SUMMARY

The **Transformational Use** *of* **Information** *and* **Communication Technologies** *in* **Africa**

eTransform **AFRICA**

eTransform Africa will be formally launched on 28 May 2012 at the Open Innovation Africa Summit in Nairobi, Kenya. Six sector and two thematic reports are already available online at www.eTransformAfrica.org, including more than 20 detailed case studies of ICT transformation in action in Africa. This overview presents the main messages arising from this body of research. It has been prepared for consideration by the African Union Ministers in charge of Communication and Information Technologies at their 2012 Summit in Khartoum, Sudan, 2–6 September.

The **Transformational Use** *of* **Information** *and* **Communication Technologies** *in* **Africa**

The World Bank
and the **African Development Bank**,
with the support of the **African Union**

eTransform AFRICA

Information and communication technologies (ICTs) have the potential to transform business and government in Africa, driving entrepreneurship, innovation and economic growth. This new flagship report – eTransform Africa – produced by the World Bank and the African Development Bank, with the support of the African Union, identifies best practice in the use of ICTs in key sectors of the African economy. Under the theme "Transformation-Ready", the growing contribution of ICTs to Agriculture, Climate Change Adaptation, Education, Financial Services, Government Services and Health is explored. In addition, the report highlights the role of ICTs in enhancing African regional trade and integration as well as the need to build a competitive ICT industry to boost innovation, job creation and the export potential of African companies.

The eTransform Africa study grew out of the African Union Summit of ICT Ministers, held in Addis Ababa in January 2010. At that meeting, Ministers expressed their belief in the transformational power of ICTs and their view that Africa was poised for a new era of growth that would take advantage of the platform laid by investment in new networks over the previous decade. In the 2000s, the focus had been on connectivity, bringing more and more of Africa's citizens into the information society and building ever-faster connections to the rest of the world. Analytical research had indicated the boost to economic and social development that could come from network investment. Over the previous 25 years, a 10 per cent increase in the penetration rate of mobile phones had been associated with a 0.8 per cent boost in GDP per capita in developing countries, while the same increase in broadband networks could add a further 1.4 per cent to general economic growth (World Bank, 2009). In the 2010s, the focus should logically shift to transformation as the penetration of ICTs deepens in the core sectors of the African economy (World Bank, forthcoming).

While Ministers were hopeful of transformational change, they also expressed their frustration at the lack of hard evidence of the links between investment in ICTs and sectoral development. There were plenty of pilot programmes but few of these had reached scale or shown wide-reaching impact. There was a need to prioritize investment in using ICTs for sectoral development, but which sectors should be first in the queue? Which business models were proving successful and which pilot programmes represented best practice that could be replicated and scaled up?

This report attempts to answer some of those questions. For the first time, detailed and systematic studies have been commissioned to show how ICTs are changing the landscape in different sectors, both in terms of worldwide best practice and in specific experience of African economies. The eight sectoral and cross-cutting reports were commissioned following an international tendering process that attracted some of the best firms and individuals globally. The study was directed by a project team headed jointly by the African Development Bank and the World Bank. The work programme kicked off with a launch meeting in Nairobi, in February 2011, and continued with a review meeting in Johannesburg in June 2011. As the reports and case studies have been elaborated, they have been subjected to expert scrutiny both by the project team and by the wider public, through the www.eTransformAfrica.org website and other blogs. This philosophy of "early exposure" of results has undoubtedly strengthened the final outputs through a rigorous process of review and ground-truthing.

The involvement in this study of the two major investors in the African ICT sector – the African Development Bank and the World Bank Group – together with the African Union is significant because it sets out a new strategy for future investment, in close coordination with client governments, the private sector and other stakeholders. Although ICT infrastructure investment will continue to be important (Independent Evaluation Group, 2011), increasingly future investment programmes will be geared to the transformational use of ICTs. The outcomes will be measured not in higher penetration rates but rather in outcomes such as poverty reduction, creation of jobs and enterprises, increase in agricultural productivity, better access to healthcare, clean water, education and so on. Thus this report marks not so much the end of a study but rather the start of a new phase of growth. The ICT investment programmes that arise from this new growth phase will be evidence-based, demand driven and stakeholder-led.

7% ICT's contribution to Africa's GDP

US$56 billion from the private sector in telecom

+ 615,000 km of national backbone networks

648.4 million of mobile subscriptions in **2011**

US$150 billion Projected ICT market by **2016**

x20 Growth of internet bandwidth in **2008–2012**

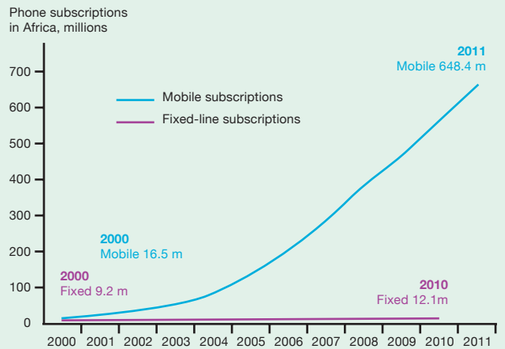
The transformational power of ICTs

The mobile phone has revolutionized communications in Africa.

