TECHNOLOGY COMMERCIALIZATION AND OPPORTUNITIES FOR GLOBAL COOPERATION

David Otwoma, PhD
Chief Science Secretary, National Commission for Science and Technology (NACOSTI) &

Chairman, Eastern Africa Association of Radiation Protection (EAARP) Nairobi, Kenya
http://eaarp.org/

Brief on NACOSTI's activities

- *Policy Development*

- *Capacity Development*

- *Collaborations and Partnerships*

- *Information Exchange*

- *Application of Research Permit*

Country Profile of Kenya

	DESCRIPTION	Unit	2011	2012	2013	2014	2015*
1	Population … … … … … … … … … … … … … … …	(Million)	39.5	40.7	41.8	43.0	44.2
2	Growth of GDP at Constant Prices … … … … … …	(Per cent)	6.1	4.6	5.7	5.3	5.6
3	GDP at Market Prices : … … … … … … … … … … …	(KSh Mn)	3,725,918.4	4,261,150.7	4,745,439.2	5,398,020.7	6,224,369.9
25	Mobile Subscriptions … … … …… … … … … … … …	('000) No.	26,980.8	30,482.8	31,309.0	33,632.6	37,716.0
26	Estimated Internet Users … … … … … … … … … .	('000) No.	12,538.0	14,032.4	21,273.7	26,163.6	35,550.0
27	Wage employment … … … … … … … … … … … .	('000) No.	2,084.1	2,155.8	2,283.1	2,370.2	2,478.0
28	Education-primary enrolment … … … … … … … ..	('000) No.	9,561.1	9,757.6	9,857.6	9,951.0	10,090.8
29	Education-secondary enrolment … … … … … … ..	('000) No.	1,767.7	1914.8	2,104.3	2,309.9	2,559.0
30	Education-University enrolment … … … … … … .	('000) No.	218.6	251.2	361.4	443.8	507.7
31	Education-other post secondary enrolment (TIVET+TTC) … … … … …	('000) No.	101.6	127.7	148.0	148.1	155.2

GDP of Kenya vs Sub Saharan Africa

GDP (PPP) per capita (int'l $), 1990–2014
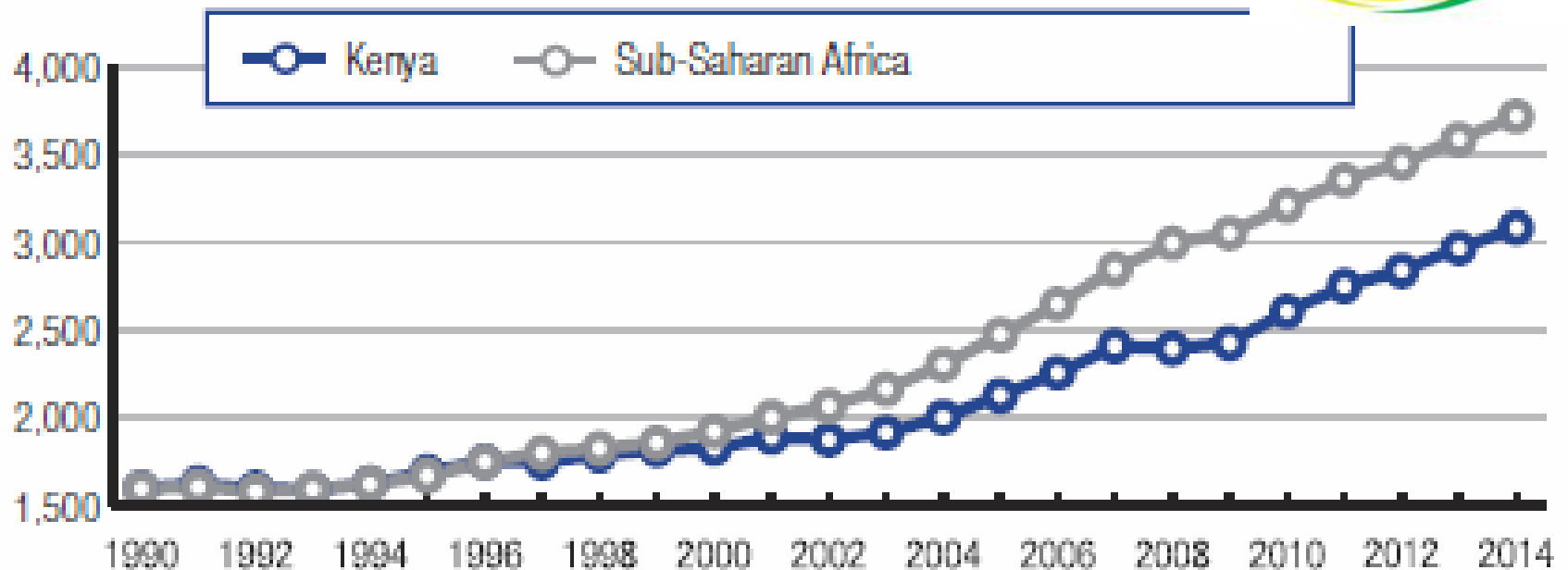
Percentage Contribution to GDP

Industry	Percentage Contribution to GDP				
	2011	2012	2013[+]	2014[+]	2015[*]
Agriculture, forestry and fishing… … … … … … … … … … … … … .	26.3	26.1	26.4	27.3	30.0
Growing of crops… … … … … … … … … … … … … … … … …	18.4	18.0	18.4	19.6	22.4
Animal production … … … … … … … … . … … … … … … … … .	5.4	5.5	5.2	5.1	5.0
Information and communication … … … … … … … … … … … …	1.6	1.6	1.4	1.2	0.9
Telecommunications… … … … … … … … … … … … … … … … .	0.8	0.8	0.7	0.5	0.3
Publishing, broadcasting, other IT and information activities …	0.9	0.8	0.8	0.7	0.6
Financial and insurance activities … … … … … … … … … … … …	5.7	5.9	6.6	6.8	6.9
Financial activities … … … … … … … … … … … … … … … … .	4.9	4.8	5.1	4.8	5.3
Insurance activities … … … … … … … … … … … … … … … …	0.8	1.1	1.5	2.0	1.6
Real estate … … … … … … … … … … … … … … … … … … … ..	8.1	8.0	7.9	7.7	7.6
Professional, scientific and technical activities … … … … … … …	1.0	1.0	1.0	1.0	0.9

