IMPACT OF THE INTERNET IN AFRICA

Establishing conditions for success and catalysing inclusive growth in Ghana, Kenya, Nigeria and Senegal

APRIL 2013
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Definitions, abbreviations and acronyms

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<tr>
<th>Acronym</th>
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<tr>
<td>AMREF</td>
<td>African Medical Research and Education Foundation</td>
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<td>AVU</td>
<td>African Virtual University</td>
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<td>BPO</td>
<td>Business process outsourcing</td>
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<td>CAGR</td>
<td>Cumulative Annual Growth Rate</td>
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<td>CCTV</td>
<td>Closed-circuit television</td>
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<td>GDP</td>
<td>Gross Domestic Profit</td>
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<td>GNI</td>
<td>Gross National Income</td>
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<td>GPS</td>
<td>Global positioning system</td>
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<td>HMO</td>
<td>Health Management Organisation</td>
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<td>HMIS</td>
<td>Health Management Information Systems</td>
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<td>ICT</td>
<td>Information and Communication Technology</td>
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<td>INEC</td>
<td>Independent National Electoral Commission, Nigeria</td>
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<td>IT</td>
<td>Information technology</td>
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<td>ITU</td>
<td>International Telecommunications Union</td>
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<td>KENET</td>
<td>Kenya Educational Network</td>
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<td>KRA</td>
<td>Kenya Revenue Authority</td>
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<td>MDG</td>
<td>Millennium Development Goals</td>
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<td>MEST</td>
<td>Meltwater Entrepreneurial School of Technology, Ghana</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<td>NCA</td>
<td>National Communication Authority</td>
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<td>NCDs</td>
<td>Non-communicable diseases</td>
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<td>NHIF</td>
<td>National Health Insurance Fund, Kenya</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Cooperation and Development</td>
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<td>SME</td>
<td>Small and medium-sized enterprises</td>
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<td>SMS</td>
<td>Short message service</td>
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<td>TIPCEE</td>
<td>Trade and Investment Program for a Competitive Export Economy</td>
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<td>USPF</td>
<td>Universal Services Provision Fund, Nigeria</td>
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<td>USSD</td>
<td>Unstructured Supplementary Services Data</td>
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This report describes the role of the Internet on the socioeconomic development of Sub-Saharan Africa and its potential going forward. It builds atop a body of research that has sought to identify and measure the economic benefits of the Internet and broadband. These previous reports, most of which have found a positive relationship between economic development and the Internet, provide helpful starting points, because they have aggregated a wealth of data from an array of countries across the globe.

However, previous research has tended to focus on macro-level data, which has limited ability to provide actionable recommendations for policymakers. Further, available studies typically lack detailed analyses of the social and political value of the Internet, especially across Sub-Saharan Africa. Finally, the majority of reports thus far have focused on developed economies, rather than low-income countries, or have defined “economic development” narrowly, by focusing on the contributions to gross domestic profit (GDP) by traditional large, commercial industries.

In contrast, this report defines the scope of economic benefits broadly, including opportunities to drive inclusive growth and to address social and inequality goals. Although it uses a macro-economic analysis to review the underlying enabling conditions, it relies heavily on a broad-based survey of over 1,300 businesses across Ghana, Kenya, Nigeria and Senegal, and an integrated heatmap of where Internet enabled solutions are likely to have the greatest impact on development.

The Internet’s impact on socioeconomic development can be described or measured at multiple levels. For the purposes of this report, we categorised the impact of the Internet within each of the seven different sectors required looking at four levels: 1) the opportunity for impact by sector in Sub-Saharan Africa; 2) the opportunity by focus country; 3) the landscape of Internet-enabled business

Study objectives

The objectives of this study were to:

- Document the Internet’s impact on socioeconomic growth in order to better equip Ministers of Information, Communication and Technology to drive increased Internet usage;
- Provide a fact base that engages policymakers in other sectors, such as health, agriculture and education, to explore the use of the Internet as a strategic tool and to drive Internet usage for development impacts; and
- Develop an understanding of the intensity with which Internet-enabled solutions are driving impact across key sectors and where the public sector, private sector and civil society can catalyse growth.

Brief commentary on methodology

The analysis contained in this report was derived through a combination of sources and approaches including: 1) desk research and analysis, 2) interviews with over 60 key stakeholders (including academics, policymakers, practitioners and media), 3) a broadbased survey of over 1,300 businesses across Ghana, Kenya, Nigeria and Senegal, and 4) an integrated heatmap of where Internet enabled solutions are likely to have the greatest impact on development.

Context and approach
models and solutions by country; and 4) the perceived attainment of impact across seven dimensions including information management, communications and marketing, supply chain management and procurement, service delivery, research, financing and sector governance. These dimensions included: 1) information management; 2) communications, awareness, marketing; 3) supply chain management; 4) service delivery; 5) R&D/innovation; 6) training and workforce development; 7) financing; and 8) leadership and governance.

FIGURE 1: SELECTED EXAMPLES OF INTERNET-ENABLED SOLUTIONS DRIVING IMPACT ON SOCIOECONOMIC DEVELOPMENT
These analyses were informed by internal and external experts, in-country researchers, interviewees within each country, and a landscape map of firms within each country. Combining each of these layers with equal weighting and classifying the composite results as high, medium or low, yielded the heat maps of opportunity shared in the chapters that follow and as illustrated in Figure 2.

**FIGURE 2: METHODOLOGY FOR ASSESSING THE IMPACT OF THE INTERNET**

At each stage of the analysis a 1-3 rating was assigned to the relevant intersection of sector and impact area, then weighted to produce a composite.

What follows is an overview of the key findings generated by the research, an analysis of the ecosystem necessary to realise the full potential of the Internet, brief profiles of the seven selected sectors, and a summary of key challenges and recommendations for policymakers, as well as other stakeholders. In addition, the annexes provide a selected set of case studies and country profiles for the four countries analysed.
The Internet is a tremendous, undisputed force for economic growth and social change. Not only has it unleashed new forms of connectivity, but it has also provided an outlet for new forms of innovation, entrepreneurship and social good. The Internet has also proven a dynamic tool for stimulating economic growth in developing countries, with the World Bank reporting that a 10% increase in broadband correlates to a 1.38% increase in GDP growth. Beyond GDP growth, the Internet also provides opportunities to pursue social and developmental objectives. Throughout the developing world, the Internet is connecting remote populations to markets and strengthening the overall efficiency of service delivery in areas such as health, education, livelihoods and financial inclusion, as well as creating access to government services for the most marginalised populations.

Still, the story of the Internet in developing countries is very much a work in progress. In particular, the Internet’s potential is still largely untapped in Sub-Saharan Africa, the focus of this report. Broadband penetration on the continent is low compared to regions of similar income, and although 15% of the world’s population lives in Sub-Saharan Africa, only 6% of the world’s Internet users do. Despite widespread agreement on the web’s potential to transform lives and reduce poverty, there is a paucity of information that details how policymakers and investors should capitalize on this potential.

This report intends to help policymakers capture the potential of the Internet for social and economic development—to help them understand how their constituencies already use the Internet, where the opportunities lie, what future potential for social impact the Internet offers, and what their countries need to get there. Based on a survey of more than 1300 businesses, including nearly 1000 SMEs and extensive interviews with experts across Ghana, Kenya, Senegal and Nigeria this report arms policymakers with data on the social and economic benefits of broadband and Internet. It also uses extensive secondary research and qualitative and quantitative analysis to support policymakers in harnessing the Internet’s potential. Finally, it provides actionable recommendations across policy portfolios.

The current state of impact

This report provides detailed assessments of the current and potential impact of the Internet on socioeconomic growth across seven sectors: agriculture, education and labor, energy, financial inclusion, governance, health and small and medium enterprise (SME) growth. It also examines the role that government, private sector and donors have played in building the ecosystem for Information and Communication Technology (ICT) innovation and driving this impact.

KEY FINDINGS CONCERNING THE INTERNET’S CURRENT AND POTENTIAL IMPACT ON SOCIOECONOMIC GROWTH INCLUDE:

SMEs are surprisingly bullish on the Internet’s potential. According to Dalberg’s survey, more than 80% of SME owners expect that the Internet will help them grow their business, and 70% of those expect to hire new employees as a result. Historically, Internet applications have focused on marketing and communications, but solutions focused on service delivery are on the rise. A Dalberg review of Internet-enabled solutions across the four countries found that Internet-enabled solutions developed within...
the past three years are increasingly focused on service delivery and information management. This figure has increased from 17% to 24% of total use cases over the past six years suggesting that new organisations are focusing on increasingly sophisticated uses for the Internet versus organisations that have used the Internet for a while.

SMEs report that enterprise systems have a high impact—but they receive scant donor and policymaker investment. According to experts, management and operations are not amongst the “sexier” Internet-based applications, but across sectors, surveyed SMEs consistently cited the Internet for its usefulness in addressing management challenges. These include payroll, information management, and backend systems—where key informant interviews suggest a short-term prioritisation would unlock significant growth. More than half of firms cited in our survey related services in supply chain management as driving current impact. Cost savings from enterprise systems, for example, have delivered 30% savings for national health insurance schemes. Despite their reported usefulness, enterprise systems receive little attention from policymakers and donors who tend to focus on user facing solutions such as mobile phone technologies.

While sustainability and scale is still elusive across all sectors, certain socioeconomic sectors have been better able to capitalise on the Internet’s potential. Secondary research and interviews with experts suggests that the majority of solutions remain stuck in pilot phase or lack evidence of impact on developmental outcomes such as better health care, improved educational performance or increased household level income. However, across all sectors, agriculture demonstrated solutions that have pushed beyond the pilot phase towards scale. This is opposed to areas such as health and education where questions around sustainability and scale remain. More than 40% of Internet-enabled solutions currently target the education, governance or health sectors, yet the majority of these solutions remain in pilot phase. This fact does not suggest that these solutions cannot be successful but it does raise questions as to where, how and why appropriate financing, measurement and innovation should be focused in order to ensure broader impact.

HIGHLIGHTS FROM KEY SECTORS INCLUDE:

- **Agriculture**: Solutions in agriculture are demonstrating impact on operations, leading to direct impact on household incomes: Survey results of over 1,300 firms cited “access to information” as one of the Internet’s most significant benefits for their businesses—but agricultural firms voiced the strongest emphasis with over 70% of respondents ranking access to information as ‘essential’. SMEs within the sector have used a range of new tools, such as Nokia Life Agricultural Services and Ghana’s Esoko, to obtain information that was once difficult to find over long distances, such as market prices and weather information. In addition, Internet-enabled supply chain management has significantly reduced shrinkage and leakage—two key problems faced along vast, multi-player value chains.

- **Health**: Internet-based applications—especially, eLearning and remote training—have begun to remedy a longstanding and life-threatening shortage of qualified health workers in Sub-Saharan Africa. By replicating one successful training model in Kenya, AMREF, could upskill the current nursing workforce nine times faster than the current infrastructure in Kenya, Ghana, Nigeria and Senegal. Concerted investments in eLearning, with matching government support to promote connectivity and lower the cost of bandwidth, can reduce the cost of health care work-force training down to $460 per nursing graduate.

However, across the sector, Internet-enabled solutions are characterised by a plethora of pilots with few examples of sustainable or scaled solutions. There are a few examples and governments recognising the importance of interoperability but, on the whole, despite mHealth and eHealth seemingly having the longest track record, the industry continues to lack evidence and appears stuck in a start up phase.

- **Education and labour**: Survey results in the education sector showed that respondents tend to value the Internet more than other sectors because it provides access to information—resource centres, libraries, curricula, and facts. But for now, evidence of impact on outcomes remains low and the Internet’s greatest educational impact appears to be emerging outside the classroom—through mobile enabled solutions such as Worldreader’s use of the Binu app for reading. Realising the Internet’s potential benefits for classroom learning will require sustained investment in broadband infrastructure. Supporting learning innovation outside the classroom will require cheaper access to high quality, low bandwidth.

- **SMEs**: The Internet brings top-line growth and bottom-line improvement to SMEs outside of the tech space. Dalberg survey data suggests that SMEs expect to benefit from the Internet primarily as an improved platform for marketing, giving them better access to customers and improving their customer relationship management.² It is clear that business growth opportunities are available for all companies willing to market themselves online, regardless of whether customers can pay for goods online.

- **Financial inclusion**: eCommerce in Sub-Saharan Africa is still nascent, but at the same time, mobile money (mMoney) and a range of payment solutions are shaping opportunities for eCommerce to emerge, for example, Pesapal in Kenya and OzinboPay in West Africa. mMoney successes, such

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² Dalberg Research Survey.
as M-Pesa in Kenya and, more recently, MTN mMoney in Ghana, seem to precipitate the rapid emergence of solutions – e.g. Nigeria’s Pagatech - that already integrate online and mobile web to deliver a suite of payment solutions for its customers. The Internet also has significant potential to extend financial services to the unbanked, to drive eCommerce—and to grow markets. More than 60% of financial organisations surveyed view the Internet as essential, the second highest response out of all industries.

**CROSS-CUTTING THEMES:**

**Social media and social networking is proving to be a catalyst in driving Internet access and impact.** Social networking, particularly through mobile Internet, is changing the nature of users’ first-time experiences with the Internet and will spur more sophisticated use going forward. The estimated 100 million social networking accounts in Africa – including mobile enabled networks such as Mxit, Saya, 2Go and Eskimi – signal a dynamic platform for marketing, communications, information sharing and citizen engagement. Social networks can create stronger links between government, educators, service providers, businesses and citizens. Users are already engaging on topics including music, dating and sport, but these networks are also quickly expanding to include education, health information and governance, and will undoubtedly influence how users engage in more sophisticated Internet use over time.

**Low-bandwidth intensive Internet solutions will bring new users online faster.** The Internet in Africa is in part a story of managing the challenges of limited infrastructure, therefore, building low bandwidth solutions can open up opportunities. This will change over time, but is fundamentally different from the bandwidth-rich content developed in countries where users have grown up accessing the Internet on desktop computers. First-time Internet users in Africa are no longer introduced to the Internet via email and software, but by mobile phones—and often via social networks. These trends require new ways of thinking about the infrastructure requirements (high and low bandwidth access) and investments.

However, **high speed broadband connections are also needed, particularly to allow SMEs to realise the huge gains offered by cloud computing.** Cloud computing offers significant cost savings, especially for SMEs. But capturing the savings of cloud-hosted software will require affordable, reliable connectivity. Eighty percent of SMEs believe they will grow and create jobs with better Internet. However, price and quality of service pose a significant barrier to access. For example, the cost of a mobile-broadband plan in developing countries represents between 11.3-24.7% of monthly gross national income (GNI) per capita versus 1.2-2.2% for developed world3. In the education sector, the availability of impactful solutions based on video, such as Khan Academies, will not be feasible unless access to high quality, uninterrupted bandwidth is available.

**Data is getting ‘bigger’**. The importance of access to publicly held data was emphasised by a number of interviewees and will continue to provide an important foundation for the development and growth of new solutions targeting national level impact. Open Data Initiatives have been initiated by a number of countries, Kenya was the first country in Sub-Saharan Africa to introduce a government open data portal and the Ghana Open Data Initiative is in the process of uploading 3 000 data sets as well as building out 140 citizen applications that will leverage this information.

**Realising future impact: Conditions for impact**

Policymakers, SMEs, and innovators are now writing the story of the Internet’s role in broad-based socioeconomic growth. Predicting how this narrative will unfold is in some ways a fool’s errand. For example, mobile telephony has changed paradigms in ways that few could have forecast ten years ago, and now, mobile Internet has similar disruptive potential. Notwithstanding these uncertainties, it is undisputable that policymakers have a foundational role to play in creating and ensuring an enabling environment for Internet-based solutions. In particular, countries that wish to reap the Internet’s potential for social and economic gains must continue to invest in infrastructure and the broader ecosystem for innovation.

**Sub-Saharan Africa appears to be on the right trajectory to catch up with countries that maintain a strong enabling environment.** As illustrated in Figure 3, two key pillars provide the basis for a well-functioning Internet economy: “core infrastructure” and “conditions for usage.” Core infrastructure includes aspects of the enabling environment – both physical infrastructure and characteristics of the business environment, such as mobile and Internet coverage, electricity, availability of skills, education levels, and perceptions of corruption. Conditions for usage include those that influence access, awareness, availability and attractiveness. They include a range of drivers, from the cost of devices and price of packages to factors affecting citizen awareness, such as education levels, usage and relevance of services.

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Based on a mapping of these indicators across all countries in Sub-Saharan Africa, we see that, absent a minimum investment in infrastructure, policymakers face a clear ceiling to progress on usage conditions. Our analysis, based on nearly 60 different indicators, shows that without a minimum investment in infrastructure, conditions of usage—including the number of Internet users—will not rise above a certain level. Countries in Sub-Saharan Africa, while on the right trajectory to build thriving ecosystems, must continue to invest in core infrastructure as well as usage conditions in order to maximise the Internet’s impact.

Recommendations

In this ever-changing context, policymakers must continue to balance the challenge of enabling market conditions, catalysing the provision of equitable service delivery, protecting privacy and championing social, economic and job creation impacts that the Internet can help achieve. In recent years, Africa’s mobile and Internet markets have seen significant growth, particularly where public-private partnerships, healthy competition and open access to information flourish. Whether the Internet’s potential to drive economic growth and social outcomes is realised will depend largely on the ability of public, private and social sector actors to set policy in a way that will build an ecosystem for innovation.

In achieving this goal, policymakers must respond to three key challenges:

- **Growth**: Developing appropriate policies and investment plans to promote growth and innovation whilst appropriately protecting consumers;
- **Protection**: Keeping pace with the new requirements of digital information and the set of industries that emerge to take advantage of new opportunities; and
- **Inclusion**: Managing digital inclusion to ensure that the Internet is not only made available across geographic and demographic boundaries but that Internet content also creates channels for socially and economically beneficial services.

Navigating the challenges will not be easy, and much can be learned from those who have successfully harnessed the Internet’s power to drive economic growth, job creation and social outcomes. Therefore, this
report provides illustrative examples of how actors in government, private and social sectors – through principles of openness and transparency – can play a catalytic role. Some key recommendations highlighted throughout this report include:

- **Prioritise convergence across sectors and the broader enabling environment.** Capturing the Internet’s potential for economic growth and social gains requires thinking and acting collaboratively, often across sectors. Harnessing ICT is an endeavor that implicates multiple policy actors across multiple sectors. For example, Kenya’s alignment of eHealth strategy and ICT policies has not only delivered significant cost savings but also resulted in interoperability standards and a national electronic medical records system4. These system innovations are foundations for scale, growth, and future innovation.

- **Invest in critical infrastructure.** Innovation is not enough. Ideas are not enough. Both require appropriate infrastructure to bloom. Throughout Sub-Saharan Africa, clear limitations to productive Internet access and use exist, and overcoming them will require appropriate investment in both infrastructure as well as demand side factors such as access, affordability, awareness and attractiveness of solutions (noted as ‘conditions for use’). Poor performance on these core conditions, comprised of indicators on physical infrastructure and general business environment, cannot be leapfrogged.

- **Coordinate and partners with private sector in order to drive market growth.** Governments can play three primary roles in developing their country’s Internet economy – leadership, governance, and promotion of eGovernment services. Within each role, they should consider the question of how best to engage with both donors and the private sector in order to maximise inclusive growth. Leadership requires setting a national ICT vision and creating the appropriate government implementing agencies to support that vision. Governance includes the timely creation of legislation, fair allocation of licenses, arbitration and resolution of disputes relating to all components of an Internet economy. Promotion of eGovernment services both helps bring new citizens online and boosts the attractiveness of getting online for the first time.

- **Set the vision:** Strong government leadership in defining a national vision and strategy for the use of ICT and the Internet aligns a diverse set of national actors.

- **Catalyze inclusive growth:** Creating an environment within which actors can invest and collaborate around the use of the Internet is a crucial role of government. Finding the right balance of market forces and healthy competition that facilitates inclusive growth will require active engagement and collaboration with the private sector. Examples from the Kenya ICT Board and TEAMS cable investment illustrate this potential.

- **Act as a first adopter:** The public sector is typically the largest consumer of Internet-enabled products and services, which creates an opportunity to lead by example and support its citizens’ entry into the digital era.

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Over the past decade, low-cost mobile telephony has created new channels of communication that have flourished in the face of large demand. By putting power of communication in the hands of billions of people, often for the first time, mobile technologies were the first wave of ubiquitous inclusion. The second wave may be the Internet. While older information and communication technologies focused on point-to-point communications, Internet users can both contribute knowledge to the network and gain information from it. They can customise it. They can use hosted software. And the Internet enables what academics call “network effects”: its value to each individual increases with the number of subscribers.

Policymakers in the developing world are starting to recognise that the value of the Internet is not a luxury good for large businesses and the economic elite but, rather, it is a necessary tool for inclusive growth. Already, the Internet is driving financial inclusion, strengthening health and educational outcomes, improving productivity and income from small-scale agriculture, facilitating access to energy, speeding small businesses growth and enabling citizens to more actively engage with their governments.

However, the impact of the Internet on socioeconomic growth has only begun to be realised. To unlock maximum growth and impact, policymakers must begin asking a series of questions about where impact is being realised, where innovation may be inhibited and who must play what role.
1.1
The potential of the Internet to transform economies

The Internet undeniably increases productivity and adds to GDP. Globally, the Internet economy contributes more to GDP than does the nation of Germany.1 The Internet’s economic effects can lift even mature economies; with a projected average 8% sector growth in the G-20’s developed markets through 2015.2 Growth is particularly fast for developing economies, where mobile technology and Internet enabled services are being rapidly adopted as a substitute for poor fixed-line infrastructure. According to an International Telecommunications Union (ITU) Report in 2013, Africa was the fastest growing region in terms of mobile broadband including 93 million subscriptions, 11% penetration and an 82% cumulative annual growth rate (CAGR) between 2010 and 2013.3

Viewing the Internet solely as a tool to boost economic growth in developing economies fails to recognize its less quantifiable benefits. While economic growth is a central driver for development, it is not the only one, and the Internet promises a variety of socioeconomic impacts: increasing citizens’ accessing of social services, broadening educational opportunities, creating platforms for innovation - and effectively increasing people’s freedoms and capacities. The Internet can enable digital citizenship as well, as eGovernment initiatives allow the extension of government services less expensively to larger populations.

In the developing world, rapid innovation in systems, applications and services is driving the Internet’s socioeconomic impact. These innovations are being developed across the public and private sectors, and are changing how countries achieve socioeconomic goals such as equitable access to quality health care or education, more efficient agricultural markets, stronger mechanisms for governance, greater financial inclusion and the promotion of SME business growth. At the same time, Internet-enabled services are driving multiple types of impact that range from basic marketing and communications to advanced operational efficiencies in extended service delivery. These impacts largely focus on efficiencies such as time and cost savings, access to services or improved quality of information. However, impact has not been achieved equally across all sectors and innovation seems to have flourished more substantially in some places than others.

Just as certain countries and sectors have already accelerated their growth by fully embracing the opportunities made available by the Internet, those that fail to recognise the opportunity will fall further behind in their development. Nigeria, Ghana, Kenya and Senegal have demonstrated social and economic gains across Sub-Saharan Africa from the development of their Internet economies. Still, each has its own strengths and weaknesses, and every country across Sub-Saharan Africa will face its own unique challenges when deepening the Internet’s impact. But it is becoming clear that whether and how they overcome these challenges will have significant impact on both social and economic goals.

