

# IST-Africa 2013 Conference Report

*Nairobi, Kenya*

29 - 31 May 2013

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# ISTO frica

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# Introduction

**IST-Africa 2013** Conference & Exhibition took place as part of **IST-Africa Week 2013** in Nairobi, Kenya from 29 - 31 May 2013. Founded in 2002, **IST-Africa** is supported by the European Commission and African Union Commission and co-funded under the EU Framework Programme since 2005. **IST-Africa 2013** was the eighth in an Annual Conference Series hosted each year by African Governments, that brings together senior representatives from leading public, private, education & research organisations, to discuss ICT, Information Society and Innovation related policy, showcase research results and share knowledge.

The European Commission has co-funded **IST-Africa** since 2005, to support Information Society and ICT aspects of the Africa-EU Strategic Partnership and promote African - European research cooperation. European research activities are structured around consecutive multi-annual programmes, or so-called Framework Programmes. Horizon 2020 sets out the Priorities and thematic areas (including ICT and Innovation) from 2014 - 2020. Horizon 2020 is fully open to international co-operation, with the aim to jointly address major challenges where significant added value is expected to be gained from worldwide R&D cooperation.

Hosted by the Government of Kenya through the Ministry of Education, Science and Technology and Technically Co-Sponsored by IEEE, **IST-Africa 2013** focused on the Role of ICT and Innovation in Africa's Development and specifically on applied ICT implementation and research in the areas of eHealth, Technology Enhanced Learning and ICT Skills, Digital Libraries, Open Source Software, ICT for eInclusion and eAccessibility, eInfrastructures, RFID and ICT for Networked Enterprise and eGovernment and eDemocracy. Each **IST-Africa Conference** provides a collegiate setting for presentation and discussion of national & regional developments, issues of concern & good practice models, networking with peers and identify potential partners for new research and innovation proposals.

**IST-Africa** directly supports Information Society, Innovation and ICT aspects of the Africa-EU Strategic Partnership, the African Ministerial Council on Science and Technology (AMCOST) and the Consolidated Plan of Action for the African Regional Action Plan on the Knowledge Economy (ARAPKE).

The goals of the **IST-Africa** Conference Series are Community Building to facilitate EU-African research cooperation and successful exploitation of research results, to stimulate take-up of RTD results by industry and the public sector, to promote knowledge sharing between commercial, government and research organisations, to exchange experiences about the current state of eAdoption at a sectoral, national or regional level, and to support International Cooperation and open up the European Research Area (ERA) to Africa.

## Participants at IST-Africa Week

**IST-Africa Week 2013** attracted policy makers, practitioners, and researchers from leading commercial, government and research organisations around the world. Through Conferences, Working Groups and interactive training workshops, **IST-Africa** provides an opportunity to meet with senior leadership, practitioners, project managers, engineers and researchers from public, private and education and research organisations.

Delegates and speakers attend to share knowledge, experience and lessons learnt, and network with their peers from around the world.

**IST-Africa 2013** Conference & Exhibition provided an opportunity learn more about Horizon 2020 and identify partners and opportunities to co-operate in international ICT research co-funded by the European Commission. Much of the European research results presented in this year's conference were co-funded under FP7 ICT Programme (2007 - 2013).

## The Venue

**IST-Africa 2013** Conference & Exhibition took place in the Safari Park Hotel, Nairobi.

## The Conference Programme

The 3-day programme featured an invigorating mix of business and government case studies, technical and policy papers and interactive workshops. As well as opening and closing plenary sessions, delegates had the opportunity to participate in 44 thematically focused parallel sessions featuring different aspects of International Cooperation, eHealth, eInfrastructures, Technology Enhanced Learning and ICT Skills, Living Labs, Digital Libraries, eInclusion, Mobile Applications, ICT for Environmental Sustainability, eAgriculture and eGovernment and eDemocracy.

In the context of focusing on the Role of ICT for Africa's Development, the Opening Plenary on Wednesday 29 May featured a high level dialogue on Implementation of the Information Society in Africa. The Closing Plenary on Friday 31 May focused on ICT Initiatives Supporting Regional Development.

## Networking

Networking is a key feature of **IST-Africa Week**. Working Group and Conference sessions are designed to maximise knowledge sharing by providing time for interactive discussions. Coffee breaks took place in the Exhibition area to maximise exposure to technology demonstrations by Kenyan entrepreneurs from Innovation Spaces and HEIs, and to facilitate informal one-on-one and small group discussions following paper or workshop sessions.

The Delegate Showcase on the Conference Portal provided registered delegates, speakers and exhibitors with the opportunity to publish short profiles including research interests to facilitate networking before, during and after the conference.

## Living Labs Workshop, 28 May

The 3rd Annual IST-Africa Living Labs Thematic Working Group Meeting took place on 28 May 2013.

This interactive working group meeting facilitated knowledge sharing and collaboration between Innovation Stakeholders and existing operators of Living Labs and Innovation Spaces, building on progress achieved at previous Working Group Meetings in Dar es Salaam (2012) and Gaborone (2011). This participatory working group meeting continued the development of a network of experts, public, private, education and research and societal stakeholders and entrepreneurs committed to Collaborative Innovation as a mechanism to support sustainable socio-economic development in Africa.

## Conference Proceedings

The **IST-Africa 2013** conference proceedings was published on CD-ROM and on the Conference Portal. Each delegate received a free copy of the conference proceedings at Registration.

Following the conference, registered participants have access to all papers and PowerPoint presentations on the Conference Portal. The **IST-Africa 2013** Conference Proceedings will also be submitted for publication in IEEE Xplore to maximise impact.

## Support Organisations

**IST-Africa 2013** was hosted by the Government of Kenya through the Ministry of Education, Science and Technology and supported by the European Commission. KENET kindly provided the Internet connectivity during the event. SPIDER kindly contributed towards a dinner for delegates.

**IST-Africa 2013** was technically co-sponsored by IEEE, Kenya Section

## IST-Africa Initiative

Founded by IIMC in 2002, Supported by the European Commission and African Union Commission, and co-funded under the EU Framework Programme since 2005 **IST-Africa** is focused on raising wider awareness of African research and innovation capacity, strengthening the research dimension of Information Society, Innovation and ICT policy dialogues between the European Union, the African Union Commission, African Member States and key regional organisations, in the context of the Africa - EU Strategic Partnership, analysing African research and innovation priorities and identifying co-operation opportunities in fields of mutual interest.

**IST-Africa** is a strategic collaboration between IIMC International Information Management Corporation Limited (Ireland, Coordinator), Department of Science and Technology (South Africa), Ministry of Infrastructure, Science and Technology (Botswana), Ministry of Communications, Science and Technology (Lesotho), Ministry of Education (Namibia), ICT Policy Implementation Technical Unit (Mozambique), National Computer Board (Mauritius), Ministry of Information Communication Technology (Swaziland), National Commission for Science and Technology (Malawi), COSTECH - Tanzania Commission for Science and Technology, Uganda National Council for Science and Technology, Ministry of Higher Education, Science and Technology (Kenya), Ministère de l'Enseignement Supérieur et de la Recherche Scientifique (Burundi), Ministry of Science and Technology (Ethiopia), Agence Nationale des Technologies de l'Information et de la Communication (Cameroon), Ministère de l'Enseignement Supérieur, des Universités et de la Recherche (Senegal), Ministry of Environment, Science and Technology (Ghana), Ministère de l'Enseignement Supérieur et de la Recherche Scientifique (Tunisia) and Ministry of Communications and Information Technology (Egypt).

