in the context of developing countries. With competition among providers, actors in the sector will focus on expansion, consumer needs and improvements in quality of supply to enlarge their consumer base instead of competing for a larger share of subsidies and external aid.
5. Find alternative sources of funding: Donor funding should be gradually reduced or at least, redirected from financing day-to-day operations of financially weak water utilities to building infrastructure, supporting innovative local ideas (especially in the informal sector) and/or improving the quality water provision among the informal providers. From a legislative perspective and depending on the success of recommended pilot programs, several alternative sources of funding can be raised from partial privatization under the mixed firm form and cross-subsidization from large industry water users to low income households' users. In this regard, a comprehensive analysis of the potential "flight" risks of increasing water tariffs for users in extractive and tourism industry, for example, should be carried out to assess the feasibility of such cross-subsidization.
6. Integrating public opinion into assessments of feasibility of reforms: When implementing reforms in the water sector, the government and the WSPs should monitor public opinion concerning proposed reforms. Since unwanted reforms (including the recommendations proposed here) may result in political instability and violence, resources must be devoted to carrying out public consultations, addressing the causes for dissatisfaction by taking into consideration the findings of the consultations, and designing a marketing strategy to gather extensive public support both through advertisements and direct engagement with the population. In such way, the potential

negative consequences of reforms recommended in this paper can be mitigated to the fullest possible extent.

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Appendices

Appendix A.

Detailed Information on the Levels of Investment

Table A.1. Detailed data on the levels of investment in Ghana.

Ghana			
	Investments in 2000 (\$US million)	Investments in 2011 (\$US million)	Aggregate total (\$US) and time period
Investments in water (donor funding)	N/A	6.52	283.84 million (2005-2011)
• Ghana Water Company Ltd. (GWCL)	N/A	N/A	114.6 million (N/A) ^a
• Aqua Vitens Rand Ltd.	N/A	N/A	103 million (2004) ^b
Investments in telecommunications	0	305.5	~ 3.7 billion (2000-2011)
• Mobitel Ghana (Tigo)	N/A	69	684 million (1992-2011) ^c
• Espresso Telecom (Sudatel)	N/A	N/A	5 million (1995-2007) ^d
• MTN Ghana	0	114	~ 1.4 billion (1996-2011) ^e
• Airtel Ghana (formerly Westel)	N/A	54.1	4.17 million (2007-2011) ^f
• Ghana Telecom (Vodafone)	N/A	68.4	109.4 million (2010-2011) ^g
• Globacom Ghana	N/A	N/A	N/A

^a According to the GWCL website, their budget is funded approximately \$30 million from donors, \$2 million from the government budget and \$3 million from sales revenue per year. Since no annual reports are available online, it is unclear how much of their budget is reinvested. The estimate given here is based on the reported investments in completed projects on the GWCL website at the exchange rate on May 18, 2013.

^b No data on actual investments in physical assets is available. The amount indicated is a loan given by the International Bank for Reconstruction and Development for the project.

^c No data available for years 1993-1998 and 2000.

^d No data available for years 1997, 1999-2002 and 2008-2011.

^e No data available for years 1999 and 2002.

^f No data available for years 2008 and 2010.

^g No data available for years 2008 and 2009.

Table A.2. Detailed data on the levels of investment in Kenya.

Kenya			
	Investments in 2000 (\$US million)	Investments in 2011 (\$US million)	Aggregate total (\$US) and time period
Investments in water (donor funding)	N/A	117.31	~ 601 million (2005-2011)
• Malindi water utility contract	N/A	N/A	0 million (1999)
Investments in telecommunications	130	518.6	~ 5.4 billion (2000-2011)
• Safaricom	68	328.1	~ 2.4 billion (1999-2011)
• Airtel Kenya	40	88	~ 1.6 billion (1999-2011)
• Essar Telecom Kenya (Yu)	N/A	N/A	75 million (2004)*
• Telkom Kenya (Orange)	N/A	102.5	178.5 million (2007-2011)

* No data available for years 2008-2011.

Appendix B.

List of Laws, Regulations, Policy Documents and Reports Used for Content Analysis

Table B.1. Laws, regulations, policy documents, and reports used for content analysis.

