# ICT DEVELOPMENT IN KENYA: What Role Has The State Played?

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Submitted to Central European University Department of Public Policy

In partial fulfilment of the requirements for the degree of Master of Arts in Public Policy

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Budapest, Hungary

2012

### **AUTHOR'S DECLARATION**

I, the undersigned ......Kabura Ciugu...... hereby declare that I am the sole author of this thesis. To the best of my knowledge this thesis contains no material previously published by any other person except where due acknowledgement has been made. This thesis contains no material which has been accepted as part of the requirements of any other academic degree or non-degree program, in English or in any other language.

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# ABSTRACT

This paper examines what role the state in Kenya has played as regards the growth experienced in the ICT Sector in the country between 2000 and 2010. The study focusses on the two most common forms of ICT in Kenya: mobile telephony and internet access. The inquiry is conducted by way of a single case, temporal case study on Kenya; selected as an extreme case on the continent due to the outstanding growth the ICT sector has experienced over the past decade. An integrated analytical framework is used to analyse the case, based on 1) factors influencing diffusion of ICT in a country; and 2) the role a state can play in the diffusion of ICT in a country. The results indicate that it is not viable to seek a single response to the research question. Instead, the hypothesis is proven true – in line with the standpoints taken by various scholars in the literature review – that the role of the state in the growth of ICT varies depending on the specific activity in question and the influence and outcome the state wishes to have.

# ACKNOWLEDGEMENTS

My gratitude goes first to my family, for always cheering me on and putting a smile on my face. I am also immensely grateful to my Hungarian family - Juli and Máté, for the herb tea, snickers bars and most importantly, introducing me to kifli. Heartfelt thanks to my supervisor Professor Thilo Bodenstein for his support and guidance in writing this thesis. My appreciation goes also to Sanjay Kumar, for the invaluable CAW sessions. I appreciate all the friends – old and new – with whom I have shared the experiences of this past year. Most importantly, I thank my God: Great is Thy faithfulness! Morning by morning new mercies I see.

# TABLE OF CONTENTS

INTRODUCTION	1		
Overview of ICT Growth	1		
The Situation in Kenya	2		
Purpose of the Study	2		
Structure of the Study	3		
CHAPTER 1: LITERATURE REVIEW	5		
1.1 The Role of ICTs	5		
1.2 ICT, Innovation and the State	6		
1.3 A Review of Government Strategies	8		
1.4 Factors affecting ICT diffusion	9		
CHAPTER 2: METHODOLOGY 1	3		
2.1 Factors Affecting ICT Diffusion1	4		
2.1.1 Enablers and Means1	5		
2.1.2 Usage of information services1	6		
2.1.3 ICT Sector development1	7		
2.2 Roles of the state in ICT growth:1	7		
2.2.1 Regulation1	8		
2.2.2 Promotion	8		
2.2.3 Dissemination1	9		
2.3 An Integrated Approach:1	9		
CHAPTER 3: CASE STUDY – ICTs IN KENYA	2		
3.1 Kenya – An Overview	2		
3.2 ICTs in Kenya	3		
3.3 Scope and Justification of Case Study25			
3.4 Factor 1: Enablers and Means26			
3.4.1 Income and Pricing2	6		
3.4.2 Market Incentives	8		
3.5 Factor 2: Usage of Information Services2	9		
3.5.1 Demographic factors29			
3.5.2 Cultural factors			
3.6 Factor 3: ICT Sector Development			

3.6.1 Presence of an institution	
3.6.2 Presence of a strategic plan	34
3.7 Discussion of Main Findings	
CONCLUSION	
BIBLIOGRAPHY	

# LIST OF TABLES AND FIGURES

Figure 1 - Factors Affecting Diffusion of ICT	15.
Figure 2 - Roles of the State in ICT Growth	18
Figure 3 - An Integrated Approach to Analyze Role of the State in ICT growth	20
Figure 4 – Map of Kenya	23
Figure 5: Kenya's ICT Revolution	24
Figure 6: 2010 Internet and mobile penetration – Kenya vs. Africa average	25
Figure 7: Kenya – Real GDP %	27
Figure 8: Government Investment in US\$ (2000-2010)	28
Figure 9: Kenya Population Growth Rate %	30
Figure 10: Kenya Age Structure (2010)	31
Figure 11: Summary of findings	35

### LIST OF ABBREVIATIONS

- **BPO** Business Process Outsourcing
- CCK Communications Commission of Kenya
- CIA Central Intelligence Agency
- GDP Gross Domestic Product
- HDI Human Development Index
- ICT Information, Communication Technologies
- IFPRI International Food Policy Research Institute
- IMF -- International Monetary Fund
- KES Kenya Shilling
- PPP Public-Private-Partnership
- UNCTAD United Nations Commission for Trade and Development
- UNDP United Nations Development programme (UNDP)

# INTRODUCTION

### **Overview of ICT Growth**

Over the first decade of the new millennium, the Information Communication Technologies (ICTs) sector in Kenya outperformed all other sectors in the economy and grew at an average of 23% between the years 2000 and 2010 (World Bank, 2010). This aggressive growth pattern seems consistent with the International Monetary Fund's prediction in 2001 that the world was in the cusp of a technological revolution. The organization made a bold forecast that the next decade would be characterized by technological transformations which would provide vast opportunities for developing countries to transition faster into the realm of developed nations (IMF, 2001).

This prediction linking technological expansion to enhanced opportunities has proven true, and the rate of ICTs growth especially in the developing world has become a global phenomenon, prompting increased discourse on the topic. Since the year 2000, there has been a renewed interest in the study of ICTs, with more academicians, renowned media houses and international organizations contributing to the body of knowledge in this sector. The strands in the literature range from analyzing the role ICTs played in the development of certain nations, notably Japan and South Korea in Asia (Jussawalla, 1999), to how these lessons can be replicated in other parts of the world (Frieden, 2005). Further, a notable number of researchers have analyzed the impact of ICT adoption on various sectors in a country's economy and the specific ways in which the process and pace of ICT adoption and diffusion can be improved (Avegrou, 1998). In recent times, there has been considerable interest in linking innovative use of ICTs by the government, the private sector and individual citizens to the development discourse (Heeks, 2008). This latest strand of research is commonly labeled ICTs for Development (ICT4D) and is increasingly popular especially for developing nations.