## Plenary Session Speakers



Prof Jacob Kaimenyi  
Cabinet Secretary  
MoEST, Kenya



Prof Crispus Kiamba  
Permanent Secretary  
MoEST, Kenya



Prof Shaukat Abdulrazak  
CEO, National Council for Science  
and Technology, Kenya



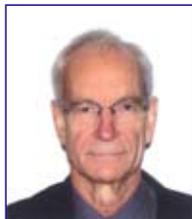
Mr. Francis Wangusi  
Director General  
Communications Commission of Kenya



Dr Katherine Getao  
ICT Secretary, eGovernment  
Directorate, Kenya



Mr Moctar Yedaly  
Information Society Division  
African Union Commission



Mr Morten Møller  
DG CONNECT  
European Commission



Prof Meoli Kashorda  
Executive Director  
KENET, Kenya



Prof Koi Muchira Tirima  
Inoorero University / LIWA  
Kenya



Mr Jerome Morrissey  
CEO, GESCI, Kenya



Mr Stéphane Hogan  
Science Counsellor  
EU Delegation to AU

Keynote Speakers as at 28 May 2013 include:

- **Prof Jacob Kaimenyi**, Cabinet Secretary, Ministry of Education, Science and Technology, Kenya
- **Prof Crispus Kiamba**, Permanent Secretary, Ministry of Education, Science and Technology, Kenya
- **Prof Shaukat Abdulrazak**, CEO, National Council for Science and Technology, Kenya
- **Dr Katherine Getao**, ICT Secretary, eGovernment Directorate, Kenya
- **Mr Christopher Kemei**, Assistant Director, Licensing-Compliance and Standards, Communications Commission of Kenya
- **Mr Daniel Obam**, Ministry of ICT, Kenya
- **Mr Moctar Yedaly**, Head of Information Society Division, African Union Commission
- **Mr Morten Møller**, Programme Coordination, DG CONNECT, European Commission, Belgium
- **Prof Meoli Kashorda**, Executive Director, KENET, Kenya
- **Prof Koi Muchira Tirima**, Deputy Vice Chancellor-ARS, Inoorero University / LIWA, Kenya
- **Mr Jerome Morrissey**, CEO, GESCI, Kenya
- **Mr Stéphane Hogan**, Science Counsellor at the EU Delegation to the African Union, Addis Ababa
- **Mr Moses Bayingana**, ICT Expert, Information Society Division, African Union Commission
- **Mr Vincent Kaabunga**, IEEE Kenya Section, Kenya
- **Ms Grace Wandera**, Director of Strategy, Vision 2030 Secretariat

## International Programme Committee

A distinguished Programme Committee was formed to review and provide feedback on papers and presentations, and chair sessions.

The **IST-Africa 2013** International Programme Committee included

- **Paul Cunningham** (Conference Chair), IIMC International Information Management Corporation Ltd, Ireland
- **Professor Jørn Braa**, Department of Informatics, Oslo University, Norway
- **Dr Bruce Becker**, Meraka Institute, CSIR / South Africa National Grid, South Africa
- **Laurens Cloete**, Meraka Institute, CSIR, South Africa
- **Miriam Cunningham**, IIMC International Information Management Corporation Ltd, Ireland
- **Kim Davis**, Research Council of Norway
- **Prof. Love Ekenberg**, University of Stockholm, Sweden
- **Razvi Doomun**, University of Mauritius, Mauritius
- **Prof. Marlien Herselman**, Living Labs of Southern Africa Network, South Africa
- **Dr. Mike Joy**, University of Warwick, United Kingdom
- **Dr. Bernhard R. Katzy**, CeTIM, The Netherlands
- **Vincent Kaabunga**, IEEE Kenya Section, Kenya
- **Vasilis Koulolias**, Gov2U, Belgium
- **Kristiina Lahde**, TANZICT Programme, Tanzania
- **Ilari Lindy**, World Bank Institute, United States
- **Gareth MacNaughton**, CISCO, United Kingdom
- **Dr Ayub Many**, Ministry of Health, Kenya
- **Prof. Maurice Mars**, University of KwaZulu-Natal, South Africa
- **Dr. Raphael Mmasi**, Tanzania Commission for Science and Technology (COSTECH), Tanzania

- **Loi Mirembe Namugenyi**, Uganda National Council for Science & Technology, Uganda
- **Dr Joseph Sevilla**, @iLabAfrica, Strathmore University, Kenya
- **Matti Sinko**, Aalto University, Finland
- **Bernard Stevenot**, SpaceBel, Belgium
- **Richard Stevens**, Stevens Consultants, Italy
- **Daan du Toit**, Senior Science and Technology Representative in Europe, Department of Science and Technology, South Africa
- **Darelle Van Greunen**, Nelson Mandela Metropolitan University/Computer Society of South Africa, South Africa

## Organising Committee

- **Miriam Cunningham**, IIMC, Ireland
- **Paul Cunningham**, IIMC, Ireland
- **Prof Crispus Kiamba**, Permanent Secretary, Ministry of Education, Science and Technology, Kenya
- **Dr Eric Mwangi**, Ministry of Education, Science and Technology, Kenya



## Conference Secretariat

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[www.IST-Africa.org/Conference2013](http://www.IST-Africa.org/Conference2013)



Wednesday,  
May 29, 2013

08:00

Registration

09:00 Opening Plenary 1a: [Opening Plenary](#)Moderator: [Prof. Harry Kaane, Higher Education, Science and Technology Secretary, Ministry of Education, Science and Technology, Kenya](#)**Brief Remarks**

Prof. Harry Kaane, Higher Education, Science and Technology Secretary, Kenya

**European Commission Address**

Morten Møller, Programme Coordination, DG CONNECT, European Commission, Belgium

**African Union Commission Address**

Moctar Yedaly, Head of Information Society Division, African Union Commission

**Official Opening Speech**

Prof. Crispus Kiamba, Permanent Secretary, Ministry of Education, Science and Technology, Kenya

10:30

Coffee Break: Networking &amp; Exhibition

11:00 Plenary Session 2a: [High-level Roundtable on Implementation of the Information Society in Africa](#)Moderator: [Paul Cunningham, IIMC, Ireland](#)

Panelists include:

**Prof. Crispus Kiamba**, Permanent Secretary, Ministry of Education, Science and Technology, Kenya**Dr Katherine Getao**, ICT Secretary, eGovernment Directorate, Kenya**Mr. Christopher Kemei**, Assistant Director, Licensing - Compliance and Standards, Communications Commission of Kenya**Mr Daniel Obam**, Ministry of ICT, Kenya**Mr Moctar Yedaly**, Head of Information Society Division, African Union Commission**Prof. Meoli Kashorda**, Executive Director, KENET, Kenya**Prof. Koi Muchira Tirima**, Deputy Vice Chancellor-ARS, Inoorero University / LIWA, Kenya**Mr Jerome Morrissey**, CEO, GESCI, Kenya

12:30

Lunch: Networking &amp; Exhibition

14:00 Session 3a: [IST-Africa – Research Capacities and Priorities I](#)Chair: [Paul Cunningham, IIMC, Ireland](#)**IST-Africa Initiative**

Paul Cunningham, IIMC, Ireland

**ICT Initiatives and Research Capacity in Kenya**

Jacob Njagi, Ministry of Education, Science and Technology, Kenya

**ICT Initiatives and Research Capacity in Uganda**

Loi Namugenyi, Uganda National Council for Science and Technology

**ICT Initiatives and Research Capacity in Tanzania**

Faith Shimba COSTECH, Tanzania

**ICT Initiatives and Research Capacity in Burundi**

Augustin Nsabayumva, Ministry of Higher Education and Scientific Research, Burundi

**ICT Initiatives and Research Capacity in Ethiopia**

Abdissa Yilma Tiky, Ministry of Science and Technology, Ethiopia

14:00 Session 3a: [mLearning](#)Chair: [Njei Check, ANTIC, Cameroon](#)**Can Micro-Volunteering Help in Africa?**

Laurie Butgereit, Meraka Institute, South Africa

**3-Category Pedagogical Frame Work For context based Ambient Learning**

Simon Mwendia, University of Nairobi, Kenya

**Social Studies Teachers' Intention to Use Mobile Phone as a Support and Tutorial Tool for Teaching**

Gloria Adedaja, University of Ibadan, Nigeria

**Use of Swarm Intelligence to Improve Interactions in mLearning Collaborative Concept Mapping**

Stephen Njenga &amp; Elijah Omwenga, University of Nairobi, Kenya

14:00 Session 3c: [eGovernment](#)Chair: [Katherine Getao, ICT Secretary, eGovernment Directorate, Kenya](#)**An Information Security Model for E-government Services Adoption in Uganda**