Africa's "mobile decade" has driven its economic growth.

Africa's mobile revolution

Mobile phone and fixed line subscriptions in Africa, 2000–2011.

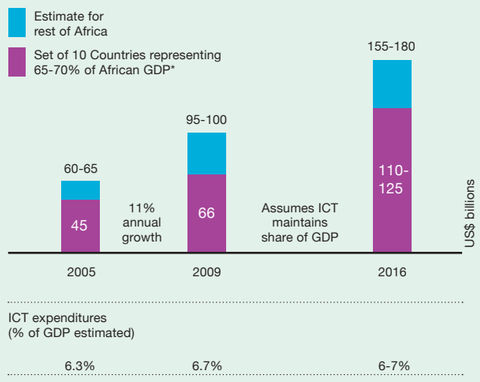


Source: World Bank, Wireless Intelligence and ITU.

The explosive growth of mobile phones in Africa over the past decade demonstrates the appetite for change across the continent. In the year 2000, there were fewer than 20 million fixed-line phones across Africa, a number that had accumulated slowly over a century, and a waiting list of a further 3.5 million. With a penetration rate of just over 2 per cent, phones were to be found only in offices and the richest households. But the coming of the mobile phone has transformed communications access. By 2012, there were more than 500 million mobile subscriptions in Africa, more than in the US or the European Union, making Africa the fastest growing region in the world. Few imagined that such demand existed, let alone that it could be afforded. In some African countries, more people have access to a mobile phone than to clean water, a bank account or even electricity.

Foreign Direct Investment is booming and Africa is now a much easier place to do business, thanks to its much-improved connectivity. ICTs directly contribute around 7 per cent of Africa's GDP, which is higher than the global average. That's because, in Africa, mobile phones give access to services that are available in traditional forms in more developed countries, such as financial credit, newspapers, games and entertainment. So the value of a mobile phone is higher in Africa than elsewhere. We are now seeing the rapid development of mobile broadband with smartphones and affordable tablets across Africa. This will bring even greater social and economic impacts over the next decade.

Projected ICT expenditures in Africa to 2016



* Countries in sample set are Algeria, Cameroon, Egypt, Kenya, Morocco, Nigeria, Senegal, South Africa, Tunisia.

Note: ICT expenditures include computer hardware and computer software, computer services (information technology consulting, computer and network systems integration, Web hosting, data processing services, and other services); and communications services (voice and data communications services) and wired and wireless communications equipment.

Source: World Bank Databank - African Development Indicators, ITU Measuring the Information Society, 2011, consultant analysis.

ICTs can empower the lives of Africans and are driving entrepreneurship, innovation and income growth.

The effect of ICTs on the African economy is impressive, but it is the way they are changing the lives of ordinary Africans that is genuinely transformational. The eTransform Africa report details how mobile phones are being used to provide financial services in Kenya (M-PESA) and agricultural market information services in Ghana (Esoko), how electronic filing of taxes in South Africa or sensor-based irrigation systems in Egypt are revolutionizing traditional practices, and how Africans are facing up to new challenges like climate change or HIV/AIDS armed with new tools. Furthermore, the wider use of ICTs in government is bringing more transparency and openness, for instance through Kenya's Open Data initiative or the use of Twitter and Facebook to coordinate protests and inform international opinion as part of the Arab Spring. This growing social and economic dependence on ICTs brings new challenges, not least the need for infrastructure to become more robust and resilient, and for services to become more reliable. Issues of cybersecurity and data protection will also come to the fore as security and trust become increasingly important.

It's not about the phone or the computer; it's about the applications and the information they deliver.

ICTs now offer major opportunities to advance human development – from providing basic access to education or health information to making cash payments and stimulating citizen involvement in the democratic process. Phones, computers and websites are powerful tools but it is individuals, communities and firms that are driving change. Mobile phones and the internet are helping to release the dynamism of African society. State-owned monopoly telephone companies were, for too long, a barrier to African ingenuity -- due to waiting lists, high prices and unreliable services -- but now a thriving local ICT sector is part of the solution, not the problem. In many of Africa's largest cities, smartphones can now be obtained for under US$100. They have the equivalent computer power of a PC that would have cost over US$3,000 a decade earlier. With cheap data packages and free WiFi, smartphones can be used to start a business, or to get a job in Africa's growing information sector.