# The Situation in Kenya

The global trend in ICT growth has manifested itself in the African continent. Kenya in particular has garnered considerable interest due to the country's emergent status as a leader in use of transformational technology with some reports touting it a potential "Silicon Valley of Africa" (World Bank, 2010). As expected, academic research on ICT enabled interventions in the country over the past decade has been extensive, ranging from analysis of the challenges, opportunities and best strategies that the country should undertake (Omwenga, 2009), to patterns of diffusion of technology and effects of such diffusion (Opiyo & K'Akumu, 2006; Mbarika et.al, 2007). In addition, the topic of technological innovation in the country especially in the commercial (Kanothi, 2009), financial (Morawczynskia, 2009), health (Simba & Mwaghu, 2005) and education sectors (Kinuthia, 2009) has garnered considerable attention. However, the body of literature relating to ICT growth in Kenya does not seem to have engaged on the topic of what role the state has played in the growth noted in the sector over the past decade.

# Purpose of the Study

In view of this gap in the literature regarding analysis of the role of the state, this study hopes to contribute by answering the question "what role has the state played in the significant growth of the ICT sector as presently evidenced in Kenya?" The working hypothesis is that the roles of the state vary based on the activities the state wishes to influence. The study attempts to answer the research question by conducting a case study analysis. The methodology borrows from established theories formulated based on countries that have experienced strong and sustained ICT growth and applies those theories to the Kenyan case in order to determine the relationship between theory and practice as relates to Kenya. The choice of a single case, temporal method of analysis is deemed ideal because it enhances focussed analysis, understanding and explanation of the phenomena surrounding the role of the state in ICT growth. Furthermore Kenya is chosen since in the last decade, it has emerged as one of the most famous success stories in Africa as relates to ICT diffusion. As a result, I hope that selection of this extreme case will shed insights on the role the state can play in enhancing ICT growth and that any lessons – positive or negative - drawn from the results of the research can be applied to other countries in the region and beyond (Gerring, 2008).

# Structure of the Study

The case study analysis will be based on extensive review of secondary data, guided by criteria from a combined methodological framework consisting of two parts: 1) analysis of factors that influence diffusion of ICT (Trkman et al., 2008) and 2) analysis of various ways in which governments can intervene in the ICT sector (Jordana et al., 2005). The merging of these two separate analytical tools was pertinent in enhancing the robustness of the case study by ensuring the role of government is analyzed first based on factors that enhance diffusion of ICT and then based on the various strategies as revealed in the literature review.

As a thesis project, the scope of this study is ultimately limited by time and length constraints. Consequently, despite the extensive usage of the term "ICT sector" to cover a range of technologies, this study narrows down the focus to two main drivers of ICT as observed in the Kenyan context. As such, only two aspects of ICT are considered here: the penetration of mobile telephony and access to broadband internet. Further, given that no similar work exists on this topic in Kenya, this analysis is undertaken from a largely macro level standpoint. Accordingly, information is gathered from review of various secondary data sources as opposed to the more nuanced micro-level interrogation which would include at a minimum, personal interviews with high level officials in government and private sector in order to gain a more explicit understanding of the role the state has played in the witnessed growth of ICT in Kenya.

All in all, through this study, I try to see whether existing theories inform actual practice in the ICT sector in Kenya. Thus, the study proceeds in the following manner: Chapter 1 gives a brief understanding of the literature surrounding ICT growth and the role of governments; Chapter 2 outlines the combined frameworks of Trkman et al., (2008) and Jordana et al., (2005) in order to come up with an integrated analysis tool; Chapter 3 delves into the Kenya case scenario, where a detailed analysis is presented based on various secondary sources; Lastly comes the Conclusions segment where the lessons and implications of the study both in practical as well as theoretical terms are discussed.

# CHAPTER 1: LITERATURE REVIEW

# 1.1 The Role of ICTs

The role of Information Communication Technologies (ICTs) in enhancing economic and social growth has been documented by various studies (Waverman et al., 2005; Mcquaid, 2002; Lehr et al., 2005; Forge & Bohlin, 2005). The consensus according to the body of research is that enhanced technology in a country plays a critical role in jump-starting the economy and in many cases has been shown to be a source of potential competitive advantage, capable of transitioning developing countries to the developed countries realm. Over the past decade, fuelled largely by improved levels of inter-connection and globalization, there has been growing interest and increased public discourse on the potential of ICTs to facilitate country development. This has resulted in notable amounts of public and scholarly discussions ranging from reports by international organizations (World Bank, 2009; UNCTAD, 2011) as well as government reports and country roadmaps to ICT growth (Government of India, 2004; Republic of Rwanda, 2004).

UNCTAD (2010) describes Information Communication Technologies (ICTs) as encompassing both goods and services solely intended to be displayed, transmitted and processed by electronic means. This includes the manufacture of computer, electronic and telecommunications equipment as well as provision of ICT-enabled services such as business process outsourcing (BPO) as well as Information Technology consulting. However, emergent patterns of ICT diffusion indicate that unexpected trends are manifesting themselves in the developing world. One of the most outstanding is the nascent role of the mobile phone as an ICT tool (Castells et al. 2009; Ling & Donner, 2009). As such, the discourse of ICT when it comes to developing countries, especially in Africa has ultimately come to revolve around penetration of mobile phone services and access to internet. Inspite of the many available tools of implementing ICT goals, the literature on the topic remains consensual on the importance of state involvement and national strategies in the achievement of success in this sector. The technical revolution being witnessed in the world requires strong foundations for continuous technological development and innovation in order to remain competitive and enhance global opportunities (IMF, 2001; Hanna, 2003). As such, the discussion in this section outlines the role of the state in ICT sector development and the various specific strategies that a government can adopt in this area. Furthermore, factors that are considered necessary to enhance sustained growth in the ICT sector are reviewed in a bid to gain a deeper understanding of the core question of this study "what role has the state played in the significant growth of the ICT sector as presently evidenced in Kenya?" The premised thesis is that the roles of the state vary based on the activities the state wishes to influence.