Gilbert Maiga, Makerere University, Uganda

**Bottom-Up eGovernment Environmental Factors (BUeEF): Facilitated Building and Implementation of eGovernment Systems in the SADC Region**

Jameson Mbale, University of Namibia, Namibia

**Factors Affecting the Use of Data Mining in Mozambique**

Constantino Sotomane, Ministry of Science and Technology, Mozambique

**eSecurity Solution for African ICT Developments**

Innocentia Dlamini, CSIR, South Africa

14:00 Session 3d: [ICT for Environmental Sustainability](#)Chair: [Richard Liahona, Ministry of Education, Science and Technology, Kenya](#)**The Potentials of ICTs in Enhancing Environmental Sustainability in Tanzania**

Resty Mushi, University of KwaZulu-Natal, South Africa

**ICT for Flood Risk Management Strategies A GIS-based MCDM(A) approach**

Avelino Mondlane, Stockholm University, Sweden

**SenseWeather: Sensor-Based Weather Monitoring System for Kenya**

Muthoni Masinde, University of Nairobi, Kenya

**E-infrastructure for Climate Adaptation Policies: the UNDP/AAP Activities**

Stefano Cozzini, CNR/IOM Democritos, Italy

14:00 Session 3e: [Cloud Computing](#)Chair: [Ashwin Seegolam, National Computer Board, Mauritius](#)**Cloud Computing for Development – Improving the Health Information System in Ghana**

Jørn Braa, University of Oslo, Norway

**Adoption of Cloud Computing for Digital Libraries in Public Universities: Challenges and Opportunities**

James Kimutai, Moi University, Kenya

**The Viability of Cloud Computing Adoption in SMME's in Namibia**

Ricardo Tjikongo, University of the Western Cape, South Africa

**Cloud Computing: an Emerging Trend for Small and Medium Enterprises**

Julia Korongo, Moi University, Kenya

**Adoption and Use of Cloud Computing in Small and Medium Enterprises in Kenya.**

Tabitha Kihara, Moi University, Kenya

14:00 Panel Session 3f: [The Role of Linkages in Leveraging the Information Society for Africa](#)Chair: [Koi Muchira Tirima, Inoorero University, Kenya](#)

15:30

Coffee Break: Networking &amp; Exhibition

16:00 Session 4a: [IST-Africa – Research Capacities and Priorities II](#)Chair: [Paul Cunningham, IIMC, Ireland](#)**ICT Initiatives and Research Capacity in Tunisia**

Noureddine Hamdi, Ministry of Higher Education and Scientific Research, Tunisia

**ICT Initiatives and Research Capacity in Egypt**

Inas Fateem, Ministry of Communications &amp; IT, Egypt

**ICT Initiatives and Research Capacity in Senegal**

Toumane Doumbouya, Ministère de l'Enseignement Supérieur et de la Recherche, Senegal

**ICT Initiatives and Research Capacity in Ghana**

Adelaide Asante, Ministry of Environment, Science and Technology, Ghana



Thursday,  
May 30, 2013

**ICT Initiatives and Research Capacity in Cameroon**  
Njei Check, National Agency for Information and Communication Technologies (ANTIC), Cameroon

**ICT Initiatives and Research Capacity in Mauritius**  
Ashwin Seegolam National Computer Board, Mauritius

16:00 Session 4b: **Technology-Enhanced Learning**

Chair: **Ebony Msikawanthu, NCST, Malawi**

**A Framework for Investigating Universities Readiness for On-line Learning: with Particular Reference to Sudanese Universities**

Atika ElMubarak, Sudan University of Science and Technology, Sudan

**Presenting a Framework for Using Full Decentralized Virtualization on Desktop Computers in an Educational Laboratory Environment**

Frederik Hattingh, Tshwane University of Technology, South Africa

**A Look into Classification: Towards Building an Indigenous Knowledge Platform for Educational Use**

Mathe Maema, Rhodes University, South Africa

**E-Learning Eco-system for Mobility and Effective Learning: A Case of JKUAT IT Students**

John Kihoro, Jomo Kenyatta University of Agriculture & Technology, Kenya

**Correlation Between Rapid Learnability and User Preference in IVR Systems for Developing Regions**

Tembaletu Ndwe, Rhodes University, South Africa

16:00 Session 4c: **eGovernment**

Chair: **Zauria Saifodine, National Institute for ICT, Mozambique**

**Towards an Electoral Process Reengineering Methodology**

John Paul Kasse, MUBS, Uganda

**Citizen-Centric Evaluation Framework for e-Government Systems in Kenya. The Case of Public Service Commission of Kenya Online Recruitment & Selection System.**

Joseph Ogutu, University of Nairobi, Kenya

**Botswana Speaks**

Vasilis Koulolias, eGovLab

**The Relevance of Social Media as it Applies in South Africa to Crime Prediction**

Coral Featherstone, Meraka Institute, South Africa

16:00 Session 4d: **Environmental Sustainability - Applications & Case Studies**

Chair: **Gatama Gichini, Ministry of Education Science and Technology, Kenya**

**EntVenture - From Binary Trees to Kenyan Forests: an Android Game Designed by Students**

Balozi Kironko, University of Eldoret, Kenya

**Towards Interoperable and Sustainable Smart Home**

Andreas Pitsillides, University of Cyprus, Cyprus

**ICT in Kenya and the Fast Growing Volumes of E-waste: Towards a Policy Framework for Sustainable ICT for Development.**

Jecton Tocho, University of Nairobi, Kenya

**The Effects of Electronic Waste on Sustainable Environment in Kenya: A Case Study of Moi University**

Daniel Samoei, Moi University, Kenya

**Innovative ICT Public Awareness Campaign Strategy to Communicate Environmental Sustainability in Africa**

Wilson Okaka, Kyambogo University, Uganda

16:00 Workshop 4e: **African IPv6 Progress Monitoring, Cloud Computing & IXP Deployment**

Chair: **Latif Ladid, IPv6 Forum - SnT University of Luxembourg, Luxembourg**

**IPv6 based Cloud Computing**

Latif Ladid, IPv6 Forum - SnT University of Luxembourg, Luxembourg

**Affordable Access to the Future Internet, IPv6 the Compulsory Transition for Africa**

Jacques Babot, European Commission, Belgium

**Deployment of IPv6 in Africa**

Adiel Akplogan, AfriNIC, Mauritius

**Kenya's IPv6 Case Study**

Alex Gakuru, IPv6 Forum Kenya, Kenya

**The African IXP Program**

Michuki Mwangi, ISOC Kenya, Kenya

17:30

End of Parallel Sessions

09:00 Session 5a: **IST-Africa – Research Capacities and Priorities III**

Chair: **Paul Cunningham, IIMC Ltd, Ireland**

**ICT Initiatives and Research Capacity in South Africa**

Peacemaker Dlamini, Department of Science and Technology, South Africa

**ICT Initiatives and Research Capacity in Botswana**

Phodiso Phole, Ministry of Transport and Communications, Botswana

**ICT Initiatives and Research Capacity in Swaziland**

Moses Zungu, Ministry of ICT, Swaziland

**ICT Initiatives and Research Capacity in Malawi**

Ebony Msikawanthu, National Commission for Science & Technology, Malawi

**ICT Initiatives and Research Capacity in Lesotho**

Lieketseng Tjokotsi, Department of Science and Technology, Lesotho

**ICT Initiatives and Research Capacity in Mozambique**

Zauria Saifodine, National Institute for ICT, Mozambique

09:00 Session 5b: **Technology-enhanced Learning - Case Studies**

Chair: **Jacob Njagi, Ministry of Education, Science & Technology, Kenya**

**Teaching and Learning Mathematics and Sciences Through Creative Computing Cycles**

Vincent Ochieng, Teachers Service Commission, Kenya

**Smart Running in Kenya Kenyan Runners' Improvement in Training, Informal Learning and Economic Opportunities Using Smartphones**