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2 Ibid.
1.2 The state of enabling Internet infrastructure and usage in Africa

The Internet is becoming a substantive force for change, with Africa as one of the fastest growing regions in the world and investment in ICT as a percentage of GDP exceeding the global average, but overall penetration is still low. Over the past five years the number of Africans online has exploded, and for many Africans the Internet has become a part of daily life. A decade ago there were roughly 10 million internet users in the whole of Africa. Today, that number has increased to over 160 million.

Public opinion has shifted. Now nearly half of the surveyed organisations in Ghana, Kenya, Nigeria and Senegal consider the Internet essential to their operations, and more than 70% of those with a global outlook did. Only one out of 20 company owners surveyed feels that the Internet is not important for his business at all.

Even though many Africans are aware of some opportunities offered by the Internet, the Internet’s full potential is far from exploited. Many companies and organisations still use the Internet primarily for simple research and communication purposes, but not for sophisticated tasks like product and services delivery or recruitment.

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7 Ibid.
Exploiting the Internet’s potential is not always an easy task for SMEs. Much of Africa’s population still faces a range of internal and external barriers, such as access to reliable Internet connections and affordable connection devices. For example, as noted by the ITU, by early 2013, the price of an entry-level mobile-broadband plan represented between 1.2-2.2% of monthly GNI per capita in developed countries and between 11.3-24.7% in developing countries, depending on the type of service. Removing these barriers will require coordinated action among the continent’s key decision makers to promote the deployment of Internet infrastructure and lower barriers to access.

A fundamental set of characteristics must be in place to construct a thriving Internet economy. These characteristics shape the environment for both the supply of and demand for Internet enabled services and are broader than simply a measure of Internet infrastructure and user access. On the supply side, one must consider the ‘core infrastructure’ conditions that are required for both doing business and individual consumption. And, on the demand side, it is necessary to consider the ‘conditions for usage’ or, the necessary factors that will ensure not only access, but meaningful engagement that drives both social and economic objectives.

**FIGURE 6: INDICATORS THAT OPTIMISE CORE INFRASTRUCTURE AND USAGE CONDITIONS FOR MEANINGFUL INTERNET IMPACT**

- **Physical infrastructure**
  - Share of population with electricity access (+)
  - Share of population covered by a cellular network (+)
  - Investment per cap in telecoms with private participation (+)

- **Environmental characteristics**
  - GDP level, current US $ (+)
  - GDP growth, % (+)
  - Urban population, % of total (+)
  - Total investment, % of GDP (+)
  - Ease of starting a business ranking (-)
  - Ease of accessing credit ranking (-)
  - Intellectual property protection ranking (-)
  - Press freedom index (-)
  - Share of firms citing electricity as a major constraint (-)
  - Share of firms identifying labour relations as major constraint (-)
  - Corruption perceptions index (-)
  - Extent of government web censorship (-)

- **Business environment**
  - Secondary education enrollment, gross % (+)
  - Tertiary education enrollment, gross % (+)
  - Quality of education (1-7 best) (+)
  - Literacy rate, adult % (+)
  - Share of population 20-39 years old (+)
  - % of population above national poverty line (+)
  - Export firms, % of total (+)
  - High technology exports, % of total manufacturing (+)
  - Intensity of local competition ranking (-)
  - State of economic cluster development ranking (-)
  - Share of firms formally registered when they started operations in the country (+)
  - Share of firms identifying an inadequately educated workforce as a major constraint (-)

- **Citizen demographics**
  - GDP growth, % (+)
  - Urban population, % of total (+)
  - Total investment, % of GDP (+)
  - Ease of starting a business ranking (-)
  - Ease of accessing credit ranking (-)
  - Intellectual property protection ranking (-)
  - Press freedom index (-)
  - Share of firms citing electricity as a major constraint (-)
  - Share of firms identifying labour relations as major constraint (-)
  - Corruption perceptions index (-)
  - Extent of government web censorship (-)

- **Stakeholder characteristics**
  - Secondary education enrollment, gross % (+)
  - Tertiary education enrollment, gross % (+)
  - Quality of education (1-7 best) (+)
  - Literacy rate, adult % (+)
  - Share of population 20-39 years old (+)
  - % of population above national poverty line (+)
  - Export firms, % of total (+)
  - High technology exports, % of total manufacturing (+)
  - Intensity of local competition ranking (-)
  - State of economic cluster development ranking (-)
  - Share of firms formally registered when they started operations in the country (+)
  - Share of firms identifying an inadequately educated workforce as a major constraint (-)

An Internet economy relies on a strong national infrastructure – both general level and ICT specific.

Non-physical aspects that are key to a well-functioning market environment. These aspects include regulatory and government interventions as well as and other factors that could influence business conditions.

Extent to which characteristics exhibited by individuals in a society are conducive to Internet usage, including demographics, skills, and consumer base characteristics.

The structure of an economy and that economy’s ability to incorporate ICT. A strong culture of innovation and a desire to use technology tools will allow for a more rapid and effective uptake of Internet capabilities.

*(+) indicates higher values raise attractiveness (-) indicates higher values lower attractiveness*
Core conditions include:

- **Environmental characteristics** that determine the opportunities and constraints in which economic actors operate. They include both the level of physical infrastructure as well as the extent to which the business environment encourages investment.

- **Stakeholder characteristics** include both citizen demographics (e.g., skills and consumer base characteristics) and business demographics, such as a strong culture of innovation and a desire to make use of technology.

These core conditions are crucial but are not by themselves sufficient for constructing a vibrant Internet economy. The value of the Internet cannot be realized until people start using it. Therefore a set of conditions that promote the Internet’s use in society must be in place.

These usage conditions include:

- **The means to use available Internet infrastructure.** This captures both the availability of Internet devices, such as computers or mobile phones, as well as the ease with which available infrastructure can be accessed, for example the price of connection.

- **The desire to use available Internet infrastructure.** This takes into account both how aware a population is likely to be of the various ways the Internet can be used and how attractive the Internet is to potential users in terms of the overall user experience and the perception of potential benefits attached to Internet use.

The “core” and “usage” factors provide a set of conditions that determine a country’s readiness and potential to realise the benefits of the Internet. It is clear that neither core nor usage characteristics are by themselves sufficient building blocks of a strong Internet economy. Hence, policymakers must evaluate both factors in parallel. At
the same time, there is no one-size-fits-all strategy for developing a thriving Internet economy. South Korea, for example, has become a world leader in Internet technology by focusing primarily on core factors: it laid world class infrastructure throughout the country and ensured universal access. It did so against the backdrop of a very strong emphasis on education.\footnote{Akamai “State of the Internet Report, Q1 2012” notes that Korea has one of the highest average connection speeds in the world and the highest broadband adoption rate of 53% (broadband defined as above 4 Mbps); ITU report that Korea’s excellence in education (highest enrolment rates amongst the Asian Tigers and compulsory free primary schooling) was a key contributing factor to its success in ICT (ITU Case Study; available \url{http://www.itu.int/ITU-D/ict/cs/korea/material/CS_KOR.pdf}; accessed November 2012).} India, on the other hand, despite relatively weak infrastructure has built a substantial Business Process Outsourcing industry based on a large pool of skilled labor and several pockets of high quality Internet.

It is therefore essential for business and government to recognise their positioning on both dimensions in order to drive national level strategies.

We evaluated 30 African countries across the core and usage dimensions in order to measure countries’ readiness and potential to deliver positive impact through the Internet,\footnote{The indexes combine nearly 50 variables. See Annex 2 for a detailed description of the methodology used.} looking at both sets of conditions in 2006 and 2012 (Figure 7) and comparing Sub-Saharan Africa to perceived global leaders.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure7.png}
\caption{Mapping of Core and Usage Conditions between 2006 and 2012}
\end{figure}
Sub-Saharan Africa is on the path to converge with global leaders but will be significantly impeded if infrastructure isn’t a priority. Looking at changes in performance between 2006 and 2012, two clear relationships emerge. First, Sub-Saharan Africa is on the right trajectory to catch up to global leaders. The speed may be slow, but the directional progress is apparent in the group of countries shifting to close the large gap identified in the 2006 snapshot. Our four focus countries are amongst the leaders in that charge to close that gap.

Second, there is a strong relationship between core and usage factors, suggesting that those countries that perform well on one dimension also tend to perform well on the other. Importantly, the pattern also suggests that, absent a minimum amount of investment in core infrastructure, there is a clear ceiling to progress on usage conditions. None of the countries in the 2012 snapshot achieved strong usage conditions without a commensurate investment in core conditions.

For policymakers, this suggests that poor performance on core conditions, measured by indicators on physical infrastructure and general business environment, cannot be leapfrogged. No vibrant Internet economies—or the positive development conditions for usage have remained relatively stagnant.

While Ghana, Kenya, Nigeria and Senegal show fairly strong performance relative to their African peers, they still lag significantly behind global leaders and other emerging market countries such as South Africa and Thailand. A comparison with the same analysis for 2006 suggests that while the four countries have all improved on their core conditions, conditions for usage have remained relatively stagnant.

Although its core infrastructure was weakest of all four focus countries, Senegal performed best on usage conditions. Senegal immediately stands out as a potential outlier, because it has strong usage conditions relative to its positioning on core factors. But this result stems from study methodology. The team used indicators that adjusted for population and share of online population, so that sheer country size would not systematically count for or against any particular country. Along these dimensions, Senegal’s smaller pool of Internet users appears to be relatively sophisticated. This suggests that if certain barriers were addressed, Senegal would be poised to realise more meaningful impact from its use of the Internet. Senegal’s main barriers are the lack of continuous ICT leadership and a weak regulation which have both led to a very limited competition in the Internet sector. These factors could help explain why the country has seen no increase in its relative positioning over the last ten years. However, the indicators show that Senegal has continued potential for strong impact, even though it has consistently underperformed from an Internet penetration standpoint.

Nigeria, by contrast, improved overall core infrastructures but lags behind in terms of broad-based access. Its improved core infrastructure ranking from 2006 stems from its drive to increase cell phone coverage to a larger share of the population and improved access to credit for small business owners, which led to more capital investment. Nigeria’s rapid growth, urban population and investment per capita have all created a strong core enabling environment, but that has not yet translated into sufficient access opportunities. Overall, levels of awareness remain particularly low, and price and low quality bandwidth are still significant barriers.

Ghana has improved business environment has pulled up its core infrastructure ranking, while its current usage patterns shows comparatively high engagement in social media, content generation on Wikipedia and video sharing. These build atop its leading position in mobile broadband penetration on the continent, relieving barriers to higher bandwidth interaction. Despite this strong performance, our analysis suggests that Ghana now needs to focus its attention on improving the level of attractiveness of Internet services.

Kenya continues to demonstrate a solid performance in terms of usage conditions, particularly given relatively weak environmental characteristics. Kenya performs well on stakeholder characteristics, because of its strong business environment, though its environmental characteristics, particularly physical infrastructure, are weaker. Its education system has proven to be a strong asset. The growth of a developer and tech community, investment in the business process outsourcing (BPO) sector and active support for the Ministry of Communications and Kenya ICT Board have also helped bolster Internet awareness amongst the population.

With strong infrastructure and usage conditions, countries will be able to maximise the benefit of the Internet towards national level objectives. The sections that follow explore the current and potential impact of Internet on key developmental challenges facing Sub-Saharan countries, namely, the promotion of health, education, financial inclusion, SME growth, energy and transport and governance.

11 Dalberg interviews, 2012.
Internet-enabled businesses within agriculture have grown to the stage where they can achieve scale and impact. Esoko, from Ghana, launched out of a public-private partnership to address market price transparency and evolved its services beyond that. Virtual City, meanwhile, received growth capital from Nokia and Acumen Fund after its proof of concept in order to scale. Within agriculture, information management, marketing and supply chain management solutions show the greatest potential for impact from Internet-enabled solutions. Such successes suggest that the sector is ripe for for-profit business models to flourish, particularly in the presence of investors looking to shift pilot projects into scalable businesses.

Policymakers can improve the conditions for Internet-enabled agriculture businesses by investing in literacy and eLiteracy, public data, eliminating customs duties on Internet-enabled devices and, in some countries, coordinating interventions involving multiple stakeholders.
VIRTUAL CITY HAS SEEN HIS SUPPLY CHAIN MANAGEMENT SOFTWARE REDUCE THE LAG BETWEEN PRODUCE DELIVERIES AND CASH COLLECTIONS FROM 8 DAYS DOWN TO 3, FREEING WORKING CAPITAL

ENABLING BUSINESSES THAT INCREASE FARM GATE PRICES COULD SHIFT $75M TO THOSE MOST IN NEED WITHIN FIVE YEARS AND GENERATE $55M IN FINANCING

CUMULATIVE FIVE-YEAR IMPACTS, $MILLION

HIGH QUALITY, RELIABLE INTERNET CONNECTIVITY IS KEY TO THE SUCCESS OF DISTRIBUTED AGRICULTURAL COLLECTIONS BUSINESSES WHICH REQUIRE SYNCHRONIZING INFORMATION BETWEEN MOBILE DATA COLLECTION DEVICES AND A DATABASE WITH HISTORICAL RECORDS

KEY ASSUMPTIONS

- Farmer incomes will increase 9% based on the lower end of Virtual City’s 9-13% claimed range
- Average farmer incomes in the four countries range between $320-$460
- Number of farmers increases at the population growth rate
- Businesses in Senegal, Ghana and Nigeria grow 30% slower than Virtual City did
- 10% of customers use their records to secure annual input loans
- Loans only cover 75% of these farmers’ total short term financing needs.

PRICE TRANSPARENCY FOR LOCAL AND INTERNATIONAL MARKETS LETS FARMERS FIND THE BEST PRICE FOR THEIR PRODUCE, WITH MANOBI’S TIME TO MARKET SERVICE INCREASING GUM PRODUCER INCOMES 40-50%

- Policymakers should make national public sector agricultural information available and useful digitally.
- Training programs should partner with private sector firms to create incentives for learning.
- A credible, comprehensive agricultural development strategy can help businesses understand where the future market opportunities are and create appropriate solutions for them.
- Eliminating import tariffs on Internet-enabled devices will help decrease the cost of Internet-enabled solutions in agriculture.

Source: Dalberg analysis and interviews
Sector needs

Internet-enabled solutions can ease agricultural challenges—a vital sector in Sub-Saharan Africa. More than 280 million people in Sub-Saharan Africa are farmers. Some countries have an especially high concentration of agriculturalists. In Senegal, for example, nine of twelve million people earn their living in the agriculture sector. ICT can boost food security and incomes for farming households by improving input procurement, production and distribution, as seen in the Figure 8.

Although smallholders and big agribusinesses are different types of enterprises, they face some common challenges. At each step along the value chain there are inefficiencies from timing and collection, potential theft and the relative expense of storage. Smallholder farmers face three significant challenges that intelligent ICT could address: access to finance, lack of price transparency, and risk exposure due to weather, disease and spoilage. Only six percent of adults in developing countries working in farming, forestry and fishing have crop, rainfall or livestock insurance.

Solving these problems for farmers and agribusinesses presents a huge opportunity for development impact due to the large share of people across Sub-Saharan Africa whose livelihoods depend on the sector.

Key diagnostic findings

Internet-enabled firms in agriculture are having the greatest impact in marketing, information management and supply chain management, according to our assessment of the need, opportunity and current level of activity.

- Over 70% of surveyed firms in the agriculture sector view access to information, as in price transparency, as the most important impact area, with marketing and improved access to customers as the second-most important.
- Marketing is most relevant for export-oriented farmers—for example, coffee or cocoa coops and estates—and agribusinesses, rather than to smallholder farmers of staple crops.
- Supply chain management applications can lower shrinkage, improve delivery timing and the speed of collections, and allow for improved management forecasting and operations planning. More than half the surveyed firms use the Internet for these purposes.

Almost all of the solutions identified in our focus countries rely on devices that interface with a cloud-hosted, backend database. Virtual City CEO John Waibochi sees agriculture-focused applications continuing to move in this direction, saying the solutions on the market are “all mixed and matched...all one and the same,” whether they mobile or Internet platforms, because they are all linked to remotely hosted databases via the Internet.

How important is the Internet for your business?

Source: Dalberg survey of 115 agricultural businesses across Ghana, Kenya, Nigeria and Senegal
Priorities for impact

Financing and training offer potential impact, but both are at a nascent stage. Within financing, new insurance and loan products, offered through existing mobile finance networks, can be rolled out cost effectively. These products use Internet-enabled technologies for risk evaluation and mobile money systems for payouts and are further detailed in the financial inclusion chapter.

Kenya’s Kilimo Salama seed insurance programme is one example, relying on climate and vegetation growth data from the United States National Oceanic and Atmospheric Administration. At the point of sale the agent registers the bar codes of specific bags of seed that have been sold to the farmer’s mobile phone number, then links this to the nearest weather station. These short message service (SMS) data then update a remote server. The solution was jointly developed by the Syngenta Foundation for Sustainable Agriculture, mobile and insurance providers.4

There are also examples of tailored online libraries of agricultural information compiled by agriculture ministries, as in Kenya’s Kilimo Library. These must be partnered with significant investments in improving rural computer and Internet access if a wide number of farmers are to benefit.

eAgriculture pilots in countries with appropriate standards demonstrate more quantifiable impact than pilots in health or education. The health or education sectors can maximise impact across a wide range of stakeholders by coordinating information technology (IT) platforms from the beginning of the system design process, ensuring interoperability. Agriculture in some countries, such as Kenya, benefits from already-established standards.

In Kenya, for example, the National Cereals Produce Board sets strict guidelines for product quality, which influences the design of these IT platforms. Developers can either choose to engage the relevant regulating agencies directly and lobby for shared standards, or independently adapt their software to individual agency requirements. Though private sector competition will help optimise the use of IT within agriculture, the private sector must harmonise its platforms with government requirements when creating platforms for regulated commodities.

Of the four focus countries, the biggest impacts have been seen in Kenya and Ghana. Ghana’s two main programmes, the Trade and Investment Programme for a Competitive Export Economy (TIPCEE) initiative to drive export agriculture and Esoko, began as public-private partnerships. Esoko was able to adapt from its roots as a development intervention to become a fully-fledged business in 16 countries.5 Kenya, meanwhile, has a large number of pilots with momentum principally driven by the private sector. Virtual City’s Agrimanagr has helped more than 300,000 farmers, while other applications are aiding information management and quality control in dairy. Impact in Senegal has been more muted, with fewer pilots and cries from the existing businesses, Manobi and Mlouma, for greater government coordination of the sector.

Nigeria holds significant potential but impact in agriculture to date has been low, as judged by interviews and the landscaping. Interviewees suggested that the country’s tech scene has focused more explicitly on building high-return businesses rather than on development impact.


5 Esoko website, www.esoko.com/about/clients.php#countries

‘HIGH OR SOME EXTENT’ OF INTERNET USE FOR BUSINESS FUNCTIONS

<table>
<thead>
<tr>
<th>% of total responses</th>
<th>2011</th>
<th>2012</th>
</tr>
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<tbody>
<tr>
<td>Conduct research</td>
<td>72</td>
<td>70</td>
</tr>
<tr>
<td>Client/customer relationship</td>
<td>53</td>
<td>49</td>
</tr>
<tr>
<td>Manage supply chain</td>
<td>49</td>
<td>43</td>
</tr>
<tr>
<td>Data &amp; information storage</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>Education &amp; training</td>
<td>23</td>
<td>18</td>
</tr>
<tr>
<td>Manage internal organisation</td>
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<td>Provide product or service</td>
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<td>Recruiting</td>
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BY IMPROVING SUPPLY CHAIN MANAGEMENT AND MARKET INFORMATION VIRTUAL CITY AGRIMANAGER HAS INCREASED FARMER INCOMES BY 13%
The country’s development interventions also tend to happen more on a state-by-state basis than at a national level, suggesting that the search for national winners may have overlooked localised programmes. Regardless, none of the local programmes have made it to national scale.

Case studies

Agrimanagr is an application created by Virtual City in Kenya that allows for more efficient field collection of produce from smallholder farmers. The handheld field units both update the collected weight of the produce for later supply chain tracking to prevent shrinkage and print out a receipt listing the farmer’s historic sales. He can then use the receipt as proof of credit when seeking input financing during the next growing season.

Success of companies such as Virtual City could enable businesses that increase farm gate prices through accurate weighing to shift $75 million to those most in need within five years and generate $55 million in financing. A range of agricultural support tools, such as Nokia Life Agriculture Services and Esoko, have provided millions of farmers with a range of information services.

FIGURE 9: POTENTIAL IMPACT OF SUPPLY CHAIN MANAGEMENT SOLUTIONS ACROSS KENYA, GHANA, SENEGAL AND NIGERIA

![Bar chart showing cumulative five-year impacts in millions for Senegal, Ghana, Kenya, and Nigeria.]

Key assumptions
- Farmer incomes will increase 9% based on more accurate weighing, the lower end of Virtual City’s 9-13% claimed range
- Average farmer incomes in the four countries range between $320-$460
- Number of farmers increases at the population growth rate
- Businesses in Senegal, Ghana and Nigeria grow 30% slower than Virtual City did
- 10% of customers use their records to secure annual input loans
- Loans only cover 75% of these farmers’ total short-term financing needs

Manobi in Senegal was created primarily to provide real-time information on agricultural prices in local and international markets, boosting certain farmers’ incomes by more than 40%. Price transparency allows farmers to choose where and when to sell their produce, which they naturally use to find better prices. The organisation has also diversified into monitoring agricultural production, commercialising agricultural products and accessing and managing credit.

Ghana’s TIPCEE programme shows that decreasing the cost of procurement for smallholder farmers by improving wholesalers’ information on actual supply can boost farmer incomes. With $30M invested over five years, this programme mapped 12,000 farms on 20,000 acres, which covered 100,000 households in more than half of Ghana’s districts. Agribusinesses that sought, for example, citrus could better project what volume of produce they could obtain from these farmers. Previously, farmers had overestimated their plot size by an average of 102%, making sourcing more difficult and costly for the businesses engaged.6

Challenges and recommendations

To boost internet-enabled development impact in agriculture, policymakers face the traditional challenges of improving literacy, increasing access and setting a clear strategic direction for the sector. Basic literacy can improve the economics of potential agriculture businesses. Respondents in Senegal, where literacy rates are poor, often cited the difficulty of extending services to farmers who were neither literate nor numerate. Mlouma had to create a call center and hire people to collect and process clients’ requests, as those clients could not write the required SMS back on their phones.7 Additional operating costs like these make creating viable business models within IT-enabled agriculture less likely. Governments should continue to push literacy and eLiteracy initiatives in rural areas using the special funds already earmarked in each focus country to boost rural access.8

Policymakers should make national public sector agricultural information available and useful digitally. Over 70% of surveyed firms in the agriculture sector view access to information, as in price transparency, as the most important impact area. Further, interviews with experts, particularly in Nigeria, noted the value that could be created by building a central repository for identifying, storing and sharing knowledge. Government should therefore consider the value of creating a central repository for storing and sharing information.

Training programmes should partner with private sector firms to create incentives for learning. Though few rural ICT training programmes have had broad-based impact, when they are staged in coordination with private sector firms to immediately follow up with products that utilise that training, there is the possibility to mutually reinforce the skills and boost demand for both programmes.

A credible, comprehensive agricultural development strategy can help businesses understand where the future market opportunities are and create appropriate solutions for them. Lack of strategy was a barrier to growth in Senegal, where developers sought to identify where the incentives were to create content with added value adapted to the needs of African users. Senegalese firms also mentioned a desire to see government coordination in the sector rather than informing the Ministry of Agriculture and Rural Equipment “after everything is done.”

This strategy can also help specialised government agricultural boards, such as the National Cereals and Produce Board in Kenya, coordinate the development of enabling software for its quality control standards.

