



The Impact of ICT on the Public Sector: Five Questions from a Decade of Experience

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I joined the Government of Kenya in the latter half of 2010 as eGovernment Secretary in the Office of the President after a career that involved a very short stint in the private sector, a slightly longer stint in nongovernmental organizations, and a very long stint in academia. My career planning was sketchy to say the least, but my argument for joining the government was that I could now apply my very broad knowledge and skills in coming up with innovative and impactful policies and projects for the Kenyan public. What I achieved for the public in the eleven years that I served before retirement is a story for another day, but I can honestly say that the public sector excited, stretched, frustrated, and transformed me in ways that I could never have anticipated. It posed hard questions whose answers required me to study a wide variety of books, engage in late night discussions, meditate, pray, and sometimes just muddle through. This paper is organized by asking and answering five questions about impacts of information and communications technologies (ICTs) and the internet on the public sector:

1. How will governments respond to the emerging opportunities and risks posed by ICT and the internet?

The internet first truly entered my consciousness in 1989, during the Tiananmen protests in China. As a PhD student at the Department of Computing at Lancaster University in the United Kingdom, I was excited by the email messages from students in China that appeared on my screen, and even more excited by the

rudimentary functionality that enabled me to both forward the appeals to my student friends through JANET (The Joint Academic Network)—a high-speed network that connected the UK research and education community—and to respond with messages of support to the Chinese students. For once, I was not just a spectator to emerging world events; I could participate!

On my return to Kenya in 1992, universities were already taking an interest in the network as a vehicle for accessing information and engaging in collaborative academic research. At the time, the cost of internet bandwidth was prohibitive, so with support from the US Leland Initiative, universities joined together and formed their own academic network, known as KENET (Kenya Education Network). At that time, government had little interest in the internet, and the private sector was cautious about its implementation.

Fast-forward twenty-five years and internet penetration in Kenya was measured by Kepios as 42 percent of the total population. In a country with a population of fifty-five million, there are just under twelve million users of social media platforms with annual growth of users at 6.8 percent. Most of these users access the internet using smartphones or feature phones. Internet penetration in Kenya stands at 98 percent. No government or aspiring political party, therefore, can afford to ignore ICTs or the internet. In our recently concluded general election, both parties and citizens were very active in promoting their views and concerns on

social as well as traditional media.

The internet is a multifunctional and multidimensional infrastructure with almost unlimited application. Governments may view it as an information system, a service delivery channel, a network infrastructure, or even as a public relations and communications tool. Each of these viewpoints will influence a government's strategy for addressing the political, order and protection, and social and economic welfare functions of government, leading to, for example, the development of informational websites as well as service delivery portals, call centers for citizen feedback, network connection of government departments and agencies, one-stop portals for accessing government opportunities and other eGovernment applications, and video channels for development information and government communications. In Kenya, it is possible to access, and pay for, most common government services through the eCitizen portal, freeing citizens who previously had to travel for more than a day to access these services to do it from their homes and businesses. Through the internet, a lot of business continued with little interruption during the COVID-19 pandemic.

However, challenges and risks remain, including the threat of interruption of business and loss of money and reputation due to cyber insecurity, especially due to the large proportion of naive users and the shortages of cybersecurity capacity for both the private sector and government. Other challenges include the cost of devices and bandwidth, and lack of skills in some sections of the population, which introduces a need for agents who sometimes pose a risk to users. Lack of capacity and experience can result in policy responses to emerging technology that are either too

fast or too slow, leading to applications that create challenges for consumers in the context of a weak policy environment.

I would anticipate that both opportunities and risks will multiply in the future, with the practical introduction of artificial intelligence and autonomous computing, robotics, and distributed manufacturing, using, for example, digital printing technology, digital currencies, and virtual computing.

Moving on to the global response to developments in internet technology, I predict that countries will demonstrate four broad postures regarding their internet (and ICT) response: technical domination, regulation, service delivery, and copy & paste. The countries with the highest technical capacity will work to gain and/or maintain technical dominance in the production and implementation in one or more of the critical technologies underlying ICTs and/or the internet, for example microprocessors or networking technology. The next tier of countries is likely to push for international policy and regulation, especially for key economic, political, and military applications, such as local taxation of multinational platform technology, data sovereignty, and financial technology. Other countries may focus on local exploitation of the infrastructure for government service delivery, local commercial applications, and local innovation through the cost-effective rollout of infrastructure, capacity building through the national education system, and the implementation of a conducive regulatory environment. Finally, some countries may not have a clear response framework and are confined to a "copy and paste" response to technology, which has been applied in peer countries.