Per-Olof Hansson, Linköping University, Sweden

**Evidence Based Medicine in HIV/AIDS and Reproductive Health Research: Piloting Two Distance Learning Courses in Low-Resource Settings**

Maria Zolfo, Institute of Tropical Medicine, Belgium

**The Reality and Rhetoric of eLearning In Higher Education in Kenya**

Harriet Kidombo, University of Nairobi, Kenya

**Experiences of Designing an eLearning Training Program in a Collaborative Way**

Paula Linna, Aalto University, Finland

09:00 Session 5c: **eHealth - Supporting Telemedicine**

Chair: **Loi Namugenyi, Uganda National Council for Science & Technology**

**Designing a Cloud-Based Multinational Telemedicine Ecosystem for Developing Countries**

Juha Puustjärvi, University of Helsinki, Finland

**Managing Health Systems in a Globalized World: Telemedicine Service Improves Access to Pediatric Cardiology in Cape Verde**

Luis Velez Lapao, Instituto de Medicina e Higiene Tropical, Portugal

**An e-Health Tele-Media Application for Patient Management**

Collins Mwesigwa, Icon Frontiers Uganda Limited, Uganda

**Connecting Remote Health Centres in Africa: Assessment of the SAHEL Programme & Perspectives For The Future**

Ghislain De La Sayette, Astrium, France

09:00 Session 5d: **ICT Initiatives in Kenya**

Chair: **Daniel Obam, Ministry of ICT, Kenya**

**Providing ICT Infrastructure for the Public Service**

Thomas Odhiambo, eGovernment Directorate, Kenya

**Konza Techno City**

Presenter to be confirmed

**Challenges of Implementing eVoting in Africa**

Dismas Ong'ondi, Independent Electoral and Boundaries Commission, Kenya

**Status and Progress of eLearning and eWaste in the Environment Sector**

Vicky Onderi, National Environmental Management Authority, Kenya

**eAgriculture Extension in Kenya**

Richard Kedemi, Kenya Agricultural Research Institute, Kenya

09:00 Session 5e: **Mobile Applications**

Chair: **Bruce Becker, Meraka Institute, CSIR, South Africa**

**Study of SMS Air Interface Delay in Strong and Weak Signal Environments**

Martin Saint, Carnegie Mellon University in Rwanda, Rwanda

**Modulo: A Modular Sensor Network Node Optimised for Research and Product Development**  
Carel Kruger, CSIR, South Africa

**Improving Path Loss Prediction in WCDMA Network Using Principal Component Analysis**  
Ashagrie Getnet, Ethio Telecom, Ethiopia

09:00 Workshop 5f: **ICT for Sustainable Agriculture in Africa**

Chair: **Walter Mayer, Progis Software GmbH, Austria**

**ICT for Sustainable Agriculture in Africa**  
Walter Mayer, Progis Software GmbH, Austria

**Vexcel Imaging / Microsoft, Image Data Collection and Mapping - Global Ortho: Rapid, High Efficiency Ortho Update Technologies**  
Caroline Kinuthia, Microsoft, Kenya

**Opening Access to Research Data for Agricultural Development**  
Ajit Maru, Global Forum on Agricultural Research, Italy

**Weather Index Insurance and Other Climate Related Services through Multi-purpose Monitoring Networks**  
Bernhard Pacher, Adcon Telemetry, Austria

10:30 **Coffee Break: Networking & Exhibition**

11:00 Workshop 6a: **Supporting Skills Development in Africa**

Chair: **Helena Tapper, GESCI, Kenya**

**African Leadership in ICT (ALICT) Framework**  
Helena Tapper, GESCI, Kenya

**African Leadership in ICT: Implementation Experience**  
Senthil Kumar, GESCI, Kenya

**African Knowledge Exchange**  
Mathias Antonsson, GESCI, Kenya

11:00 Session 6b: **Technology-Enhanced Learning in HEIs**

Chair: **Koi Muchira Tirima, Inoorero University, Kenya**

**Determinants of Technology Innovation Implementation Effectiveness in Higher Education Institutions**  
John Kandiri, Kenyatta University, Kenya

**The lasting Effects of the Information Literacy Training Among Undergraduate Students: a Case Study of MUHAS**  
Edda Lwoga, Muhimbili University of Health & Allied Sciences, Tanzania

**A Study of the Sudanese Students' Use of Collaborative Tools within Moodle Learning Management System**  
Izzeldin Osman, Sudan university of Science and Technology, Sudan

**Evaluating the Challenges of Technology Enhanced Learning in Universities in Tanzania**  
Neema Mduma, Tumaini University, Tanzania

**Perspectives on Underutilisation of ICT in Education in Tanzania, Uganda and Kenya**  
Josephat O. Oroma, Tumaini University - At Iringa, Tanzania

11:00 Session 6c: **eHealth - Health Information Management Systems**

Chair: **Ayub Many, Ministry of Public Health and Sanitation, Kenya**

**Open Data Kit, A Solution Implementing a Mobile Health Information System To Enhance Data Management In Public Health**  
Paul Macharia, National AIDS/STIs Control Programme, Kenya

**Strengthening the Health Information System in Mozambique through Malaria Incidence Prediction**  
Orlando Zacarias, Stockholm University, Sweden

**Adoption of Health Information Systems by Health Workers in Developing Countries – Contextualizing UTAUT**  
Josephine Karuri, University of Nairobi, Kenya

**Adapting Mobile Medical Information Search to Low-Resourced Areas**  
Allan Hanbury, Vienna University of Technology, Austria

11:00 Workshop 6d: **AfricaConnect Extension**

Chair: **Lishan Adam, ICT in Development, Ethiopia**

**Examples of Collaboration between the African and European NRENs – The Case of RENATER and SnRER**  
Sabine Jaume-Rajaonia, RENATER, France

**AfricaConnect Extension - Preliminary Survey Results & Scenarios**  
Lishan Adam, ICT in Development, Ethiopia

11:00 Session 6e: **Wireless Networks**

Chair: **Vincent Kaabunga, IEEE Kenya Section, Kenya**

**The Challenges of Implementing EDUROAM in Kenyan University Campus Wireless LANs**

Maureen Njue, Kenya Education Network, Kenya

**Wireless Sensor Networks Testbed: ASNTbed**  
Angeline Gcina Dlodla, CSIR, South Africa

**Building a Sustainable Research & Hcd Eco-system: Case Study of Two Wireless Communication Eco Systems**  
Fisseha Mekuria, CSIR Meraka ICT Institute, South Africa

**Content Hosting and Distribution Framework for Wireless Mesh Networks**  
Thomas Gone, Cape Peninsula University of Technology, Kenya

11:00 Workshop 6f: **ICT for Sustainable Agriculture in Africa**

Chair: **Walter Mayer, Progis Software GmbH, Austria**

**The Importance of IT in Agriculture and Necessity of Agro-ICT Infrastructures**

Lucy Muchoki, Pan African Agribusiness and Agroindustry Consortium, Kenya

**Worldclass Agribusiness Practice: What is the Role of Executive Management Education?**

David Mugun, Strathmore University, Kenya

**Automatic Nationwide Real time Weatherstation Networks to Forecast Diseases, Pest Developments, Irrigation Management to run Risk Management Systems and Reduce Damages for Smallholder Agriculture in Africa**  
Gottfried Pessl, Pessl Instruments GmbH

12:30 **Lunch: Networking & Exhibition**

14:00 Panel 7a: **Senior University Leadership Roundtable on ICT Education, Research and Innovation**

Moderators: **Prof. Harry Kaane, Ministry of Education, Science and Technology & Paul Cunningham, IIMC, Ireland**