ICTs can ease cross-border communications, financial transactions, and sharing of data and information and have a catalytic impact upon regional integration and trade facilitation.

Until recently it was cheaper to call America or Europe from Africa than a neighbouring country. And Africa's entire internet connectivity was less than that of the tiny country of Luxembourg. Such disparities hindered cross-border regional trade. But this has changed with some 68,000 km of submarine cable and over 615,000 km of national backbone networks laid in the past few years. The internet bandwidth available to Africa's one billion citizens grew 20-fold between 2008 and 2012. These electronic highways will provide the trading routes of the future. Africa no longer needs to look beyond its shores for trading partners and the electronic links to make this happen are slowly but surely being put in place.

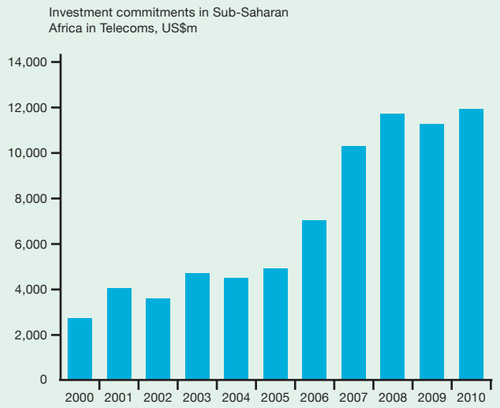
The deployment of ICTs and the development of applications must be rooted in the realities of local circumstance and diversity.

Despite the optimism caused by Africa's ICT revolution, there is no one-size-fits-all model, and services that prove popular in one country may fail elsewhere. National ICT strategies must be developed locally, building upon consultative stakeholder processes and adapted to local circumstances. The private sector will drive the investment, and provided more than US$56 billion in telecom infrastructure investment in the decade to 2008. But this may not be enough to ensure competitive markets, or to reach rural areas. Public Private Partnerships (PPPs), such as the Burundi Backbone System consortium, can help. But there are still whole countries, such as the newly independent South Sudan,

that are connected to the outside world only through slow and expensive satellite links.

ICT driving Africa's renaissance

Private investment in telecoms, 2000–2010.



Source: World Bank, World Development Indicators, PPI Database.

Governments have an important role to play, in creating an enabling environment and in acting as a lead client for large-scale ICT-based programmes.

Governments may participate directly in infrastructure investment, as the government of Botswana did when creating an alternative fibre route to the coast via Nambia. But their larger role lies in creating an enabling environment – issuing licenses, making available rights of way, auctioning spectrum or mandating infrastructure sharing and interconnection – that allows a liberalized market to thrive. Beyond that, governments can serve as a leading customer for faster networks, and can migrate their own services and data online. When the Kenyan government allowed exam results to go online, it provided a major demand driver for mobile broadband, and stimulated further investment in that country's networks. Similarly, in Ethiopia, government and donor sponsorship of eHealth initiatives is helping to finance network investment.

Effective use of ICTs will require cross-sectoral collaboration and a multi-stakeholder approach, based on open data and open innovation.

Valuable and sustainable ICT applications are most likely to develop within an environment that encourages experimentation and collaboration between technologists, entrepreneurs and development practitioners. Often, stakeholders may combine their interests in communal projects, such as the creation of the Cape Town Internet exchange. The recent flowering of local ICT development clusters (LIDs) – such as iHub and NaiLab in Kenya, Hive CoLab and AppLab in Uganda, Activspaces in Cameroon, BantaLabs in Senegal or infoDev's mLabs in Kenya and South Africa – is helping to create new spaces for collaboration, training, applications and content development, and for pre-incubation of firms.

Africa is still at the beginning of its growth curve and, to date, most ICT applications have been pilot programmes. Now is the time for rigorous evaluation, replication and scaling up of best practice.

The research carried out for this study has highlighted a number of success stories and has shown examples of programmes that could be scaled up and replicated elsewhere. But there is a lack of systematic monitoring of outcomes, and cost-benefit analyses of investments are rare. Nevertheless, the evidence that has been marshaled in these studies, the most comprehensive carried out to date, does point to the potential for effective rollout and a period of growth ahead. Africa was once an ICT laggard, but is now becoming an ICT leader. Innovations that began in Africa – like dual SIM card mobile phones, or using mobile phones for remittance payments – are now spreading across the continent and beyond.

Local ICT Development Clusters

Located on the 4th floor of a modern office building in Nairobi, where a sunny balcony gives views over the bustling city, Kenya's *iHub provides a space where young entrepreneurs can network, while joining focus groups discussions, receiving mentorship, and chatting to venture capital investors. Apart from having the best coffee shop in town, its other big attraction to the nation's digerati is that it offers a fast broadband connection, which is the quickest way to set up a business in Kenya. Established in March 2010 by Erik Hersman, a renowned blogger, TED fellow and entrepreneur, it now has over 2,000 members benefitting from the co-working space. It's not quite a business incubator, though there are two of those in the same building, with Nailab next door and *info*Dev's m:Lab East Africa one floor below. Rather, it might be described as a "pre-incubator" where good ideas come to take shape and be turned into commercial prospects. The young technologists who crowd into the place are able to get the necessary support to develop their ideas into marketable products.