Eliminating import tariffs on Internet-enabled devices will help decrease the cost of Internet-enabled solutions in agriculture. Nearly all of the development-focused agriculture solutions identified used a combination of desktop computers in the office and Internet-enabled devices in the field. Reducing tariffs on these devices would increase the likelihood that financially viable businesses emerge in this sector.

7 Interview with Aboubacar Sidy Sonko of Mlouma.
8 Interview with Maimouna Lo Gueye, Senegal’s General Secretary of Ministry Of Agriculture & Rural Equipment.
Innovation surrounding Internet-enabled businesses in health is not lacking, however, most of them remain as pilots, with limited evidence of impact on health outcomes. However, a few examples that have transcended to a phase of growth suggest the potential for scale. And, while there is limited evidence of the impact of Internet-enabled solutions on health outcomes, governments are forging ahead to create enabling environments recognising the impact on operational efficiencies and cost savings in service delivery. By developing eHealth policies and strategies, and committing to interoperability, the governments of Kenya and Ghana have helped spur the development of applications that can be integrated onto government platforms. Nigeria and Senegal’s eHealth sectors have several pilots in place, but they are yet to be scaled. Policymakers should ensure that there is an eHealth strategy in place, coordinate the various ICT developers that seek to build atop those systems and continue to bring health care administration costs down by encouraging health care providers to adopt networked technology.
Despite an overwhelming number of pilots and limited evidence of impact, governments are forging ahead to create enabling environments recognising the impact on operational efficiencies and cost savings in service delivery.

**E-learning models such as Amref’s in Kenya enable health workers to improve their skills without impacting health care delivery through taking health workers away from the job.**

**Application of systems that reduce administrative tasks, such as digitising the claims payment process in Kenya, free up significant costs to be reallocated to direct health care.**

**Operational efficiency gains:** 2/3 attributed to the Internet.

**Access to information particularly for pregnant women has the potential to improve pre-natal care and encourage safe deliveries.**

- Develop policy and regulatory frameworks that promote national standards. The health sector requires regulatory oversight for many reasons, from clinical protocols to data policies to electronic records management.
- Coordinate and partner across sectors in order to share information, avoid duplication of applications and investments, and enable the adoption of interoperability standards.
- Act as a first mover by automating health administration and datasets. The use of enterprise solutions and digitization of processes has led to significant cost savings through increased operational efficiency.

*Source: Dalberg analysis and interviews*
Sector challenges

Despite decades of investment targeted toward improving health outcomes, health care in Sub-Saharan Africa remains a challenge. The continent carries 25% of the world’s disease burden and is home to 12% of the world’s population, but receives only one percent of global health expenditure. Global attention on the Millennium Development Goals has reduced HIV/AIDS prevalence and deaths from malaria and tuberculosis. However, these diseases still plague health systems, and high rates of maternal mortality continue to afflicting the continent. New diseases are on the horizon. Epidemiologists predict that by 2030, non-communicable diseases (NCDs) will cause more deaths in Sub-Saharan Africa than communicable, maternal, perinatal, and nutritional diseases. Preventing and managing this emerging NCD epidemic will require more resources and greater health-system efficiencies.

Compounding the challenges described above, the systems that support delivery of health care in the region remain weak. Sub-Saharan Africa only has 3.5% of the world’s trained healthcare workers and 1.7% of its physicians to address 90% of the world’s malaria deaths, 67% of the global HIV/AIDS caseload, and 28% of the underweight children in developing countries. In addition, there remain huge disparities in access to health care between the urban and rural populations. The systems to support delivery including supply chain and information management systems, remain paper-based and bureaucratic, thus slowing down the delivery of the health care.

Despite these enormous health challenges, governments in Sub-Saharan Africa remain ambitious. They have designated universal health coverage as a priority, though their implementation approaches vary. Achieving this goal requires an integrated approach that recognizes the interdependence of key building blocks of the health system and working on all of them in tandem.

Key diagnostic findings

Internet technologies are demonstrating an impact on the overall efficiency of health systems although, they may not yet be directly improving regional health indicators. Internet-enabled tools have been used to automate processes, particularly in health administration; implement electronic record keeping; and transform the delivery of health training through eLearning. Mobile phone technologies have helped health workers ease the burden and improve the accuracy of data collection. Mobile phones have also been a useful tool for health savings and payments, tracking patients, especially pregnant women and HIV/AIDS patients, and empowering communities with health information. One key challenge in promoting Internet-enabled processes to improve global health has been demographic. Seventy-five percent of the world’s poor they live in rural areas that happen to be on the wrong side of the digital divide. Nonetheless, ICT is making an impact in health systems.

HOW IMPORTANT IS THE INTERNET FOR YOUR BUSINESS?

Source: Dalberg survey of 153 health businesses across Ghana, Kenya, Nigeria and Senegal

1 WHO Health Statistics.
3 A Survey of Sub Saharan Medical Schools accessed at http://www.human-resources-health.com/content/19/1/4
4 WHO Health Statistics.
6 The mobile application of Epi surveyor, a health data collection tool, is currently being used in Kenya, Ghana and Senegal to collect data from the field. This information is then uploaded to the Governments Health Management Information System for analysis. The tool has been useful in ensuring accuracy of data, providing GPRS coordinates from data collection sites and reducing the administrative burden of data collection.
The strongest indication of current and potential impact appears to be coming from training, service delivery and information management, according to interviews with sector experts, in-country entrepreneurs, analysis of the level of activity per sector and a broad based survey of businesses and organisations operating in this sector. This is illustrated in Figure 10. Across this heatmap, four areas for impact stand out: information management, communications and marketing, service delivery and workforce development.

Priorities for impact

Workforce training, information management and service delivery are the three areas in which Internet-enabled solutions could drive better health outcomes, as detailed below.

Health workforce training is a key regional challenge, in large part because of limited training infrastructure, particularly in rural areas. Typically, rural health workers must travel across long distances to urban areas in order to access training. While on the road, health care workers cannot provide care.

Thus, eLearning is an important tool for health care worker training—including both teaching and upgrading of skills. ELearning holds special promise for rural health care workers, but it has important applications for urban workers as well. Because reliable bandwidth remains a challenge in rural Sub-Saharan Africa, work around delivery methods are important.

Key delivery strategies include downloading of course material on to CD-ROM and e-learning delivery sites.

The African Medical Research and Education Foundation (AMREF), a health-system strengthening institution based in Kenya, uses eLearning to circumvent these challenges. Its model allows nurses to upgrade their qualification online, from Certificate to Diploma, and permits ongoing training and eDelivery of information on new health care practices. More than 4500 nurses have so far enrolled online, including nurses in remote areas where AMREF has built eLearning training facilities. In all, AMREF has enabled nurses in rural areas to access training they never could before—in part because bricks-and-mortar classroom infrastructure could accommodate only 100 students a year. Thus, AMREF’s eLearning model not only has helped nurses upgrade their skills—and deliver better health care to their patients—but also has improved equality in training. The model is being replicated in other countries that face similar challenges in health care worker training. AMREF has increased the training capacity 35 fold while keeping nurses in the workforce.

Workforce training programmes can have extraordinary impact both for health and potentially other resource constrained sectors such as education. Replicating AMREF’s model could upskill the current nursing workforce nine times faster than could the current infrastructure in Kenya, Ghana, Nigeria and Senegal. But such training programmes require concentrated investments above and beyond the current infrastructure.
REPLICATING AMREF’S MODEL COULD UPSKILL THE CURRENT NURSING WORKFORCE NINE TIMES FASTER THAN THE CURRENT INFRASTRUCTURE IN KENYA, GHANA, NIGERIA AND SENEGAL

Years required to upskill current nursing workforce

Number of nurses eligible for upskilling, 000s

CONCERTED INVESTMENTS IN ELEARNING, WITH MATCHING GOVERNMENT SUPPORT TO PROMOTE CONNECTIVITY AND LOWER THE COST OF BANDWIDTH, CAN EASE THE HEALTH CARE WORKFORCE TRAINING BURDEN BY $320-$460 PER NURSING GRADUATE.

Notes: Assumes a three-year ramp-up in training capacity, conservatively assumes skilled nurses trained at twice the rate seen in Kenya


INFORMATION MANAGEMENT

Improving the management systems of health sector makes health care delivery more efficient and provides health workers the information they need to make crucial decisions. Several large-scale initiatives in the region that support clinical and business processes and data collection and aggregation have been implemented. These include Health Management Information Systems (HMIS). By reducing administrative burdens and improving access to information, these systems have had a huge impact in improving efficiencies and cost savings.

The health insurance sector has had notable successes in managing large amounts of data. In Ghana, the National Health Insurance Authority has automated their processes and developed an online claims management system. In Kenya, the National Health Insurance Fund (NHIF) reduced its administrative costs from 60% to 32% by automating its claims processing to enable online pre-approval, accessing real-time data and tracking payment processes.7

Other governments recognise the potential for cost-savings in electronic information management. The Government of Nigeria in mid-2012 passed an eHealth Policy to enable the development of an ICT platform for the National Health Insurance Scheme.

To improve oversight of health care, the Government of Kenya has successfully mapped all the accredited hospitals. (The map is available at http://www.ehealth.or.ke.) The map provides up-to-date information for patients seeking medical services and encourages them to visit only accredited hospitals. Its list of hospitals has also streamlined the planning of medical supply deliveries the mapping of staff by the relevant agencies. It has also enabled developers to integrate their applications using government data. For example, the company MedAfrica has a mobile application ‘MedApp’ that aggregates all health services in Kenya. From the application, citizens can access health information and contact details of the closest hospitals and doctors.

7 Chacha Marwa Strategy Department NHIF estimates that 60% of the cost savings were enabled by having Internet-enabled solutions
SERVICE DELIVERY

Access to health care, particularly for vulnerable citizens such as pregnant women and youth, is a challenge especially in rural areas. One key trend in addressing MDG 4 and 5 has been providing prenatal and antenatal health care information through mobile services. Several initiatives in the four target countries provide information to mothers and nurses. One common feature of the programmes in the region is that they focus on certain localities. MOTECH has to date been implemented in four districts. None of the projects have been scaled nationally but the MOTECH Suite, which provides a suite of mHealth services, is poised for scale.

A second challenge in service delivery is low doctor-to-patient ratio, with less than 0.5 physicians per 1,000 people in Sub-Saharan Africa (vs. 2.42 in the US or 2.74 in the UK). Several innovations are seeking to address the relative scarcity of physicians by bringing healthcare closer to citizens. The Ask a Doc Website (www.askadoc.co.ke), developed in Kenya, provides online consultation through the web and mobile phones.

Challenges and recommendations

Develop policy and regulatory frameworks that promote national standards. The health sector requires regulatory oversight for many reasons, from clinical protocols to data policies to electronic records management. eHealth policies encourage innovation by providing developers clear guidelines; eHealth policies also boost investor confidence and enable the government to prioritise health as a key investment area. As Table 1 suggests, Kenya and Ghana have a more developed policy and regulatory framework in the health sector.

<table>
<thead>
<tr>
<th>Table 1: eHealth Policy Framework in the Four Countries</th>
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<tbody>
<tr>
<td><strong>Government ICT Strategy or eGovernance strategy</strong></td>
</tr>
<tr>
<td>Kenya</td>
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<tr>
<td>Nigeria</td>
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<td>Senegal</td>
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Coordinate and partner across sectors in order to share information, avoid duplication of applications and investments, and enable the adoption of interoperability standards. Sector coordination can be led by either the private or public sectors. In Ghana, the Ghana Information Network for Information for Knowledge Sharing promotes sharing information on ICT for development. In Kenya, a similar structure with the Tele-health Society is developing a directory of all eHealth and mHealth applications. Greater coordination—especially via a vis interoperability standards—promotes investment, and Ghana and Kenya are home to more e-health businesses that are transcending the pilot stage to successful business models.

Act as a first mover by automating health administration. Automating and digitising health management processes has led to huge cost savings and increased efficiency in medical administration. The success in conducting online business processes by the National Health Insurance Schemes in the three countries are success stories that provide confidence to have more institutions in the health channel adopting Internet-enabled processes in health administration.

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8 World Health Organisation Health Statistics.
9 Kenya ICT Master plan for 2012 – 2017 is to be approved by early 2013
10 Government of Senegal has advertised in November 2012 for the development of an ICT Strategy
Nearly 60% of education organisations surveyed responded that access to the Internet is ‘essential’ for their work. Further, the rapid reduction in cost of devices, increasingly affordable bandwidth and development of local content are indications of a positive trend towards leveraging technology to support educational outcomes. But despite significant agreement that the Internet and Internet-enabled solutions could be powerful tools for learning, to date, evidence of scale and impact is limited because interventions d. Yet, notable examples stand out. First, in tertiary education, virtual learning universities are exponentially expanding learning opportunities across the continent. Second, the rapid growth of mobile web and social networking has enabled a surge of access to information outside the classroom. What’s needed now are solutions that fully incorporate bandwidth, hardware, software, training – both student and teacher – , content and policies in order to deliver both impact and scale.
INTERNET-ENABLED SOLUTIONS ARE EXTENDING ACCESS TO INFORMATION BUT DELIVERING AN IMPACT ON UNIVERSAL ACCESS TO EDUCATION REQUIRES A HOLISTIC APPROACH INCLUDING BANDWIDTH, HARDWARE, CONTENT AND SUFFICIENT TRAINING FOR BOTH STUDENTS AND TEACHERS

Heat mapping based on perceived sector need, perceived national need and level of current activity in the country.

Education leaders and policymakers must integrate technology projects and policy into the broader transformation of service delivery and national education strategy.

Policymakers must continue to recognise the limitations of insufficient infrastructure conditions including affordable and sufficient quality bandwidth, electricity and ICT literacy.

Innovators should seek out and emphasise local content.

Education leaders should look outside the classroom for solutions that will support access to educational information and resources.

Source: Dalberg analysis and interviews
Access to quality education remains one of Sub-Saharan Africa’s most significant challenges.

Sector challenges

Access to quality education remains one of Sub-Saharan Africa’s most significant challenges. More than 100 million school-age children in developing countries do not have access to education, and nearly half of them live in Sub-Saharan Africa. Educational quality is another barrier: more than 900 million children worldwide lack access to quality education. Although about $2.5 trillion for education has been mobilized globally, primarily in the form of public funds, access and quality problems persist.

Quality education and decent work are closely interlinked in the African context, which suffers from the lowest progression rates in the world: only one in three youth attend secondary school. Uneducated youth become marginalized unskilled workers who face competition from the other eight to ten million new job seekers every year. Skilled workers face a different set of challenges, including, often, a mismatch between the skills required by employers and those that they have obtained.

Achieving universal access to education requires an integrated, end-to-end solution. Universal access to quality education is at the core of government strategy. Solutions must recognize the links between student needs, appropriate curricula, delivery and management of educational services.

Key diagnostic findings

The Internet and education are a natural fit, given the Internet’s ability to gather and share knowledge. Indeed, respondents from the education sector highly valued the Internet, with 60% calling it essential and nearly 80% of them believing that improved access to information is a key outcome of Internet use.

But barriers to access mean the Internet’s promise for education is a long way from being fulfilled. These barriers—in particular access to reliable networks, cost and relevant content for the African context—are serious impediments to harnessing the Internet’s potential for education. They prevent initiatives from achieving scale. The most common example of eLearning still typically requires holistic investment in: sufficient bandwidth, hardware, teacher and student training and relevant content.

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1 UNICEF Child Info: Children of primary school age out of school
2 Underserved children populations estimated from World Bank Database of 4 – 19 year old low-income populations as of 2010.
3 UNESCO Education For All Global Monitoring Report

**Impact of the Internet in Africa**

**HOW IMPORTANT IS THE INTERNET FOR your BUSINESS?**

[Image showing the impact of the Internet in Africa with categories: Essential, Somewhat Important, Important, Not Important, Don’t Know]

Source: Dalberg survey of 191 education businesses or organizations across Ghana, Kenya, Nigeria and Senegal
The Internet is starting to influence curriculum delivery by providing consistent access and supplementary tools to both students and teachers.

Figure 12 synthesises evidence from interviews with sector experts, a landscape analysis of the level of activity per sector and a broad survey of education organisations.

Priorities for impact

SERVICE DELIVERY

Improvements in service delivery are driving efficiency, quality and access to education. Improved efficiency is being accomplished by providing online applications and programmes, such as virtual learning, to a wider range of students. The Kenya National Examination Council has made significant strides in developing student portals. On them, students can register for examinations, check their results and track their school selection process. Such online platforms have led not only to increased student convenience and lower transport costs, but also to better educational tracking.

The Internet is starting to influence curriculum delivery by providing consistent access and supplementary tools to both students and teachers. One of the more well known examples is Worldreader, an initiative focused on distributing eReaders to classrooms across Kenya, Ghana, Uganda, Rwanda and Tanzania where programmes aim to reach 30 000 children and families will now have access to over 94 000 eBooks4. With several partners, the Government of Kenya also has several initiatives to improve access to computers and tablets to schoolchildren. In tandem with this initiative, the digitization of the national state school curriculum and several learning applications are increasing local content available online. A launch of educational content on a specialised channel on digital TV is expected to be available in 2013.

The African Virtual University (AVU), with offices in Senegal and Kenya, is dramatically extending access to students by connecting more than a million users worldwide to AVU Open Education Resources between January 2011 and June 2012. AVU offers degrees in math, physics, chemistry, and biology as well as courses in ICT and renewable energy.5

Outside the classroom, the proliferation of mobile Internet is also dramatically increasing access to educational materials and labor markets. Solutions such as the Binu and Worldreader partnership have been designed to address the lack of access to reading materials by delivering digitized books via mobile. As of July 2012, the Binu Worldreader app was delivering materials to over 484K readers globally including >190K in Africa alone. This included 1.2M page views per month in Ghana and another 10.1M per month in Nigeria.

Challenges and recommendations

Policymakers continually struggle with meeting donor requirements while advancing their particular country’s interests. Policies geared toward universal access to education have been the main focus for most African countries; they have focused on building schools and other physical infrastructure. But other educational inputs—including qualified teachers, administrators, and career services—are not generally included in donor funding. Moreover, learners in African countries are impeded by the lack of access to knowledge flows—due in part to lack of reliable, cost-efficient access. For example, students typically cannot access online journals, let alone state of art technology, due to lack of stable connection. Following the recommendations below will not solve all the education sector’s Internet challenges, but it is a start.

Education leaders and policymakers must integrate technology projects and policy into the broader transformation of service delivery and national education strategy. The Internet alone cannot solve the education sector’s systemic challenges, and should therefore be viewed as a tool within holistic approach to educational transformation. While initiatives such as eLearning, eBooks, and virtual universities offer great opportunities in expanding education services, these modernised initiatives must be accompanied by trained professionals – including both teacher and administrators - that are not only capable of using and disseminating information, but will also serve as reference points able to provide innovative lessons to digitising the sector

Policymakers must continue to recognise the limitations of insufficient infrastructure conditions, including affordable and sufficient quality bandwidth, electricity and ICT literacy. While Internet access has improved significantly across the four target countries, rural and poor areas are still very much underserved due to a lack of sufficient infrastructure, high connection prices, and low levels of literacy. Strategies for enabling environments must outline not only plans to expand access to Internet services, but also the supported physical infrastructure (including school buildings, electricity, devices and bandwidth). For example, Kenet (Kenya Educational Network) has increased bandwidth from 50 megabits per second to 2.5 gigabits per second in two years while reducing the unit price to almost one tenth of what it was. It’s now extending its reach to schools as well as universities and research centers6.

Innovators should seek out and emphasise local content. Beyond core infrastructure, Internet-enabled education services require locally relevant content based on the needs and capabilities of students, teachers and administrators. But interviews revealed that a lack of locally tailored content was a barrier both to implementation of new education initiatives as well as their ability to scale.

Education leaders should look outside the classroom for solutions that will support access to educational information and resources. Those in the education sector tended to value the Internet because it provides access to information—resource centres, libraries, curricula, and facts. But for now, the Internet’s greatest uptake appears to be emerging outside the classroom—through mobile enabled solutions such as the Binu Worldreader collaboration in Ghana. Realising the Internet’s potential benefits outside the classroom can be enhanced through the development of and affordable access to lower bandwidth solutions.

5 African Virtual University 2007 – 2009 Annual Report

More than eight in 10 surveyed SMEs believe taking better advantage of the Internet would improve their businesses’ economic performance, and seven in ten of those expect that doing so would create new jobs in their organisation. They have good reason to believe this. The Internet is enabling both top-line growth through marketing and sales, as well as bottom-line growth through increased efficiency in information management. It is enabling entirely new classes of business to emerge, as entrepreneurs develop local content and applications, while helping existing businesses trim costs as information management becomes digitised and networked. Policymakers should boost their small business sectors by helping to smooth the transition from mMoney to eCommerce, continuing to lower bandwidth costs and improve connection quality, and improving business environments.
THE INTERNET IS BRINGING TOP-LINE GROWTH AND BOTTOM-LINE IMPROVEMENT TO SMALL AND MEDIUM-SIZED ENTERPRISES. THIS CAN BE ACCELERATED THROUGH TARGETED INVESTMENT IN CONDITIONS FOR CLOUD SOLUTIONS

MARKETING AND AWARENESS HAVE DRIVEN SIGNIFICANT BUSINESS GROWTH IN NIGERIA, WHERE THE GET NIGERIAN BUSINESS ONLINE (GNBO) INITIATIVE HAS BROUGHT 25 000 BUSINESSES ONTO THE WEB SINCE 2011

ACCORDING TO INTERVIEWS IN GHANA, ONLINE SALES (ECOMMERCE) ARE GROWING, BUT HINDERED BY THE LACK OF SUPPORT SERVICES SUCH AS DELIVERY SYSTEMS AND ONLINE PAYMENT PLATFORMS.

ACCORDING TO KENYA’S IHUB RESEARCH, A SHIFT TOWARDS MOBILE PHONE BANKING AND PAYMENT SERVICES IS THE KEY TO UNLOCKING OTHER INTERNET SERVICES FOR SMES

Policymakers should engage with private sector as the eCommerce and payments ecosystem develops and support space for innovation as eCommerce business models develop.

Leaders must ensure that the conditions necessary for cloud computing are integrated into National ICT Strategies in particular, promoting quality, affordable broadband, investing in digital skills and capabilities and ensuring a sound business environment.

Policymakers should consider lowering bandwidth costs by convening large telecom companies to set investment strategy and provide subsidies.

Governments can play a special role in increasing Internet awareness—and therefore, use of it across sectors—by migrating further toward eGovernment services.

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Sector challenges

SMEs, particularly in Sub-Saharan Africa, face challenges accessing finance and the cost consequences of dealing in poor business environments. In Kenya and Nigeria, the collateral required to secure a loan is, on average, 160% of the value of the loan itself. Competing against larger companies is also made difficult by the cost and quality of electricity and the need to extend facilitating payments to speed regulatory and permitting compliance. SMEs are less likely to own generators than are large companies in each of these countries, which all have poor electricity infrastructure. Firms in Kenya spend on average 9% of their sales towards the combined cost of security and an additional 4% as unofficial payments to get business done.

Key diagnostic findings

SMEs benefit primarily from the communications, awareness and marketing, information management and direct sales opportunities allowed by the Internet, as shown in Figure 10.

Priorities for impact

The Internet brings top-line growth and bottom-line improvement to SMEs outside of the tech space. Dalberg survey data suggest that SMEs expect to benefit from the Internet primarily as an improved platform for marketing, giving them better access to customers and improving their customer relationship management. It is clear that business growth opportunities are available for all companies willing to market themselves online, regardless of whether customers can pay for goods online.