**Panelists include:**

Prof. Ogembo Kachienga', DVC for Research, Technical University of Kenya

Prof. Izael Da'Silva, DVC, Academic Affairs, Strathmore University

Prof. Ddembe Williams, Dean, Faculty of ICT, KCA University

Prof. William Okello-Odongo, Director, School of Computing and Informatics, University of Nairobi

Dr. Waweru Mwangi, Director, Institute for Computer Science and IT, Jomo Kenyatta University of Agriculture and Technology

Dr. Edwin Ataro, Head of Electrical and Communication Engineering Department, Moi University

Dr. Kamau Gachigi, Director, University of Nairobi Science Park

Dr. Salome Gichura, Director Higher Education, Ministry of Education, Science and Technology, Kenya

14:00 Session 7b: **Living Labs**

Chair: **Marlien Herselman, Meraka Institute, CSIR, South Africa**

**Embedding Business Model for Sustainable Collaborative Innovation in African Living Labs**

Vincent Grèzes, University of Applied Sciences Western Switzerland

**Using Technology in Livings Labs to Transform Health, Wellness and Disease Management In South Africa**

Alida Veldsman, Nelson Mandela Metropolitan University, South Africa

**Virtual Buying Cooperative: a Procurement Model for Improving the Sustainability of Very Small Retailers in Emerging Economies**  
Mpho Raborife, SAP Research Pretoria, South Africa

**Energy Management Using Living Lab In the Developing Countries**  
Jean Marie Vianney Bikorimana, National University of Rwanda, Rwanda

14:00 Session 7c: **eHealth - Case Studies**

Chair: **Noureddine Hamdi, Ministere de l'Enseignement Supérieur et de la Recherche Scientifique, Tunisia**

**AFRICA BUILD Portal: Developing a Social Network of African Health Researchers and Educators**

Victor Maojo, Universidad Politecnica de Madrid, Spain

**MEDISHARE: a project based on ICT Tools for Improving the Sustainable Development of Capacity in Medical Research**  
Judith Torimiro, Initiative to Strengthen Health Research Capacity in Africa, Cameroon

**An Open eHealth Platform for Real-Time Professional-to-Professional Collaboration**

Jaume Benseny, i2CAT, Spain

**AIMEP for Malaria Mapping and Infectious Disease Eradication**  
Kseniya Khovanova-Rubicondo, Ashburn Institute, Ukraine

**Value Proposition for mHealth Monitoring Solution of Diabetes**  
Suzana Brown, Carnegie Mellon University in Rwanda, Rwanda

14:00 Panel Session 7d: **iMentors**

Chair: **Vasilis Koulolias, eGovLab, Sweden**

**Panelists include:**

Björn Pehrson, KTH, Sweden

Meoli Kashorda, KENET, Kenya

Aida Opoku-Mensah, United Nations Economic Commission for Africa

**Demonstration of iMentor Platform**

Louis Papaemmanuel, eGOVLAB, Belgium

14:00 Session 7e: **Mobile Applications - Leveraging SMS**

Chair: **Lieketseng Tjokotsi, Department of Science and Technology, Lesotho**

**SMS-Based Systems: Towards Implementation of Mobile Discussion Groups**

George Matto, Moshi University College of Cooperative and Business Studies, Tanzania

**SMS Advertising in Tanzania: Factors Affecting Consumer Attitudes**

Deo Sabokwigina, Iringa University College, Tanzania

**Mobile Messaging for Service Integration for Marginalised Communities in Lesotho**

Chabalala Chabalala, The National University of Lesotho, Lesotho

14:00 Session 7f: **eAgriculture**

Chair: **Moses Zungu, Ministry of ICT, Swaziland**

**Mobile Technology in Kenyan Agriculture: Status & Opportunities**  
Amos Gichamba, Africa Nazarene University, Kenya

**Startup Business Models and Challenges of East African mAgriculture Innovations**

Angela Crandall, iHub Research, Kenya

**Mobile Applications for Value Chain Marketing in Agriculture**

Simon Gitonga, Egerton University, Kenya

**The Diffusion of Mobile Agricultural Information Services in Ghana: a Case Study**

Jenny de Boer, TNO, Netherlands

**Bridging the IT Divide - Case Study on the Botswana Livestock Industry**

Dominic Ferguson, Consult IT (Pty) Ltd, Botswana

15:30 **Coffee Break: Networking & Exhibition**

16:00 Panel 8a: **Roundtable on Supporting Entrepreneurship in East Africa**

Chair: **Paul Cunningham, IIMC Ltd, Ireland**

**Panelists include:**

Mary Kiguru, Kenya Methodist University, Kenya

Catherinerose Barretto, KINU, Tanzania

Rachel Gichinga, iHub, Kenya

Martin Tubula, Inoorero University, Kenya

Simon Stumpf, Ashoka East Africa, Kenya

Emmanuel Kweyu, @iLabAfrica, Strathmore University, Kenya

16:00 Session 8b: **Living Labs to Support Skills Development**

Chair: **Darelle Van Greunen, NMMU, South Africa**

**Utilising Living Lab Principles to Model and Create a Collaborative Education Environment – The CAT Schools Programme**

Ulza Wassermann, Tshwane University of Technology, South Africa

**Developing Educational Assessment Tools for ICT Education – a South African Living Lab Approach**

Paul Johannes Retief, Tshwane University of Technology, South Africa

**E-Skills Training on Communal, Fixed Infrastructure as an Activator of Personal Use of Mobile Internet**

Sibukele Gumbo, University of Fort Hare, South Africa

**Maputo Living Lab Summer School of ICTs: an Experience Report**

Pietro Benedetto Molini, Fondazione Bruno Kessler, Italy

**Improving Student Achievement in Science and Maths -- A Living Lab Approach**

Lebohang Kompi, Lesotho National Commission for UNESCO

16:00 Session 8c: **eHealth**

Chair: **Ayub Many, Ministry of Public Health and Sanitation, Kenya**

**Free and Open Source Software for Development of Sustainable M-Health Systems in Kenya**

Stephen Ondimu, JKUAT, Kenya

**Adaptive GUIs Tailored to Different User Groups for Public Health Service Delivery via Fuzzy Logic Membership Functions**

Melanie Platz, University of Koblenz Landau, Germany

**Description of Availability of Medical Care with Fuzzy Logic for Logistic Optimization of Medical Resources**

Matthias Groessler, University of Koblenz-Landau, Germany

**Digital Analysis of Malaria Infected Blood Smears via Mobile Devices**

Dirk Elias, Fraunhofer Portugal Research Center for Assistive Information and Communication Solutions, Portugal

**An Enhanced Entity-Attribute-Value Data Model for Representing High Dimensional and Sparse Healthcare Data**

Augustus Kamau, JKUAT, Kenya

16:00 Session 8d: **Exploiting the Potential of e-Infrastructures to Boost RTDI in Africa**

Chair: **Karin Valin, Sigma Orionis, France**

**eI4Africa: Overview**

Karine Valin, Sigma Orionis, France

**The eI4Africa Science Gateway, its Applications and How people/organisations can Contribute to it**

Roberto Barbera, University of Catania, Italy

**The eI4Africa Demonstrator Projects**

Bjorn Pehrson, KTH, Sweden

**The Knowledge Base of Open Access Document Repositories (OADRs) and How African Libraries can Contribute to it**

Roberto Barbera, University of Catania, INFN, Italy

**Links between eI4Africa, AfricaConnect & CHAIN-REDS in the Region**

Margaret Ngwira, UbuntuNet Alliance, Malawi

**Prospects for Extending Distributed Computing Infrastructure in Africa**

Bruce Becker, Meraka Institute, CSIR, South Africa

**Discussion on Futures Thinking Research Priorities in the ICT Infrastructure Focus Area**

Barend Taute, CSIR, South Africa

16:00 Session 8e: **Mobile Applications**

Chair: **Inas Fateem, Ministry of Communications & IT, Egypt**

**The Role of Mobile Applications in Social and Economic Development in East Africa**

Salesio Kiura, Kenya Methodist University, Kenya

**Towards a Demand-side Smart Domestic Electrical Energy Management System**

Nomusa Dlodlo, CSIR, South Africa

**Leveraging Participation in Entrepreneurship through Mobile Technology**

Leah Mutanu, United States International University, Kenya

16:00 Session 8f: **eAgriculture II**

Chair: **Eric Mwangi, Ministry of Education, Science & Technology, Kenya**

**The Role of ICT in Exchange of Agricultural Information and Knowledge in Kenya: the Case of Kenya Agricultural Research Institute (KARI)**