# 1.2 ICT, Innovation and the State

A discussion of the importance of growing the information technology sector would be incomplete without a mention of the importance of continuous innovation. As illustrated by Freiden (2005), exponential increases in levels of globalization have resulted in an increase in the intensity, speed and regularity of information exchange around the globe. As such, any competitive advantages a country may have in the technology field can be easily and quickly erased. In light of this, I suggest that it is crucial that any policy directed at growing the information technology sector be as well accompanied by a focus on continuous improvement facilitated by encouraging constant innovation as well as building tools that aid continuous investment. This is reiterated by Bauer (2010), who concedes that continued competitiveness and growth implicitly calls for constant reform and sustained investment in building an innovation culture in the Information Technology sector. This need for continuous, innovative improvement and regular, sustained investment as required for successful growth of the ICT industry indirectly necessitates significant involvement of the government in several areas. Various authors in the literature echo this stance and maintain that government is the key driver of development in the ICT sector (Forge & Bohlin, 2005; Freiden, 2005). As Bauer (2010) reports, government involvement is split into two general types – the first is market liberalization, where, as the name suggests, the sector is left to the forces of demand and supply and where the government has very little control and/or involvement in sector happenings and outcomes. This type of situation is clearly observed in the United States of America's telecommunications market.

On the other end of the spectrum is the non-liberal approach, where the government plays a significant role in the direction taken by telecommunication growth. This approach is characterized by a heavy reliance on public sector initiatives and policies in order to enhance and sustain development and growth. The best examples of this non-liberal approach are the South Korea and Japan ICT trajectories. However, despite the various differences in practice and planning, both approaches involve a certain focus on the role of government in enhancing the division of the ICT sector. The importance of the government's role is emphasized further when we consider the findings of Hargittai (1999) and Beilock & Dimitrova (2003) who acknowledge that the two main factors that influence the rate of ICT adoption in a country are: the economic wealth of the country and the policies in place within the telecommunications sector. Therefore, an important emergent theme is that regardless of which approach a state decides to adopt, success in the ICT sector nevertheless requires the state to play a part. When one takes into consideration the fact that policy is set primarily by the state, (Flinders, 2006) then the role of government in the development of the ICT sector cannot be emphasized enough.

# **1.3** A Review of Government Strategies

Keeping in line with the emerging necessity of state involvement, Falche (2007) notes that the main way the state participates is through setting policy initiatives and frameworks. Further measures can include regulatory programs that touch on fiscal incentives such as tax incentives and subsidies and industrial programs such as incentivizing public private partnerships. In addition to the distinctions made by Bauer (2010) regarding the liberal and non-liberal approaches, Jordana et al. (2005) elaborates this concept further by categorizing government roles into three as follows: 1) Regulation; 2) Promotion; and 3) Dissemination.

The first category - regulation - is broadly perceived to be a form of direct intervention in a distinctly non-liberal manner. It is characterized by the state being heavily involved in the development of an ICT environment, mainly from a legalistic and rule-making approach. This can extend from the level of national plans to the innovation aspect. According to Bauer (2010), the efficiency of a regulation strategy is highly dependent on the manner in which it is implemented. Further, the level of regulation in the ICT sector has the potential to influence greatly the level of competitive intensity and as a result the level of investment and hence innovation encountered in the sector in comparison to other sectors in the economy.

The second form of intervention – promotion - is decidedly liberal and mainly involves analysis of the ICT supply side or production factors. It is concerned with the government's approach to supporting and encouraging production of ICT through such strategies as improving infrastructure networks for both software and hardware. It may involve initiatives by the government to market the sector to potential investors in order to create supply and therefore influence the behaviour of the industry (Jordana et al., 2005). Quite commonly, it involves taking measures to create equal opportunities for all industry players as well as incentivize potential private actors to get involved in the sector through reducing transaction costs. Such incentives may include tax subsidies and tax breaks for firms involved in ICT investment or innovation and accelerated depreciation options (Bauer, 2010).

The third intervention – dissemination - is also a liberal market oriented approach that is more concerned with creating a conducive environment to enhance demand for ICT. This intervention is designed to encourage or discourage consumption of ICT products within the general population. Such policies may include household and individual tax credits as well as the availing to the public discounted vouchers if they consume certain ICT products. This in turn, serves to increase the level of ICT demand (Jordana et al., 2005). In many start up sectors, the state itself acts as the main consumer of products from the sector and incrementally influences demand.

# 1.4 Factors affecting ICT diffusion

In addition to outlining the three ways in which the government may get involved in the ICT sector, it is important to analyse the factors that influence how fast ICT diffuses within a society in order to critically analyse which role the government can or may play. Various ideas are presented in the vast literature on the topic, but they coalesce into the themes covered by Trkman et al. (2008). These are: 1) Enablers and means; 2) Usage of Information Services; 3) ICT sector development.

The first group of factors, enablers and means (Trkman et al. 2008), are largely market factors and involve the analysis of incentives that boost the function of market supply and demand players (Falche, 2007; Waverman et al, 2007). As noted by Bouras et al. (2009), the supply-side factors revolve mainly around the provision of good quality infrastructure – both in terms of content and hardware. Good infrastructure, as Waverman et al., (2007) observes, results in better quality services at lower prices, which in turn serves to stimulate higher

demand. As documented by Lee & Brown, (2008) the ICT pricing levels are closely linked to the economic and financial capability among the population which in turn exerts a great influence on whether, and to what extent ICT growth will take place. In addition, the average levels of income as well as the size of the population will affect how attractive the ICT service market is to potential investors – which directly influences the level of diffusion (Freiden, 2005).

The second group of factors are concerned with the usage of information services (Trkman et al., 2008) and include demographic and geopolitical influencers of ICT diffusion. In addition to the level of population density in a certain area, the cultural environment present in a certain country may play a central role in determining how receptive a society is to ICT services. As Erumban (2006) reiterates, the general view of technology within the wider society affects the pace of adoption among the populace. Some countries may therefore be observed to be earlier adopters of a certain technology, all because of the prevailing country culture. Further, Kellerman (2004) analyses the diffusion rate from a sociological aspect and notes that urbanites adopt ICT faster than people living in the rural areas. Freiden (2005) links these lower levels of e-readiness partly to educational literacy. By default, higher levels of technology literacy are to be found in the urban areas. As such, promotion of digital literacy in both the urban and rural areas through such initiatives as training courses, improved curricula can go a long way in enhancing the level and pace of diffusion of ICT in a Additionally, Freiden (2005) notes that ICT diffusion is enhanced by digital country. empowerment in the form of community outreach and funded pilot programs, to name a few. Further, offering better methods to access the digital world can greatly increase aggregate demand for ICT services.