*iHub is part of a much larger technology movement in Kenya and in Africa. Two important predecessor organizations that helped shape *iHub are Skunkworks, an informal grouping of mobile applications developers, and Ushahidi, a non-profit software company co-founded by Erik Hersman, that develops free and open source software for information collection, visualization and crisis mapping. Ushahidi was born in the aftermath of the disputed elections in early 2008 and has subsequently been used in over ten countries, primarily to map critical information to aid disaster recovery efforts such as in the Haiti earthquake in 2010 and the Japan earthquake in 2011. *iHub is now, in turn, giving birth to other spin-offs, such as *iHub research, and Akirachix, both female-run start-ups.

*iHub's success has been widely followed elsewhere. Africa continues to see the emergence of technology labs in Kampala (Hive CoLab), Dar es Salaam (Kinu), Dakar (Bantalabs), Thswane (mLab Southern Africa) and Douala (ActiveSpaces) as well as new initiatives that are coming online in Accra and Lagos. The labs serve as an accessible platform for bringing together technologists, investors, tech companies and hackers in the area. Each lab shares a focus on young entrepreneurs, web and mobile-phone programmers and designers.

The technology movement in Africa is being driven by the youth who, through these labs, have the means and foresight to apply new and accessible technologies to solve immediate problems and find useful solutions for common problems. Many of the youth are in tune with the problems and challenges that are faced in the communities in which they live. The labs conduct workshops among themselves to share experiences and brainstorm ideas, and use digital technology to create tech communities that have no borders. This approach to nurturing technology is quite different to the top-down approach that had been tried in the early 2000s of building science parks, or government run initiatives to promote business process outsourcing. The difference this time is that these initiatives are generally bottom-up and community driven. They may receive the blessing of government but are not dependent upon it for providing opportunities for training and capacity building.

Source: Authors, and adapted from http://ihub.co.ke/pages/about.php and http://afrilabs.com/about (both accessed 20/4/2012) and White, 2011.