Boniface Akuku, Kenya Agricultural Research Institute, Kenya

**ICT Adoption Model for Rural Agricultural Communities in Kenya**

Dan Orwa, University of Nairobi, Kenya

**A System Dynamics Analysis of Seed Banking Effectiveness for the Prosperity of Smallholder Farmers**

Benedict Oyo, Gulu University, Uganda

**ICT Solution Architecture for Agriculture**

Fredrick Awuor, Kisii University College, Kenya

**Poultry Contractual Farming Decision Support System**

Thambo Nyati, National University of Science and Technology, Zimbabwe

17:30

End of Parallel Sessions



Friday,  
May 31, 2013

09:00 Workshop 9a: **Mutually Beneficial Africa-EU ICT Research**

Chair: **Karin Valin, Sigma Orionis, France**

**Strengthening ICT Research and Policy links under the 8th Africa-EU Strategic Partnership**

Karine Valin, Sigma Orionis, France

**ICT Research and Innovation for Socio-economic Impact - Focus Areas and Futures Thinking**

Barend Taute, CSIR, South Africa

**Lessons from Innovation Success Stories**

**Innovation Policy Considerations in Africa**

Inas Fateem, Ministry of Communications and IT, Egypt

**Practical Research Collaboration - Demonstrator Projects**

Bjorn Pehrson, KTH, Sweden

09:00 Session 9b: **Transformation of Research Results into Local Innovation**

Chair: **Marlien Herselman, Meraka Institute, CSIR, South Africa**

**Authentic Assessment of Programming Skills in Kenyan Universities**

Joseph Sevilla, Strathmore University, Kenya

**Defining the African Tech-Innovation System & Innovation Index**

Chrisostom Mwairumba, iHub Research, Kenya

**Assessment of Business Process Outsourcing (BPO) in Nairobi County, Kenya: A Case of Selected Organizations**

Peter Wanderi, Kenyatta University, Kenya

**A Three Level Research Gateway for African Renewable Energy Collaboration**

Kim Jansson, VTT, Finland

**Utilization of Knowledge Management Tools in Software Development**

Samuel Kamunya, JKUAT, Kenya

09:00 Session 9c: **Leveraging Open Source Software**

Chair: **Moses Rugutt, Ministry of Education, Science and Technology, Kenya**

**Managing Open Source, Open Access Digital Libraries: Case of Pwani University Library, Kenya**

Wanyenda Chilimo-Muoki, Pwani University, Kenya

**Motivation for the Adoption of Open Source Software in Kenya Academic Libraries**

Michael Maua, Pwani University, Kenya

**Open Source Software Adoption in Mauritius**

Aneerav Sukhoo, Central Informatics Bureau, Mauritius

**Surveying National Systems of Innovation (NSI) Using Free Open Source Software (FOSS): The Case of Ghana**

Ritin Koria, UNIDO, Austria

**Adoption and Diffusion of Open Source Software in Tanzania: A Way Forward.**

George S. Oreku, TIRDO, Tanzania

09:00 Session 9d: **ICT Regulatory Frameworks**

Chair: **Peacemaker Dlamini, Department of Science & Technology, South Africa**

**Regulatory Convergence of ICT Sectors in the East African Community (EAC): Challenges for the Current Legislative and Regulatory Frameworks and Lessons from the European Union Experience**

Joseph Nyaga, InterDisciplinary Centre for Law and ICT (ICRI), Belgium

**Spectrum Award Procedure in the Era of Convergence: A Key Towards Promoting Emerging Mobile Services**

Mahen Soobron, Ministry of ICT, Mauritius

**Broadband ICT Policies in Southern Africa: Initiatives and Dynamic Spectrum Regulation**

Thomas Olwal, Meraka Institute, South Africa

**Policy-Based Radios for Spectrum Sharing**

Malcolm Brew, Mawingu, Kenya

**Assessing the Implications of SIM Card Registration Policy in the SADC Region**

Mbuyu Sumbwanyambe, University of Johannesburg, South Africa

09:00 Session 9e: **Use of ICT in HEIs and Schools**

Chair: **George Ombakho, Ministry of Education Science and Technology Kenya**

**Analysis of the Effect of Wireless Campus Networks on Internet Usage in Kenyan Universities**

Eric Sifuna, Kenya Education Network (KENET) & Elijah Omwenga, University of Nairobi, Kenya

**Understanding the Implementation of Online Assessment in Public Universities in Kenya**

Robert Omulami Manaka & Elijah Omwenga, University of Nairobi, Kenya

**Information Security Management Systems in Public Universities in Kenya: A Gap Analysis between Common Practices and Industry Best Practices**

Philip Mutisya Kitheka, Technical University of Kenya & Elijah Omwenga, University of Nairobi, Kenya

**ICT Adoption Framework in Rural Secondary Schools: Case of Meru, Kenya**

Dorothy Bundi, Kenya Methodist University, Kenya

**Strategies for Wider Use and Access of Digital Libraries in Secondary Schools in Developing Countries: A Case Study of Uganda**

Gideon Wananda, University of Nairobi, Kenya

10:30

Coffee Break: Networking & Exhibition

11:00 Session 10a: **Strengthening Democracy in East Africa through ICTs - Challenges and Opportunities**

Chair: **David Isaksson, Swedish Program for ICT in Developing Regions**

**CIPEA: ICTs for Participatory Civic Engagement**

Ashnah Kalemera, CIPEA, Uganda

**KHRC: How can We Fight Impunity?**

Grace Were, Kenya Human Rights Commission, Kenya

**CHRAGG: New Technology for Reporting Human Rights Abuse**

Wilfred Warrioba, Commission for Human Rights & Good Governance, Tanzania

**ToroDev: ICT4D tools as a Leapfrogging Process for Gender Equality**

Johnstone Baguma, Toro Development Network (ToroDev), Uganda

**Wougnet: Empowering Women in Democratic Processes through ICT**

Goretti Zavuga, Women of Uganda Network, Uganda

**iHub, Mobile Technology in Water Governance**

Anne Salim, iHub Research, Kenya

**TI: ICT for Better Health Service Delivery**

Simon Peter Ogwang, Transparency International Uganda, Uganda

11:00 Session 10b: **eInclusion**

Chair: **Enock Mpenzwa, Ministry of Communications, Science and Technology, Tanzania**

**Auto-Configuration Through Cloud: Initial Case Studies for Universal and Personalised Access for All**

Evangelos Bekiaris, Centre for Research and Technology Hellas, Greece

**Making ICT Accessible for the Deaf**

Darelle Van Greunen, Nelson Mandela Metropolitan University, South Africa

**Evidence of Dyslexia in Special School in South Africa and A Proposal of Assistive Technology**

Mpia Ndombo, Tshwane University of Technology, South Africa

**ICTs and Survival Tactics for the Day-Labour Workers: Implications for Design**

Christopher Chepken, University of Nairobi, Kenya

11:00 Session 10c: **Digital Libraries**

Chair: **Toumane Doumbouya, Ministère de l'Enseignement Supérieur et de la Recherche, Senegal**

**i4Life: Cataloguing the World's Biodiversity**

Alastair Culham, University of Reading, United Kingdom

**Towards Digital Libraries in Kenyan Universities: Concretizing the Prospects**

Joseph Kavulya, Catholic University of Eastern Africa, Kenya

**The Development of a Community-generated Digital Library: the Case of the Ulwazi Programme**

Niall McNulty, McNulty Consulting, South Africa

**The Role of ICT in Appreciating Tri-axis Efforts of Research, Publications and Library Services in Higher Education**  
Richard Omollo, Jaramogi Oginga Odinga University of Science and Technology, Kenya  
**Developing Digital Content and Services: Experiences from the Library of the University of Eastern Africa, Baraton, Kenya**  
Margaret Adeogun, University of Eastern Africa, Kenya