Percentage Changes in Growth

Industry	Percentage Changes (growth)				
	2011	2012	2013[+]	2014[+]	2015[*]
Agriculture, forestry and fishing… … … … … … … … … … … …	9.2	14.8	21.5	14.7	22.0
Growing of crops… … … … … … … … … … … … … … … …	5.5	7.5	17.8	13.5	12.3
Animal production … … … … … … … … … … … … … … …	0.3	2.4	1.7	1.7	10.0
Support activities to agriculture… … … … … … … … … …	1.5	2.3	0.5	-1.4	0.0
Information and communication … … … … … … … … … … … …	10.1	1.7	7.0	9.1	4.7
Telecommunications… … … … … … … … … … … … … …	8.8	2.4	6.9	9.4	4.3
Publishing, broadcasting, other IT and information activities .	1.2	-0.7	0.1	-0.3	0.4
Financial and insurance activities… … … … … … … … … … …	4.3	7.4	8.2	9.1	9.3
Financial activities… … … … … … … … … … … … … …	1.9	5.3	6.9	8.2	8.5
Insurance activities… … … … … … … … … … … … … …	2.4	2.0	1.2	0.9	0.7
Real estate… … … … … … … … … … … … … … … … … … ..	6.9	7.3	6.0	8.5	8.9
Professional, scientific and technical activities … … … … … …	0.2	1.4	1.3	0.7	0.7

Educational Institutions

					Number
Category	2011	2012	2013	2014	2015*
Schools:					
Pre-Primary :					
Public	24,588	24,654	24,702	24,768	24,862
Private	14,912	15,104	15,443	15,451	15,913
Sub Total	**39,500**	**39,758**	**40,145**	**40,219**	**40,775**
Primary:					
Public	19,848	20,307	21,205	21,718	22,414
Private	5,534	6,242	6,821	7,742	8,919
Sub Total	**25,382**	**26,549**	**28,026**	**29,460**	**31,333**
Secondary:					
Public..	5,311	6,188	6,807	7,680	8,297
Private .. ..,..	946	986	1,027	1,067	1,143
Sub Total	**6,257**	**7,174**	**7,834**	**8,747**	**9,440**
Teacher Training Colleges:					

Educational institutions

Public TVET Institutions					
Youth Polytechnics .. …….. … … … … … ..	585	647	701	701	816
Technical and Vocational Colleges ….	40	49	49	51	55
Kenya Technical Training College ….	1	1	1	1	1
National Polytechnics .. ….. … … … … ..	2	2	2	2	2
Polytechnic University Colleges .. … ..	2	2	-	-	-
Sub Total .. .. ….. … … … ..	630	701	753	755	874
Universities					
Public .. .. .. ….. … … … … … … … …	7	8	22	22	23
Private .. .. .. ….. … … ... … … … … ..	27	27	30	31	30
Sub Total .. .. ….. … … … ..	34	35	52	53	53
GRAND TOTAL .. .. ….. … … … ..	72,161	74,587	77,197	79,641	82,889

Source : Ministry of Education, Science and Technology / TVETA

TVET: Technical Vocational Educational Training

Primary School Enrollment

'000

Class	2011 Boys	2011 Girls	2012 Boys	2012 Girls	2013 Boys	2013 Girls	2014+ Boys	2014+ Girls	2015* Boys	2015* Girls
Standard 1	713.9	656.8	712.2	658.1	710.5	659.1	712.1	670.4	702.0	659.4
Standard 2	679.4	651.8	677.8	654.9	676.2	639.8	679.9	644.9	682.7	648.3
Standard 3	677.6	646.5	676.0	648.6	676.1	652.0	674.5	637.7	675.9	641.9
Standard 4	676.0	637.4	674.2	643.3	672.6	645.3	677.9	651.7	683.9	657.3
Standard 5	603.0	579.3	646.5	625.7	644.8	631.5	640.5	628.2	657.4	641.1
Standard 6	575.5	560.9	589.0	567.5	631.4	613.0	621.4	618.5	638.7	633.9
Standard 7	510.2	512.9	547.2	553.9	560.0	560.3	598.2	601.0	616.6	619.7
Standard 8	451.6	428.1	449.8	433.0	448.1	436.8	448.0	446.1	470.7	461.3
TOTAL	4,887.3	4,673.7	4,972.7	4,784.9	5,019.7	4,837.9	5,052.5	4,898.5	5,127.9	4,962.9
GRAND TOTAL	9,561.1		9,757.6		9,857.6		9,951.0		10,090.8	

Source : Ministry of Education, Science and Technology

Secondary School Enrollment

Class	2011		2012		2013		2014		2015*	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Form 1… … … … …	276,965	244,636	282,555	249,573	327,775	289,753	342,378	331,041	380,448	352,216
Form 2… … … … …	240,552	219,469	274,195	239,743	288,238	253,739	326,389	307,256	359,762	331,649
Form 3… … … … …	224,637	188,408	239,149	218,278	267,221	228,869	294,263	263,671	331,147	296,366
Form 4… … … … …	206,552	166,501	223,132	188,198	244,463	204,204	250,236	216,463	277,091	230,302
TOTAL… … … … ..	948,706	819,014	1,019,031	895,792	1,127,697	976,565	1,213,266	1,118,431	1,348,448	1,210,533
GRAND TOTAL…	1,767,720		1,914,823		2,104,262		2,331,697		2,558,981	