**iHub in Nairobi, Kenya.*

ICT data table

		MOBILE								BROADBAND		
		Total Mobile Subscriptions		Compound Annual Growth Rate (CAGR) 2005–11 (in %)	Mobile Subscriptions (per 100 people)		Mobile cellular prepaid tariff (US$ per month)		Mobile cellular prepaid tariff (% of GNI per capita)		Fixed-broadband Internet subscribers	Mobile broadband subscriptions	Total broadband subscriptions
		2005	2011		2005	2011	2005	2010	2005	2010	2010	2010	2010
✳	ALGERIA	13,661,355	28,229,835	15.6%	41.54	78.46	17.48	12.49	7.71	3.42	900,000	- -	900,000
	ANGOLA	1,611,118	11,443,293	48.0%	9.77	58.33	- -	19.24	- -	5.82	20,000	873,216	893,216
	BENIN	596,267	7,074,914	85.6%	7.81	79.94	22.35	13.04	47.05	20.00	3,569	- -	3,569
	BOTSWANA	563,782	2,933,000	39.1%	30.06	144.43	- -	13.16	- -	2.35	11,978	116,817	128,795
	BURKINA FASO	633,554	7,246,000	62.8%	4.46	42.70	23.66	21.20	72.81	46.25	14,193	- -	14,193
	BURUNDI	153,000	2,149,212	69.6%	2.11	25.06	- -	- -	- -	- -	200	0	200
	CAMEROON	2,252,508	10,623,000	36.4%	12.83	53.03	30.98	20.07	39.98	20.10	1,000	- -	1,000
	CAPE VERDE	81,721	371,871	46.1%	17.28	74.97	34.48	41.64	- -	- -	15,971	- -	15,971
	CENTRAL AFRICAN REPUBLIC	100,000	736,000	64.7%	2.49	16.72	- -	- -	- -	- -	- -	- -	0
	CHAD	210,000	3,968,922	80.0%	2.15	34.44	- -	15.35	- -	29.81	150	- -	150
	COMOROS	15,523	244,463	73.6%	2.41	32.45	- -	24.25	- -	- -	150	- -	150
	CONGO, DEM. REP.	2,746,094	9,095,000	34.9%	4.78	13.79	- -	- -	- -	- -	8,673	- -	8,673
	CONGO, REP.	558,192	3,885,000	47.4%	15.80	93.85	- -	- -	- -	- -	124	0	124
	CÔTE D'IVOIRE	2,349,439	17,041,000	48.6%	13.04	84.56	45.03	13.61	62.11	14.07	7,900	- -	7,900
✳	EGYPT, ARAB REP.	12,828,000	80,389,817	44.3%	17.29	97.40	11.12	7.02	10.68	3.47	1,449,904	4,988,001	6,437,905
	EQUATORIAL GUINEA	96,900	403,000	42.8%	15.94	57.57	- -	- -	- -	- -	1,186	- -	1,186
	ERITREA	40,438	185,275	46.3%	0.90	3.53	- -	- -	- -	- -	118	- -	118
	ETHIOPIA	410,630	10,526,190	91.3%	0.55	12.42	- -	4.10	- -	12.62	4,107	442,997	447,104
	GABON	736,690	2,533,000	28.0%	53.74	165.10	- -	- -	- -	- -	4,082	- -	4,082
	GAMBIA, THE	247,478	1,478,347	56.3%	16.46	85.50	- -	- -	- -	- -	350	9,229	9,579
	GHANA	2,874,560	21,165,843	49.1%	13.28	84.78	16.18	7.37	42.21	7.10	50,082	201,000	251,082
	GUINEA	189,000	4,731,000	90.4%	2.09	46.28	- -	4.13	- -	12.30	500	- -	500
	GUINEA-BISSAU	98,825	869,000	54.5%	7.23	56.17	- -	- -	- -	- -	- -	- -	0
	KENYA	5,329,000	28,080,771	39.4%	14.96	67.49	21.07	10.78	48.63	16.00	4,155	1,405,814	1,409,969
	LESOTHO	249,786	961,000	40.1%	12.09	44.27	- -	24.14	- -	26.53	400	62,942	63,342
	LIBERIA	160,000	1,677,000	60.0%	5.03	40.62	- -	- -	- -	- -	186	- -	186
✳	LIBYA	2,000,000	10,900,000	52.8%	34.66	171.52	- -	- -	- -	- -	72,800	2,714,269	2,787,069
	MADAGASCAR	510,269	7,711,721	97.2%	2.85	37.23	21.82	15.43	87.27	42.98	5,359	157,190	162,549
	MALAWI	421,163	4,050,000	57.3%	3.28	26.33	- -	21.24	- -	77.09	5,120	23,189	28,309
	MALI	761,986	10,940,000	70.4%	5.78	69.07	33.90	14.44	104.30	28.80	2,314	99,924	102,238
	MAURITANIA	745,615	2,961,000	31.8%	24.47	83.61	- -	14.62	- -	17.52	6,624	- -	6,624
	MAURITIUS	656,828	1,190,900	16.0%	52.83	92.97	6.57	6.84	1.47	1.04	79,227	194,360	273,587
	MAYOTTE	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	0
✳	MOROCCO	12,392,805	36,554,000	24.2%	40.78	113.27	32.99	33.10	20.20	13.94	498,682	3,321,325	3,820,007
	MOZAMBIQUE	1,503,943	5,947,000	41.0%	7.24	25.43	- -	16.95	- -	46.36	14,633	347,097	361,730
	NAMIBIA	448,857	2,549,392	41.5%	21.58	109.70	26.30	17.01	9.56	4.52	9,640	135,066	144,706
	NIGER	323,853	3,664,000	83.4%	2.49	23.62	27.15	20.81	125.32	67.46	3,707	- -	3,707
	NIGERIA	18,587,000	95,167,308	38.6%	13.29	58.58	25.76	13.74	49.06	13.37	99,108	4,783,403	4,882,511
	RWANDA	222,978	4,304,532	80.8%	2.42	39.34	21.82	13.92	96.98	32.08	2,640	420,593	423,233
	SÃO TOMÉ AND PRINCIPE	11,953	102,700	71.2%	7.83	62.24	- -	12.72	- -	- -	582	- -	582
	SENEGAL	1,730,106	9,384,300	40.2%	15.91	73.50	25.83	12.68	38.74	14.11	78,647	232,309	310,956
	SEYCHELLES	58,806	126,635	21.1%	70.94	145.56	- -	15.90	- -	- -	6,278	4,938	11,216
	SIERRA LEONE	- -	2,000,000	- -	- -	34.09	15.84	- -	- -	- -	- -	5,749	5,749
	SOMALIA	500,000	3,236,332	45.3%	5.98	33.86	- -	- -	- -	- -	- -	- -	0
	SOUTH AFRICA	33,959,958	64,613,000	13.7%	71.95	127.73	24.68	23.26	6.11	4.59	743,000	8,097,586	8,840,586
	*SUDAN	1,827,940	22,517,000	65.2%	4.76	50.45	9.00	- -	- -	- -	164,500	2,027,225	2,191,725
	SWAZILAND	200,000	834,000	33.1%	19.66	78.11	- -	24.17	14,16	9.91	1,626	- -	1,626
	TANZANIA	2,964,000	25,666,455	54.0%	7.63	55.53	17.01	9.69	52.35	21.56	3,150	1,032,697	1,035,847
	TOGO	433,635	2,452,433	54.2%	8.02	40.68	29.29	19.90	103.37	48.73	3,852	- -	3,852
✳	TUNISIA	5,680,726	11,300,401	14.7%	56.64	105.87	11.49	10.00	4.31	2.88	481,810	109,611	591,421
	UGANDA	1,315,300	14,676,505	62.0%	4.63	42.53	14.41	12.20	57.63	29.28	54,804	239,628	294,432
	ZAMBIA	949,559	7,308,000	50.4%	8.28	54.23	21.23	16.85	50.95	18.95	10,267	- -	10,267
	ZIMBABWE	647,110	7,500,000	84.5%	5.15	59.66	6.00	20.49	16.37	53.48	33,000	433,312	466,312
	NORTH AFRICA SUB-TOTAL	46,562,886	167,374,053		30.38	99.69	14.49	11.25	9.20	3.45	3,403,196	11,133,206	14,536,402
	SUB-SAHARAN AFRICA SUB-TOTAL	91,085,364	448,325,314		12.14	57.10	22.09	14.98	50.01	19.48	1,477,152	21,346,281	22,823,433
	AFRICA TOTAL	137,648,250	615,699,367		15.24	59.26	21.82	14.53	47.84	16.76	4,880,348	32,479,487	37,359,835