11:00 Session 10d: **Probe-IT: The Internet of Things in Africa**

Chair: **Sofiene Sghaier, CERT, Tunisia**

**Current IoT landscape in Africa**

Hend Ben Hajji, CERT, Tunisia

**IoT Demos from South Africa**

Louis Coetzee, Meraka Institute, CSIR, South Africa

**Birds of a Feather**

11:00 Session 10e: **mBanking**

Chair: **Phodiso Phole, Ministry of Transport and Communications, Botswana**

**Organizing Innovation to Deliver Financial Services to the Base of the Pyramid**

Bineke Posthumus, TNO, Netherlands

**ICT and Financial Inclusion: Adoption of Mobile Phone Banking Among Small Business Owners at Iringa, Tanzania**

Hosea Mpogole, Iringa University College, Tanzania

**Mobile Banking Influence on Wealth Creation and Poverty Reduction for the Unbanked**

Jimmy Macharia, USIU, Kenya

**Artificial Neural Network Based Expert System: A Case Study of Kenya Commercial Bank.**

Jane Juma, Great Lakes University of Kisumu, Kenya

12:30 **Lunch: Networking & Exhibition**

13:30 Closing Plenary 11: **Closing Plenary**

Moderator: **Dr Eric Mwangi, Ministry of Education, Science and Technology Kenya**

**Horizon 2020**

Stephane Hogan, Science Counsellor at the EU Delegation to the African Union, Ethiopia

**African Internet Exchange System (AXIS) & AfricaConnect**

Moses Bayingana, ICT Expert, Information Society Division, African Union Commission

**IEEE's Information Society Activities in Africa**

Vincent Kaabunga, IEEE Kenya Section, Kenya

**Role of ICT in Vision 2030**

Grace Wandera, Director of Strategy, Vision 2030 Delivery Secretariat

**Future of Innovation and ICT Research in Kenya**

Prof. Shaukat Abdulrazak, National Council for Science and Technology, Kenya

**Awards and Formal Closing of IST-Africa 2013**

## Opening Plenary

The Opening Plenary Session was in two parts, starting with a number of high-level presentations from the Host Government, European Commission and African Union Commission to provide an overall political context for the **IST-Africa 2013** Conference.

The formal Opening Plenary was moderated by Prof. Harry Kaane, Higher Education Science and Technology Secretary, Ministry of Education, Science and Technology, Kenya. Prof. Kaane welcomed the participants and plenary speakers, expressing the pleasure of the Ministry that Kenya was selected to host the **IST-Africa 2013** Conference. He outlined the importance for researchers to work in multidisciplinary teams to produce results that impact on social problems, supporting social transformation that can be taken up quickly. Prof Kaane introduced the three plenary speakers – Mr Morten Møller, Programme Coordinator, DG CONNECT, European Commission; Mr Moctar Yedaly, Head of Information Society Division, African Union and Prof. Crispus Kiamba, Permanent Secretary, Ministry of Education, Science and Technology, Kenya who also represented the Cabinet Secretary.

### European Commission Address by Mr Morten Møller, Programme Coordination, DG CONNECT, European Commission



Mr Møller thanked Prof. Kaane for the introduction and expressed his pleasure to speak on behalf of the European Commission before such a distinguished audience of policymakers, practitioners, researchers from leading government and research organisations from Africa and other continents. Given his interest in research, he looked forward to learning more about research and innovation cooperation priorities between Europe and Africa.

Mr Møller highlighted that it is common knowledge today that ICT and Innovation has a key role to play in creating sustainable jobs and fostering economic growth. There is a clear correlation between countries with the best rollout of broadband and economic

performance. There is also a clear correlation between countries who spend most in research and innovation and economic performance. ICT contributes to economic recovery and long-term prosperity by accelerating growth in productivity. So, a strong ICT component will be required to overcome the challenges that are facing us today, be it youth unemployment, aging or other challenges in Europe, Africa and in the world at large. Being aware of this, the European Commission is launching a new Research and Innovation Programme, called Horizon 2020, which will start in 2014 and run until 2020. It is the continuation of the current framework programme for research (FP7), but it also combines the programme for innovation (Competitiveness and Innovation Programme) as well as the European Institute of Innovation and Technology. Horizon 2020 will bring together all the different elements needed in order to boost research and innovation into one programme.

Mr Møller outlined that the ultimate aim of Horizon 2020 is to maximise the contribution of EU-funded research to sustainable growth and jobs, and to tackle the grand challenges which are facing the world today such as climate change, clean energy, more efficient transport, food security, sustainable societies, secure societies, health and ageing populations. The Commission Services will create a coherent set of instruments along the entire innovation chain, covering everything from basic research up to concrete, tangible innovation, culminating in bringing innovative products and services to the market and supporting non-technological innovation, for example, in design and marketing. So Horizon 2020 is planned as a very broad programme, spanning the whole innovation cycle. It is divided up into three priorities: Industrial Leadership, Societal Challenges and Excellent Science.

The Industrial Leadership priority aims at supporting strategic investment in key generic technologies. It is envisaged that half of the budget will go to ICT as the most prominent technology, but it also covers areas like advanced materials, advanced manufacturing, space, biotechnology and nanotechnology. So, the whole spectrum of key enabling technologies are covered under Industrial Leadership and the aim is to boost innovative products and services in these generic technologies which can be used in the other parts of the programme.

The real innovative part of Horizon 2020 is the focused on Societal Challenges. This sub-programme aims is to tackle the major societal problems that are particularly acute in today's world and to reflect the EU's goal of achieving a sustainable development and achieve growth and jobs. So the aim is, through multidisciplinary research and innovation to try and provide real tangible solutions to the problems which we are facing today and there are six areas which the programme will focus on: health, energy, transport, climate, sustainable societies and secure societies, and then food, and the whole area around food.

Mr Møller outlined that the Commission Services is aware that world-leading innovation cannot be achieved without a sustained investment in world-class science. This requires supporting human capital development by attracting and retaining the most talented people and providing them with necessary research infrastructure. This constitutes the precise focus of the Excellent Science challenge, which will include the creation of scientific and technological knowledge in the European Research Council, which supports eminent individual researchers. It will also cover areas like Future and Emerging Technologies, which is collaborative research focused on ground-breaking, pathfinding, blue sky research. Activities like capacity-building through exchange of researchers and institutions and between industry and research organisations (Marie Curie Programme) will continue to be supported, and provide tangible research support to the infrastructure-building of the different organisations.

Mr Møller highlighted that Horizon 2020 is based on a new approach building on scientific disciplines for market sectors and a much more integrated approach focused on providing tangible solutions to real problems. Horizon 2020 is still a work in progress, as the final details are still under discussion.

Mr Møller emphasised that Horizon 2020 is completely open for participation from any third country. There are a few differences in the funding compared to FP7 as BRICS countries will no longer automatically receive funding but all other developing countries will continue to enjoy access to funding. During FP7 there were about seventy projects funded in the ICT area with more than forty organisations from Africa participating. It is hoped that African participation will continue to improve with Horizon 2020 as it is focussed more on real problems and there is a clear focus on actually developing a more coherent international collaboration strategy.

Mr Møller highlighted that over the last couple of years real progress has been achieved in the research infrastructure connecting Africa, Europe and the World. Africa Connect is beginning to establish a high-capacity network for research and education in Southern and Eastern Africa to provide the region with a gateway to global research collaboration and a connection to the European backbone network. This represents a major breakthrough for the African scientific community and will provide researchers and students with what they need to collaborate with worldwide peers and to access remote computing and scientific data resources. Within Horizon 2020 it is also proposed to have a strong focus on making data more accessible, through open data to ensure access to the necessary resources and databases for researchers from anywhere in the world.