Indeed, the web is a central portal for advertising that can reach new customers—sometimes with smashing success. One proprietor in Nigeria found that going online boosted her sales more than ten times over, with Internet sales now making up 80% of her revenue. Initiatives like Get Nigerian Businesses Online (GNBO) that allow businesses to list themselves online without having to hire website builders have been extremely popular.

HOW IMPORTANT IS THE INTERNET FOR YOUR BUSINESS?

Source: Dalberg survey of nearly 1000 SMEs across Ghana, Kenya, Nigeria and Senegal.

PERCEPTION OF ‘HIGH IMPACT’ OF INTERNET USE FOR BUSINESS FUNCTIONS

Source: Dalberg survey of nearly 1000 SMEs across Ghana, Kenya, Nigeria and Senegal.
The Internet brings top-line growth and bottom-line improvement to small and medium-sized enterprises outside of the tech space.

However, SMEs that wish to sell online face impediments, including lack of trust in ePayments and poor supporting services, such as delivery and purchasing. Some companies have decided to accept emailed orders and begun delivering the goods themselves, which is only realistic for local companies such as Ghana’s breakfast order service KokoKing. Migrating to pure online advertisement, however, sometimes requires changing consumer behavior, as Dealfish realised when it resorted to offline advertising of its online classified ads service in Nigeria in order to gain initial traction online. The pull of social networking to get people online in Ghana and Senegal has boosted the effectiveness of SME marketing because satisfied customers with extensive online networks have more channels to share their positive experience with other online users.

SMEs have access to greater cost efficiency via improved internal information and supply chain management. These solutions are particularly promising in sectors like agriculture, where there is a high risk of spoilage without a functional supply chain, and in heavy industries, where timed equipment replacement can yield greater asset utilisation and fewer plant shutdowns. Information management through Internet-hosted applications, often referred to as ‘the cloud’, significantly reduces the cost of using ICT to scale up businesses by decreasing labour, equipment, software and electricity bills. In India, for example, that relocation of costs to the cloud has reduced IT cost by a third. While broadband penetration and other factors for ‘cloud readiness’ are on the rise, Africa remains at a nascent stage of realising the impact of Cloud services on socioeconomic development.

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**WHAT PERCENTAGE OF YOUR FILING, RECORD KEEPING, STAFF AND CLIENT MANAGEMENT DOCUMENTS WOULD YOU SAY ARE DIGITIZED?**

<table>
<thead>
<tr>
<th>Ghana</th>
<th>Kenya</th>
<th>Nigeria</th>
<th>Senegal</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>&lt;10%</td>
<td>&lt;25%</td>
<td>&gt;75%</td>
</tr>
<tr>
<td>69</td>
<td>118</td>
<td>81</td>
<td>259</td>
</tr>
</tbody>
</table>

Source: Dalberg survey of nearly 1,000 SMEs across Ghana, Kenya, Nigeria and Senegal

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8 Interviews with experts across Ghana and Nigeria.
9 Interviews with experts across Ghana and Nigeria.
10 Interviews with experts across Ghana and Nigeria.
“The cloud can be particularly meaningful in supporting SME growth by reducing the cost, the upfront investment and the operational complexities of using ICT to help build smaller businesses into larger ones. At the same time, both SMEs and individual users are relying on many ‘free’ cloud services that are in turn paid for by cloud-enabled advertising, often delivered trans-border.”

As noted by Cowhey and Kleeman, “the cloud can be particularly meaningful in supporting SME growth by reducing the cost, the upfront investment and the operational complexities of using ICT to help build smaller businesses into larger ones. At the same time, both SMEs and individual users are relying on many ‘free’ cloud services that are in turn paid for by cloud-enabled advertising, often delivered trans-border.”

Internet penetration also opens up entirely new business models for both companies with technical expertise as well as entrepreneurs. In Nigeria, for example, it has created opportunities for software designers developing gaming applications and mobile traffic applications, such as Maliyo Games, Gidi Traffic and Road Peer. It has also created opportunities for traditional and new media companies via advertising revenues, bringing in over 5M Naira a month for bloggers such as BellaNaija and Linda Ikeja, discussion forums like Nairaland, and newspapers such as Vanguard. Vanguard’s print business was unprofitable on its own, but its online portal ranks as the twelfth most popular site in Nigeria, and generates enough advertising revenue to make the entire operation viable.

Another example, Rancard Solutions is demonstrating the way in which Internet-enabled business models are enhancing business productivity and directly impacting revenue. Rancard, a Ghanaian company, offers a cloud based platform for delivering content to 250M subscribers across Sub-Saharan African and increasing subscriptions for Glo Nigeria from 40 000 to 540 000 using its Rendevous solution.

Recognising the future potential of Internet-enabled business models, all four countries are actively investing in support to entrepreneurs. In Senegal, public-private partnership CTIC was established to make earlier stage investment in supporting the development of technology entrepreneurs. In 2012, CTIC launched over a dozen ICT businesses by working with twenty four start-ups. Similarly, in Ghana, the Meltwater Entrepreneurial School of Technology provides training and mentoring for aspiring African software entrepreneurs with the goal of creating wealth and jobs locally in Africa.

Our four focus countries face different constraints in their attempts to incubate IT startups. Kenya and Nigeria have funding available through the VC Africa Network, iHub, the Enterprise Development Centre, and Wennovation. Both countries also see their bandwidth costs are coming down and many more people coming online. However, a worker at one of Ghana’s incubators, the Meltwater Entrepreneurial School of Technology (MEST), voiced a complaint about pilots emerging, yet the number of software developers with the business skills to create viable businesses that will scale remains low. In Senegal, on the other hand, the strong voice of the telecom companies in pushing the national universities to train software engineers has led to a large number of developers without any of the ancillary designers or web designers needed as part of an Internet startup ecosystem.
Challenges and recommendations

Policymakers should boost their small business sectors by focusing on smoothing the transition from mMoney to eCommerce, continuing to lower bandwidth costs and improve connection quality, passing legislation on privacy and data protection and improving their business environment. These measures will boost the competitiveness of SMEs and allow them to make greater use of Internet-enabled technologies for growth.

Policymakers should engage with private sector as the eCommerce and payments ecosystem develops and support space for innovation as eCommerce business models develop. Creating a thriving eCommerce sector requires more than just legalising mMoney. Allowing transactions to be final, and allow the private sector to market and begin to build consumer trust in them. In addition, eCommerce has been held back by a lack of innovative, integrated business models. The growth of hubs and incubators can support experimentation of these various models.

“An assessment of benefits from e-commerce found little evidence of producers in developing countries selling significant amounts of goods directly to consumers online. The overall picture is one of slow progress for e-commerce directly benefiting poor producers.”

Leaders must ensure that the conditions necessary for cloud computing are integrated into National ICT Strategies in particular, promoting quality, affordable broadband, investing in digital skills and capabilities and ensuring a sound business environment. Survey results suggest that SMEs perceive the Internet as enabling improved business growth and employment, but in and of itself unable to compensate for missing elements of a good business environment and the such as poor access to electricity or lack of regulation. Continued Doing Business improvement is therefore expected to be a broad enabler of the sector.

Policy makers should consider lowering bandwidth costs by convening large telecom companies to set investment strategy and provide subsidies. Facilitating investments such as the $210 million put in by Capcom to merge three telecoms companies into a national broadband company could provide a good model. Making full use of cost saving cloud software requires that businesses have good connectivity, which should be a central goal for policymakers.

Governments can play a special role in increasing Internet awareness—and therefore, use of it across sectors—by migrating further toward e-government services. Doing so will help acclimate individuals to online services, whether offered through the public or private sector. Judging from the marketing efforts required to popularise Dealfish in Nigeria, offline public education campaigns for eGovernment services may be necessary to change citizen behaviour.

19 Interview with John Staley of Equity Bank; In Kenya, mMoney transfers max out at $1,000, above which ePayments must be used. This restricts the size of potential transactions. Interview with John Waibochi of Virtual City
Mobile and electronic financial solutions have begun to expand beyond transfers and payments to provide a suite of financial services that are driving financial inclusion across Sub-Saharan Africa. Although mobile money (mMoney) is expanding slowly, it has already created significant opportunities for eCommerce and other online transactions. Examples in Ghana and Kenya highlight the potential of the Internet to drive access to a full range of financial services, including insurance, credit and savings for individuals and businesses. Meanwhile, the growth of solutions such as Pagatech and Pesapal illustrate the opportunities for mMoney to drive eCommerce for a broader base of the population. To realise the full potential of Internet-enabled solutions that will drive financial inclusion, policymakers must ensure that eCommerce and mMoney policies converge and create enough space to allow for innovation while protecting consumers.
MOBILE AND INTERNET-ENABLED SOLUTIONS ARE DRIVING FINANCIAL INCLUSION BY IMPROVING OPERATIONAL EFFICIENCIES AND EXTENDING A FULL SUITE OF FINANCIAL SERVICES – PAYMENTS, CREDIT, SAVINGS, INSURANCE, TO BOTH INDIVIDUALS AND BUSINESSES.

Information management
Communication, awareness, marketing
Supply chain management
Service delivery
R&D/innovation
Training/workforce development
Financing
Leadership/governance

Heat mapping based on perceived sector need, perceived national need and level of current activity in the country.

MORE THAN 60% OF FINANCIAL ORGANISATIONS SURVEYED VIEW THE INTERNET AS ESSENTIAL, THE SECOND HIGHEST RESPONSE OUT OF ALL INDUSTRIES. DIGITISING CLAIMS PROCESSING FOR KENYA’S NATIONAL HEALTH INSURANCE FUND HAS HELPED LOWER ADMINISTRATIVE COSTS BY 30%.

KOPO KOPO ENABLES BUSINESSES TO AGGREGATE AND MANAGE TRANSACTION DATA FROM MULTIPLE MOBILE MONEY ACCOUNTS.

To enable the success of mMoney and eCommerce, governments must not only create legal frameworks for mobile money operators, but also guide banks on integrating mMoney and eCommerce into existing technology systems.

Policymakers should promote digitisation and strengthening of citizen identification systems in order to enable the delivery of a broader range of social and commercial services.

Public and private sector actors must continuously emphasise connectivity to promote the competitiveness of the ancillary delivery and transport services necessary to foster thriving online commerce.

Source: Dalberg analysis and interviews

Operational efficiency gains: 2/3 attributed to the Internet

- Administrative costs as percent of collections
  - 2006: 60
  - 2012: 32
  - 47% decrease

- Weeks taken to pay out claims
  - 2006: 12
  - 2012: 2
  - 83% reduction

Claims processing 6x faster

SELECTED ANALYSES

FOR POLICYMAKERS

SECTOR INTENSITY

FIGURE 14: IMPACT INTENSITY AND POTENTIAL OF INTERNET-ENABLED SERVICES FOCUSED ON FINANCIAL INCLUSION

WITH 56.3M REGISTERED ACCOUNTS ACROSS EAST AND WEST AFRICA, MMONEY IS STARTING TO CREATE OPPORTUNITIES FOR ECOMMERCE THROUGH SOLUTIONS SUCH AS PESAPAL WHICH ALLOWS MERCHANTS TO RECEIVE PAYMENTS VIA MOBILE MONEY. OZINBOPAY ENABLES MERCHANTS IN WEST AFRICA TO RECEIVE AND MAKE PAYMENTS ONLINE AND OFFLINE VIA MOBILE MONEY.
Sector challenges

The majority of people in Sub-Saharan Africa lack access to appropriate suite of financial and risk management solutions. Formal financial inclusion still eludes 76% of adults in Sub-Saharan Africa, or about 500 million people.1 Of them, 81% say that they do not have enough money to start a formal account, 36% say that having a formal account is too expensive, and about 30% cite distance and insufficient documentation. Even fewer Africans—less than three percent—have appropriate insurance that could safeguard them against shocks—which are more likely to affect the vulnerable poor, and more likely to have a long-term, negative impact on them.2 The loss of productive assets, homes, or income-earning potential creates a vicious cycle that keeps families trapped in poverty.

Key diagnostic findings

Interviews with sector experts and surveys of more than 100 companies in the financial services sector show that the Internet is enabling financial inclusion across our four target countries in three ways: 1) making the operations of financial service providers more efficient, 2) expanding the range and reach of service provision, and 3) creating new opportunities to expand eCommerce to a broader (and lower income) segment of the market.

Priorities for impact

MAKING THE OPERATIONS OF FINANCIAL SERVICE PROVIDERS MORE EFFICIENT

Acquisition and customer management increasingly requires a full suite of services, according to interviews with experts, entrepreneurs and service providers. More than 60% of financial organisations surveyed view the Internet as essential for their organisation, the second highest response out of all industries. These organisations see the greatest potential for use of the Internet as being in marketing and customer acquisition. They also highlighted information management as a key impact of the Internet. Internet-enabled solutions are also driving improved operational efficiencies and product design innovation. For example, such solutions can:

- Manage customer transaction data (e.g. Kopo Kopo’s solution which enables small and medium businesses to accept mobile payments and build relationships with their customers or the National Health Insurance Scheme in Kenya which has digitised claims and payment processing in order to significant reduce costs);
- Manage weather information to provide crop insurance or deliver up-to-date commodities pricing information; and
- Manage customer registrations for a variety of financial products, including life insurance, savings, loans, and asset financing. (Companies in the ICT and energy/transport sector responded as the most likely to use the Internet for financial payments management, according to our survey.)


2 Source: Leapfrog investments. Existing studies have shown the positive impact that mMoney solutions have had on both economic growth and financial inclusion.

HOW IMPORTANT IS THE INTERNET FOR YOUR INSTITUTION?

Source: Dalberg survey of 88 financial services companies or institutions across Ghana, Kenya, Nigeria and Senegal
Insurance is a key area where information-management solutions can have impact. Kenya, for example, has established 6190 health facilities across the country but even with access to services, delivering health insurance through health maintenance organisations (HMOs) was challenging – with average reimbursement time of three to six months. By digitising NHIF claims processing, through real-time processing and authentication of health care payments, NHIS was able to reduce its overall administration costs by nearly 50%. Eventually, making the provision of insurance more efficient could allow more Africans access to all sorts of insurance—including life insurance, which only three percent of people in Sub-Saharan Africa have.

EXPANDING THE RANGE AND REACH OF FINANCIAL SERVICE PROVISION

Although growth has been slow, mMoney and cloud computing are demonstrating the potential to drive financial inclusion in Africa. The emergence of cloud computing potentially allows greater access to a fuller suite of financial and risk management solutions for the poor, particularly as it allows for improved management of ‘m’ enabled business models. A number of studies, including by the World Bank and International Monetary Fund, have quantified the value of mobile financial services on financial inclusion.3


Their findings show that the Internet has the potential to impact financial inclusion through service delivery and though more efficient information management.

Indeed, mMoney and eMoney solutions have begun to extend beyond payments, remittances and transfers to include a full suite of financial services including credit, savings and insurance. Such solutions are often delivered to the user via SMS or Unstructured Supplementary Service Data (USSD), but many companies delivering them are managing information and data in the cloud.

For example, miLife has been delivering low cost life insurance in Ghana. miLife’s ability to leverage a mobile platform allows it to administer the product at 50—80% less than traditional life insurance products. Other examples include mKopa asset financing for solar lighting, consumer health savings products, livestock and crop insurance, and Equity’s cash advances/credit based on coop sales records.

‘HIGH OR SOME EXTENT’ OF INTERNET USE FOR BUSINESS FUNCTIONS

“IT’S TIME FOR THE MOBILE OPERATORS TO STEP BACK AND SEE THE BIGGER PICTURE. 30% OF SEVERAL HUNDRED THOUSANDS OR MILLIONS OF PEOPLE BUYING CONTENT PRODUCTS IS BETTER THAN 70-80% OF THE CURRENT CONSTRAINED, SMS-DOMINATED MARKET. GROWING FAMILIARITY WITH M-PAYMENT SYSTEMS MAY WELL LEAD ON TO USERS MOVING OVER TIME TO ONLINE DELIVERED PAYMENT SERVICES.”

Russell Southwood, Balancing Act

Source: Dalberg survey of financial service businesses across Ghana, Kenya, Nigeria and Senegal
CREATING NEW OPPORTUNITIES IN PARTICULAR THROUGH MMONEY - TO EXPAND ECOMMERCE TO A BROADER (AND LOWER INCOME) SEGMENT OF THE MARKET.

For most Africans, eCommerce does not yet exist, but at the same time, mobile money provides opportunities for eCommerce to emerge. Indeed, when online commerce takes root, so do innovative business models that try to take advantage of mPayment systems. These include, for example, Pesapal in Kenya and OzinboPay in West Africa. mMoney successes, such as M-Pesa in Kenya and, more recently, MTN mMoney in Ghana, seem to precipitate the rapid emergence of solutions – e.g. Nigeria’s Pagatech - that already integrate online, mobile web access to services.

Examples of innovation that have leveraged the growth of mMoney to drive eCommerce do exist across both Kenya and Nigeria (e.g. iPay, PesaPower and Kopo Kopo in Kenya; Pagatech in Nigeria) where business models have been designed to meet the mobile and online payment needs of merchants. Recognizing this opportunity, Safaricom recently partnered with PayGate to develop eCommerce technology for its M-Pesa platform5.

In terms of eCommerce for the mass market, the technology is there but the business models still evolving. This mismatch reinforces the need for sound business process integration. Cash on Delivery seems to be a proven way for scaling e-commerce in Nigeria as we are seeing with the rise of sites like Konga.com and Dealday6.

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Challenges and recommendations

Mobile payments and mMoney technologies have been around for many years, but, as experienced in Africa, the ecosystems to allow these technologies to thrive take much longer to build. The growth of mobile money across Sub-Saharan Africa is catalyzing opportunities for eCommerce but, despite the technology being ready, the merchant business model, access to credit for the consumer and protection against fraud continue to create barriers for innovation. M-Pesa still largely remains an outlier in terms of mMoney’s proliferation on the continent but others are starting to show promise.

To enable the success of mMoney and eCommerce, governments must not only create legal frameworks for mobile money operators, but also guide banks on integrating mMoney and eCommerce into existing technology systems. Failure to do so can result in inadequate consumer protection. Nigeria’s lack of a policy to protect customer funds held by mobile money providers has diminished consumer confidence and security, and in Kenya, lack of such guidelines resulted in vast consumer losses at the Harambee Sacco savings cooperative. At the same time, regulators must not step in too soon, so as to keep open space for innovation, particularly in areas such as insurance, credit and savings. Active partnerships with donors and the private sector will help support the testing of new ideas and impact assessment.

Policymakers should promote digitisation and strengthening of citizen identification systems in order to enable the delivery of a broader range of social and commercial services. By establishing an integrated identification system, both administration and ease of access to a wide range of services will be improved. Electronic signatures and receipts should also be considered as legally binding documents.

Public and private sector actors must continuously emphasise connectivity to promote the competitiveness of the ancillary delivery and transport services necessary to foster thriving online commerce. Survey data suggests that larger financial institutions face more barriers to making full use of the Internet than smaller ones, the opposite of the relationships seen in other sectors. These larger institutions cite regulation and client capability as being the limiting factors, compared to smaller financial institutions that cite connection reliability.

7 Business Daily Africa noted that the failure to create guidelines for banks to integrate mMoney into their systems resulted in the loss of “multiple millions of shillings for the Harambee Sacco savings cooperative.” Source: Business Daily Africa, “Technology opens theft window for corrupt officials,” 2012, http://www.businessdailyafrica.com/Technology+opens+theft+window+for+corrupt+officials+/+539546/1611622/-/d4bf1g/-/index.html
Based on survey data and interviews with experts, Internet solutions have generated little within the energy and transport sectors in our focus countries, but two types of solutions offer potential. Citywide traffic monitoring can help governments allocate traffic police. By easing installment payments, mMoney can ease asset financing for solar equipment in unelectrified rural areas. The former requires significant government involvement, while private sector could drive the latter, once the government has sufficient legal protection for mMoney.
BY EASING INSTALLMENT PAYMENTS AND MONITORING USAGE, INTERNET-ENABLED SOLUTIONS HAVE THE POTENTIAL TO INCREASE ACCESS TO AND REDUCE EXPENDITURE ON ENERGY

<table>
<thead>
<tr>
<th>Information management</th>
<th>Communication, awareness, marketing</th>
<th>Supply chain management</th>
<th>Service delivery</th>
<th>R&amp;D/innovation</th>
<th>Training/workforce development</th>
<th>Financing</th>
<th>Leadership/governance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Med</td>
<td>High</td>
<td></td>
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</table>

Heat mapping based on perceived sector need, perceived national need and level of current activity in the country.

AN EMERGING MODEL IN KENYA, M-KOPA, IS EXTENDING FINANCING FOR OFF-GRID SOLAR ELECTRIFICATION IN PARTNERSHIP WITH SAFARICOM’S M-PESA AND HAS SHOWN RAPID SALES SINCE COMING TO MARKET

MULTIPLE MOBILE APPLICATIONS HAVE EMERGED IN KENYA AND NAIROBI THAT CROWD SOURCE TRAFFIC INFORMATION TO ALLOW INDIVIDUALS TO SELECT MORE EFFICIENT ROUTES, SYSTEMICALLY HELPING RELIEVE CONGESTION

IN ALL FOUR COUNTRIES CONSUMERS CAN VIEW THEIR ELECTRICITY BILLS ONLINE. IN SENEGAL AND KENYA CUSTOMERS CAN ALSO IMMEDIATELY PAY THEM ONLINE

- Policymakers should ensure that mMoney can be used for commercial transactions rather than just person-to-person transactions. Continued use and promotion of online payments could both increase revenue for government while reducing costs (through convenience) for citizens.
- By aggregating public data and making it widely available to developers, government can spur the growth of applications that will improve the use of public services. E.g. government can improve the use of existing roads by collecting traffic data and making it available to developers.
- Governments should use their leverage to engage telecom companies in the fight against traffic jams.

Source: Dalberg analysis and interviews; www.businessweek.com/news/2012-10-04/kenya-s-m-kopa-offers-cheaper-solar-power-to-off-grid-villages
Sector challenges

Lack of affordable, reliable electricity is a central development challenge in Sub-Saharan Africa. Compared to electricity in the Organisation of Economic Cooperation and Development (OECD) countries, electricity in Sub-Saharan Africa is more expensive—but less reliable and less available. Nearly 600 million people on the continent lack electricity, 1 and available electricity is usually of poor quality. 2 Businesses suffer from late deliveries, unpredictable power bills, and high input costs—which handicap them on the global market. 3 At home, people turn to kerosene, which is costlier and provides dimmer light than electricity. It also causes respiratory problems. 4

Transport is also a challenge—and one that is growing every day. The rapid increase in the number of cars on Africa’s streets has outpaced the governments’ ability to expand urban road infrastructure. Huge traffic jams and wait times effectively shorten the workday, with four hour commutes home in Nairobi during rainy season. The overall cost of lost productivity and pollution in Nairobi is Ksh. 50M per day, or nearly $220 million annually. 5

Key diagnostic findings

Beyond supply chain management solutions noted in previous sections, no sector-defining firms have yet emerged in energy or transport, but solutions with the potential for large scale impact are emerging. In particular, payment systems for services in rural areas—such as electricity—are poised to fill an access gap and crowd-sourced applications for traffic reporting are on the rise.

Priorities for impact

Internet-enabled solutions could expand electricity access in rural areas. By leveraging mMoney marketing channels, they address a typical barrier to electrification: the individual cost of purchasing and the business cost of distributing solar products to a diffuse population. Household-scale solar cannot solve the entire energy challenge, but can drastically improve quality of life in rural areas through cheaper cell phone charging and better quality light that allows students to study and businesses to stay open at night.