The third group of factors are those related to ICT sector development (Trkman et al. (2008) and include regulatory factors which revolve around the manner in which the telecommunications sector is framed (Freiden, 2005). This involves among other things, presence of a strategic vision which orchestrates and tracks the emergence, development and growth of the ICT sector. Further regulatory factors revolve around influencing the structural market and industry changes through incubation and other forms of legal and political policy in order to enhance the performance and growth of the ICT sector. Deficient planning in many cases may result in malfunctioning of the entire sector and could lead to failure or stagnation of ICT development (Bouras et al., 2009). In addition, regulatory factors play a part in stimulating private investment as well as orchestrating the market players in a manner that reduces anti-competition practices and levels the playing ground as much as possible (Forge & Bohlin, 2008). Closely linked to regulatory framework is the question of political regime. Milner (2006) asserts that autocracies tend to want to hold on to power and hence may hinder development of ICT in the fear that such developments could pose a risk to their power. As such, the analysis of the regulatory framework needs to take into consideration the form of political regime in place.

The ideas discussed in this chapter seek to outline the various strands of literature relevant to the research question raised in this study: "what role has the state played in the significant growth of the ICT sector as presently evidenced in Kenya?" To begin with, the chapter begins with a reiteration of the important spot ICT has taken in world development and economic growth especially in developing countries. Further, the link between the growth in ICT and innovation is established, hence implicitly pointing towards the need for government involvement, given the substantial investment required to sustain a competitive and innovative ICT sector. After outlining the importance of the state and establishing that there must always be some form of state involvement, the literature review focusses on the various ways that the state can get involved. First, the general concepts of liberal and non-liberal government approaches covered, and are thereafter broken down further based on the more specific work of Trkman et al. (2009). The last section surveys the different factors that are likely to affect the pace of ICT diffusion in a country as conceptualized by Jordana et al. (2005) among others. The concepts reviewed in this chapter are expected to form the building blocks of the integrated analytical framework as outlined in the methodology section in the next chapter.

# CHAPTER 2: METHODOLOGY

Moving on from the literature review, this chapter sets out an analytical framework upon which the main question in this study is analyzed: "what role has the state played in the significant growth of the ICT sector as presently evidenced in Kenya?" Building on the examination of the literature as documented in the previous section, this chapter hopes to present a focused framework that incorporates the main ideas in the literature review and assimilates them to test the thesis statement in this study: the roles of the state vary based on the activities the state wishes to influence. The use of an analytical framework is a crucial step in guiding the process of case study evaluation (Gerring, 2008). Further, by using an existing framework developed for a different region, one is able to infer whether the theoretical frameworks used are sufficient to inform the practices evident in Kenya, and if so, to what extent. In this way, the body of research surrounding ICT and public policy is enriched either by widening the scope of the framework or by identifying explanatory gaps and suggesting improvements to the framework.

As discussed in the previous literature review section, in order to come to a relevant and reliable conclusion on the research question posed in this study it is necessary to analyze two aspects of ICT growth. The first concerns factors affecting diffusion of ICT in a country, while the second is concerned with what roles the state can play in development of the ICT sector in a country. I concede that in order to come to an informed, robust and viable response to the research question, these two perspectives must be analyzed concurrently. Once we are able to identify the specific factors that have led to an increase in the level of ICT diffusion in Kenya, we can then proceed to evaluate whether these factors were influenced by state intervention or not. As such these two frameworks covering both perspectives are identified and merged to create an integrated analytical tool.

The first framework is by Trkman et al. (2008) and deals with factors that influence diffusion of ICT in any given country. The second framework was developed by Jordana et al. (2005) and it analyzes the different ways in which government policies can enhance ICT growth in a given country. A detailed review of both frameworks is presented below, covering the specific criteria covered under each framework. Subsequently, the two frameworks are synthesized to come up with an integrated evaluation framework that will be used to analyze the Kenyan case. It is important to note that the integration of these two frameworks is solely meant to enhance the robustness of the methodological analysis and is not in any way intended to infer causality.

# 2.1 Factors Affecting ICT Diffusion

In a bid to determine the reasons explaining the difference in ICT diffusion among European Union countries, Trkman et al. (2008), undertook an extensive factor analysis that can be used to explore the appropriate policies necessary for increased diffusion of technologies within countries and even regions. The study identified the main determinants of ICT diffusion to be: a) Access to enablers and means; b) Level of usage of information services; and c) Level of ICT sector development. Each of these categories are diagrammatically outlined in Figure 1 below and further discussed in the following segments.

**Figure 1: Factors Affecting Diffusion of ICT** 



Source: Trkman et al. (2008).

#### 2.1.1 Enablers and Means

The first category outlines the level of access to enablers and means which propel ICT diffusion. This mainly includes economic indicators that may affect the ability to access ICT services. The analysis undertaken by Trkman et al. (2008) distinguishes between supply side and demand side determinants. The supply side includes the ICT service providers, and for them, the factors included in this category cover the level of government support as measured by the number and amount of economic incentives such as: tax cuts, favourable legislation, sector funding and research and level of infrastructure. In the same way, the access to enablers and means can affect the demand side of the ICT market. This focusses mainly on

consumers and includes the level of infrastructure as well as the general income levels since the amount of disposable wealth as well as availability of reliable and quality infrastructure networks will determine whether a potential consumer will take up ICT. Therefore, as indicated in Figure 1 above, the main criteria used in the analysis of enablers and means category are: i) Income and pricing; and ii) Market Incentives. These indicators will be explored further in the actual case study analysis undertaken in the later in this study.

#### 2.1.2 Usage of information services

The second category relates to levels of usage of information services, and focus on factors that will affect how often ICT services are utilized in a given country (Trkman et al., 2008). The main focus rests on a decidedly social dimension with a lot of influence being placed on demographic and geopolitical factors. For the supply side (service providers), the attractiveness of a sector is of high importance. This encompasses the population levels vis a vis economic returns. The higher the number of potential customers, the higher the potential investor returns. In addition, the political regime in power at any given time is a strong indicator of the future political environment and communicates the current and future attractiveness of a sector to the business community. For the demand side (ICT end consumers) the important considerations under this category include the lifestyle and cultural outlook in a given society which indirectly signals the 'e-readiness' in terms of digital literacy and desire or lack thereof to embrace technology. As such, as indicated in Figure 1 above, the main criteria used to analyze determinants in this category are: i) Demographic factors ii) Cultural factors. These will be covered in greater detail in the subsequent case study section of this study.