Source : Ministry of Education, Science and Technology

Schooling Profile for 2014 & 2015
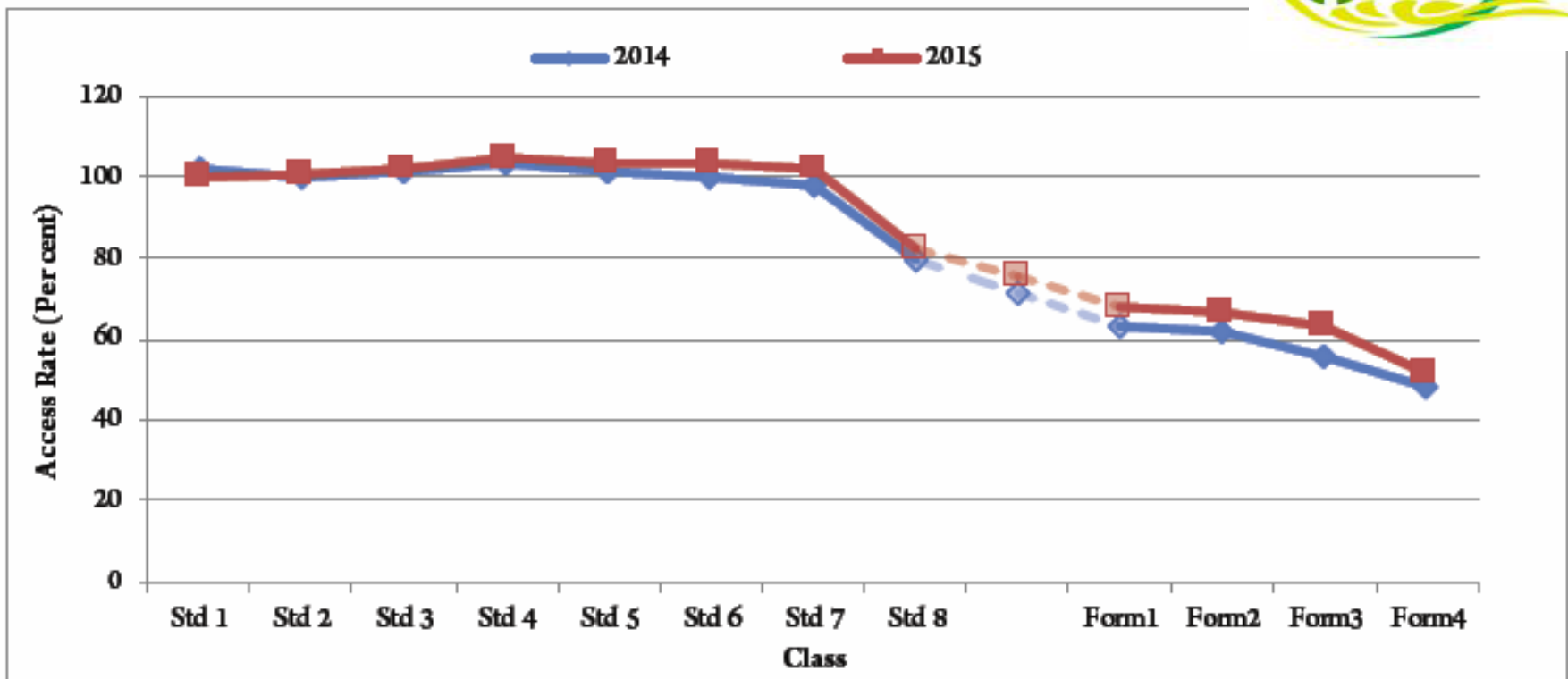
Public Universities Enrollment

Number

INSTITUTION	2012/13		2013/14		2014/15		2015/16*	
	Male	Female	Male	Female	Male	Female	Male	Female
Public Universities								
Nairobi… … … … … … … … … …	30,710	20,185	38,693	25,376	42,328	27,618	60,102	38,611
Kenyatta… … … … … … … … … .	25,633	31,559	37,758	32,248	43,165	33,714	40,254	31,237
Moi … … … … … … … … … … …	17,372	14,273	18,547	15,684	22,458	20,838	26,469	20,257
Egerton … … … … … … … … … .	4,577	3,101	7,044	4,896	8,661	5,267	5,869	3,253
Jomo Kenyatta (JKUAT)… … … … .	19,048	9,870	19,729	10,847	20,860	11,469	24,025	15,089
Maseno… … … … … … … … … …	3,953	2,159	3,922	2,247	7,356	7,412	11,031	7,084
Masinde Muliro… … … … … … … .	6,295	3,901	5,606	3,445	7,480	4,213	8,642	5,613
Technical University of Kenya… …	405	135	5,102	1,915	5,391	2,024	7,586	2,446
Technical University of Mombasa…	1,828	524	3,993	1,050	4,186	1,234	5,060	1,813
Dedan Kimathi … … … … … … …	871	338	1,546	584	4,715	1,578	4,378	1,435
Chuka … … … … … … … … … …	-	-	7,318	2,663	9,716	3,931	6,455	4,066
Karatina … … … … … … … … …	-	-	2,700	2,014	3,095	2,209	4,680	3,045
Kisii … … … … … … … … … …	-	-	913	531	4,780	3,495	6,660	5,059
Meru… … … … … … … … … …	-	-	2,001	903	2,825	1,174	3,067	1,272
Multi Media… … … … … … … …	-	-	697	331	754	346	1,160	539
South Eastern … … … … … … … .	-	-	1,988	1,037	3,676	2,138	4,274	2,624
Jaramogi Oginga Odinga… … … … .	-	-	1,259	771	2,537	1,638	6,040	3,773
Laikipia… … … … … … … … …	-	-	857	574	3,260	2,652	4,049	3,384
University of Eldoret… … … … … .	-	-	8,059	4,507	9,447	6,215	13,898	9,810
Kabianga… … … … … … … … …	-	-	1,004	681	3,375	2,366	1,249	1,017
Pwani … … … … … … … … … …	-	-	2,666	1,591	2,981	1,603	3,777	2,494
Masai Mara… … … … … … … …	-	-	2,585	1,851	4,118	3,036	5,149	3,988
Kibabii … … … … … … … … …	-	-	-	-	-	-	3,527	1,815
SUB-TOTAL… … … … … … … … .	110,692	86,045	173,987	115,746	217,164	146,170	257,326	169,708
Private Universities	29,554	24,905	39,980	31,666	42,454	37,994	45,259	40,630
GRAND TOTAL… … … … … … …	251,196		361,379		443,783		512,924	