Country	Documents	Year
Ghana – Water Sector ^{a b}	Water Resources Commission Act; Act 522	1996
	Public Utilities Regulatory Commission; Act 538	1997
	Community Water and Sanitation Act; Act 564	1998
	Water Use Regulations; LI 1692	2001
	Social Policy and Strategy for Water Regulation	2005
	Urban Water Tariff Policy	2005
	Drilling Licence and Groundwater Development Regulations; LI 1827	2006
	National Water Policy	2007
	Update on the Strategic Investment Plan 2008–2015, Board Draft	2007
	PURC Annual Reports [a total of 7 yearly reports]	2001 to 2005, 2007, 2008
	Communications Service Tax Act; Act 754	2008
	MWRWH: Water and Sanitation Sector Performance Report	2009
	African Ministers' Council on Water: Water Supply and Sanitation in Ghana – Turning Finance into Service for 2015 and beyond	2009/2010
	WRC Annual Report	2011
	National Integrated Water Resources Management (IWRM) Plan	2012
Vitens Evides International: Management Contract 2006–2011 for urban water supply in Ghana	N/A	
Ghana – Telecom. Sector ^{c d}	National Communications Authority Act; Act 524	1996
	National Communications Regulations; LI 1719	2003
	An Integrated ICT-led Socio-economic Development Policy and Plan Development Framework for Ghana	2003
	The Ghana ICT for Accelerated Development Policy	2003
	National Telecommunications Policy	2005
	National Communications Authority Act; Act 769	2008

	Electronic Communications Act; Act 775	2008
	NCA Annual Report	2008
	Electronic Communications Amendment Act; Act 786	2009
	Guidelines for the Deployment of Communications Towers	2010
	License for Mobile Cellular Operations in Ghana	N/A
Kenya - Water Sector ^e	National Policy on Water Resources Management and Development	1999
	Water Act; Act No. 8	2002
	The Water (Plan of Transfer of Water Services) Rules	2005
	The National Water Services Strategy 2007-2015	2007
	Model Water Services Regulations; WASREB	2007
	The Water (Water Services Levy) Regulations	2008
	WASREB Annual Report 2008	2008
	WASREB Annual Report 2010/2011	2012
	Draft of the National Water Policy	2012
	WASREB Impact Reports no. 1, 2, 3, 4, 5 [yearly reports]	2008-2012
	Corporate Governance Guidelines for the Water Services Sector; WASREB	N/A
	Licence for Provision of Water Services; WASREB	N/A
Kenya - Telecom. Sector ^f	The Kenya Communications Act	1998
	The Kenya Communications Regulations	2001
	Capital Markets (Foreign Investors) Regulations	2002
	National Information and Communications Technology (ICT) Policy	2006
	The Kenya Information and Communications Act	2009
	The Kenya Information and Communications (Fair Competition and Equality of Treatment) Regulations	2010
	The Kenya Information and Communications (Universal Access and Service) Regulations	2010
	The Kenya Information and Communications (Tariff) Regulations	2010
	The Kenya Information and Communications (Licensing and Quality of Service) Regulations	2010
	The Kenya Information and Communications (Interconnection and Provision of Fixed Links, Access and Facilities) Regulations	2010
	CCK: Regulated Services in Specific/Relevant Markets in the Telecommunications Market in Kenya; Consultation Paper	2011

	Safaricom: Annual Report and Group Accounts	2012
	CCK: Annual Reports [a total of 11 yearly reports]	2000/2001 to 2011/2012
	Code of Practice for the Deployment of Communications Infrastructure in Kenya ^g	N/A

^a *Water Resources Commission of Ghana*. Accessed April 29, 2013, <http://wrc-gh.org/en>.

^b PURC website. Accessed April 20, 2013, <http://www.purc.com.gh/>.

^c *Ministry of Communications*. Accessed April 29, 2013, <http://www.moc.gov.gh/>.

^d NCA website. Accessed April 29, 2013, <http://www.nca.org.gh/>.

^e WASREB website. Accessed April 30, 2013, <http://www.wasreb.go.ke>.

^f CCK website. Accessed April 20, 2013, <http://www.cck.go.ke/>.

^g Code of Practice is guidelines for voluntary industry self-regulation.