Large utilities and refineries are using Internet-enabled technology for cost savings rather than service extension.
Utilities have extended online bill viewing in Ghana, Kenya, Nigeria and Senegal, with M-Pesa and Orange Money payment options in Kenya and Senegal. 6 This may improve revenue collection, as it has for the South Africa Revenue Service, where revenue significantly increased after the introduction of electronic filing. On the energy industry side, there are also opportunities for greater efficiencies with MIS in oil refineries. IBM expects its asset management system, networked across all Kenya Petroleum Refineries Ltd. sites, will reduce operating risk and increase equipment lifespan by tracking its equipment. 7

1 IFC Lighting Africa Brochure, 2012.
2 For example, Nairobi experiences 15 high voltage fluctuations or outages per hour. IBM Press Release, Technology Holds the Key to Nairobi’s Development and Increased Competitiveness, citing the Kenya Electricity Generating Company, 2012. www-03.ibm.com/press/us/en/pressrelease/37114.wss
3 Energy in Kenya costs three to four times more than energy in Egypt. Ibid.
4 Daily use of kerosene to light the home can be as harmful as smoking two packs of cigarettes per day. World Health Organisation. Fuel for life: household energy and health, 2006.
6 Dalberg analysis.

HOW IMPORTANT IS THE INTERNET FOR YOUR ORGANISATION/COMPANY?

Source: Dalberg survey of 135 energy and transportation companies or institutions across Ghana, Kenya, Nigeria and Senegal
The Internet cannot reduce the number of cars, but it can expand the number of roads used. Real-time traffic information can help drivers take routes less travelled, avoiding traffic jams. In Lagos, drivers post route traffic information via Twitter to NigerianTraffic.com, Traffic Butter and Gidi Traffic, while motorists in Nairobi use the #OverlapKe hashtag to share traffic information.\textsuperscript{8} Telecom companies could map traffic information at higher resolution by tracking the mobile phones on their networks, similar to how the traffic monitoring tool works on Google Maps. Traffikator tries to aggregate information based on global positioning system (GPS) signals, but comparatively low smartphone penetration makes its data less useful than that collected by telecoms. Traffic solutions will likely scale with increased penetration of smart phones.

Other solutions aim to improve safety, convenience, or customer service. Surveyed travel companies and logistics and transportation providers give the Internet some of the highest marks for importance, and cite the need for more information storage and access. Travel search sites in Nigeria, Kenya and Ghana allow customers to book travel plans online.\textsuperscript{9} Two to three times a year the Kenyan government hosts a forum on social media for the tourism sector as a way to boost businesses’ ability to attract customers from abroad.\textsuperscript{10} In Kenya, the KamataKab app crowdsources customer ratings of taxicab safety and service.

The IBM Smarter Cities campaign would use existing closed circuit television (CCTV) networks with backend analytics to suggest where police should redirect traffic. Its team also suggests ePayment systems for public transit systems, soon to be piloted with the backing of Kenya’s Ministry of Information and Communications, which would decrease roadside wait time and stabilise fares.\textsuperscript{11}

Challenges and recommendations

Policymakers should ensure that mMoney can be used for commercial transactions rather than just person-to-person transactions. Doing so will open opportunities for microgrid infrastructure asset financing in rural areas.

Governments should improve the use of existing roads by collecting traffic data and making it available to developers. Open data in entrepreneurial environments like Kenya and Nigeria can quickly translate into effective information dissemination of traffic patterns to citizens.

Governments should use their leverage to engage telecom companies in the fight against traffic jams. Telecoms have access to data about cell phone locations and movement, and opening that data to developers could result in better congestion-relieving applications.

\textsuperscript{8} TechLoy, "We Love Gidi Traffic So Much That We’re Gonna Disrupt Him," 2012. techloy.com/2012/08/02/we-love-gidi-traffic-so-much-that-were-gonna-disrupt-him/
\textsuperscript{9} Senegal still lacks online booking applications. Dalberg analysis
\textsuperscript{10} e-Tourism Frontiers, www.e-tourismfrontiers.com

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\textbf{‘HIGH OR SOME EXTENT’ OF INTERNET USE FOR BUSINESS FUNCTIONS}

<table>
<thead>
<tr>
<th>Business Function</th>
<th>High or some extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduct research</td>
<td>65</td>
</tr>
<tr>
<td>Client/customer relationship</td>
<td>73</td>
</tr>
<tr>
<td>Manage supply chain</td>
<td>54</td>
</tr>
<tr>
<td>Data &amp; information storage</td>
<td>57</td>
</tr>
<tr>
<td>Education &amp; training</td>
<td>42</td>
</tr>
<tr>
<td>Manage internal organisation</td>
<td>41</td>
</tr>
<tr>
<td>Provide product or service</td>
<td>42</td>
</tr>
<tr>
<td>Recruiting</td>
<td>30</td>
</tr>
</tbody>
</table>

\textbf{% OF TOTAL INTERNET ENABLED SOLUTIONS IN THE ENERGY/TRANSPORT SECTOR}

- Leadership and Governance: 14%
- Information Management: 4%
- Communications, Awareness, Marketing: 40%
- Supply chain management: 16%
- Service delivery: 22%
- Training and workforce development: 4%

\textit{Source:} Dalberg survey of energy and transportation businesses across Ghana, Kenya, Nigeria and Senegal
Each of the focus countries has begun to recognise the Internet’s potential to reduce the cost of governance and improve transparency, accountability and citizen engagement. eGovernment initiatives have been funded by both governments and external donors, and have seen particular success in Kenya, through the leadership of the Permanent Secretary of the Ministry of Information and Communications and the Kenya ICT Board. Outsourcing eGovernment services to the private sector has been limited but also shows significant potential. eGovernment initiatives are most effective when a mandate to initiate, coordinate and develop eGovernment services is clearly issued to an agency with executive authority.
INTERNET-ENABLED SOLUTIONS ARE ALREADY IMPROVING ADMINISTRATION AND THE PROMOTION OF OPEN DATA AND PUBLIC PRIVATE PARTNERSHIPS CAN ACCELERATE AND EXTEND SERVICE DELIVERY

**FIGURE 19: IMPACT INTENSITY AND POTENTIAL OF INTERNET-ENABLED SERVICES FOCUSED ON GOVERNANCE**

Systems can reduce administrative tasks and enable the sharing of information between different government agencies, as per the Gainde 2 000 single window customs clearance.

The Kenya Revenue Authority requires that all citizens turning 18 register for a tax identification number online, giving them no option to use a paper-based system.

Leaders should seek to drive clear eGovernment mandates with the executive authority to speed the rollout of services. Initiatives appear most effective when implementation responsibility is assigned to an agency with executive authority to drive implementation.

Policymakers and other stakeholders should promote access to ICT education. Getting the population online to access government services requires a parallel programme of ICT education, both within government and for new users.

**Source:** Dalberg analysis and interviews
Sector challenges

As a region, Sub-Saharan Africa is governed poorly, barely escaping the bottom quartile in the World Bank’s Worldwide Governance Indicators that cover accountability, stability, effectiveness, regulatory quality, rule of law, and corruption control.¹ There are bright spots, such as Ghana, which ranks in the top half of countries worldwide but there are also pockets of concern, such as Nigeria, which ranks in the lowest decile for political stability and absence of violence. The extremes present different opportunities for the Internet to positively impact outcomes.

1  http://info.worldbank.org/governance/wgi/sc_chart.asp

Key diagnostic findings

The Internet could facilitate better governance, including strengthening electoral and legislative systems, improving access to justice and expanding capacity to deliver services to marginalized populations. Each endeavor requires working across multiple ministries, departments and agencies, sharing information and engaging citizens.

Internet-enabled services can generate internal cost savings and productivity gains, facilitate access to government services and information and boost accountability to citizens. Examples of trends that emerged during research are listed in Table 2 below.

<table>
<thead>
<tr>
<th>Key Impact Areas</th>
<th>Examples of Internet-enabled Solutions</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Management</td>
<td>Creating online databases of information that can be accessed by the public</td>
<td>Nigeria Governors Forum</td>
</tr>
<tr>
<td>Communication Management and Awareness</td>
<td>Engaging with citizens using platforms supported by the Internet</td>
<td>Independent Electoral Commission Nigeria</td>
</tr>
<tr>
<td>Supply Chain</td>
<td>Access to government tenders</td>
<td>Youth Access to Government Procurement Online (Kenya)</td>
</tr>
<tr>
<td>Service Delivery</td>
<td>Provision of e-government services to promote accessibility</td>
<td>Tax Registration in Lagos State</td>
</tr>
<tr>
<td>R&amp;D Innovation</td>
<td>Facilitating a culture of innovation and research</td>
<td>Fab Lab Nairobi University</td>
</tr>
<tr>
<td>Training</td>
<td>E-learning for Public Administrators</td>
<td>Distance Learning Centre (Ghana)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Africa Virtual University (Senegal)</td>
</tr>
<tr>
<td>Financing</td>
<td>Innovative payment systems for government services and transfer of cash for the vulnerable communities</td>
<td>Cashless Nigeria</td>
</tr>
<tr>
<td>Leadership and Governance</td>
<td>Promoting data driven development</td>
<td>Kenya Open Data Initiative</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ghana Open Data Initiative</td>
</tr>
</tbody>
</table>

Table 2: Examples of Internet-enabled solutions

HOW IMPORTANT IS THE INTERNET FOR YOUR INSTITUTION?

Source: Dalberg survey of 105 governance organizations or institutions across Ghana, Kenya, Nigeria and Senegal
All of our focus countries have taken initiatives in the eGovernment sector, though they are at different stages of maturity. Kenya has been most progressive. All of its ministries have a web presence, compared to less than half of Nigeria’s. Nigeria’s Ministry of Communication and Technology has the mandate for design of an appropriate eGovernment framework. Although it has not yet designed a framework for implementation, it is choosing key priority areas for implementation in 2013. After having publicised eGovernment initiatives for many years, Ghana has now begun to implement them in justice, immigration, finance and the parliament.

Priorities for impact

Internet-enabled solutions have had greatest impact in direct delivery of eGovernment services and more systematic information management, according to our analysis. This evaluation is introduced in Figure 19.

INFORMATION MANAGEMENT

Information management systems can significantly decrease administrative costs and improve accountability. In Kenya, several initiatives automated processes around information management. Digitising the registry of companies resulted in a number of benefits: it enabled online searches for company names and information, reduced corruption during the registration process, sped up registration by six days, allowed online tax registration, and improved Kenya’s ranking on the World Bank’s Ease of Starting a Business to 117, from 121.3

Making court judgments and legislation available online is another eGovernment initiative in Nigeria. Laws are available online on www.nigeria-law.org and Senegal has a similar portal at www.demarches.gouv.sn where citizens can access information and updates on laws and regulations. In Kenya, The National Council of Law Reporting ensures its citizens have free access to relevant and up to date legal information.4 In addition to having all laws and legal decisions online, the council in partnership with Google has successfully digitised legal notices dating back to 1905. Such initiatives increase availability of relevant local content that impact positively on Internet usage.

Another key trend in information management is a shift toward dynamic platforms that allow citizens to access online parliamentary debates and interact with their legislative representatives. Nigeria has piloted a platform where citizens can message their local governors online and expect an official response. Engagement beyond messaging, however, would require much more bandwidth.

Making government data public could open up vast opportunities for developers, because governments are often the largest collectors and custodians of data. Kenya’s open government initiative has made available more than 430 data sets on its portal. As Figure 17 shows, the project both improves transparency and aims “to get citizens to be part of development and to get young people to find opportunities to innovate.”5 The initiative has also stimulated the software development ecosystem. Among the more than 50 applications developed since 2011 is Mzalendo, which monitors parliament spending and decision making and shares this information in a simple format to enable citizens make informed decision when voting.6

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4 The Council won the International Association of Law Libraries (IALL) 2011 Website Award and the Technology in Government Award.
5 Kenya Open Data Initiative.
6 Nation Newspapers, November 10th 2012 available at www.nation.co.ke/business/news/Open+data+initiative+has+hit+a+dead+end/-/1008/1617026/-/11tfwouz/-/index.html

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Source: Dalberg survey of governance organizations or institutions across Ghana, Kenya, Nigeria and Senegal

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<table>
<thead>
<tr>
<th>% of total responses</th>
<th>High or some extent</th>
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<tbody>
<tr>
<td>63</td>
<td></td>
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<tr>
<td>54</td>
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<td>34</td>
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<td>32</td>
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</table>

Source: Dalberg survey of governance organizations or institutions across Ghana, Kenya, Nigeria and Senegal
Figure 20: Case Study on the Kenya Open Data Initiative

Role of policy/government
- Commitment by the ICT Board to develop the portal and get buy-in from different MDAs to submit government data
- Ministry of Information is currently developing a Cabinet Memo to ensure that government agencies release the required data sets

Results to date: Socioeconomic impacts
- 50 apps have been developed based on the information on the portal. The apps address different aspects of economic development including governance, health and education
- The Open Data Initiative has started an Open Data pre-incubation to spur the development of applications addressing four critical priority areas
- The Initiative has developed partnerships with key stakeholders such as the media and civil society to train them on how to use the data to develop creative analysis for journalism. One of the successful applications developed from this partnerships includes County Score Cards that provides development data on the different countries

Social media has provided wholly new opportunities for information management and for citizen-government interaction. The Independent Electoral Commission (INEC), in Nigeria, monitors elections by crowd sourcing information from voters in different areas. One result has been to boost Nigerians’ confidence in the commission. On the citizen side, networked information management is at the core of successful elections monitoring. Project Swift Count has leveraged technology to reduce electoral intimidation and violence, verify the validity of outcomes and highlight districts that may have disenfranchised voters.

Service Delivery

Online eGovernment service delivery could help end the historical marginalisation of rural residents. Extending brick and mortar services to rural areas, where three in four Africans live, is expensive and may not be feasible in all areas. But eGovernment service delivery could reach remote citizens, while reducing administrative costs, wait times, and travel times. Still, eGovernance does not necessarily equate to cost savings; indeed, it can be as or more expensive. Thus, when designing eGovernment programmes, governments should choose investments that generate cost savings.

EGovernance does not necessarily equate to cost savings. In design of bringing services closer to citizens the key driver should be investments that generate cost savings, rather than directly address service delivery.

To increase use of eGovernment services and ICT in general each country has set up an external fund to extend access to rural areas. In Kenya, the eDirectorate is responsible for working with ministries, departments or agencies (MDAs) to bring services online, increasing outreach of government services to areas where they do not have offices.

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7 IFAD Fact Sheet, 2011.
Table 3: Rural ICT Access Funds

<table>
<thead>
<tr>
<th>Country</th>
<th>Rural ICT Access Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghana</td>
<td>The Ghana Investment Fund for Electronic Communication (GIFEC) has set up over 100 Community Information Centers for citizens in underserved areas to access internet and ICT related services. GIFEC has also provided subsidies for the setting up of rural telecommunications infrastructure in over 20 areas and also been involved in the set up of eLibrary projects, school connectivity and setting up of eBusiness centers.</td>
</tr>
<tr>
<td>Kenya</td>
<td>The ICT Board has a fund for entrepreneurs to access funds to set up digital village in rural areas. To date over 30 Pashas are operational in both urban and rural areas. The Communications Corporation of Kenya is currently setting up the Universal Access Fund. This will have provisions for Telecommunication service providers to receive subsidies for setting up infrastructure in rural areas.</td>
</tr>
<tr>
<td>Nigeria</td>
<td>Universal Services Provision Fund (USPF) provides subsidies to the Telecommunication sector to improve access in rural areas. The fund has also subsidized the setup of 224 community centers, provided 18 Local government authorities with broadband and set up ICT facilities in 766 primary schools and 193 tertiary schools. In addition the fund has deployed eLibrary in 74 schools.</td>
</tr>
<tr>
<td>Senegal</td>
<td>Working with the Ministry of Information and Communication the Government has set up over 27 Community Multimedia Centres where citizen have access to ICT services and training.</td>
</tr>
</tbody>
</table>

In Kenya, these Pasha Centres have provided access and training while creating new small enterprises.

Figure 21: Pasha Centres - Extending Citizen Access to Government Services

**Development need**
- 72% of Kenya’s 41.6 million people lack access to the internet
- ICT literacy rate in rural Kenya is ~30%
- Only 4% of households have internet access at home, the vast majority of which are in urban areas
- eGovernment services beyond the Interactive Voice Response System currently require a computer terminal for access rather than a feature phone application

**Solution**
- The Digital Villages Programme has funded the set up of 29 Pashas that provided a broad range of ICT services, from access to training
- Includes access to a range of government services including Kenya Revenue Authority (KRA), PIN registrations and online tax returns, ePayslips by the Kenya National Union of Teachers, application and tracking of passports and IDs, business licensing, Youth Assistance in Procurement forms, Form One admission forms, college intake forms, KNEC results, access to Higher Education Loans Board online bursary applications and repayment forms

**Results to date: Socioeconomic impacts**
- eGovernment access to 440 clients per month across 29 constituencies
- Supports the creation of 15 new businesses
- Expands the services of 14 existing businesses
- Creates infrastructure for rural ICT training, which one centre in Ruiru turned into 78 certificate graduates in a one-month course.
- Intel-funded incentive payments to 28 of 37 Pasha entrepreneurs caused an additional 580 adults to be trained between May and June 2012

Sources: IBM Digital Villages As A Center For Rural Empowerment and Development Report, 2010; International Telecommunications Union; World Bank; Kenya eGovernment website; Kenya ICT Board website; Dalberg interviews.
Senegal had an early success in the development of its Single Service Window for customs clearance, significantly easing the flow of goods into and out of the country. GAINDE 2000 has allowed Senegal to migrate to a completely paperless customs system, thereby speeding up clearance of goods by 22%.

**Challenges and recommendations**

**Leaders should seek to drive clear eGovernment mandates with the executive authority to speed the rollout of services.** eGovernment initiatives are most effective when a mandate to initiate, coordinate and develop eGovernment services is clearly issued to an agency with executive authority. This avoids duplication of efforts and improves coordination, especially vis a vis interoperability. Developing common platforms for systems allows for better sharing and leveraging of information across sectors.

**Policymakers and other stakeholders should promote access to ICT education.** Getting the population online to access government services requires a parallel programme of ICT education, both within government and for new users. Making ICT education compulsory from the primary school level, as Nigeria’s president did in mid 2012, creates demand for ICT services, as well as a population that knows how to use them.

**Policymakers must make clear but careful decision about data collection and publication.** Open data initiatives require making hard decisions about how much data to publish and require consistent data collection procedures. Kenya’s Open Data Initiative faces challenges procuring key data sets from institutions that require a mind shift in the control and ownership of key data and also the vulnerability to citizen scrutiny. To address these hurdles, the ICT Ministry hopes to legally oblige other ministries and government agencies to provide data.
The Internet’s socioeconomic impact is being driven by rapid innovations in systems, applications and services developed across the public and private sectors. These innovations are giving policymakers and other stakeholders new tools to achieve longstanding development goals, such as equitable access to health care, quality education and financial services. As we reviewed the current and potential impact of the Internet across the seven individual sectors, we also observed a broader set of trends that are, and will continue to shape future growth.
Across all sectors, Internet-enabled solutions have moved beyond basic marketing and communications and toward advanced, integrated solutions that will enhance service delivery and information management. An analysis of nearly 500 Internet-enabled solutions across Ghana, Kenya, Nigeria and Senegal, showed that solutions developed before 2008 tended to focus on marketing and communications (40% of total). However, over the past four years, Internet solutions have increasingly focused on service delivery (2%) and information management (24%). In other words, today’s Internet solutions are no longer about communication alone. Rather, they recognise the power of data, information, networked communities and the ability to support operational efficiencies and impact. This trend will continue.

In particular, solutions focused on information management, including both digitisation of data and access to data, will build the foundation for more advanced solutions and innovations to emerge. Digitization and enhanced information management provide clear economic gains for businesses and public administration. Improved information management has led to substantial cost savings and operational efficiencies. For example, the Ghana Community Network (GCNet) introduced an electronic system for processing trade and customs information which led to revenue increase of 49% within the first 18 months of deployment. Similarly, the Kenya National Health Insurance Fund’s digitisation of claims processing resulted in 47% cost savings, two-thirds of which was attributed to the Internet. The digitisation process also increased the speed of claims processing six-fold. However, the rate of digitisation across businesses, particularly SMEs, remains low. The majority of the SMEs surveyed report that less than half of business process administration is digitised. Nonetheless, this increased focus on information management reflects a growing recognition of the need for reliable, timely, quality data as an essential input for weighing options, setting goals, making decisions and measuring impact.

Open data initiatives such as those in Ghana and Kenya are on the rise, but they are relatively nascent, and still building models for establishment, use and impact. For example, the Ghana Open Data Initiative is in the process of uploading 3,000 datasets as well as building out 140 citizen applications that will use and increase awareness and information contained in the data. Policymakers and private sector have important roles to play in delivering and promoting access to information.

The continued growth and permeation of payment systems will be necessary to strengthen and deepen impact. In 2008, only 15 live mobile banking deployments existed. Today there are at least 163 deployments, 107 more deployments planned, and 55 million registered mobile banking accounts in East and West Africa alone1. Yet these deployments need to continue to scale and integrate with Internet-enabled services. In Kenya, the success of M-Pesa has given rise to a range of other solutions—such as Kopo Kopo, M-Kopa, PesaPal, and Changamka—that have significantly extended the reach of business services, asset financing for energy and even health savings accounts.

In Figure 22: Trends in Internet-enabled solutions across Kenya, Ghana, Nigeria and Senegal (2009-2012 vs. pre-2009), we see a significant increase in the percentage of total Internet-enabled business models focused on information management and service delivery, with a decrease in communication-oriented solutions.
The strength of mobile and Internet-enabled payments systems in Nigeria is starting to emerge through providers such as Pagatech and OzinboPay. However, Ghana and Senegal lag behind. Without a functional payment platform, the growth of new Internet-enabled business models in those countries will be stifled.

Users are leapfrogging fixed-line Internet. Social media, particularly through mobile Internet, is changing the nature of users’ first-time experiences with the Internet and will influence more sophisticated use going forward. With an estimated 100 million people in Africa now connected to mobile Internet-enabled social networks, a dynamic platform for marketing, communications, information sharing and citizen engagement has emerged. These networks are create stronger links between government, educators, service providers, businesses and citizens. Users are already engaging on topics including music, dating and sport, but these engagements are also quickly expanding to include socioeconomic goods and services, such as education, health information and governance. Social media will undoubtedly influence how users engage in more sophisticated Internet use over time.

Cloud computing solutions help SMEs grow by reducing investment requirements, increasing operational efficiency and building a competitive edge—making cloud solutions a second wave of Internet impact. The first wave of Internet impact resulted from access to basic email and websites. Today, businesses are looking to the next wave. More than 80% of surveyed SMEs believe taking better advantage of the Internet will improve their businesses’ economic performance, and the majority of those expect that doing so will create new jobs. Cloud computing is, and will continue to be, a substantial part of making this a reality. In order to compete, African businesses, in particular SMEs, need to ensure an unwavering focus on operational efficiency, productivity, flexibility and innovation. Policymakers, meanwhile, must ensure the necessary infrastructure is in place – including sufficient quality high-speed bandwidth, standards to manage the unrestricted flow of information and high quality data centres.