Kenya is Factor Driven on GCI

Globa Competetive Index
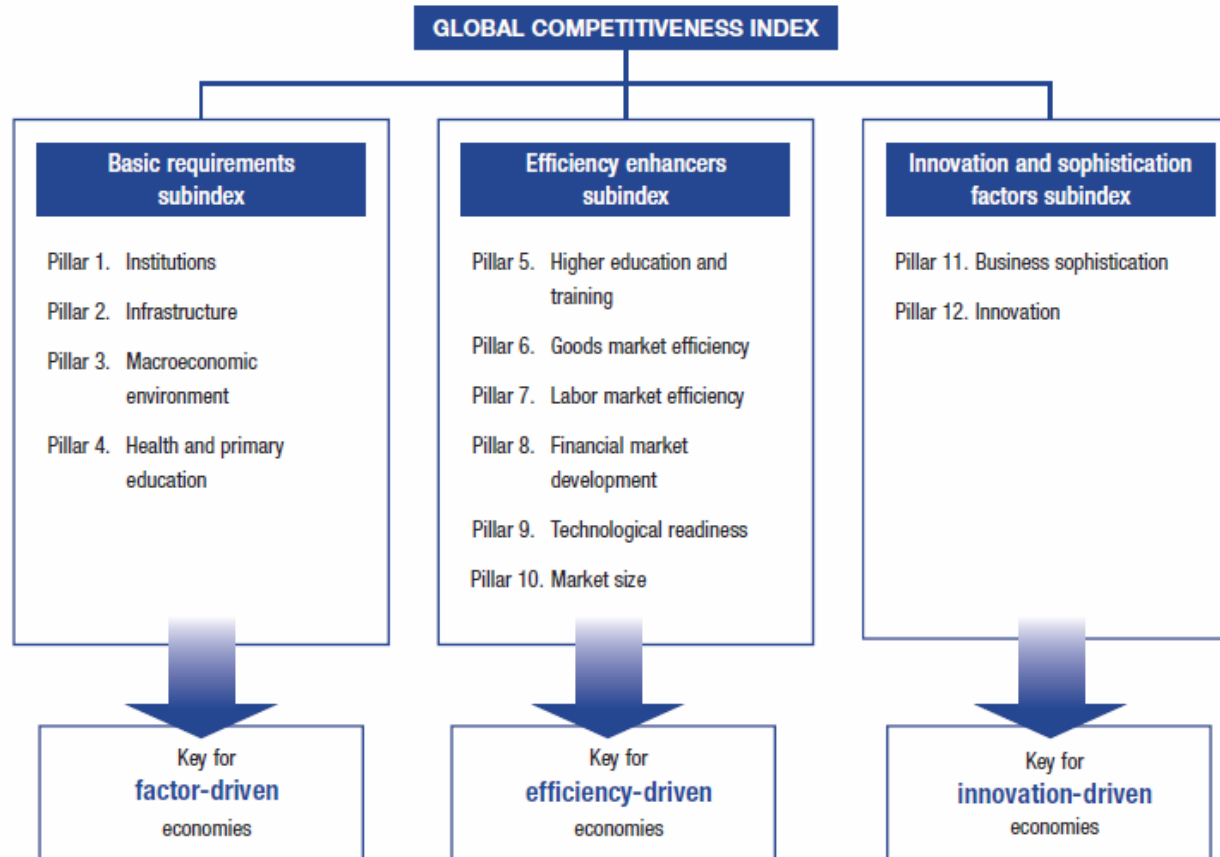
Country/Economy	GCI 2015–2016			GCI 2014–2015 rank (out of 144)
	Rank (out of 140)	Score (1–7)	Rank among 2014–2015 economies*	
Botswana	71	4.19	71	74
Morocco	72	4.17	72	72
Uruguay	73	4.09	73	80
Zambia	96	3.87	95	96
Seychelles	97	3.86	96	92
Dominican Republic	98	3.86	97	101
Kenya	99	3.85	98	90