Figure 1: Public Sector Strategic Responses to ICTs and the Internet

	Internal Focus	External Focus
Advanced Strategy	EGovernment Service Delivery	Domination
Basic Strategy	Copy Paste	Regulation

In my view, these strategies maintain an outdated view of international relations that should have been challenged by learning from the COVID-19 pandemic. Instead of technology domination, we should share and diversify. Instead of over-regulation, it would be wise to promote the creation of an ethical, normative internet culture. Instead of focusing internally on service delivery or catching up, we should learn from the Smart Africa Initiative and cost-effectively share technology in our areas of competitive advantage.

2. Freedom of information and freedom of expression are important tenets of human rights. Will developing countries continue to defend these rights on the internet in the face citizen self-assertion using social media?

Freedom of information is enshrined in the Constitution of Kenya 2010, Article 35. Freedom of expression has been part of our culture for the past 20 years. However, it is clear that many bureaucrats remain uncomfortable with free disclosure of government information to ordinary citizens.

The tendency of the citizenry to write, photograph, videotape, and then share information in real time, combined with the internet’s quality of never forgetting, can be very uncomfortable both for politicians and bureaucrats. Citizen journalism presents unedited and often unverified information to a mass audience. Directed algorithms can be used to skew information for specific users so that they do not gain access to alternative views which might have helped them to develop a more balanced viewpoint. Clever video-editing can also produce “fake news,” which can be misused to influence hearts and minds.

These issues may pose a real challenge in developing countries that have weak education systems, isolated citizens, and religious or ethnic polarization. Governments may begin to view internet information as a kind of powder keg.

Government responses may take the form of limiting the number of national gateways and sifting incoming and outgoing information using firewalls. Some governments may go as far as surveillance through honeypot applications, man-in-the-middle eavesdropping, and data harvesting malware placed on end user devices during manufacture. Governments may limit the passing of legislation that is likely to make such intrusive activity illegal.

In Kenya, civil society (KICTANET) has recently partnered with government to carry out Citizen cyberhygiene awareness creation and capacity building. It is hoped that such initiatives will encourage citizens to adopt norms in their online behavior that will preempt incidents that provoke bureaucrats and lawmakers to implement reactionary policy and legislation and/or

intrusive technology. It will be interesting to measure whether this approach is effectual.

3. Given the technical nature of the internet, what are the capacity-building priorities of a developing country?

Developing countries are very aware of their shortage of technical capacity when it comes to ICTs and the internet, and countries, such as Kenya, are always eager to participate in capacity-building initiatives offered by the more developed world. We are also making regional and internal efforts to build capacity at all levels, including basic education (in Kenya we have the Digital Literacy Programme), universities and research institutions (University ICT programs have grown from four to over sixty in the last fifteen years, according to KENET), professional associations, government, and the private sector. Initiatives, such as Gearbox, are making efforts to extend this from software development to hardware manufacturing, and ICT courses are also diversifying to areas such as machine learning, data analytics, and cybersecurity.

I would argue, however, that technical capacity is just part of the equation, if countries are to reap the full benefit of the internet.

Countries need strategic capacity to identify their areas of strategic need and strategic advantage; design a persuasive ICT and internet vision for their citizens; prioritize, plan, and fund programs and projects; and develop a conducive ICT infrastructure, legislation, and policy environment. Often, this area is neglected, and naive politicians promote ill-thought-out, crowd-pleasing policies and projects

with few long-term national benefits. Projects are often driven by external funding opportunities, selfish business interests, megalomania, and “first ninety days” performance pressures fueled by multinational “public sector liaison” officers, “thought leadership” breakfast engagements, and “fireside chats.”

While in Kenya it is required that all infrastructure projects must include an operation and maintenance capacity-building component, there is neither the managerial capacity to manage the actual operation and maintenance, nor the funding mechanism. Incomplete capacity building is ineffective.

Another area where capacity building is incomplete is in education, where community awareness, skills, and support have proved critical to the success of in-school initiatives. Innovation capacity building and funding initiatives are also less effective when underlying policies (e.g., those in the procurement guidelines) create barriers.

Capacity building should take a more holistic approach and should always include an institution-building, support, and ongoing funding element.

4. Some pundits have theorized that developing countries have a “youth dividend” or a “green field” advantage. Are these opportunities real, and, if they are, how can they be exploited regarding ICTs and the internet?

With its vast store of information and entertainment and its close association with trendy end user devices and applications, the internet is particularly attractive to the young. Moreover, many

are digital natives and have none of the confusion or discomfort with which older people often approach emerging technologies. A “youth dividend” would therefore provide a useful competitive advantage to those nations that have it.