Infrastructure is essential. Low-bandwidth intensive Internet solutions will bring new users online faster. However, high speed broadband connections are also needed, particularly to allow SMEs to realise the huge gains offered by cloud computing. The Internet in Africa is part a story of managing the challenges of limited infrastructure, therefore, building low bandwidth solutions can open up opportunities. This will change over time, but is fundamentally different from the bandwidth-rich content developed in countries where users have grown up accessing the Internet on desktop computers. Cloud computing offers significant cost savings, especially for SMEs. But capturing the savings of cloud-hosted software will require affordable, reliable connectivity.
Content is critical: Establishing affordable access to the Internet is useless if not combined with relevant, appropriate content. Local content is on the rise. Interviews with stakeholders suggest that local content is critical. Both in order to ensure that content is relevant and applicable to the daily lives of the users but also to ensure maximum economic benefit for the country. Local content will 1) drive user uptake, 2) create jobs and 3) create role models for future innovation.

The Internet is enabling impact at different rates across sectors, suggesting the need for different interventions for sustainability and scale. For example, notwithstanding the recent growth of large-scale health platform MOTECH Suite, mobile and Internet-enabled solutions targeting healthcare appear trapped in pilot phase. Solutions targeting education seem to suffer the same fate. Within eGovernment and agriculture, a focus on building shared datasets and facilitating open data may lead to more and better local content, which could contribute to scale. Identifying and building ecosystems that combine the right mix of financing, technical assistance, policy, capacity building and innovation is an essential part of the solution.

Standards are increasingly critical in taking solutions to scale. Whether it’s building interoperability standards to drive health or promoting international standards to drive cloud computing, standards are critical enablers of Internet-based solutions. African decision-makers agree that a regulatory environment that adheres to international requirements and standards for personal data protection and data transfer security is the main pillar of cloud computing. Similarly, healthcare experts have highlighted the importance of introducing standards and moving towards interoperability of systems in their sector, because they will enable the growth of mobile and Internet-enabled solutions.

With these trends and opportunities in mind, policymakers face the daunting challenge of how to accelerate growth while managing and monitoring impact.

The Internet is based on a layered, end-to-end model that allows people at each level of the network to innovate free of any central control. By placing intelligence at the edges rather than control in the middle of the network, the Internet has created a platform for innovation.

Vinton Cerf, computer scientist and Internet pioneer
In recent years, Africa’s mobile and Internet markets have seen significant growth, particularly where public-private partnerships, healthy competition and open access to information exist. However, the Internet’s potential is much vaster than has been realized. To tap the potential, policymakers must continue to act as enablers of market conditions, catalysts for equitable service delivery, and protectors of consumer rights and privacy. They also must vigorously champion the social, economic and job creation impacts that the Internet can help achieve.

There is not a single recipe for success when it comes to Internet policy. Each country has its own market dynamics, regulatory structure, access to international cables, culture and education levels, which together create a unique ecosystem. Still, policy choices will largely determine whether the Internet’s potential to drive both economic growth and social outcomes is realized. Policies and investment plans should 1) promote growth and innovation, 2) keep pace with the new requirements of digital information and the set of industries that emerges in order to take advantage of new opportunities, and 3) manage digital inclusion and ensure that the Internet is made available across geographic and demographic boundaries.

Ultimately, governments should focus on playing three roles in the development of an impactful Internet economy. Leadership requires setting a national ICT vision, strategy and policies while creating the appropriate government implementing agencies to support that vision. Governance includes the timely creation of legislation, fair allocation of licenses, arbitration and resolution of disputes relating to all components of an Internet economy. Promotion of eGovernment services both helps bring new citizens online and boosts the attractiveness of getting online for the first time.

**Government as a visionary (leadership):** Defining a national vision and strategy for the Internet and ICT use sends an important signal to stakeholders and is also a practical way to align a diverse set of national actors. Ideally, ICT strategy should be integrated into the broader national development strategy. Giving ICT an explicit role in national development goals helps to provide direction on budget allocations and shows how the Internet can support the achievement of sector-specific goals and objectives. Countries that have seen rapid development of the Internet have been proactive in using national strategies to drive investments in key public-goods related to the Internet. These can be developed using a combination of instruments such as direct public investment, public-private-partnerships, tax breaks and incentives.

Policymakers must work toward greater convergence across three spheres of policy that affect the Internet ecosystem: ICT policy, industry-specific policy and the broader set of policies related to doing business in a country. Building a holistic approach to managing the Internet economy will require harmonisation and alignment across these three overlapping spheres.
National ICT policies must account for the ways in which ICT impacts particular socioeconomic sectors within a country. Ideally, a national ICT strategy that includes eHealth should be complemented by a clear role for eHealth in that country’s national health strategy. Neither necessarily precedes the other, but both must be aligned. This is not always the case. Moreover, neither strategy will succeed without sound doing business policies. These create the appropriate environment atop which successful Internet-enabled economies can grow.

Besides the challenge of harmonising policy spheres, policymakers must balance priorities for national stakeholders and regulate emerging types of commerce while leaving sufficient space for innovation.

In many countries the private sector will create new products and services faster than the government can effectively regulate them. The well documented spread of mobile money (mMoney) is a prime example. The growth of eCommerce has in some cases outpaced policy frameworks. Uncertainty hinders private sector expansion. To support the continued growth of eCommerce, policymakers must resolve questions about the legality and enforceability of the eCommerce transactions and put in place appropriate legal frameworks. This burden comes in parallel with the unpredictability of what the next wave of technologies will require in terms of regulation. Cyber crime legislation, for example, was on few minds until fraud began.

**Government as a catalyst (governance):** Creating the environment within which actors can invest in and collaborate around the use of the Internet is a crucial role of government. However, finding the right balance between allowing market forces to create the ecosystem and ensuring healthy competition and affordable access for consumers is not easy. Relevant, appropriate and transparent regulation, licensing policies, and managing arbitration channels are key to ensuring the potential of the Internet is realised.

Policymakers also face the challenge of moving innovative policies and strategies into practice. Countries such as Ghana, for example, are applauded for national strategy and policy but criticised for the slow implementation of programmes and delivery. Implementing the vision is challenging, but can and will be achieved through active partnership and collaboration with the private sector.

The private sector is a critical partner in both creating the appropriate environment and in implementing programmes and vision. The Kenyan government has spearheaded numerous innovative Internet-related projects in East Africa, in part due to its active engagement and collaboration with the private sector. Ghana, with its strong and stable regulatory institutions, has built out a networked infrastructure in order to drive investment and create capacity. Analyzing the two approaches that these governments have taken and their respective results can be instructive for policy makers across the continent.

**Government as a first adopter (promoter):** As a first adopter of the Internet’s various capabilities, the government has immense power to catalyse national usage and realise impact. The public sector is often among the largest consumers of ICT services and a major source of data within a country. With a national mandate to provide social services, government can kick-start usage by role modeling behavior that includes digitising content and using the Internet to transform service provision. For example, Ghana’s investment in eGovernment Network aims to connect 1 050 sites across all 170 districts in order to digitize government and deliver a range of eGovernment services. Similarly, Kenya’s Pasha Centres were established to not only drive digital inclusion and access to eGovernment services, but also to facilitate local entrepreneurship. The benefits of government shared services, facilitated through ICT and the Internet, are now well understood in terms of cost savings, service quality and access improvements. However, the secondary benefits of making public information available online are also numerous in terms of public accountability and enabling new business development.

The survey, analysis and extensive interviews demonstrate conclusively that policymakers can no longer treat the Internet as a luxury good that may benefit the economy on the fringes. Instead, it’s a necessity for social inclusion and economic growth that sits at the core of any inclusive growth strategy. While the Internet’s impact is difficult to measure, largely because of limited data and the nascency of interventions, substantial evidence shows that it already plays a powerful role in achieving social and economic goals. Moreover, it is clear that the Internet can continue to drive social gains in education, health, banking, and inclusive economic growth.

Although the story of the Internet in Sub-Saharan Africa is very much a work in progress, policymakers are helping to write it. National governments and the policymakers within them play a key catalytic role in accelerating the Internet’s impact and enhancing the socioeconomic benefits it can deliver to citizens and economies. They must embrace their role.
## ANNEXURE 1: CASE STUDIES

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<td>Kenya Education Network</td>
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MANOBI ENABLES FARMERS TO GET REAL TIME INFORMATION ON LOCAL AND INTERNATIONAL PRICES AND HAS LEAD TO INCREASES IN INCOME OF 40-50%

**DEVELOPMENT NEED**
- With a population of over 12 million people, over 77 percent earn their living in the agriculture sector
- The agricultural and agribusiness sectors are very complex and the growing competition in the sector leaves little room for small farmers, especially for marginalised areas in Senegal
- Weaknesses in the agriculture value chain include poor infrastructure, volatile climate—particularly desertification—and limited storage facilities
- Farmers are exposed to a high risk of spoiled crops or forced to dispose of their products due to a lack of access to markets

**SOLUTION**
- Manobi Senegal is an initiative created to ensure economic competitiveness of business and personal development using information technology; particularly mobile internet applications
- mAgri is a solution that Manobi provides to operators in agricultural value chains to reinforce their individual and collective performance and improve their competitiveness
- Provides agriculture actors with real-time information on agricultural prices in local and international markets, monitoring of agricultural production, commercialization of agricultural products for local and international markets, access to and management of agricultural credit, among other internet/mobile based services

**RESULTS TO DATE**
- Income of gum producers has increased by 40-50 percent by using Time to Market (T2M) an application designed for people with low literacy levels and provides real time pricing and information on the market
- Over 3,000 SMSs focusing on markets information are sent daily through Manobi’s system
- Fresh food trace another Manobi application, guaranties complete product traceability to importers, retailers and customers
- Manobi made available the Fresh Food Trace Electronic Passport which provides information about farmers’ identity and the parcel of land (topography, surface area, type of soil, etc.), in other to facilitate access to credit to farmers

**ROLE OF POLICY/GOVERNMENT**
- Ministry of Agriculture’s (MoA) National Agricultural Investment Program (2011-2015) aims to boost production and diversification
- MoA is implementing a strategy (2004-2024) based on Senegal’s Sylvo-pastoral law promoting sustainable development, improved water management, increased production, resolving land disputes, and supporting nutritional health
- Government and private sector are facing challenges in coordinating their agricultural initiatives. However, Manobi focuses on the emphasised portions of the government’s strategy

**COUNTRY**
- Senegal

**SECTOR**
- Agriculture

**YEAR FOUNDED**
- 2003

**BUDGET**
- US$ 550 000

**NO. OF EMPLOYEES**
- 25

**KEY INVESTORS/FUNDERS**
- Hewlett Foundation

**NETWORK:**
- Bank, producers, agronomists, engineers and students

**SOURCES**
**Development Need**

- On the World Bank’s Doing Business Index, Senegal continually had a very long process for opening a business
- Customs charges are prone to very long red tape
- Small scale and informal traders were disadvantaged compared to large volume traders given the number of separate offices and requests required to move goods across borders
- Prior to GAINDE 2000, Africa had not developed any paperless customs systems allowing migration from available paper-bases systems, and imported European systems did not fit local needs

**Solution**

- GAINDE 2000 was created as a PPP in 2002 to help the government streamline and digitise customs procedures. It rolled out in phases from 2002-2004 then achieved full functionality in 2005
- Coordinates the inspection service, banks, port stakeholders, public agencies, insurance companies, traders, and public agencies via a single electronic clearing agent
- Automatically sends electronic forms to banks, insurance companies and inspectors as necessary
- New regulation on electronic documents in 2008 enabled an automated goods release process and fully electronic payments
- Enables the Government of Senegal to more closely control border security and increase its revenue through improved monitoring

**Results to Date**

**Time Savings**

- Time required to gather customs forms
  - 2004: 4.0 days
  - 2008: 0.5 days

- Total days spent clearing goods
  - Imports:
    - 2010: 14 days
    - 2011: 11 days
  - Exports:
    - 2010: 14 days
    - 2011: 11 days

**Role of Policy/Government**

- During initial 2004 implementation there was no legal framework to accept electronic documents or signatures, which was fixed in 2008
- Director General of Customs declared that all permits and certificates would be only accepted online
- August 2010 law enabled paperless trade

**Sources**

CTIC HAS LAUNCHED OVER A DOZEN ICT BUSINESSES IN 2012 BY WORKING WITH 24 STARTUPS, PROVING A MODEL THAT THE GOVERNMENT SEEKS TO REPLICATE

### DEVELOPMENT NEED

- ICT focused SMEs often have innovative ideas and initiatives yet lack appropriate business skills and knowledge to properly develop their companies
- SMEs working in the sector are quite informal, making them risky investments for banks
- Lack of infrastructure and reliable electricity discourage SME startups to flourish
- ICT SMEs lack access to relevant information, financial resources, access to markets, and business networks

### SOLUTION

- CTIC is an initiative public-private partnership between the Government of Senegal, Sonatel, Infodev, Neurotech and other players to incubate ICT startups and entrepreneurs
- CTIC offers entrepreneurs business development services, office space and access to finance and markets
- The hub is created to assist up to 30 SMEs or entrepreneurs per year. CTIC also provides trainings and seminars for SMEs in the sector

### RESULTS TO DATE

- In less than a year, CTIC has worked with 24 startups. These startups work in sectors such as agriculture, health, social network management and IT development
- With a preincubation plan designed to help innovators with their business plans and ideas, CTIC has helped 14 innovators turn their ideas into viable businesses

### ROLE OF POLICY/GOVERNMENT

- Government of Senegal owns a 1/3 share of CTIC
- As a crosscutting sector, the creation of CTIC is part of the government’s Accelerated Growth Plan (SCA)
- Using CTIC Dakar as a pilot, government intends to create other centers in St. Louis and Ziguinchor

### COUNTRY

- SENEGAL

### SECTOR

- ICT

### YEAR

- 2011

### BUDGET

- Undisclosed

### NO. OF EMPLOYEES

- ~10

### KEY INVESTORS/ FUNDERS

- Sonatel, Government of Senegal, Neurotech, World Bank Infodev

### NO. OF USERS

- 30 SMEs

### SOURCES

- Dalberg interviews
Binu’s app platform for feature and smart phones allowed Worldreader to attract 200,000 new active book readers

**Development Need**
- The majority of school children in Sub-Saharan Africa never own a single book
- eReaders are expensive as a content delivery mechanism because they’re an additional up-front hardware purchase
- 19 out of 20 people believe that the mobile phone can be a tool for learning
- Voluntary reading is widely recognised to improve vocabulary, test scores, and content knowledge

**Solution**
- Uses Binu platform to turn feature phones into eReaders with access to over 1,000 books digitised by Worldreader
- Binu platform allows feature phones to access smart phone content, with 1/10 the data usage of a standard browser

**Impact metrics**
- Pages read per month: 1.2 million in Ghana, 10.1 million in Nigeria in July 2012, with continent-wide growth of 720% since January
- 484,000 active readers worldwide, of which 190,000 are in Africa. They view on average 93 pages per month each

**Results to Date**

**Product Results**
Share of Binu respondents sharing their mobile for reading with...

- **Children**: 6
- **Parents**: 10
- **Siblings**: 12
- **Friends**: 28

On average each phone reaches 1.5 readers

**Role of Policy/Government**
- Government of Ghana allowed Worldreader into district schools for an earlier pilot of an eReader

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**Sources**
Worldreader and binu websites; portal. sliderrocket.com/binu/binu-and-Worldreader-Education-Symposium; Amer. Association of School Librarians “Independent Reading and School Achievement”
RANCARD SOLUTIONS DISTRIBUTES SUBSCRIPTION CORPORATE CONTENT ACROSS FORTY MOBILE NETWORKS COVERING 250M PEOPLE IN SUB-SAHARAN AFRICA

DEVELOPMENT NEED

- People in developing countries often lack access to global good and services because the cost of customer acquisition to those companies is too high
- Internet content is inaccessible to people without feature or smart phones unless converted to SMS
- Only 10% of the mobile market in Ghana is smart phones, of which 30-50% are high-intensity users, which forces companies to adapt their smart phone content to a lower bandwidth platform

SOLUTION

- Cloud based platform to connect content providers, such as multinational brands, to consumers in Africa (including Ghana, Nigeria, Senegal) and the Middle East
- Carrier billing APIs for transaction billing and in-app billing
- Helps content providers and app developers aggregate lots of operators to deliver services and reach their customers
- Helps 20+ operators aggregate content under their brands

RESULTS TO DATE

PRODUCT RESULTS

Subscription increase for Glo Mobile Nigeria, 000s of users

ROLE OF POLICY/GOVERNMENT

- Requires legal framework for micropayments
- Entrepreneurs hoping that the government will improve infrastructure and bandwidth enough to create an attractive environment for regional operators to locate their IT hubs in Ghana

1 Quote from cofounder Ehizogie Binifiie, Interview with Rancard CEO Kofi Dadzie.

COUNTRY

SECTOR

YEAR FOUNDED

BUDGET

NO. OF EMPLOYEES

KEY INVESTORS/FUNDERS

NO. OF USERS

Rancardmobility.com; interview with CEO available at www.youtube.com/watch?v=0x8rwkna3po
MI-LIFE DRASTICALLY LOWERS THE COST OF OFFERING LIFE INSURANCE, A PRODUCT ACCESSED BY ONLY 2% OF PEOPLE IN SSA, BY SELLING COVERAGE VIA SMS

**DEVELOPMENT NEED**

- 1-2% of Africans (18-24 million total) have had access to life insurance, despite a growth rate of 13% per year outside of South Africa
- Three quarters of adults earning less than $2 a day worldwide do not have a bank account
- Death can force poor families to draw on existing savings, sell assets, withdraw children from school, or draw on their social networks for financial support, using up the resources that could enable them to escape poverty
- Workers in the informal economy throughout Sub-Saharan Africa are not covered by any company insurance policies

**SOLUTION**

- Microsure, MTN, Tigo, UT Life, Vanguard Life, and Hollard Insurance teamed to provide mobile-activated life insurance available to anybody between the ages of 18-75
- Users can purchase insurance for the month through a text message that deducts money from their Mobile Money account
- One Ghanaian cedi per month purchases 400 cedis worth of insurance for the user and next of kin, paid out within three business days of the claim. 200 claims were filled in the first year of operations
- Administrative cost savings are 50-80% compared to traditional life insurance

**RESULTS TO DATE**

**PRODUCT RESULTS**

Per-person cost of insurance delivery

<table>
<thead>
<tr>
<th>Brick and mortar</th>
<th>Mobile</th>
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<tbody>
<tr>
<td>100%</td>
<td>35%</td>
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</table>

Operating cost

-65%

**SOCIOECONOMIC IMPACT**

Cost savings for consumers

<table>
<thead>
<tr>
<th>Traditional</th>
<th>Mi-Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>30%</td>
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</table>

Income

-70%

**ROLE OF POLICY/GOVERNMENT**

- 2003 National Health Insurance Act made health insurance mandatory for all Ghanaians
- National Insurance Commissioner instrumental in allowing the innovation
- Seeking additional telecom and financial regulation to allow more diverse premium collection, e.g. through deductions

**SOURCES**

- MILife company website; interview with Richard Leftley available on http://www.mobileworldmag.com/we-are-confident-that-70-african-can-be-insured-richard-leftley-president-ceo-microsure.html; Munich Re Foundation Microinsurance Compendium Vol. II; World Bank Global Findex 2011; interview with MFS CEO

1 Estimates range from 50-80%.
2 Estimates range from 50-90%
JOBBERMAN ADDRESSES INFORMATION ASYMMETRY BY MATCHING EMPLOYERS AND EMPLOYEES MORE EFFICIENTLY THAN USING PERSONAL NETWORKS

DEVELOPMENT NEED

- Nigeria has a working population of 60 million and high unemployment rates of 23%
- Recruiting the best talent can be a challenge particularly if the process is paper-driven, requiring a lot of time spent on manual processes
- The average length of time it takes to fill a position that is advertised competitively can be excessive and companies receive only a minimum return on their investment

SOLUTION

- Jobberman was started in 2009 and is a job site that provides job listings, recruitment services, short listing and database searches
- Provides CV and career advice, database searches and specialised alerts for both job seekers and recruiters

RESULTS TO DATE

- To date Jobberman has advertised over 80 000 jobs, of which 40 000 were filled through Jobberman
- This has enabled companies to focus on their core competencies rather than recruiting, allowing Jobberman to conduct the short listing process
- Provided training to job seekers in career advisory and soft skills for the workplace
- Jobberman has provided an avenue for Nigerians in the Diaspora to be informed on the job market and expand their networks

ROLE OF POLICY/GOVERNMENT

- Broadband and mobile penetration has enabled the company to attract users from different parts of the country
- Government regulations require advertisements for jobs to be done in three newspapers, limiting Jobberman’s effectiveness as a platform with wider reach

COUNTRY

SECTOR

YEAR FOUNDED 2009

BUDGET US $1.8 million

NO. OF EMPLOYEES 48 employees (35 full time)

KEY INVESTORS/ FUNDERS Tiger Global

NO. OF USERS 700 000 registered users, 9 million hits per month

SOURCES

Delberg interviews with Ayodeji Adewunmi, Jobberman
CaSHleSS initiate Nigeria Has addreSSed private SeCtOr reSiStanCe tO electrOniC paymentS, and mOre tHan dOUBled tHe nUmBer Of POS terminalS in tHe COUntry

DEVELOPMENT NEED

- A high reliance on cash payment systems is costly and decreases transparency compared to electronic systems
- A predominantly cash economy results in a large amount of money outside the formal economy, thus limiting the effectiveness of monetary policy in managing inflation and encouraging economic growth.

SOLUTION

- Cashless Nigeria Initiative aims to modernise payment systems by encouraging the use of internet banking, point of sale terminals and mobile money payment systems
- To reduce the downtime for POS terminals the Lagos State purchased bandwidth from different providers
- Central Bank has revised banking procedure to allow for agency banking and the registration of mobile money operators

RESULTS TO DATE

- The number of internet banking transactions has increased to over 1.5 million in 2011 with a total value of over 2 billion Naira
- 20 mobile money operators have been licensed and providers such as Pagatech have over 300 000 subscribers and transactions worth 1B Naira per month
- The number of POS terminals has increased from 40 000 to 103 000
- The Central Bank has seen savings of 1.2 billion Naira from reduction in the cost of banking and cash transfer services, reduced robberies and damage to cash

ROLE OF POLICY/GOVERNMENT

- The Central Bank has pushed for the Cashless Nigeria Initiative and the pilot stage was implemented in Lagos State
- Mobile money banking regulations including agency banking polices and procedures have been finalised
- Central Bank reviewed procedures on cash handling limits to encourage implementation of the initiative
- Created a Consumer Protection Department to coordinate with the Communications Commission in the registration and regulation on mobile money providers

COUNTRY

SECTOR

YEAR FOUNDED Policy was implemented in 2011

BUDGET Undisclosed

NO. OF EMPLOYEES Undisclosed

KEY INVESTORS/FUNDERS Undisclosed

NO. OF USERS 20 operators

SOURCES: Dalberg interviews
THE INDEPENDENT NATIONAL ELECTORAL COMMISSION’S USE OF SOCIAL MEDIA PROVIDED REAL TIME DATA TO ADDRESS VIOLENCE AND MONITOR ELECTIONS

DEVELOPMENT NEED

- Nigeria’s population that is eligible to vote is over 73 million people over 120,000 polling stations
- Independent National Electoral Commission (INEC) had a beleaguered reputation which voters blamed for mismanaging the discredited elections of 2003 and 2007
- Fraud, ethnic and religious violence was common in several states during elections

SOLUTION

- INEC developed a social tracking center with telephones, television, computer and internet communication to provide a platform for INEC for reporting incidents and giving feedback
- The team designed a social media aggregator tool that could pull content from about 20 different sources (including Twitter) and analyse the data in real time using keywords
- INEC had educational campaigns to sensitise the citizens to serve as poll observers, monitoring the vote count, watching over ballot boxes, and recording evidence of fraud with mobile phone cameras

RESULTS TO DATE

SOCIOECONOMIC IMPACTS

- Social media provided real time data that can improve the electoral process by having critical information that can be responded to by the required agencies. The Situation room had the police force that could respond to areas where violence was reported.
- Nigerians actively participated in the election process and election monitoring improving transparency and confidence in INEC.
- The 2011 election has been described as the fairest since Nigeria’s independence.