Stage of development

1	Transition 1–2	2	Transition 2–3	
Factor driven		**Efficiency driven**		**Innovation driven**

Legend: Kenya, Sub-Saharan Africa

Chart axes: Institutions, Infrastructure, Macroeconomic environment, Health and primary education, Higher education and training, Goods market efficiency, Labor market efficiency, Financial market development, Technological readiness, Market size, Business sophistication, Innovation
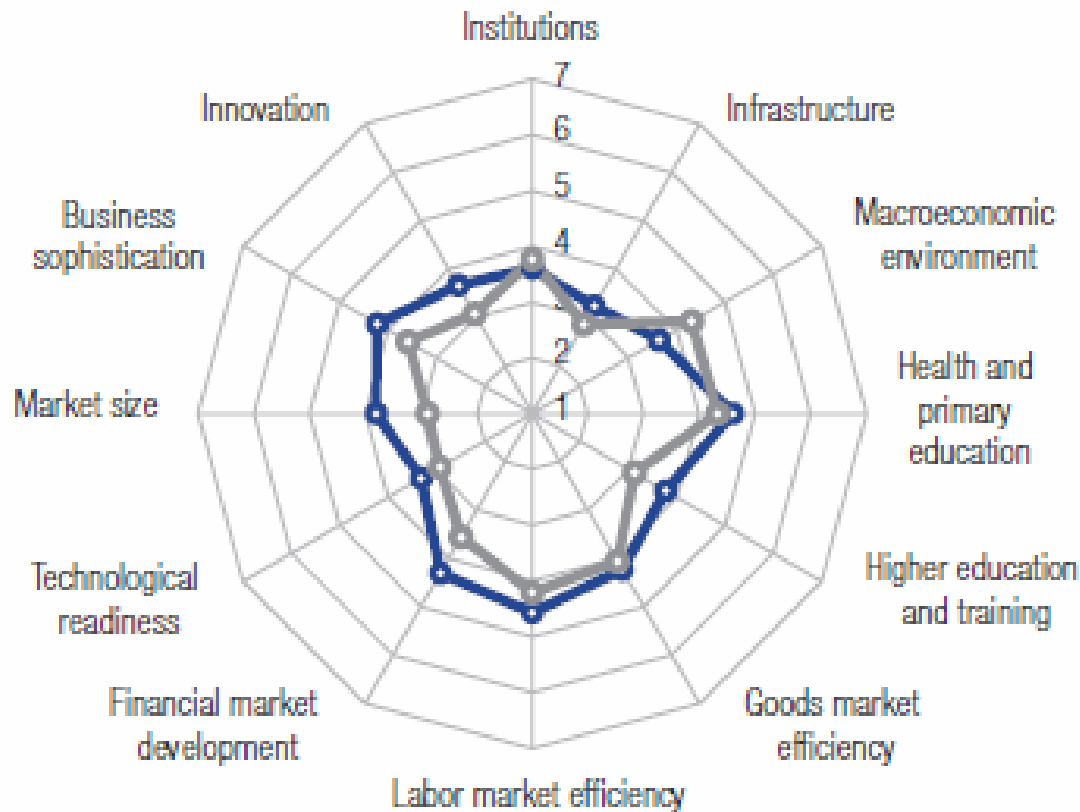
Wage Employment
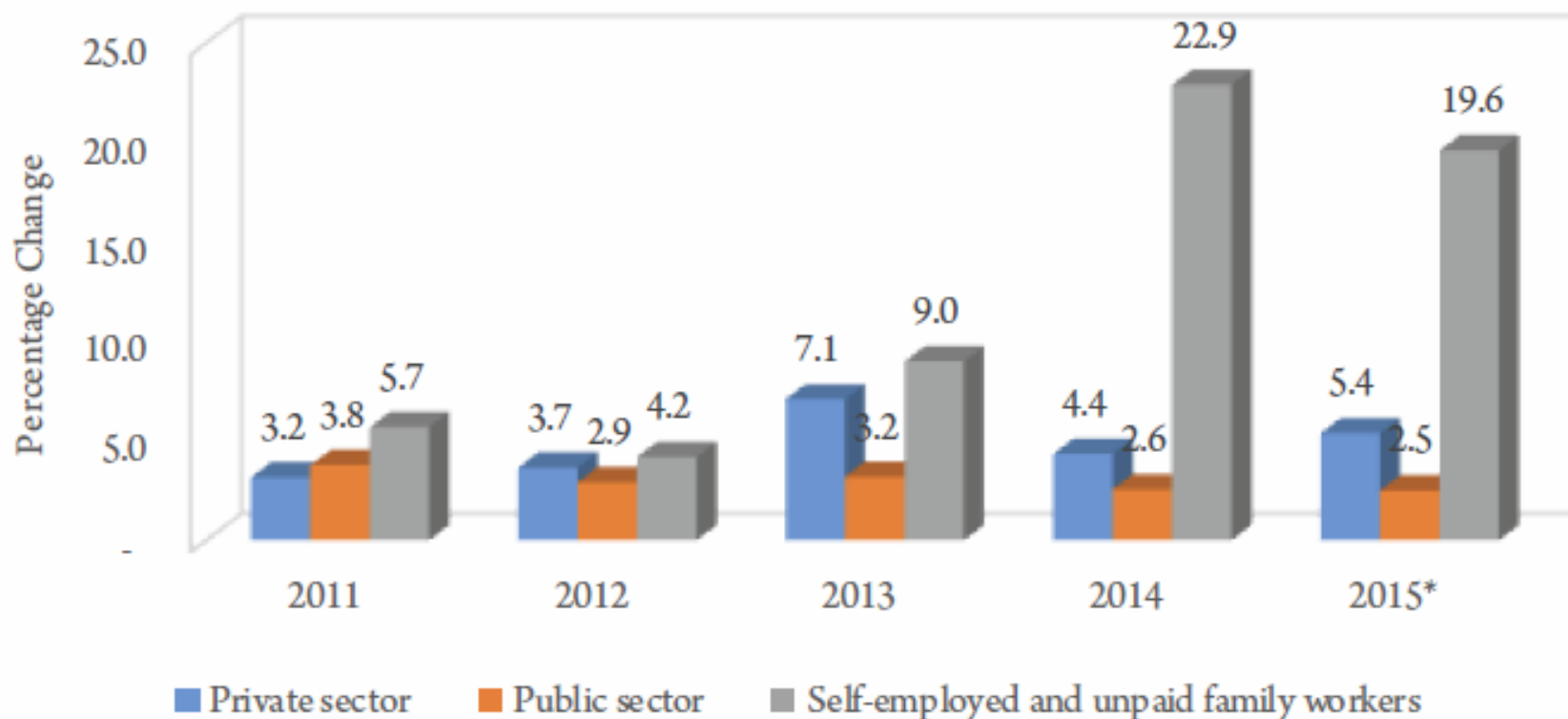
Job Creation
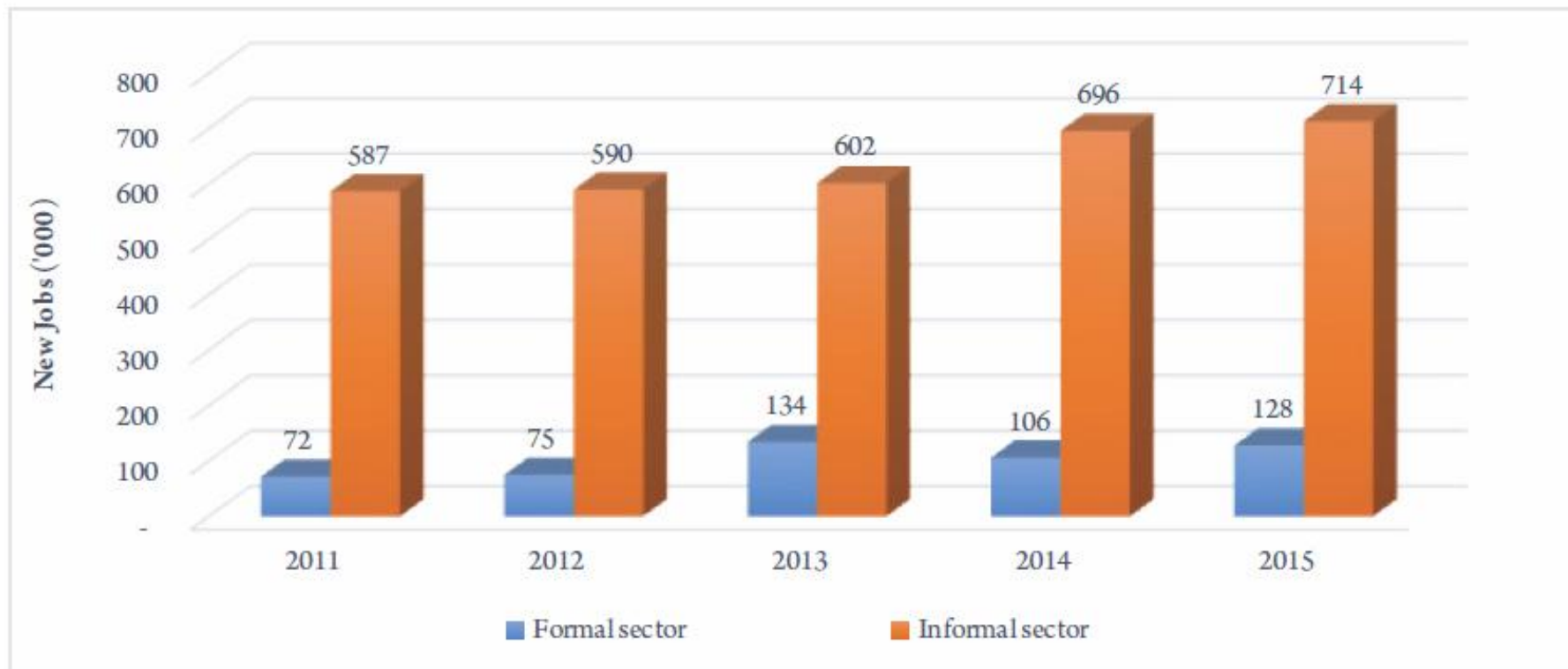
Local Daily/Weekly Newspapers in Circulation