#### 2.1.3 ICT Sector development

The third category is concerned with analysis of the level of ICT sector development in a given country (Trkman et al. (2008). This by default incorporates the overall framing and improvements in the telecommunications sector. For the supply side – service providers, the indicators for this category include prescence of a national strategic vision incorporating such aspects as funding and regulation. As well, the prospective formation of successful public-private partnerships which will in turn enhance the growth, development and diffusion of suppliers in the ICT sector. Similarly, for the demand side (consumers), existence of a strategic vision is of high importance for similar reasons as those outlined above. However, in addition to the funding and regulation aspects, the demand side is strongly propelled by having incentivized digital empowerment – ranging from e-government initiatives to funding of e-business competitions. Therefore, the main indicators identified under this category are: i) Prescence of institution; and ii) Prescence of a strategic plan. These are outlined in Figure 1 above and further elaborated on in the next section of this study.

# 2.2 Roles of the state in ICT growth:

In addition to analyzing the factors affecting the spread and diffusion of ICT technology as detailed in the first framework by Trkman et al., (2008) above, Jordana et al. (2005) conducted a pivotal study on government initiatives in Spain. This study provides a focused analysis of public policies geared to increase the level of ICT diffusion and lead to growth of the sector. The authors determine three possible classifications of roles that governments can play in this diffusion process. These are: 1) Regulation; 2) Promotion; and 3) Dissemination, all of which are diagrammatically outlined in Figure 2 and discussed further below.

**Figure 2:Roles of the State in ICT Growth** 



Source: Jordana et al. (2005).

#### 2.2.1 Regulation

Under this classification, the government is seen as the main rule-maker. The government is largely involved in defining the path and giving instructions within the telecommunications sector. This classification focuses largely on the ways in which the government controls how things will be done in the sector, specifically as regards to formation and interaction of market forces. An important aspect of the role of the state in this category involves promoting ICT consumption as well as enhancing fair and sustainable competition (Jordana, et al., 2005).

#### 2.2.2 Promotion

This second classification is concerned with the extent to which the government supports and encourages the production side factors that enhance ICT growth. This relates to the relationships established between the state and suppliers of ICT, as well as any incentives the government profers to the supply side of the ICT market equation. Promotion can occur, among other ways, through financing key aspects of ICT growth such as infrastructure networks – encompassing both content (software) and hardware. This category is critical in analysis of government intervention in ICT and will be taken up further in the case study section of this study.

#### 2.2.3 Dissemination

The third classification is concerned with the extent to which the government supports the spread of ICT through stimulating higher consumption from the demand side of the ICT market equation. This can be done in a myriad of ways, including through acting as a user of technology or through advocating for its use through expanding technological capabilities, enhancing availability of the technology through improved infrastructure, among many others. The role of government as an encourager of demand and consumption will be taken up further in the next chapter which deals with the actual case study.

# 2.3 An Integrated Approach:

After reviewing the main aspects of the two frameworks introduced at the beginning of this chapter: firstly the factors that enhance ICT diffusion and secondly the ways in which the state can get involved in boosting the ICT sector, it is imperative to find a way to merge them into a single integrated work in order to solidify the methods and enhance confidence in the results of the case study analysis of ICT in Kenya. As noted earlier, in order to arrive at a grounded analysis of the role the state has played, the viewpoints of both authors mentioned above will be combined to come up with an integrated framework as shown diagrammatically in Figure 3 below.



Figure 3:An Integrated Approach to Analyze Role of the State in ICT growth

Source: Author's representation based on Trkman et al., (2008) and Jordana et al., (2005).

The integrated framework (refer to Figure 3) does not claim to infer causality between the individual frameworks, but instead provides an opportunity to combine two separate techniques of analysis in one study, thereby enhancing the overall robustness of the final framework. In sum, two criteria will be analyzed in relation to Kenya for each category identified under the determinants of ICT diffusion in a country (Trkman et al., 2008). Consequently, each criterion analyzed will be related to state action as illustrated by the classifications outlined by Jordana et al. (2005). The application of this integrated framework to the actual Kenyan case is done in detail in the following chapter.

# CHAPTER 3: CASE STUDY – ICTs IN KENYA

In this chapter, the theoretical background discussed in the literature review section and simplified into a framework in the methodology section is applied to an actual case in order to arrive at a nuanced understanding of the relationship between the theory and practice as regards the diffusion of ICT and what role the state plays. The goal is to arrive at a definite response to the research question: "what role has the state played in the significant growth of the ICT sector as presently evidenced in Kenya?" The hypothesis is that the roles of the state vary based on the activities the state wishes to influence. In line with this goal, the chapter proceeds by discussing briefly the history and general facts about Kenya, then moving to a review of the ICT sector and the gains made therein. Finally, an analysis of the country based on previously mentioned criteria (refer to Figure 3) will be done. The information garnered will be based on secondary literature ranging from government reports and web pages, international organizations annual and sectoral reports and statistics as well as from credible media sources as the need may be.

# 3.1 Kenya – An Overview

Kenya is a country of approximately 40 million people, located on the East coast of Africa and bordered by Ethiopia, Somalia, Sudan, Uganda and Tanzania (see Figure 4 below). Due in part to the relative stability compared to a number of bordering countries; and also due to the fact that it connects the Indian Ocean coast to a number of land-locked neighbours, Kenya has become an economic and communications hub in the region. The capital city – Nairobi is home to a number of international organizations, making the country relatively multicultural even though the main languages remain English (official language) and Kiswahili (national language). As at 2010, Kenya was ranked 128 out of 169 countries in the United Nations Development programme (UNDP) Human Development Index (HDI), a widely accepted measure of national development. The Kenyan economy is driven mainly by agriculture which employs 80% of the population and contributes 25% to the Gross Domestic Product (GDP). Although the country is one of the most industrialized in the region, industry contributes only 10% to the GDP. However, this is slowly beginning to change as evidenced by the World Bank (2010) report which asserts that in the period between 2000 and 2010, the ICT sector grew six times over and that without it, the Kenyan GDP would have stagnated to the rate of population growth.