ROLE OF POLICY/GOVERNMENT

- INEC commitment to create new platforms to engage and communicate with citizens over the election processes

COUNTRY

- Nigeria

SECTOR

- Government

YEAR

FOUNDED

1998

BUDGET

US $560 million

NO. OF EMPLOYEES

13,000

KEY INVESTORS/ FUNDERS

Government and donors

NO. OF USERS

>400,000

SOURCES

Dalberg interviews and analysis
By improving supply chain management and market information, Virtual City Agrimanagr has increased farmer incomes by 13%.

**Development Need**

- More than 280 million people in Sub-Saharan Africa are farmers, either livelihood or subsistence.
- Smallholder farmers are dispersed and isolated due to a range of factors including information asymmetry, lack of purchasing power and geographic constraints.
- Up to 40% of agricultural produce in Africa is lost due to poor storage, infrastructure, and shrinkage.

**Solution**

- Agrimanagr offers real-time market intelligence and connects stakeholders along the agricultural value chain.
- Allows farmers to manage the weighing, grading, and receipting of produce collected at rural centers.
- Allows farmers to pay suppliers using cashless transactions, tracks and rewards loyal customers and suppliers.
- Integrates the collections process with supply chain management for wholesalers.
- Farmers can use receipts as credit history.

**Results to Date**

**Product Results**

Operational efficiency gains

- Efficiency: supply chain tracking can reduce the 8-12 days from wholesale delivery to cash receipt down to 3 days.
- Profitability: price transparency for farmers, lower admin cost due to digitisation of paperwork, improved inventory management, reduced human error on data entry.

**Socioeconomic Impact**

Increased income for 350,000 farmers, affecting 1.5 million people.

<table>
<thead>
<tr>
<th>Country</th>
<th>Sector</th>
<th>Year Founded</th>
<th>Budget</th>
<th>No. of Employees</th>
<th>Key Investors/Funders</th>
<th>No. of Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenya</td>
<td>Agriculture</td>
<td>1999</td>
<td>Undisclosed</td>
<td>Undisclosed</td>
<td>Acumen Fund, Nokia, Kenya ICT Board and others undisclosed</td>
<td>350,000 farmers</td>
</tr>
</tbody>
</table>

**Country**

- **Kenya**

**Sector**

- **Agriculture**

**Year Founded**

- **1999**

**Budget**

- **Undisclosed**

**No. of Employees**

- **Undisclosed**

**Key Investors/Funders**

- Acumen Fund, Nokia, Kenya ICT Board and others undisclosed

**No. of Users**

- 350,000 farmers

**Role of Policy/Government**

- Mobile money has an upper limit of $1,000, above which eCash must be used, which puts a ceiling on some larger supply chain transactions.

**Sources**

International Fund for Agricultural Development, Rural Poverty Report 2011; World Bank, interview with Acumen Fund CEO available at blog.acumenfund.org/tag/virtual-city; Dalberg interview with Virtual City CEO.

**CASE STUDIES**

**78**
DIGITISING CLAIMS PROCESSING FOR KENYA’S NATIONAL HEALTH INSURANCE FUND HAS HELPED LOWER ADMINISTRATIVE COSTS BY NEARLY 50%

DEVELOPMENT NEED

- 1-2% of people in sub-Saharan Africa have access to life insurance
- Kenya has 6,190 health facilities distributed throughout the country
- Government reimbursement to HMOs historically took 3-6 months

SOLUTION

- Digitise claims processing, allowing real-time processing and authentication of health care payments to hospitals from the insurance scheme
- Members register online and link their bank account for payroll deduction
- Creates common platform for bank and hospital information
- Maps health facilities to allow for identification of avoided facilities, e.g. a patient goes out of her way to go to a noted clinic rather than seeking care at a closer facility
- NHIF operations have been computerised and decentralised, enhancing efficiency in settling claims and effective management of membership database
- Currently 31 fully-fledged branches and 45 satellite offices and service points at most district hospitals countrywide are networked

RESULTS TO DATE

OPERATIONAL EFFICIENCY GAINS

2/3 of gains attributed to the internet

<table>
<thead>
<tr>
<th>Year</th>
<th>Administrative costs as percent of collections</th>
<th>Weeks taken to pay out claims</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>60</td>
<td>12</td>
</tr>
<tr>
<td>2012</td>
<td>32</td>
<td>2</td>
</tr>
</tbody>
</table>

Claims processing 6x faster

-47%  -83%

ROLE OF POLICY/GOVERNMENT

- eGovernment policy helped create protocols that were easy to use and standardised
- Implementation speed hindered by lack of matching health care policy that could push forward resistant stakeholders
- eHealth expected to grow as M-Pesa has prepared the market for ePayments

SOURCES

Kenya Ministry of Health HIS Strategic Plan 2009-2014; Munich Re Microinsurance Compendium Vol. II; Interviews with IFC, NHIS; Dalberg analysis
Kenya ICT Board’s Pasha Centres and Loans have supported SME growth and expanded access to e-Gov and other internet services.

**Development Need**
- 72% of Kenya’s 41.6 million people lack access to the internet
- ICT literacy rate in rural Kenya is ~30%
- Only 4% of households have internet access at home, the vast majority of which are in urban areas
- e-Government services beyond the Interactive Voice Response System currently require a computer terminal for access rather than a feature phone application

**Solution**
- Digital Villages Program has funded the set up of 29 Pashas that provided a broad range of ICT services, from access to training
- Includes access to a range of government services including Kenya Revenue Authority (KRA), PIN registrations and online tax returns, e-payslips by the Kenya National Union of Teachers, application and tracking of passports and IDs, business licensing, Youth Assistance in Procurement forms, Form One admission forms, college intake forms, KNEC results, access to Higher Education Loans Board online bursary applications and repayment forms

**Results to Date**

**Socioeconomic Impacts**
- eGovernment access to 440 clients per month across 29 constituencies
- Has supported the creation of 15 new businesses and has expanded the services of 14 existing businesses
- Creates infrastructure for rural ICT training, which one centre in Ruiru turned into 78 certificate graduates in a one-month course.
- Intel-funded incentive payments to 28 of 37 Pasha entrepreneurs caused an additional 580 adults to be trained between May and June 2012

**Role of Policy/Government**
- Driven by Kenya ICT Board’s pursuit of universal internet access

**Sources**
- IBM Digital Villages As A Center For Rural Empowerment and Development Report, 2010; International Telecommunications Union; World Bank; Kenya e-government website; Kenya ICT Board website; Dalberg interviews;
AMREF’s e-Learning Course to Upskill Nurses in Kenya Has Increased Training Capacity by 35X While Keeping Nurses in the Workforce

**DEVELOPMENT NEED**
- Enrolled Nurses comprise 45% of Kenya’s health care work force, but are inadequately trained to manage new and emerging diseases such as HIV/AIDS, which takes up three of five public hospital beds at any given time.
- Sub-Saharan Africa has a chronic shortage of skilled nurses, with 2.3 per 10,000 people compared to 14.0 across the rest of the world.
- Four certificate programs to upgrade Kenya’s Enrolled Nurses had a combined capacity of 100 students per year and required taking 18 months off from work.

**SOLUTION**
- AMREF designed, piloted and scaled an e-learning course for Enrolled Nurses to complete in 24 months while remaining in the work force.
- Built 34 e-learning centers to provide access to the online training materials.
- Increased the tutor : student ratio to 50:1 from 20:1 due to the bulk of the instruction happening in the computer lab.
- Chief Nurse at Kenyatta National Hospital has seen increased confidence in clinical areas, increased diagnostic expertise, improved time management, and improved relationships with staff as nurses are not required to take extended leave for in-person training.

**RESULTS TO DATE**

**Socioeconomic Impacts**
- 32 nursing schools participate, with 230 registered nurses trained as eLearning tutors.
- Training capacity increased to 7,000 nurses at once in the two-year program, yielding 3,500 graduates per year.
- With 22,000 nurses in total to be trained, this suggests that the entire work force has the potential to be upgraded within seven years, even without any increase in training capacity.
- Has trained over 5,000 since first piloted in 2005.
- Tuition has reduced from $250 per month to just over $60 per month.
- Maximum stay in Kangundo Hospital has halved from 4 to 2 weeks due to improved care, decreasing congestion.

**Role of Policy/Government**
- In 2008 Kenyatta Hospital committed to fund 500 of its nurses at $1,500 each for training.
- Governments can make policies to decrease the likelihood of brain drain after upskilling, which is attractive after nurses accrue debt to pay tuition.
- Improving electrification and connectivity enables training nationwide.

**Sources**
KENYA OPEN DATA INITIATIVE IS AVAILING KEY GOVERNMENT DATA FREELY TO THE PUBLIC THROUGH A SINGLE ONLINE PORTAL

**DEVELOPMENT NEED**

- Government is the largest collector and custodian of data however this information is held in several formats and by a myriad of institutions.
- Article 35 of the Bill of Rights in the constitution of Kenya states that every citizen has a right to access information held by the state.

**SOLUTION**

- Goal of opendata.go.ke is to make core government development, demographic, statistical and expenditure data available in a useful digital format for researchers, policymakers, ICT developers and the general public.
- Availability of the data is to enable citizens to be part of development and to get young people to find opportunities to innovate.

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>SECTOR</th>
<th>YEAR FOUNDED</th>
<th>BUDGET</th>
<th>NO. OF EMPLOYEES</th>
<th>KEY INVESTORS/ FUNDERS</th>
<th>NO. OF USERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2011</td>
<td></td>
<td></td>
<td>World Bank</td>
<td>Over 5 000 data sets downloaded to date</td>
</tr>
</tbody>
</table>

**RESULTS TO DATE**

**SOCIOECONOMIC IMPACTS**

- To date over 50 applications have being developed based on the information on the portal. The applications address different aspects of economic development including governance, health and education.
- Open Data Initiative has started an Open Data pre-incubation to spur the development of applications addressing four critical priority areas.
- Initiative has developed partnerships with key stakeholders such as the media and civil society to train them on how to use the data to develop creative analysis for journalism. One of the successful applications developed from this partnerships includes County Score Cards that provides development data on the different counties.

**ROLE OF POLICY/GOVERNMENT**

- Commitment by the ICT Board to develop the portal and get buy in from different MDAs to submit government data.
- Ministry of Information is currently developing a Cabinet Memo to ensure that government agencies release the required data sets.

**SOURCES**

Dalberg interviews and analysis
M-KOPA IS ENABLING OFF-GRID ELECTRIFICATION BY LEVERAGING THE POPULARITY OF KENYA’S MOBILE PAYMENT NETWORKS

DEVELOPMENT NEED

- 590 million people in Sub-Saharan Africa are not connected to the electricity grid, with 3 million homes representing 80% of the population in Kenya
- 64% of the population in Sub-Saharan Africa lives outside cities, where electric grid infrastructure is generally available
- One third of Kenyans are financially excluded, lacking a savings account, credit card, or access to loans
- Kerosene lighting is low cost and poor ventilation makes consistent use equivalent to smoking two packs of cigarettes per day

SOLUTION

- M-Kopa is renting-to-own home solar systems that can provide electricity, cell phone charging and other potential future applications
- A down payment of 2,500 shillings earns the system, which then subtracts 50 shillings from the user’s M-Pesa account every day until paying off the full 16,900 that the system costs. The full cost is just under one quarter of national GDP per capita
- Once the system is owned, power is free
- All of M-Pesa’s 15.1 million customers, representing a third of Kenya’s population, are eligible
- M-Kopa has sold more than 1,000 units from June to October 2012

RESULTS TO DATE

SOCIOECONOMIC IMPACTS

Daily expenditure on power nearly halves, in Kenyan shillings

- Cost of phone charging and kerosene to off-grid households
  - Kerosene: 70
  - M-Kopa: 40
  - 43% reduction

ROLE OF POLICY/GOVERNMENT

- Regulation enabling mobile payments is central to this business’ success
- Lack of promising rural electrification or microgrid initiatives by the government increases consumers’ demand for alternate products

SOURCES

KENYA EDUCATION NETWORK (KENET) IS A NATIONAL RESEARCH AND EDUCATION NETWORK THAT PROMOTES THE USE OF ICT IN TEACHING, LEARNING AND RESEARCH IN HIGHER EDUCATION INSTITUTIONS

### DEVELOPMENT NEED

- Government of Kenya had recognised the need to provide institutional Internet access to their students and faculty members however high cost was a barrier for the educational institutions.
- There was a growing demand for internet services and e-learning resources by students and faculty
- Low investment in ICT Infrastructure in educational institutions

### SOLUTION

- KENET aims to interconnect all the Universities, Tertiary and Research Institutions in Kenya by setting up a cost effective and sustainable private network with high speed access to the global Internet.
- KENET also facilitates electronic communication among students and faculties in member institutions, shared learning and teaching resources by collaboration with international research and development institutions

### RESULTS TO DATE

#### SOCIOECONOMIC IMPACTS

- Increased Internet outreach: As of October 2012 the Network has provided cost effective bandwidth to over 114 educational institutions and distributing more than 1.95 GBPS. This has benefited over 100,000 students and over 5000 faculty staff
- Access to international content: KENET works with regional research institution to include both research and educational content on its network improving learning experiences and student exposure

### ROLE OF POLICY/GOVERNMENT

- Government of Kenya provided a $21.5 million network infrastructure and international Internet bandwidth expansion grant
INTRODUCTION

Infrastructure: A leader in channeling international bandwidth, Ghana claims the fastest connection speeds in Africa. Ghana’s approach to building an ecosystem for internet growth has focused on establishing a networked infrastructure and promoting government as an early adopter.

Usage conditions: Ghana appears poised for success, although up until recently user penetration lagged behind expectations. It currently has the largest mobile broadband subscriber base in Africa, suggesting the opportunity for domestic software developers to create platforms for the local market that may be extended to countries with much higher broadband penetration.

Activity and impact across sectors: Ghana is home to agriculture and health innovations that are regional leaders. Esoko, an agriculture information management application, sells to clients in 16 countries. MoTech’s health information platform provides a model that the Gates Foundation is investing in, intending to scale the system to nine additional countries. mPedigree’s mobile, on-site verification of pharmaceutical products has also been adopted throughout the region. Each solution has involved both the private sector and public stakeholders.

CONTEXT

Ghana is one of the fastest growing economies in the world. It offers one of the most stable and attractive business environments in the region. In 2011 Ghana recorded GDP growth of 14.4%, which slowed to 7.5% in 2012. Ghana is endowed with gold and cocoa and is developing its national oil resources, which will produce 120 000 barrels per day. Just over one-third of the country’s 24.6 million people speak English, the official language, and two-thirds are literate.

While Ghana has relatively advanced infrastructure for a low-income country, it has yet to reach the infrastructure levels of middle-income countries. Over the last year Ghana has seen significant improvements in macroeconomic stability and health and educational outcomes, part of its vision to join the group of middle-income countries by 2020.

Recent elections may help define national development priorities. More than half the labour force is still employed in agriculture, where access to credit is a primary challenge. To address this, the government created a pro-poor spending policy, extending microloans to farmers, decreasing collateral requirements for women and promoting contract farming.

ICT SECTOR OVERVIEW

Ghana’s approach to building an ecosystem for internet growth has focused on establishing a networked infrastructure and promoting government as an early adopter. But this has not yet translated into a substantial increase in access for the broader population, with Internet penetration at 9.6% of the population in 2011.
The National Information Technology Agency (NITA) was established in 2008 as the governing body supporting the national ICT for Accelerated Development (ICT4AD) Strategy and National Telecom Policy (NTP). ICT4AD proposed using Internet-enabled technologies to transform government administration, information dissemination and service delivery, and is currently being refreshed with UN support. The NTP defines how the government intends to extend high quality, affordable ICT access to every Ghanaian and move toward a knowledge-based economy.

The strategy involves increasing competition, broadening rural access and developing e-literacy. By opening the market to more operators through additional licensing, it aims to make telecom services available to at least 25% of the population, with 10% or more penetration in rural areas. To date, the bulk of the development has been limited to Accra, Kumasi and Takoradi. Its eCare and CIC centers provide ICT access and eSkill development, funded by a 1% tax on telecom revenues, but currently only cover a minority of the country. The government also seeks to stimulate local competition with major operators by offering incentives to connect to the fibre backbone and submarine cables.

NITA implements IT policies while overseeing the National Data Centre, Government Enterprise Architecture, Government ICT Interoperability Standards, and public sector ICT training through the e-Ghana Project. The e-Ghana Project was launched in 2006 by the World Bank to build IT Enabled Services (ITES) and e-government applications, then supplemented two years later with a $30m loan from China to construct a nationwide eGovernment infrastructure extending fibre optic and WiMax coverage to 15 cities.

The government introduced the national Ghana Interbank Payment and Settlement System (GhIPSS) in an attempt to migrate the country from cash to electronic payments, which are more easily tracked and decrease the opportunities for corruption. Slow rollout of E-zwitch compliant ATMs and the lack of explicit mMoney or eCommerce regulation in the 2008 Branchless Banking Guidelines were obstacles to the hoped-for electronic payment growth.

MARKET STRUCTURE

With six major telecom companies in the country, including the recent entry of Glo, Ghana’s telecom market is competitive. MTN and Tigo collectively control three-quarters of the market, with Vodafone, Airtel and Expresso each holding very low market share. The government is trying to extend access beyond the current 77% mobile coverage rate by offering tax rebates to companies extending mobile telephone and Internet services to rural parts of the country.

It is unclear which companies are taking that offer and building out their infrastructure. Operators appear content making revenue from SMS and voice, not having extended significant resources to move their current customers onto the Internet. As one of the first countries to connect to the SAT3 international fibre cable in 2002, Ghana has made the core investment in infrastructure for connectivity. Implementing cost-based interconnection fees resulted in a dramatic drop in tariffs and significant growth in mobile access.

1 International Telecommunications Union report, 2012.
5 World Bank African Development Indicators 2005 and USAID Agriculture Commercial Legal and Institutional Reform (AgCLIR) assessment of the environment for agribusiness 2008.
6 International Telecommunications Union, 2011.

COUNTRY CASE STUDIES

- Binu’s app platform for feature and smart phones allowed Worldreader to attract 200,000 new active book readers
- Rancard Solutions distributes subscription corporate content across forty mobile networks covering 250m people in Sub-Saharan Africa
- Mi-Life drastically lowers the cost of offering life insurance, a product accessed by only 2% of people in SSA, by selling coverage via SMS
INTRODUCTION

Infrastructure: Kenya’s existing infrastructure and approach to extending capacity is promising. Its combination of wireless broadband networks and fibre optic cable infrastructure could be a model for the rest of Africa, effectively addressing backhaul challenges by including electricity transmission and distribution lines alongside cables. The government has taken a lead role in providing infrastructure, as seen in the TEAMS project, while partnering with Safaricom and KDN to increase bandwidth across the country.

Usage conditions: Strong underlying conditions for usage have translated into significant Internet use. Internet access has grown tremendously to cover 34% of the population. Thirty-seven percent of the population at the base of pyramid have internet-enabled mobile phones and 25% report Internet use. Broadband use, however, remains low, with penetration rates below 1%.

Activity and impact across sectors: A plethora of programmes across agriculture, health and the SME sectors remain in pilot mode, few have reached large scale. Startups seem to have taken the front seat, but the backend systems that provide the foundation for growth and wider, deeper impact receive less attention. National ID systems and large scale, interoperable health information platforms, for example, have been stalled or shelved, while consumer apps continue to procure donor funding. Integration of apps to government platforms has been slow limiting commercial viability of apps and the social economic impact. Mobile money and eCommerce are beginning to converge through applications like Pesapal, though eCommerce policy and protection of transactions is still murky. More financial products are likely to emerge as Safaricom’s user growth on M-Pesa, currently 18% of the company’s revenue, plateaus. Widespread access to these payment platforms has enabled service delivery across other sectors, such as rent-to-own solar financing through mKopa, consumer health savings products, and livestock and crop insurance.

Role of government: Kenya’s government leadership has been widely acclaimed, particularly for its drive to increase access to bandwidth. Its next hurdle will be to drive backend digitisation initiatives to create shared platforms and systems for new applications and consumer solutions. Having a standardised platform for, for example, a national ID system, would allow private sector developers to build additional eGovernment service portals and add-ons that are compatible. Driving broadband growth in the health and education sectors, meanwhile, will help achieve the respective Ministry policy goals to extend learning and training services via the web.

ICT SECTOR OVERVIEW

Kenya has added 4.6 million internet users to its current base of 13.5 million, one year growth of 33% by September 2012. Broadband uptake has also accelerated, bringing in 0.5 million new users in the same period.

Kenya’s growth has been attributed to strong national leadership, particularly the establishment of a strong regulator and the inclusion of ICT as a pillar for national growth in the Vision 2030 plan. Vision 2030 was followed up by the ICT Strategy in 2006, and ICT Master Plan 2012 that frames ICT as a vehicle to drive broader industry growth, create jobs and meet citizens’ needs via eGovernment. The Master Plan was jointly formulated by a wide range of ministries and stakeholders.

The Kenya ICT Board, established in February 2007 to attract ICT investment and implement projects in the sector, has developed effective regulation of the patchwork of operators and agencies created by the 1998 Communications Act. The relationships between these regulators are shown below in Figure 1.
Various ministries have made ICT adoption strategies and initiatives in support of the Vision 2030 plan. The Ministry of Education, for example, has created the Kenya ICT Fund as a public-private partnership to increase Internet access in schools, digitize the core curriculum and publish national exam results online. The Ministry of Agriculture aims to increase productivity and improve farmer livelihoods by consolidating technical information in an online Killimo Library and publishing daily market prices for various crops. The Ministry of Health’s National eHealth Strategy builds atop the eGovernment Directorate and Shared Services Strategies, targeting improved health information systems, information sharing with citizens, and extending online health worker training.

However, not every ministry is accelerating ICT development. In October 2012, the Ministry of Finance proposed a new VAT on all M-Pesa transactions that will increase the cost of mobile money. Kenya has a number of investment funds focused on early stage ICT that have generated software and pilot businesses, including the ICT Board’s Tandaa innovation grants programme. As demonstrated in the case studies, many are focused on developing solutions to the country’s specific socioeconomic challenges.

While in West Africa regulation is expected before products are developed, in Kenya innovation has driven markets forward, with regulation emerging in response. For example, the Freedom of Information Bill to enforce data privacy and security has not been approved, despite the success of Kenya’s domestic tech incubators. Though M-Pesa launched in 2007, it took until 2011 to enact the National Payment Systems Act, which designated the Central Bank of Kenya as regulator and supervisor of all payment systems and service providers.

MARKET STRUCTURE

Kenya’s mobile market is vibrant, with penetration of over 7%, or 30 million subscribers, up 17.5% from last year. Safaricom continues to hold dominant market position while Airtel, Telkom/Orange and Essar maintain smaller shares. Kenya’s 7.7 million Internet subscribers access the web primarily through mobile devices.

There is significant competition among ISPs. Seven main companies, including Kenya Data Network, AccessKenya and Wananchi Online, constitute a decent portion of the wireless customer market. Mobile operators, however, are the largest ISPs, with Safaricom having sold more than 3.5 million broadband modems by the start of 2010.10

Kenya has access to four sea cables providing 5Tbps to the country, 90% of which is supplied through Telkom Kenya Limited’s EASSy project. Increased capacity in SEACOM over the past year has also helped reduce broadband prices, which already halved between 2010 and 2011.11 This is aided by the government’s National Optic Fibre Backbone Infrastructure (NOFBI) programme.