'000 Copies

Newspapers	2011	2012	2013	2014	2015*
Daily Newspapers					
English ………………………………………	108,000	110,592	104,057	102,000	98,548
Kiswahili ………………………………	9,000	6,000	5,900	5,800	5,209
Weekly Newspapers					
English ………………………………………	27,000	29,019	16,794	15,900	14,975
Kiswahili ………………………………	1,600	1,790	1,810	1,900	1,825
Average online visitors per day	149,858	294,546	793,046	1,025,043	1,575,043

Source: Various Media Houses

Fixed and Mobile telephone services

	2011	2012	2013	2014[+]	2015[*]
Fixed Telephony					
Fixed line Capacity ('000)[1]	401	380	408	340	75
Total Connections ('000)...	380	263	206	180	85
Wireline Connections	188	75	57	48	85
Wireless Connections[1]	192	188	149	132	0
Mobile Telephony					
Mobile Telephone Capacity ('000)[2]	47,677	49,977	55,077	65,077	62,800
Connections ('000)..........	26,981	30,433	31,309	33,633	37,716
Mobile Money Transfer Agents	42,313	49,079	93,689	123,703	143,946
Mobile Money Transfer Service Subscribers ('000)..	17,396	19,319	26,016	26,023	26,753
Total Deposits through Agents in KSh Billion [+]	566	811	1,033	1,269	1,347
Total Transfers, in KSh Billion............................	1,169	1,544	1,902	2,372	2,816

Source: Communication Authority of Kenya/Central Bank of Kenya

Telephone Call Traffic (minutes '000)

Domestic Calls					
Total Fixed to Fixed Telephone Traffic[+] (a+b)…….	**171,000**	**59,078**	**28,560**	**23,298**	**5,252**
Fixed wireless to Fixed wireless[+] (a) … … … … …	93,153	41,026	18,892	21,622	3,336
Fixed to Fixed telephone[+] (b)… … … … … … … … … …	77,847	18,052	9,668	1,676	1,916
Fixed to Mobile telephone … … … … … … … … … … ….	130,920	124,423	101,722	117,053	47,702
Mobile to Mobile telephone … … … … … … … … … … …	26,024,608	27,439,110	29,758,949	30,473,694	39,068,816
Mobile to Fixed telephone … … … … … … … … … … …. ….	90,420	66,823	52,334	66,564	75,394
Total Domestic Traffic… … … … … … … … … … … … … … …	**26,347,464**	**27,654,199**	**29,960,246**	**30,680,916**	**39,197,164**
International Outgoing Fixed VoIP … … … … … … … … … …	18,171	9,886	8,101	7,335	4,785

Source: Communication Authority of Kenya

Registered Domains

						Number
Subdomain	**Users**	**2011**	**2012**	**2013**	**2014**	**2015***
.ac.ke	Institutions of Higher Education	341	603	737	792	851
.co.ke	Companies	12,798	22,607	27,643	35,274	47,800
.go.ke	Government entities	157	278	339	314	351
.info.ke	Information e.g. blogs	46	84	98	105	119
.me.ke	Personal websites & email	187	331	413	650	325
.mobi.ke	Mobile content	17	31	37	48	46
.ne.ke	Network Devices	24	38	46	65	139
.or.ke	Non profit making organisations or NGO's	537	948	1,159	1,190	1,577
.sc.ke	Lower & middle institutions of learning	53	93	113	95	335
TOTAL		**14,160**	**25,013**	**30,585**	**38,533**	**51,543**
	Number of registras	120	150	180	210	199
	Domain renewal fee	2,320	2,320	2,320	2,320	580
	Average annual fee to operate domain in KSh	2,300	2,300	2,300	2,300	650

Source: Kenya Network Information Centre

Media frequencies and mobile transceivers

	2011	2012	2013	2014[+]	2015[*]
					Number
TV Frequencies… … … … … … … … …	91	228	336	245	302
Radio FM Frequencies… … … … … … … … ….	346	461	553	561	608
Digital Signal Distributor (Number)	1	2	2	2	5
Analogue TV Stations[1]	14	14	14	19	0
Digital TV stations	0	0	0	36	62
Total TV Stations	**14**	**14**	**14**	**55**	**62**
Digital Subscriptions					
Cable TV	..	..	..	56,106	81,118
Direct to Home Satellite	..	..	..	211,846	250,627
Digital Terrestrial Televisions (STBs)	..	..	..	1,041,656	3,712,548
Total Digital Subscriptions	**0**	**0**	**0**	**1,309,608**	**4,044,293**
Radio Stations					
English and Kiswahili	72	74	80	85	89
All Vernacular Languages	44	50	50	50	50
Total Radio Stations	**116**	**124**	**130**	**135**	**139**
Mobile Transceivers by Technology — 2G	65,809	71,884	80,894	84,631	89,994
Mobile Transceivers by Technology — 3G	5,039	11,053	12,775	15,381	19,300
Total	**70,848**	**82,937**	**93,669**	**100,012**	**109,294**

Source: Communication Authority of Kenya

Employment, Investment and Revenue

		2011	2012	2013	2014	2015*
Employment (Number)	Telecommunication Operators[1]	5,827	5,542	5,668	6,201	6,147
	Internet Service Provider (ISPs)[2]	7,482	7,154	7,076	6,237	7,817
Annual Investment in KSh Billion[3]	Telecommunication Operators[1]	34.6	33.8	30.4	32.5	36.2
	ISPs[2]	5.2	6.4	3.7	3.4	3.3
Annual Revenue in KSh Billion[3]	Telecommunication Operators[1]	22.5	134.1	152.5	173.6	194.5
	ISPs[2]	11.7	12.8	14.6	15.7	17.2