#### Figure 4: Map of Kenya



Source: CIA World Factbook.

#### 3.2 ICTs in Kenya

These seemingly changing tides in the Kenyan economic sector brings us to a focus on the history and progression of the ICT sector in Kenya. According to Waema (2005), until 1999 when there were a number of structural changes in the government management of ICT, the sector was under seven different ministries. However, following the focussed restructuring

and decentralization of the sector, the growth figures started to grow stronger. From a miniscule 3% of Kenyans covered by mobile telephony in the 1990's, the numbers by 2010 stood at 90% penetration for Kenyan adults. Further, the internet penetration rate has increased from less than 1.6% in 2000 to above 20% in 2010. Figure 5 below maps the increase in mobile and internet penetration from 1999 to 2010 while Figure 6 outlines the level of penetration of internet and mobile telephones in Kenya in relation to the rest of the African continent as at 2010. When the information contained in both graphs is considered simultaneously, it is clear that Kenya has experienced phenomenal growth in the ICT sector in the years between 2000 and 2010.





Source: World Bank: Kenya Economic Update, (2010)



Figure 6: 2010 Internet and mobile penetration – Kenya vs. Africa average

Source: ITU and World Bank estimates

# 3.3 Scope and Justification of Case Study

The impressive growth outlined above, coupled with the transformative potential of ICT has placed Kenya on the global ICT development map, with some stakeholders holding the opinion that the country may be at a tipping point, with regards to experiencing an ICT revolution (World Bank, 2010). This claim is backed up by various research projects undertaken in Kenya (Omwenga, 2005; Opiyo & K'Akumu, 2006; Mbarika et al., 2007). Additionally, the numerous reports on innovative solutions to local problems in the education (Kinuthia, 2009), health (Simba & Mwaghu, 2005), financial (Morawczynskia, 2009) and commercial (Kanothi, 2009) sectors gives further credence to the World Bank claim above. However, the general term "ICT revolution" describes a wide array of technologies; more than a limited study can analyse. According to World Bank (2003), Information Communication Technologies consist of software, hardware, networks and media for collection, presentation, transmission and storage of information via texts, data, voice and

messages. However, as noted by Chew et al. (2010), when it comes to the developing world, the technology that has diffused the fastest is the mobile telephone followed closely by internet access. As such, these two aspects of ICT are going to be the focus of this case study. In addition to being a country classified as part of the developing world, where the most notable ICT growth is occurring, Kenya was chosen as the focus country due to the widely reported strong and consistent growth witnessed in the country's ICT sector in the last decade. As such, the country can be considered an extreme case which will enrich the literature as well as garner lessons that will inform public policy in Kenya as well as other countries undergoing growth in ICT, both in Africa and the rest of the world. Lastly, the fact that the growth spurt occurred in the years between 2000 and 2010 necessitates that the study focusses on that decade during the case analysis. The case study will progress based on the analysis of each of the factors that affect ICT diffusion as outlined in the integrated framework (refer to Figure 3) followed by an evaluation of which category each of the criteria falls under, based on the three roles of the state identified in the previous chapter.

#### 3.4 Factor 1: Enablers and Means

Based on the discussion regarding the evaluation of factors affecting diffusion of ICT, the category of enablers and means included indicators that were economic and market oriented. The two identified ones as per Figure 3 are: 1) Income and Pricing and 2) Market Incentives; both of which are discussed in further detail below in regards to Kenya.

#### 3.4.1 Income and Pricing

This indicator refers mainly to the extent that affordability drives uptake and diffusion of ICT in a given country or society. The premise is that the more affordable the products in the market are, the higher the rate of consumption will be. Hence, to analyse this indicator, we assumed that the level of affordability can be determined by analysing the level of GDP and comparing it for the years between 2000 and 2010, with the assumption that higher GDP would mean more disposable income and therefore a higher propensity to consume more ICT products.

Based on the review of the GDP trends as indicated in Figure 7 below, it would seem that Kenya's GDP did not grow in a simple incremental fashion. As such, by comparing this trend with the notably smoother graph lines in Figure 5 (representing rate of internet and mobile phone penetration) I would conclude that the general income of the population considered independently does not seem to play such an important role in influencing ICT diffusion.







On the other hand, when we consider the pricing of the ICT tools, then the trend reveals that in Kenya, a dramatic drop in pricing was witnessed between the earlier years of the decade. World Bank (2010) and Communications Commission of Kenya (2011) indicate that the price of a phone call per minute fell from KES 16.8 in 2002 to KES 3 in 2010. Such a drastic change over the decade may mirror better the trend observed in terms of penetration as shown in Figure 5. As such, it seems that even in situations where the income levels are not growing, an initiative that reduces pricing of ICT products could result in a higher level of consumption, hence higher diffusion levels.

#### 3.4.2 Market Incentives

The second indicator under enablers and means is linked to the attractiveness of the ICT market in a given country and to what extent it encourages investment. In the case of Kenya, the main ways that the attractiveness has been enhanced is through tax breaks on mobile telephones and business transactions undertaken using a mobile phone. The investments range from infrastructure to setting up business process outsourcing centres in order to stimulate local investment into the sector (CCK, 2011). Furthermore, the general level of targeted investment in the sector has undergone massive change. Since the year 2000, the ICT sector enjoys a generous portion of the national budget, as opposed to periods prior to 1999 when it was virtually ignored. Figure 8 reveals the amounts the government has invested in different areas of the ICT sector between the years 2000 and 2010.

Figure 8: Government Investment in US\$ (2000-2010)

Area	\$ Millions
Mobile Services	3,200
Fixed Telephone	3,000
Undersea fibre optic cable	700
Internet & Data services	60
Business Process Outsourcing	0.5
	10

Source: ITU: Kenya Statistics 2010.

Based on the two types of initiatives observed under the enablers and means categories, and tying them to the government roles as outlined by Jordana et al. (2005), it would seem that the government in this case is taking a regulatory role when it comes to income and pricing, while it seems to veer more towards the role of promotion when it comes to the market

incentives indicator. This is because the reduced prices as noted under pricing and income are directly a result of increased competition in the market, which in turn came about due to lowered entry barriers (CCK, 2011). As such, the state is bound to have improved the regulatory environment of the ICT sector in order to simplify and equalize the market for all potential investors. Infact, ITU (2012) describes the Kenyan ICT market as one of the most competitive in the region. On the other hand, the analysis of the market incentives indicator reveals that the government is working hard to stimulate supply side investment. Based on the categories conceptualized by Jordana et al. (2005), such activity is clearly recognizable as a promotion antic.