Notes

✳ North African countries

2010 data is in white

* Data for 2005 and 2010 refer to the former country of Sudan before the independence of South Sudan in July 2011.

Mobile-cellular telephone subscriptions refers to the number of subscriptions to a public mobile-telephone service.

Mobile-cellular prepaid tariff refers to the price of a standard basket of mobile monthly usage for 30 outgoing calls per month (on-net, off-net, to a fixed line and for peak and off-peak times) in predetermined ratios, plus 100 SMS messages. It is based on the 2009 methodology of the OECD low-user basket.

Fixed broadband subscriptions refers to subscriptions to high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s.

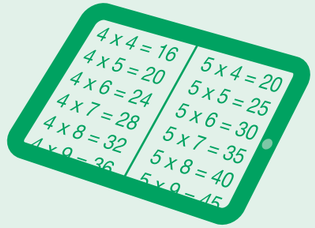
Mobile broadband subscriptions are the sum of the number of subscriptions using the following technologies: CDMA2000 1xEV-DO, WCDMA, TD-SCDMA, LTE and mobile WiMAX.

Source: ITU World Telecommunication/ICT Indicators Database, ictData.org, Wireless Intelligence, and World Bank.

Lessons from the sectoral studies

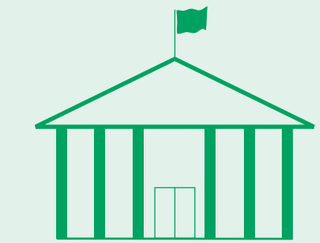
A study on the **Agriculture** sector was carried out by Deloitte and contains case study analysis of the use of RFID tags for tracking livestock in Botswana, and ICT sensor networks used in water management for irrigation in Egypt. These examples show how ICT can help address some of the challenges facing agriculture and food security in Africa, such as inadequate access to markets and unfavorable market conditions, weak infrastructure, high production and transport costs, natural disasters, environmental degradation and loss of biodiversity. A common information system/platform for stakeholders – businesses, farmers, researchers and government – such as DrumNet (Kenya) has been shown to improve efficiency by minimizing the duplication of data, ensuring consistency, improving integrity of data.

The use of ICTs in adapting to **Climate Change** was studied by the International Institute for Sustainable Development (IISD), with country case studies of Malawi, Senegal and Uganda. Africa is especially vulnerable to the impacts of climate change because its climate is likely to be more severely affected than other regions, because its major economic sectors are climate sensitive and because low levels of general economic development and other stress factors, such as conflict and disease, constrain adaptive capacity. African countries are preparing for and responding to the potential consequences of climate change by building their understanding of climate science, assessing their vulnerability to projected impacts, identifying priorities for adaptation, developing plans and strategies, and implementing targeted adaptation measures. ICTs could play an important role in support of these efforts, although there is still much to learn.



The **Education** sector was examined by *ict* Development Associates, with a focus on South Africa and Uganda. For a knowledge society to be realized, supported and developed, education and innovation should be viewed as interrelated drivers for socio-economic development, in a context where ICT is the enabler. A critical element concerns the devices through which educators and students access learning materials and collaboration platforms. Connectivity is also an important aspect of accessing learning resources. This calls for continued focus on the competitive supply of access to broadband networks using suitable technologies (wired and wireless). Fully integrating technology into teaching and learning requires well-qualified educators, with a clear focus on both equipping teachers with ICT literacy skills and showing teachers how to use these skills to plan lessons and use technology for teaching and learning.