Key Indicator Measuring Society

Represents Total Population	2011	2012	2013	2014	2015*
Fixed telephone lines per 100 inhabitants … … … … … … … … ….	1.20	0.96	0.65	0.52	0.19
Mobile-cellular telephone subscriptions per 100 inhabitants … … .	68.2	74.9	74.9	78.3	85.40
Wireless internet subscribers per 100 inhabitants … … … … … ….	15.4	20.8	31.4	38.1	53.90
Internet subscribers per 100 inhabitants (Wireless and Fixed) … .	15.6	20.9	31.6	38.3	54.20
Bits per second per capita (Bps/person) … … … … … … … … …	855.7	6824.7	9,168.2	12,157.9	20,293.0
Broadband subscriptions per 100 inhabitants (wireless) … … … …	0.5	4.6	5.8	9.7	16.20
Broadband subscriptions per 100 inhabitants (Fixed and Wired) …	0.7	4.7	5.9	9.9	16.40
Mobile money subscriptions per 100 inhabitants	44.0	47.5	62.3	60.6	60.60

International Trade in ICT Equipment

					KSh Million
Exports	**2011**	**2012**	**2013**	**2014**	**2015***
Office machines [1]… … … … … … … … … … … … … … … … … … …	77.8	9.8	24.1	17.1	113.3
Automatic data processing machines, storage units etc… … … … … … …	1,405.3	2,818.7	980.3	330.9	358.5
Part and accessories [2]… … … … … … … … … … … … … … … … … …	113.9	96.1	63.8	68.9	76.2
Monitors and projectors and reception apparatus for television [3]… …	104.6	118.4	72.4	294.9	194.6
Reception apparatus for radio broadcasting [4] … … … … … … … … … .	24.6	16.1	30.5	8.8	12.5
Recording equipments [5]… … … … … … … … … … … … … … … … … …	18.9	6.9	5.7	9.5	5.9
Telecommunications equipment [6]… … … … … … … … … … … … … … …	555.7	1,016.7	1,122.6	528.2	1,303.5
Total	**2,300.8**	**4,082.7**	**2,299.4**	**1,258.3**	**2,064.5**
Imports					
Office machines [1]… … … … … … … … … … … … … … … … … … …	1,382.8	603.3	834.1	804.7	1,352.1
Automatic data processing machines, storage units etc… … … … … … …	15,546.1	19,556.0	15,018.8	9,720.0	11,211.7
Part and accessories [2]… … … … … … … … … … … … … … … … … …	871.1	1,158.9	998.9	1,034.1	682.3
Monitors and projectors and reception apparatus for television [3]… …	3,227.6	3,923.1	8,621.6	5,991.5	8,049.7
Reception apparatus for radio broadcasting [4] … … … … … … … … … .	232.0	247.8	488.8	134.9	118.4
Recording equipments [5]… … … … … … … … … … … … … … … … … …	655.4	477.5	592.2	370.0	462.3
Telecommunications equipment [6]… … … … … … … … … … … … … … …	21,280.9	24,582.4	24,160.0	23,622.2	29,444.0
Total	**43,195.9**	**50,549.0**	**50,714.4**	**41,677.4**	**51,320.5**

Most Problematic Factors 4 Doing Business

Factor	Value
Corruption	19.7
Access to financing	12.9
Tax rates	11.2
Inadequate supply of infrastructure	9.7
Inefficient government bureaucracy	7.9
Inflation	7.5
Crime and theft	7.4
Complexity of tax regulations	5.1
Insufficient capacity to innovate	3.6
Policy instability	3.1
Poor work ethic in labor force	2.8
Restrictive labor regulations	2.4
Foreign currency regulations	2.1
Inadequately educated workforce	1.9
Poor public health	1.3
Government instability/coups	1.2

Opportunities and Challenges

- Access to Electricity:

- Africa at Night

- Statistics on Kenya

- 43 M people in 2014
- ICT growing 13.4 (2014)
- Internet Penetration 38.3%
- SMS 27.5 Billion 38.5%
- Mobile Money 26 M (60.6%
- Cash Deposits MM 1,269 B
- 36 digital Kenya TV stations

M-Pesa

- Mobile money innovation
- $ 2 billion transfer in over 700 million transactions
- Mobile money agents
- Integration with:-
  - Banks
  - microfinance institutions
  - Companies
  - Mega stores
  - Start ups

Digital Platforms and banking

- Customers enjoying efficiency and convinience
- Banks cutting on operational costs
- Manage bank accounts
  - Access loans upto to $ 30,000
  - Apply and repay loans
  - Inter bank cash transfers
  - Pay utility bills
  - Tax payments
  - Online share trading

M-Kopa through M-Pesa

- Conected more than 280,000 homes in Kenya, Uganda and Tanzania

- Solar kit costing shs 40 per day for 365 days

- Comprise of solar battery powered home system – 2 bulbs, a phone charging facility and a rechargable radio

- After paying kshs 14,600 buyesr own the kit

ICT creating local entrepreneurs

Good   **Bad**

- NaiMotion – traffic
- ReportTaka – garbage
- FixMtaa – problems
- Ushahidi – tell
- Gearbox – prototyping
- Akirachix – women
- Totohealth – maternal
- Ujuzi compliance - money

- High Tech Fraud
- Tax evasion
- Exam cheating
- Personal interaction
- Physical activity
- Security
- Pornography is viral