And it is true that young nations tend to be richer in young people. The percentage of young people below fifteen years of age in Kenya is 43 percent (compare this with 21.4 percent in the US or 12.6 percent in Japan.) However, in my view, a youth dividend is tempered by at least five factors. Youth should have good health (nutrition); good values; reasonable educational attainment; a positive attitude towards their country; and hope for the future.

In the absence of these factors, the so-called youth dividend can become youth dynamite (and not in a positive sense). Economies which are characterized by difficult family environments, weak public education systems, high unemployment, and polarized politics are unlikely to reap the benefits of a youth dividend.

The good news is that, with smart strategies, the internet itself can be used to address these shortfalls. It can be used to continuously collect and analyze information about the youth demographic and its static and dynamic characteristics, in order to design and test appropriate public policy responses. It can be used to cost-effectively deliver relevant, quality, adaptive education to youth. It can be used to provide work opportunities for youth, and youth can also use the internet to innovate products and services, access markets, and run businesses, at lower cost than implementing a traditional business. In Kenya, the Ministry of ICT and Youth Affairs has tried to exploit two of these opportunities through the Ajira

Programme, which trains youth to take up online job opportunities, and the Whitebox Programme, which promotes youth innovation. The recently implemented Cyber Hygiene Programme tried to impart good online values to participants.

During a recent visit to Europe, I noted that, for example, a lot of customer care activities are being delegated to automated platforms and bots. This may sometimes be frustrating for naïve users or users with complex requirements. VOIP (voice over internet protocol) and other internet-based technology could make it possible for human customer care interaction to be carried out by young people in developing countries at reasonable cost.

The green field advantage is the ability to quickly deploy infrastructure and emerging technology where there is an absence of a competing older technology. It is true that the low penetration of traditional banking and home telecommunications in Kenya probably facilitated the rapid uptake and exponential growth of mobile technology and mobile money solutions.

In 2013, Kenya promulgated a new constitution that introduced a devolved system of government. In anticipation of rapid construction in the main towns and cities of the emerging county governments, I joined a small team that engaged with local governments to persuade them to adopt town and infrastructure planning methodologies and develop metronetwork blueprints. We had modest success; they listened, but it was clear that most did not prioritize the issue. The green field will only be exploited by administrations that have sufficient knowledge and experience to appreciate smart strategies as well as the capacity and resources to implement them.

5. What lessons can be learned about ICTs and the Internet from the experience of the COVID 19 pandemic?

When news of the COVID-19 pandemic broke, I was in Switzerland attending a government meeting. I remember becoming conscious of how close we were to Italy, where reports of cases were becoming common. I was on one of the last planes that arrived in Kenya before the government took the step of requiring passengers to quarantine in designated centers until it could be demonstrated that they were symptom-free. I stayed at home for a few days wondering what to do, but had to report back to work after my organization was designated as a provider of essential telecommunications services. Suddenly, there was countrywide demand from public institutions for networks and internet connections. Our young engineers were run off their feet, travelling to every corner of the country. Our risk of infection, and the risk that we would carry infection to vulnerable people in rural Kenya, was high, and I spent my time advocating for everyone in my organization to be prioritized for vaccination. The Kenya Medical Research Institute responded and sent a team to vaccinate us. I had to set an example by being the first to take the vaccine since, due to the many rumors circulating on social media, many of my staff were reluctant to be vaccinated.

We instituted rosters for work from home, which were adopted by other government organs, and many public servants started accessing government enterprise information systems from home for the first time. We were posed with the challenge of creating work from home cybersecurity guidelines and a help desk where other

government departments could get quick advice and help. Luckily, I had a competent and motivated workforce, and we were quickly able to tweak existing projects to provide the necessary services. COVID-19 was a disaster, but it was a boon for the ICT sector, where it motivated rapid technology adoption and upskilling.

But there were challenges; we were at the inception of the second phase of a program where we were to deliver technology to almost 22,000 schools. The contractors began to push back and complain about bottlenecks in the global supply chain and the rapid increase in technology costs due to global demand. The procurement law did not allow for the huge cost increases being proposed; we did not have the money anyway, and political imperatives did not leave room for us to downsize the project.

There were many lessons to be learned from the pandemic. The mutual vulnerability of humankind across geographies and the near impossibility of isolating oneself from problems happening in other parts of the world. The generosity and resilience of human beings and their superhuman will to survive. The need for new models of production and distribution—perhaps not deglobalization as much as reglobalization—models based on sharing and fair distribution of skills and production sites and not so much on exploitation and dominance. The need to better understand each other, north and south, rich and poor, advanced and developing, and to realize that there is always something to be learned from the other party. I hope these lessons shall truly be learned.

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