# 3.5 Factor 2: Usage of Information Services

The second category based on Trkman et al. (2008) is closely linked to the social aspect of ICT diffusion and is analysed based on two indicators: 1) Demographic factors and 2) Cultural factors both of which are reviewed in more detail below.

#### 3.5.1 Demographic factors

Demographic factors are indicative of the traits of the population. These range from the population density, to the structure of the population and also the level of urbanization. This is because generally, it is assumed that people living in urban areas are likely to take up ICTs faster than those living in rural areas. As such, a significant change in urbanization rates between 2000 and 2010 would be indicative of the steep increase witnessed in ICT penetration in the country (as per Figure 5 above). Statistics from World Bank (2011) report support the rapid urbanization claim and further approximate the change as 26% people living in urban areas in 2000 compared to 30% in 2010. Despite the small change, the trend

supports the urbanization theory as regards demographics and is in line with the observed trends of ICT uptake as shown in Figure 5.

In the same way, countries with a high population growth rate are known to encourage investment since the potential return for any supplier is increased due to higher numbers of potential consumers. In this case, the trend shown in Figure 9 below supports this theory since it indicates a gradual but sustained growth in the population which would contribute to the ICT penetration trend shown earlier in Figure 5.





Source: CIA World Factbook

Furthermore, a country with a larger percentage of younger people making up the population is likely to be more receptive to ICT and hence it will diffuse faster in such scenarios. Figure 10 below shows that almost 98% of Kenya's population is below retirement age, lending credence to the theory of age structure as a reason behind fast ICT diffusion.

#### Figure 10: Kenya Age Structure (2010)

Age	Percentage
0-14 years	42.20%
15-64 years	55.10%
65 and over	2.70%
C CLAT	

Source: CIA World Factbook

Having established using the statistical evidence above that the demographic change between 2000 and 2010 was in line with suggested theories to increase diffusion of ICT, we will now analyze any influence the government may have had as regards encouraging uptake from a demographics angle. According to Omwenga (2009), the Kenya government has taken a decisive role when it comes to linking all Kenyans to ICTs. Part of this bid includes the establishment of the rural electrification project which targets to have all rural areas in Kenya served with electricity. Concurrently, the government launched the Digital Villages program which is aimed at creating a computer hub in every rural township in the country in order to encourage ICT interest and uptake.

# 3.5.2 Cultural factors

The second indicator under usage of information services is closely linked to the societal attitude, lifestyle and outlook towards technology. This is also termed as e-readiness and indicates the level of interest the general population – both the supply and demand side have in regard to technological initiatives, as influenced by cultural backgrounds or life beliefs. According to the literature, people tend to be more open minded to ICT if they are aware of the ways in which it can simplify and improve their efficiency. Further, any real benefits especially in financial terms are known to significantly improve receptiveness to ICT in a given society.

In light of the above, the activities of the Kenyan government are analysed for the period between 2000 and 2010 regarding cultural, attitude and outlook aspects to assess whether the government played a role, and if so, which one. The most notable government initiative that could be categorized as designed to change society's outlook towards computers is one that overhauled the education system to include more computer and telecommunications studies both at primary and secondary levels as well as at tertiary level (Omwenga, 2009). The most famous initiative was the Wezesha campaign, through which the government subsidized the purchase of laptops as long as those buying were registered students. Such initiatives were geared towards empowering and educating the populace to embrace ICT (Kenya ICT Board, 2012).

Additionally, the government embarked on a major e-governance program which in addition to making government services more accessible to the average citizen, also managed to integrate the use of ICT in government offices and hence by default made it obligatory for all public servants to engage in higher use of ICT. Further, some government offices require online interaction or at the very least prior communication before setting an appointment. This in turn culminated in more Kenyans than would otherwise have been likely, getting to engage with ICT, as a necessity (Kenya E-government, 2012).

In review of the government actions described under the usage of information technology section, it would seem that both indicators: demographic factors and cultural factors tend to fall on the dissemination role of government. This is because in both cases, the state intervention was geared to encourage higher demand. In the case of demographics, upgrading rural areas to prepare them to sustain ICTs; while in the case of cultural factors, introducing e-governance as well as empowering the youth and general population through education are both indirect ways of building up demand.

### 3.6 Factor 3: ICT Sector Development

The third category of analysis is the ICT sector, and in specific, the ways in which it is being developed to attract, sustain or increase growth. The two indicators under this category are: 1) Presence of an institution; and 2) Presence of a strategic plan. Both of are elaborated on below.

#### 3.6.1 Presence of an institution

The main argument for having an independent institution committed to dealing with ICT issues in a country is that it reveals a level of dedication which signals that the country takes the sector seriously. Further, such an institution encourages investment since it is a sign that any misunderstandings or misdemeanors that may occur in the market will be dealt with in a fair manner. Furthermore, presence of an institution acts as a link between the state and the market, and can enhance the probability of successful Public-Private-Partnerships (PPPs) which in turn encourage further investment into a sector by the private players in the long term increasing the competitiveness of such a sector. Further, as World Bank (2010) notes, privatization increases jobs in industries experiencing high growth. The potential for the economy from such partnerships is immense.

The case of Kenya seems to follow the above path to success as witnessed in ICT product penetration trend as shown in Figure 5. Firstly, there exists an independent regulatory body – the Communications Commission of Kenya, whose mandate was conceptualized via an act of parliament and whose operational validity is enshrined in the constitution and whose roles are to encourage investment, fair completion and ICT growth and improvemnts. Specifically, their mission is to "To facilitate access to communications services through enabling regulation and catalyse the country's socio-economic development" (CCK, 2012). Further,

the Kenya ICT board, established by the president in 2007, is another notable institution – formed in with the mandate to market Kenya as an ICT destination, build capacity within the country, provide advisory services to the populace and specific market players or provide project management services (Kenya ICT Board, 2012).