USING TECHNOLOGY TO EMPOWER COMMUNITY

- **Konza Techno City will be:**

  - A Sustainable, World-class Technology Hub

  - A Major Economic Driver for the Nation

  - A Global Centre of Innovation

- **Konza Techno City will have a vibrant mix of:**

  - Businesses

  - Workers,

  - Residents

  - Science and Technology

  - Urban Amenities
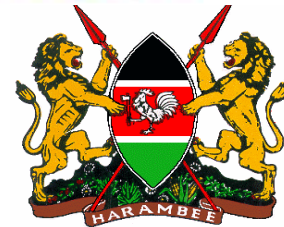
95% of the 5 M monthly FB via Mobile
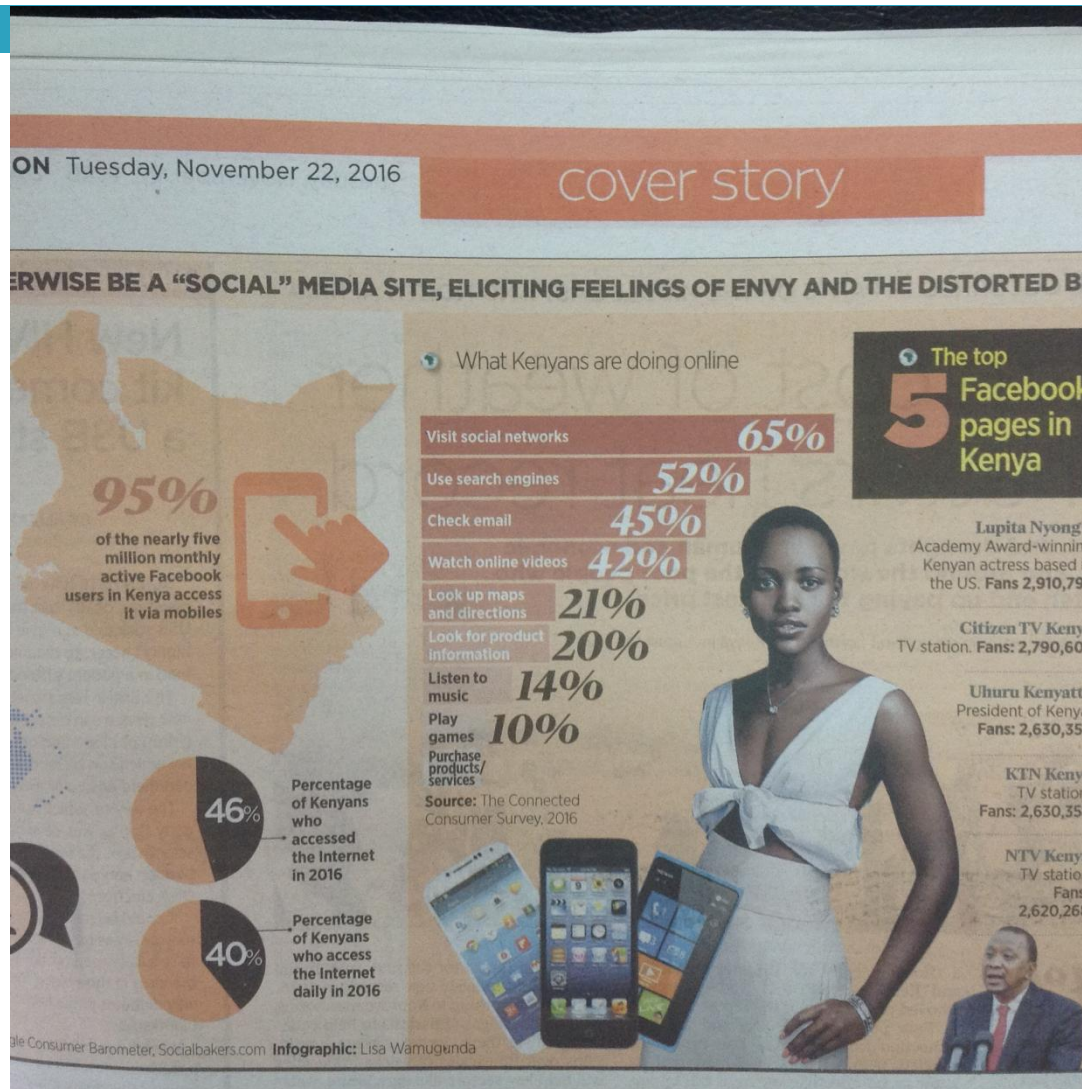
Ushahidi - tell

- www.ushahidi.com
- Election monitoring
  - Gather reports, triaging & verifying and monitor spikes
- Crisis response
  - Collect reports, triaging & organize response
  - document changes with real time mapping & visualization
- Advocacy and Human Rights
  - Collect reports, citizens sign up for sms and email alerts
  - Export vis CSV with geolocation and trend analysis

Gearbox - prototyping

- www.gearbox.co.ke
- Incubation – connect with global resources in investment, mentorship and business development
- Design – use industry leading tools to design better products
- Contracting – hire electrical and mechanical designers, engineers and fabricators
- Community – join Africa's growing community of hardware entrepreneurs

Akirachix - women

- www.akirachix.com
- Vision of nurturing generations of women who use tech to develop innovations and solutions
- Mission of providing training, mentorship and outreach programs to increase number of skilled women
- Training programs – she trains
- High school outreach – she serves
- Community building – she leads
- Kids camp – she serves

iHub – Technology Innovation Community

- www.ihub.co.ke
- Research – knowledge discovery sharing
- Consulting –teams projects coodination
- Uxlab – design training testing
- M:lab – centre for mobile entrepreneurship
- Shop – community market place
- Community – explore membership plans
- Partners – collaboration is everything

Smart Grid yet to be incorporated

- Wind and solar energy joining the energy mix

- Erratic nature makes them unreliable

- Digital technology into power grids prevent wastage increases efficiency and reliability

- Home owners could benefit and in turn generate electricity

Cloud Computing, IoT and Big Data

- NaiMotion – web and mobile components
  - Collects (nodes & tweets), analyses and displays traffic data
- ReportTaka – crowd sourcing garbage collection
  - Pictures of unattended garbage posted tweeted
- FixMtaa – twitter used to report floods, outages, potholes and other societal problems
  - Machine learning algorithms sends report to relevant authority

Smart Farming

- Drones enable early warning
- UAV assembling
  - Designing, sensor adaptation and printing components
  - Maintenance, sensor customization
- Mission Planning
  - Field surveys,
- Data Processing
 - Spectral data acquisition, crop discrimination, disease detection

Conclusion

- Insurance for small scale farmers -health services – Monitoring Traffic, water quality and quantity, etc. – AVU, Uber, Smart grid,

- all stakeholders, governments, regulators, ICT service providers, academia and research community, consumers and civil society need to change the way we interact with each other in order to create a new enabling ecosystem.

End of Presentation
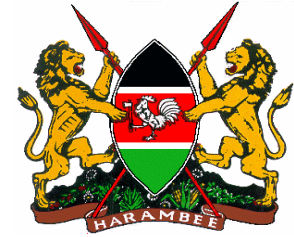
Thank You

Questions are guaranteed in life; Answers aren't.