Vital Wave Consulting analyzed the **Financial Services** sector, including country case studies of Gabon and Kenya. They conclude that mobile banking has reached a tipping point in Africa and now is the time for policy makers to act boldly. ICT and innovative business models have helped widen financial inclusion, most visibly case in Kenya, where active bank accounts have grown fourfold since 2007 aided by some 17 million M-PESA mobile money accounts. Governments have a key role to play in encouraging investment and in enabling effective regulation, in consultation with central banks and the private sector, including commercial banks and mobile money service providers. Governments need to coordinate with the Regional Economic Communities (RECs) in support of regional integration by introducing favorable regulations to allow mobile operators and other non-bank third parties to offer cross border mobile financial services.



The issue of **Modernizing Government through ICT** was tackled by Deloitte, with case studies of integrated financial management systems in Malawi and electronic tax filing in South Africa. Clearly ICTs are fundamentally changing the way in which citizens and businesses interact with government representatives and other agents of the state. The associated high expectations, particularly regarding the speed and flexibility with which public service providers can respond to individual requests, provide feedback on programmes and expenditure and handle national crises, are extremely challenging. Attention to how governments communicate should not overshadow the importance of the accuracy, completeness and relevance of what they communicate. A balance is needed between the citizen-facing aspects as well as the underlying efficiency and effectiveness of back-office systems. Hence, the delivery tiers of e- and m-Government are key but depend on the design, development and implementation of underlying ICT systems. Governments should recognize the power of social media and exploit it to their advantage, in particular to reinforce democratic processes, drive efficiency, foster innovation, empower public sector workers and expose corruption. Establishment of accurate, effective and efficient national identification systems, incorporating technology that reduces fraud and identity theft, was found to be one of the key building blocks for an effective government service delivery.

The **Health** sector study, carried out by Vital Wave Consulting, includes country case studies of Ethiopia and Mali. Health trends in Africa are generally positive but there is need for significant improvements. The pre-emptive use of ICT could act as a "game-changer" in helping to achieve the Millennium Development Goals (MDGs). With the impact that mobile-based ICT has already made for consumer communication and transactions, ICTs could be used to enable and simplify consumer and institutional healthcare service delivery funded by out-of-pocket and insurance transactions. Supply chain issues that also impede procurement and delivery of equipment and medical supplies could

be addressed by a mobile supply chain management and equipment tracking system in which mobile devices (phones, PDAs, tablets, laptops) are used for data collection and monitoring. ICTs can also help in outreach to rural areas, and by providing communication between rural healthcare extension workers and trained nurses and doctors in peri-urban facilities as exemplified by the IKON teleradiology program in Mali.

The cross-cutting study of **regional trade and integration** was carried out by *ict* Development Associates, and includes case studies of Botswana, Kenya and Senegal as well as thematic case studies of ICT use in governance, logistics and cross-border information exchange mechanisms. Africa's trade performance is weak compared with other world regions and within-Africa trade accounts for only 10% of total African trade. This suggests a missed opportunity for economic growth. The RECs and International Financial Institutions (IFIs) will need to work with other stakeholders to exploit ICTs in trade facilitation progressively over time.

Finally, a second cross-cutting study on **ICT competitiveness** was carried out by Excelsior with TNO, with country case studies of Kenya, Morocco and Nigeria. These countries are embracing the use of ICTs in novel ways to improve the social and economic opportunities available to firms and citizens. Provided the African ICT market continues its impressive double-digit growth, the market could be worth more than US$150 billion by 2016.