3 International Telecommunications Union
6 Source to be added

COUNTRY CASE STUDIES

- By improving supply chain management and market information Virtual City Agrimanagr has increased farmer incomes by 13%
- Enabling businesses that increase farm gate prices through accurate weighing could shift $75 million to those most in need within five years and generate $55 million in financing
- Digitising claims processing for Kenya’s National Health Insurance Fund has helped lower administrative costs by nearly 50%
- Kenya ICT Board’s Pasha Centres and loans have supported SME growth and expanded access to eGovernment and other internet services
- AMREF’s eLearning course to upskill nurses in Kenya has increased training capacity by 35x while keeping nurses in the workforce
- M-Kopa is enabling off-grid electrification by leveraging the popularity of Kenya’s mobile payment networks
- Kenya education network
- Kenya open data initiative
INTRODUCTION

Infrastructure: Nigeria’s strong international bandwidth but weak domestic coverage and last-mile connectivity suggest a relatively low performance in infrastructure rollout. The private sector led more than 95% of greenfield investments in telecoms from 1990-2010. Currently there are subsidies that support infrastructure extension and service delivery in rural areas.¹ Given investment by operators in backhaul infrastructure, networks should be positioned to support mobile network operator rollout while moving towards uncovered areas.² Suburban Telecom could lead the next wave of expansion.

Usage conditions: Nigeria has seen very strong telecom and mobile sector growth, with slightly slower uptake of the Internet due to limited accessibility. Twenty five percent of rural dwellers do not have access to cell coverage and have to travel a distance of between one to 10km to access telephone services.³

Activity and impact across sectors: Nigeria shows the greatest potential in using the Internet to promote good governance, eCommerce and finance, though these sectors have not yet produced solutions that have spread across the region. The Cashless Nigeria Initiative aims to boost eCommerce and has been fairly successful in Lagos with plans to rollout to other states. Pagatech, a mobile payments company, has 200,000 users but is limited by the lack of legal protection of consumer funds within mMoney systems. In governance, the electoral commission and citizen sector have teamed up to create multiple elections monitoring platforms based on SMS aggregation.

Role of government: The Ministry of Communication Technology is playing an increasingly active role. In August 2012, it revised the national ICT policy and is considering incentives to drive the private sector to expand access to less-profitable rural areas. Consumer protection policies, however, are needed to further innovation and customer acquisition in mMoney and eCommerce.

CONTEXT

The Nigerian economy is Sub-Saharan Africa’s second largest, posting growth of 7% over the past five years. At this rate, Nigeria’s economy will double within ten years. Growth is currently driven by agriculture, retail, oil and gas. Nigeria depends on oil exports for more than 80% of government revenue, though in 2012 its government announced a ten-year plan to cut oil dependence.⁴ Wholesale and retail trade, finance and insurance, telecommunications, and building and construction are other major growth sectors. Thirty percent of the country’s GDP growth last year was attributable to the ICT sector.⁵

Nigeria faces significant health, education, infrastructure and governance challenges. Life expectancy is 52 years, with two nurses and less than one doctor per thousand people. Only three of every four primary students complete their schooling, down from nine in ten in 2006. Like many emerging markets, Nigeria has limited physical infrastructure that increases the cost of doing business. Electricity remains an issue, with only half the population with access and three quarters of businesses citing it as a major constraint to growth.⁶ With 84% of its people living on less than $2 per day, spending money on the Internet to promote good governance, eCommerce and finance, though these sectors have not yet produced solutions that have spread across the region. The Cashless Nigeria Initiative aims to boost eCommerce and has been fairly successful in Lagos with plans to rollout to other states. Pagatech, a mobile payments company, has 200,000 users but is limited by the lack of legal protection of consumer funds within mMoney systems. In governance, the electoral commission and citizen sector have teamed up to create multiple elections monitoring platforms based on SMS aggregation.

ICT SECTOR OVERVIEW

Nigeria has a vibrant and competitive telecommunications sector. It was the largest growth contributor in the first quarter of 2012, boosted by near universal mobile phone penetration, reduction of Internet costs and improvements in telecommunications infrastructure.⁷ The country has fostered several leading eCommerce ventures, with incubators and venture funds available in recognition of the commercial potential of developing Internet-enabled technology solutions for the more than 160 million Nigerians.

The sector is receiving significant local and international investment. Of the five mobile providers, the largest are MTN, Glo, Airtel and Etisalat,⁸ who are regulated by the National Communications Commission (NCC). Separate is the country’s Ministry of Communication Technology that is responsible for developing ICT policy and oversight of its implementation in the country. The Broadband commission is a temporary committee set up to develop the broadband strategy for the country.

The government’s new ICT policy promotes using ICT to address social development challenges, grow the nation’s ICT industry and make Nigeria a knowledge-based, globally competitive economy.

FIGURE 2: NIGERIA’S NATIONAL ICT POLICY AND IMPLEMENTATION BODIES

<table>
<thead>
<tr>
<th>Policy and strategy implementation</th>
<th>Oversight &amp; regulation</th>
<th>Private sector interest groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINISTRY OF COMMUNICATION TECHNOLOGY</td>
<td>NATIONAL COMMUNICATIONS COMMISSION</td>
<td>ASSOC OF LICENSED TELECOMMUNICATIONS IN NIGERIA</td>
</tr>
<tr>
<td>Advise on vision, define policy (e.g. ICT Masterplan)</td>
<td>Regulate all communication</td>
<td>Telecoms lobbying group</td>
</tr>
<tr>
<td>NATIONAL INFORMATION AND TECHNOLOGY DEVELOPMENT AGENCY</td>
<td>GALAXY BACKBONE</td>
<td>NIGERIA COMPUTER SOCIETY</td>
</tr>
<tr>
<td>Develop plans for ICT initiatives</td>
<td>Advise Government on ICT Implementation</td>
<td>Umbrella private sector ICT lobbying group</td>
</tr>
<tr>
<td>NIGCOMSAT</td>
<td>to manage commercial viability of satellite communication</td>
<td>BROADBAND COMMISSION</td>
</tr>
<tr>
<td>UNIVERSAL SERVICES PROVISION FUND</td>
<td>Promoting universal access to connectivity</td>
<td>Stakeholders appointed by the Minister to design the broadband infrastructure in the country</td>
</tr>
<tr>
<td>30 federal ministries</td>
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Public Sector Private Sector

President
Defines and sets national vision

The Ministry of Communication Technology is playing an increasingly active role. In August 2012, it revised the national ICT policy and is considering incentives to drive the private sector to expand access to less-profitable rural areas. Consumer protection policies, however, are needed to further innovation and customer acquisition in mMoney and eCommerce.
The Ministry of Communication Technology is playing an increasing role in industry development. To boost the Internet’s impact on social and economic development, the government created a Universal Services Provision Fund to subsidise companies promoting ICT access in rural areas and has set aside $15 million to fund software development. It has achieved varied levels of success across its eight initiatives promoting access. Legislation mandating a certain portion of hardware and software be procured locally, similar to what is required of oil companies operating in the Niger Delta, is expected next year.

Internet adoption by the Nigerian government is low, however, despite the creation of a wholly owned company, Galaxy, providing the government with ICT services and backbone. Only 46% of ministries, departments and agencies have active websites. At the time of this publication the national government itself lacked a website.

MARKET STRUCTURE

The telecommunication sector in Nigeria is among the fastest growing markets in the world. In addition to a competitive mobile market, there is a range of domestic support services, including hardware manufacturers and software providers.

In addition to these mobile providers are a large number of ISPs. However, cost of access and quality of service are cited as major constraints. The availability of four international cables has increased bandwidth availability, shifting the challenge to extending that infrastructure domestically. Last mile connectivity provides an additional set of challenges that could be addressed by the government’s proposed new subsidy for infrastructure and service delivery in low coverage areas. Poor infrastructure increases the cost of distribution and limits the potential positive impacts of access. For example, Nollywood content is accessed primarily by Nigerians in the Diaspora due to slow connections that limit accessibility by local users.

Comparatively low equipment prices are driving rapid increases in the number of people online. Thanks to domestic manufacturing, computer prices are low enough in Nigeria to allow nearly one in six households to own one as of 2010. Feature and smart phones, however, are currently driving increases in Internet access. One analyst claims that smart phone sales are growing at 4% per month, aiming towards 25 million smart phones in the country by 2016. Broadband penetration, at 6%, is also increasing as the average cost dropped to $1/Mb from $7/Mb between 2010 and 2011.

Nigeria’s feature phone application market is thriving. Particularly popular is the social-networking application 2go, developed in South Africa, which hosts nine million users, 50% more than Facebook. Company research suggests that two-thirds of members use their phones for two hours or more every day. This level of engagement suggests a massive opportunity for low-bandwidth applications and platforms in the country. Incubators such as CCHUB and Wennovation Hub are fostering companies that recognize that opportunity.

This emphasis on commerce outshines progress made in other socioeconomic sectors. Little evidence suggested that Nigeria was leading in the development of health, education or agriculture applications. Interviewees often cited Nigerians’ entrepreneurial drive, attraction towards sectors that offer clear financial returns and the government’s history of developing policy that steered businesses and entrepreneurs towards financial services and commerce over other sectors.

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2. Ibid.
7. ITU 2012 Strategies for the promotion of broadband services and infrastructure, A Case Study on Nigeria.
9. Interview with CEO and CTO of Suburban Telecom.
15. World Bank Little Data Book on ICT 2012.
19. Ibid.

COUNTRY CASE STUDIES

- Jobberman addresses information asymmetry but matching employers and employees more efficiently than using personal networks
- Cashless Initiative Nigeria has pushed through private resistance to electronic payments, more than doubling the number of POS terminals
- The Nigerian Independent National Electoral Commission’s use of social media provided real time data to address violence and monitor elections
INTRODUCTION

Infrastructure: Senegal has a significant advantage on infrastructure thanks to a large number of international connections to sea cables. Sonatel holds dominant market position but, Internet access is inexpensive compared to nearby countries. Little infrastructure extends into second tier cities, even less to rural areas in the south and southwest.

Usage conditions: On a per capita basis Senegal should be well placed to absorb the positive impact of the Internet. Social networks have driven people online, access costs in the city are low, and demand from major telecoms has created a relatively large pool of software developers.

Activity and impact across sectors: There are many pilots across the agriculture, health, and SME sectors, but efforts are largely fragmented, and as a result, the Internet has had little sustainable impact compared to Kenya, Ghana, and Nigeria.

Role of government: Across nearly every sector, our interviewees said the government should provide more direction on the role of ICT, either by being the first mover and convener, or by setting a clear set of policies that would allow more action from the private sector. Governmental flux has diminished confidence in the ICT Ministry, which has seen 11 ministers in the past ten years.

CONTEXT

As the gateway to West Africa, Senegal is one of the most politically stable countries in the region. Of its 12.7 million people, 43% are below the age of 15. The capital, Dakar, is the most populous region of the country, home to more than one fifth of the population. French is the official language, and much of the foreign content accessed in Senegal comes from Europe. Wolof, the language of the dominant ethnic group, is also spoken throughout the country.

Senegal faces significant challenges in education, infrastructure and health care. According to the United Nations Development Program (UNDP), Senegal’s Human Development Index (HDI) ranking is above the average of countries in the low human development group, but below the average for Sub-Saharan Africa. More than half the population is illiterate and only three in five students complete primary school. Only two in five people have access to electricity, and lack of electricity is cited as a major constraint by 58% of firms and caused significant rioting in Dakar in 2011. There is fewer than one nurse or doctor per thousand people, and infant mortality is 47 per thousand births due to lack of access to healthcare in rural areas.

ICT SECTOR OVERVIEW

Senegal has made significant investments in the ICT sector and has been connected to the Internet since April 1996. Since liberalising the ICT sector to private investment in 2001, Senegal has regulated it via the Regulatory Agency for Telecommunications and Post (ARTP). ARTP answers to the President and is widely regarded as having regulatory power over the Ministry of Information and Communications. The Agence De l’Informatique De l’Etat (ADIE), which replaced the former Direction Informatique de l’Etat (DIE), provides the national government with ICT systems and tools to provide eGovernment services for citizens.
Senegal’s Internet engagement began early, with the 2002 National Strategy Paper for ICT Development broadly promoting e-governance and strengthening the domestic ICT industry. More recently, Senegal’s National Program of Good Governance (PNBG) and its Economic and Social Policy Paper (DPES) have highlighted ICT as a crosscutting sector that will enable the country to realize its development goals through 2015. The Accelerated Growth Strategy (SCA) envisions training 10,000 experts in ICT and online services, promoting initiatives to allow the sector to contribute up to 15 percent of national GDP and generating at least 240,000 jobs by 2015.

This goal is optimistic, given current IT illiteracy among users and government officials. Moreover, Senegal lacks a comprehensive strategy specifically for the ICT sector, with no government funds are explicitly dedicated to it. Bureaucracy and resistance are hindering ADIE’s current efforts to digitise all government ministries and entities. The Ministry of Communication, Telecommunications and Information Technology, for example, has yet to develop a website. Though ADIE is responsible for implementing ICT services in ministries, 80% of the government’s ICT spending is outside its control and the agency continually suffers from funding gaps.

Senegal needs additional investment in its physical infrastructure to improve access and achieve its ICT development goals. The country experiences a funding gap of more than US$36 million per year. Dakar has been the primary beneficiary of ICT improvements and access to date. Rural Senegal has been neglected. Proactive efforts must be made if the government is committed to extending access and improving the labor force’s ability to utilise ICT.

Senegal has also enacted laws and policies for the sector, but at the time of publication, there was little perceived enforcement. The following five laws were enacted in 2008 and govern access to information, preferential funding for Senegalese ICT companies, digital crime, e-commerce, encryption, and privacy: Orientation Law; Law on Cybercrime; Electronic Transactions Act; Data Encryption Act; Law on Personal Data.

MARKET STRUCTURE

Senegal began liberalizing its telecommunications sector in 1997 with the partial privatization of the national telephone operator, Sonatel, to Orange, formerly France Telecom. Though the number of major mobile phone operators has increased from one to three, Sonatel continues to control more than 60% of the market. By 2012, more than 8 million people of the 12.6 million Senegalese owned cell phones.

Senegal has also had significant access to bandwidth with connections to the ACE, Atlantis 2, GLO 1, Main One and SAT-3/WASC submarine fibre optic cables.

Internet penetration in Senegal reached 16% in 2011. Connection quality has improved over time, and telephony has also advanced significantly, from a fixed-line rental telecentre system toward near universal replacement by mobile phones.

1 Aminata Drame, Sonatel, presentation at the International Telecommunications Union Workshop on Apportionment of Revenues and International Internet Connectivity, Geneva, 2012.
2 World Bank World Development Indicators, 2010.
3 World Bank World Development Indicators, 2011.
4 Stratégie Nationale de Développement des TIC et à la Définition de la Vision NTIC du Sénégal.
5 World Bank, Senegal’s Infrastructure: A Continental Perspective, elibrary.worldbank.org/content/workingpaper/10.1596/1813-9450-5817
7 World Bank.
Dalberg

ANNEXURE 3: METHODOLOGY
Core and conditions for usage indexes

The “core” and “conditions for usage” indexes are a tool to assess factors enabling a country to derive economic and social benefits from the Internet. They were built upon three broad assumptions:

Infrastructure and use of the Internet are both important: Both physical and market infrastructure and actual use of the Internet are required for a well-functioning and impactful Internet economy. Both components are necessary, but not sufficient, conditions.

A multi-stakeholder approach is key: A healthy Internet economy encompasses society at large, including government, citizen and business use and contribution.

Stronger core and conditions for use will result in positive impact: All else equal, stronger statistics across core and conditions for usage dimensions yield greater impact. In other words, core and conditions for usage assess the ingredients necessary for the Internet to have a positive development impact.

The indexes measure a country’s readiness and potential to realize the benefits provided by the Internet rather than measuring the current, realized impact. Variables were chosen based on their importance to the development of an Internet economy, their reliability and common acceptance as useful indicators and their ability to be impacted by specific action of decision makers.

- The indexes are evaluated across two dimensions: core and conditions for usage. Each dimension has two key pillars of two sub-indexes each. The data used for the 2012 calculation in this report are the most recent available figures after 2009, while data used for the 2006 calculation are the earliest available figures between 2006-2009. Proxies were occasionally used for data not in existence during 2006-2009.

Scoring occurred in four stages. First, countries were ranked against each other along each variable. Each variable was then given equal weighting and individual variable rankings were averaged across each sub-index to obtain a specific sub-index ranking. Missing data was replaced by these sub-index rankings to avoid penalizing or rewarding countries for data availability. Each pillar’s score became the average of its sub-index rankings. Finally, Overall index scores were calculated as the sum a country’s score for each pillar.

**Figure 1: Structure of Core Index**

**Physical infrastructure**
An Internet economy relies on a strong national infrastructure—both general level and ICT specific.

**Business environment**
Non-physical aspects that are key to a well-functioning market environment. These aspects include regulatory and government interventions as well as other factors that could influence business conditions.

**Citizen demographics**
Extent to which characteristics exhibited by individuals in a society are conducive to Internet usage including demographics, skills, and consumer base characteristics.

**Stakeholder characteristics**
Measures the conditions necessary to establish an environment for Internet enables solutions to be developed.

**Core index**
The structure of an economy and that economy’s ability to incorporate ICT. A strong culture of innovation and a desire to use technology tools will allow for a more rapid and effective take-up of Internet activity.

- Share of population with electricity access (+)
- Share of population covered by a cellular network (+)
- Investment per cap in telecoms with private participation (+)
- GDP level, current US $ (+)
- GDP growth, % (+)
- Urban population, % of total (+)
- Total investment, % of GDP (+)
- Ease of starting a business ranking (-)
- Ease of accessing credit ranking (-)
- Intellectual property protection ranking (-)
- Press freedom index (-)
- Share of firms citing electricity as a major constraint (-)
- Share of firms identifying labour relations as major constraint (-)
- Corruption perceptions index (-)
- Extent of government web censorship (-)
- Secondary education enrollment, gross % (+)
- Tertiary education enrollment, gross % (+)
- Quality of education (1-7 best) (+)
- Literacy rate, adult % (+)
- Share of population 20-39 years old (+)
- % of population above national poverty line (+)
- Export firms, % of total (+)
- High technology exports, % of total manufacturing (+)
- Intensity of local competition ranking (-)
- State of economic cluster development ranking (-)
- Share of firms formally registered when they started operations in the country (+)
- Share of firms identifying an inadequately educated workforce as a major constraint (-)

(+) indicates higher values raise attractiveness
(-) indicates higher values lower attractiveness

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1 Sources: World Bank World Development Indicators; World Bank Little Data Book on ICT; World Bank African Development Indicators; IMF World Economic Outlook; World Bank Ease of Doing Business Survey; World Economic Forum Network Readiness Index; Reporters Without Borders, via World Intellectual Property Organisation (WIPO) Global Innovation Index; World Bank Enterprise Survey; Transparency International Corruption Index; World Wide Web Foundation Web Index; World Economic Forum Global Education Initiative; United Nations World Population Prospects; World Economic Forum Executive Opinion Survey.
**Figure 2: Structure of Conditions for Usage Index**

- **Availability**: Measures the extent to which a population (both citizens and businesses) is exposed to the necessary infrastructure to partake in the Internet economy.
  - Households with a computer, % (+)
  - Secure Internet servers per million people (+)
  - Mobile cellular subscriptions per 100 people (+)
  - International bandwidth (bit/s per Internet user (+)
  - Individuals using the internet, % of population (+)

- **Accessibility**: Measures how readily a population is able to access the available infrastructure, allowing them to connect to the internet.
  - Fixed broadband subscriptions, per 100 people (+)
  - Households with Internet access at home, % (+)
  - % of computers connected to the Internet (+)
  - Fixed broadband sub-basket, $/month (-)
  - Cheapest prepaid mobile product, USD (-)
  - Individuals using the internet, % of population (+)

- **Usage Index**: Measures the conditions necessary to ensure that Internet enabled solutions are used and poised to deliver large-scale impacts.
  - Number of video uploads on Youtube/mo, per 100 ppl (+)
  - Number of edits on Wikipedia/mo, per 100 ppl (+)
  - % of online population on Facebook (+)

- **Awareness**: Measures how aware a population is likely to be of the various ways in which the Internet can be used and contribute to their lives.
  - Individuals using the internet, % of population (+)
  - 30-day average of Speedtest download speed ranking (-)

- **Desire to use Internet infrastructure**: Measures how appealing the Internet is to a country's population both in terms of the overall user experience as well as the perception of relevance or benefit to use.
  - % of firms having their own website (+)
  - Individuals using the internet, % of population (+)

- **Attractiveness**: Measures how appealing the Internet is to a country's population both in terms of the overall user experience as well as the perception of relevance or benefit to use.
  - Individuals using the internet, % of population (+)

(+/-) indicates higher values raise attractiveness
(-) indicates higher values lower attractiveness

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2 Sources: World Bank Little Data Book on ICT; World Bank World Development Indicators; PanAfrican Research Agenda; Research ICT Africa Fair Mobile Price Index; WIPO Global Innovation Index; CheckFacebook Online Data Source; Ookla Download Speed Online Data Source; UN Public Administration Network; World Bank Enterprise Survey
Surveys

Surveys were conducted among businesses, organisations and institutions in Ghana, Nigeria, Senegal and Kenya. The survey was piloted in Ghana before being extended to the other countries. A total of 1,307 responses were collected between September and December 2012.

The survey evaluated how the Internet is impacting businesses, organisations and institutions. It contained three sets of questions: general profiling questions about the respondent, Internet use questions about how the Internet is used in the workplace and what would contribute to increased usage, and impact questions about how the Internet has positively contributed to the organisation's performance. A complete list of questions is available on request.

Outreach to businesses, organisations and institutions was undertaken by local researchers in each country. A target list of respondents was constructed using a random sample from each country's yellow pages. Surveys were administered to management level employees with expressed understanding of the extent of Internet use within the organisation.

An equal number of target contacts were generated for each of this report's seven socio-economic focus areas-3 and at least 20-30 responses were collected for each socio-economic area in each country. Surveys were conducted over the phone. Individual responses were checked for discrepancies and aggregated for analysis.

Landscape mapping

Dalberg catalogued 364 Internet-enabled organisations operating in Ghana, Kenya, Nigeria and Senegal between September and October 2012. Each organisation was classified within one of the seven socioeconomic areas. In a few special cases, such as for social networking site 2go or iRoko Partners in Nigeria, an eighth category that was reserved for companies that are obviously making significant impact in their countries but lay outside of the defined socioeconomic verticals. It represented six percent of the overall sample.

Each organisation was also classified into one or more impact areas. These included:

- **Information management**: Internet-enabled service that allow clients to manage internal information
- **Communications, awareness, marketing**: Use of the Internet to communicate with potential clients and offer information about a specific topic, product or service
- **Supply chain management**: Use of the Internet to manage a business’ supply chain
- **Service delivery**: Use of the Internet to directly sell a product or service to customers
- **R&D/Innovation**: Internet-enabled products or business models existing to improve research and development or the ecosystem for Internet related innovation
- **Training and workforce development**: Use of the Internet to directly train people
- **Financing**: Use of the Internet to expand access to financial and risk management products and services to otherwise underserved consumers
- **Leadership and governance**: Use of the Internet to promote stronger governance through engagement, communications, accountability or transparency of service delivery

The database also catalogues which countries the organisation worked in, whether its content was primarily local, global or both; whether it is for profit, not for profit or a hybrid organisation; and the year it was founded, as available.