#### 3.6.2 Presence of a strategic plan

Having a strategic plan for a given sector is perceived to be a signal for positive growth momentum – since the plan is expected to guide the actions of the decision makers and hence keep them focused on achieving a certain goal within a given timeframe. In 2007, Kenya adopted a nationwide strategy – named the Kenya Vision 2030 which is aimed at transitioning the country to a middle income economy by the year 2030. One of the pillars of this vision relates to ICT an intensified application of science, technology and innovation in order to drive the economy forward. In the same year, 2007, the Kenya ICT Board was formed to manage the ICT aspect of Vision 2030.

Based on the above analysis of institutions and plans, it is clear that both indicators fall into the regulation category of state intervention. This is largely because in both instances, the state is very instrumental in determining the path that the sector will follow and acts mainly as a giver of instructions and as a rule maker.

# 3.7 Discussion of Main Findings

This chapter sought to determine which roles the state has played in the development of the ICT sector in Kenya between the years 2000 and 2010. To do so, the integrated framework model was used as an analytical tool through which diffusion factors as conceptualized by Trkman et al. (2008) were analyzed by two pre-determined criteria (refer to Figure 3). After outlining how the diffusion criteria had manifested itself in the Kenyan scenario, the role of

the state was derived based on concepts discussed in the literature review and methodology sections of this study. The results of the case study are as shown in Figure 11 below.

In a bid to answer the research question "what role has the state played in the significant growth of the ICT sector as presently evidenced in Kenya?" The summary below reveals that the state, in line with Jordana et al. (2005) framework has either been a regulator, promoter or disseminator of information in the ICT sector. However, it is interesting to note that most of the observed roles relate to regulation (3 times) followed by dissemination (2 times) and lastly promotion (1 time). These varied roles, especially within one category of diffusion factors such as "enablers and means" indicates that the hypothesis is infact true - the roles of the state vary based on the activities the state wishes to influence. This seems to suggest that no blanket response can be given to the research question. Again, the hypothesis seems to hold true since as evidenced in the case study, the type of government intervention primarily depends on the manner in which the diffusion criteria has manifested itself.

<b>Diffusion Factor</b>	Diffusion Criteria	State Role
Enoblars and Maans	Income & Pricing	Regulation
Litablers and Means	Market Incentives	Promotion
Usage of	Demographic factors	Dissemination
Information Services	Cultural factors	Dissemination
ICT Sector	Presence of Institution	Regulation
Development	Presence of strategic plan	Regulation

I Igui C II, Dummary Or imumg	Figure	11:	<b>Summary</b>	of findings
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Source: Author

The inability to come up with a single clear-cut answer that can be applied across the board to determine what role the state is playing in an emergent ICT sector aligns with the discussions in the literature review which indicate that the role of the state can vary from regulation to promotion and dissemination – all depending on the specific timing and unique setting of the occasion. Additionally, the fact that the regulatory role of the state has been most common

could be an indicator of the fact that the ICT sector in Kenya despite being over a decade old now is still in its infancy stages and requires a strong guiding hand in the form of the state. Further, the results of the framework used seem to fit the case study well. This suggests that even existing frameworks formulated for different regions and in different timeframes can still be relevant to current occurrences happening in countries in the developing world. As such, in regards to the purpose of this study, the results reveal an answer to the research question is varied as documented in the Figure 11 above. Further, the results reveal that the two existing frameworks, when merged can still inform new practices in different parts of the world than where they were created for.

# CONCLUSION

An analysis of the current discourse on ICT reveals that the topic is becoming more and more relevant for the developing world, especially given the potential benefits of the technological revolution which many experts believe occur in countries that embrace ICT. The literature reveals that adoption of ICT leads to a multi-sectoral impact characterized by lower costs, higher productivity and more jobs (Hanna, 2003). Given these insights, the question of embracing ICT for any developing nation ceases to be "if" and instead becomes a matter of "when" and "how." This study leans more towards addressing the "how" question. Specifically, the focus of this study is on the role of the state; with the research question being: "what role has the state played in the significant growth of the ICT sector as presently evidenced in Kenya?" By finding a response to this question, the study seeks to contribute to the theoretical body of literature by filling the existing gap as relates to Kenya. Further, given that Kenya is an extreme or outlier case when it comes to diffusion of ICT in Africa, it is hoped that the outcomes and lessons borne from the study will inform public policy decisions of other countries pursuing the goal of ICT growth, both in Africa and beyond.

The hypothesis throughout this study is that the roles of the state vary based on the activities the state wishes to influence. This is a notion supported in the literature, where the different ways in which the state can get involved in the ICT sector are outlined, and thereafter linked closely to factors that affect ICT diffusion. Based on the lessons from the literature review, an integrated methodological framework is devised based on findings of Trkman et al. (2008) and Jordana et al. (2005) who present analytical tools for factors that affect ICT diffusion and the role the state can play, respectively. Further, a case study approach is used to assess how the theoretical framework interacts with the practical Kenya case study, using statistics

garnered from country and international organization reports, existing scholarly research as well as reliable media sources.

The results of the extensive case study are in line with the positions taken by the theorists in the literature review and align with the hypothesis, confirming that the roles of the state vary based on the end goal and therefore are not homogenous, and neither can a blanket answer be applied to the research question. As such, the answer to what role the state has played in the growth of the ICT sector in Kenya is multi faceted and includes all three possible roles: regulatin, dissemination and promotion, all at different times and in different situations. Besides proving that it is not viable to come up with a single answer to the research question, the study succeeded in proving that a merger of existing older frameworks learned from a different time and situation are still applicable to relatively new ICT processes. Further, this study has contributed to the body of knowledge surrounding Kenyan ICT and as well created a previously non-existent analytical tool that can be used to test the role of government in a different country, anywhere in the world.

The findings in this study validate the positions of different authors in the literature, proving that while it is possible to give a response to the question what role the state has played in advancing ICT in Kenya, the answer cannot be all encompassing and must be considered for each event separately. The limitations of the research were to do with the depth and scope of the research which was restricted by the length and time set apart for this project. Further, the study involves a macro analysis based on secondary sources and only focusses on two aspects of the ICT sector – mobile telephony and internet access. Future research should include a broader and more encompassing understanding of the ICT sector and should conduct primary research in addition to utilizing secondary sources in order to find out if the outcomes evidenced in this study would still hold true.

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