MXit, home-grown African social networking

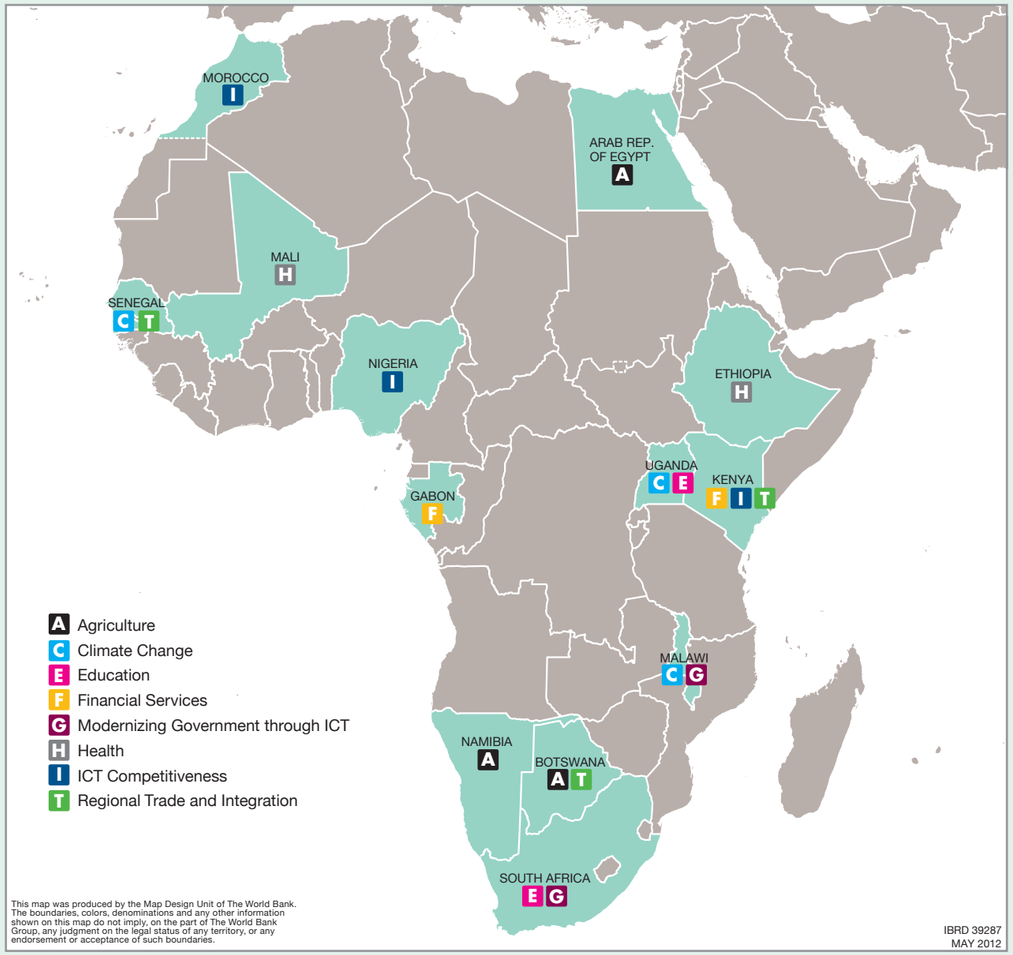
MXit, a South African social network, has become the premier social network in its home country and has expanded to reach more than 30 million users across Africa and beyond with 40,000 new users joining every day. Overall, MXit has 50 million users registered in more than 120 countries.

In the first half of 2011, MXit registered 24 million users just in Sub-Saharan Africa compared to less than 19 million for Facebook, making MXit the biggest social media network in Sub-Saharan Africa. Success has been enhanced by the high level of activity of its users compared to other social networks, with an average MXit user spending 45 hours per month on the site.

Source: www.mxit.com and newspaper reports.

ICT putting Africa on the map

Infographic map of the case studies covered in the eTransform Africa studies.



Of course, challenges remain. The continent largely lags behind the rest of the world in terms of ICT readiness and Africa has made slower progress in the past two years when compared to other regions. The Arab Spring has caused a short-term decline in inward FDI in the north of the continent. Pricing of ICT services, especially broadband, continues to be higher than other regions. Furthermore, the growing trend towards taxing incoming international calls suggests a reversion to the former view of the ICT sector as a cash cow.

The challenge for the next decade is to build on the mobile success story and complete the transformation. This will require reducing the cost of access for mobile broadband, supporting government private-sector collaboration, improving the eCommerce environment, enhancing ICT labor market skills, encouraging innovative business models that drive employment, such as microwork and business process outsourcing, and creating spaces that support ICT entrepreneurship, such as ICT incubators, and local ICT development clusters.

Africa was once an ICT laggard, but is now becoming an ICT leader. In virtually every area of ICT – mobile,11 broadband, international bandwidth, PC penetration – Africa is closing the gap with the rest of the world and in some areas, like mobile financial services, it is setting the pace. The studies in this report document a huge amount of local-level innovation, both in adapting applications developed in the rest of the world to African circumstances and in developing new home-grown applications. But there is insufficient south–south learning. It remains the case that African leaders are more likely to look outside their continent for role models than to look at the successes happening next door.

Ironically, south–south learning is already happening in Africa, but not so much among its leaders as among its young people. Social networks, like Twitter, Facebook and Africa's home-grown MXit provide a platform for informal learning to take place in an environment of fun and experimentation. It is a commonplace to say that Africa's greatest strength is its youth, but in this case it is really true. As the generation of Africans that have grown up with mobile phones and social media enter the labour market and government, they will bring with them the habits of information sharing that they have grown up with. That will be a real eTransformation.

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