ICT also faces important challenges in developing countries, such as 'brain drain' problem, and we offer solutions encountered in important sectors such as health, education, civil protection and the protection of the environment. And in this regard the European Commission recognises three key priorities for the collaboration on development: 1. Harmonisation and alignment of the e-communication policies and regulatory frameworks of the developing countries with the EU framework to promote a fair, transparent, enabling environment which will improve the ICT access for citizens, businesses and organisations in the target countries; 2. Interconnection of national research and communication networks using e-infrastructure through the GÉANT research backbone network which will provide the necessary bandwidth to support collaboration with the different research communities around the world and 3. ICT capacity-building to reduce the digital divide, for instance by developing digital literacy and digital skills but also through the uptake and better understanding of new emerging technologies, applications and services and a rollout of broadband and the promotion of free and open access to the Internet.

In summary Mr Møller highlighted that there are numerous opportunities for collaboration between Europe and Africa, and invited the participants to continue to work together and strengthen the collaboration. In conclusion he wished the participants a successful and productive conference.

## **African Union Commission Address by Mr Moctar Yedaly, Head of Information Society Division, African Union Commission**

Mr Yedaly outlined that the IST-Africa Conference has always been one of the greatest opportunities for African and European researchers and policy makers as well as for European Commission and African Union Commission to meet and exchange on matters related to the implementation of the EU-Africa Partnership. The event is evidence that this Partnership is not only something happening in the political cloud, but something concrete, something inclusive, something about action. IST-Africa 2013 comes right after the conclusion of the 21st African Union Summit of the Heads of State and Governments and the commemoration of the 50th anniversary of OAU. Indeed, four days ago we have celebrated the birth of the Organisation of African Unity of the African Union under the team Africanism and Renaissance.

Fifty years ago, the 25th of May 1963 was a truly momentous day in Africa marking the establishment of the continental organisation. It was the culmination of over a century of pan-Africanist strategy to assert the dignity of the African peoples. It has showcased the desire of unity of the African people and their desire to overcome the balkanisation of the continent. It was also the repudiation of negative stereotypes of racialist interpretations of African history. The establishment of the OAU was about Africans taking pride in their continent, and indeed, our own destiny. By that act, our founding fathers came towards the consolidation of the independence of our countries and to strengthen the solidarity across Africa and total liberation of the continent. They did not



only lay the foundation of our unity through a common African identity but also triggered the dynamics of actions and effort to integration and sustainable development that our continent today is pursuing.

Mr Yedaly highlighted that ICT, Science and Technology are playing a vital role in pursuing the African Union vision to build an integrated, prosperous and peaceful Africa, an Africa managed by its own citizens and representing a dynamic force in the international area. The Internet of all things is at the centre of this play. ICT has improved the lives of Africans and is driving the entrepreneurs, innovation and economic growth. The effect of ICTs on the African economies is impressive. Today, about 62 percent of all populations of Africa is below 35 years of age and more than 20 percent are between the 15 and 24 years age bracket. By 2020 c.70 percent of the youth will be at least 20 years old - these are the actors for ICT, Science and Technology. The future of the continent and the future of those sectors, of ICT, is what those young people will do with it. The African Union is faced with several decisions in relation to developing strategies to make sure that Science, Technology and Innovation is relevant to our society, to increase woman and youth participation in Science and Technology, to motivate scientists to reduce the brain drain and to implement the programme for infrastructural development in Africa.

Mr Yedaly highlighted that IST-Africa Week takes place during a critical change in the international landscape of ICT and Internet governance. Issues related to the unity and coherence of the Internet and those related to cyber security and the freedom of the Internet are being discussed at the international level. Africa should contribute positively to this debate. The AU recognise the effort of the technical community, academia and government that started the Internet, and believe that private sector, civil society and governments and technical communities should keep building the Internet for the benefit of all humanity. Africa is the cradle of humanity, it is also the continent of the future. The middle class will be about 208 million people by 2020. This is an African engine. Africa's spectacular economic growth over the last two years was actually impressive (5 percent per year) and it is assumed that by two years from now the goals attained will be at 7 percent, towards eradicating poverty on the continent. We must create a global political space in which we can all contribute and to cooperate. While inviting all stakeholders to inclusion and cooperation are at the centre of all our actions, to join AU action so that together we can develop ICT and science and technology for the benefit of our economies, our people. This principle, with objectivity of professionalism transparency and, above all, the love of our continent, should be our priority.

Mr Yedaly concluded by inviting the participants to have a very fruitful conference.

### **Opening Speech by Prof. Crispus Kiamba, Permanent Secretary, Ministry for Education, Science and Technology, Kenya**

Prof. Kiamba welcomed Mr. Morten Møller of the European Commission, Mr. Moctar Yedaly of the African Union Commission, delegates from Europe and Africa, the IST-Africa partners and distinguished guests to Kenya.

On behalf of the Republic of Kenya and the Cabinet Secretary, Prof. Kiamba acknowledged the honour bestowed on Kenya to host this conference and exhibition which is being organised by IST Africa Initiative with support from the European Commission. He thanked the European Commission for this support, and very much looks forward to a continued strengthened cooperation in the areas of ICT and Science, Technology and Innovation. He thanked the African Union Commission, the Kenyan Education Network (KENET), SPIDER and IEEE for supporting



the event. Prof Kiamba expressed a special acknowledgement to the IST Africa project coordinators, Paul Cunningham and Miriam Cunningham of IIMC International Information Management Corporation Ltd, Ireland for their commitment and dedication in making sure that this conference and exhibition took place in Kenya. Kenya has collaborated with IST-Africa since 2008, and has been an active partner since 2009. The Ministry looks forward to continued and indeed strengthened relationship and coordination between the IST-Africa Initiative and Kenya. Prof Kiamba outlined that he had had the pleasure of participating in three previous IST-Africa conferences and benefited immensely from this participation. He trusted that the participants would benefit for this event

in Nairobi and take the opportunity to make new friendships and start new collaborations.

Prof. Kiamba highlighted that Science, Technology and Innovation including ICT are essential for economic and social development and are particularly central to competitiveness in a rapidly globalising, increasingly knowledge-based world. We are aware that most European and North American countries, and especially the recently industrialised East Asiatic countries, all have had rapid, sometimes unprecedented development to the rapid and aggressive utilisation and application of Science and Technology, including ICTs in the main areas of human endeavour and health, agriculture, environment, governance and so forth. African countries have too started to recognise that fact, as evidenced by the many Ministries of Science and Technology or Departments of Science and Technology and Departments of ICT that are being established to dedicatedly provide the necessary leadership in policies, strategies and in the application of these sciences and technologies for development. This is reflected in terms of Africa, for example, in the establishment of the African Ministerial Conferences, one of Science and Technology, another one of ICT under the auspices of the African Union. This has similarly been followed by development of the Consolidated Plan of Action to address Africa's Science, Technology and Innovation Agenda and the African Regional Action Plan on the Knowledge Economy to address the Information and Technology Agenda. Similarly, most African countries are now in their second cycle, of Science, Technology and Innovation and Knowledge Economy policies, strategies and programmes.

In the case of Kenya, Science, Technology and Innovation and ICT, have been identified as key foundations, on which the economic, social and political pillars of our development are anchored. This long-term development envisioning is what we have come to call the Kenya Vision 2030, and indeed in many African countries, similar long term development and envisioning is taking place, Kenya is not an exception.

In 2000, Africa and Europe came together in the Africa-Europe Summit in Cairo, to underscore the need to cooperate in Science and Technology for development and the commercial need for development and cooperation of the two continents. In 2007, during the Lisbon Europe-Africa Summit, the plan for that cooperation became better defined and structured. This led to the development of the joint Europe-Africa Strategy and strategic partnership in eight areas. This included the 8th Partnership on Science, Information Society and Space which had three priorities: 1. To support the development of an inclusive information society in Africa; 2. To support Science and Technology capacity-building in Africa, in order to largely implement Africa's Science and Technology Consolidated Plan of Action. And finally, to enhance cooperation on space and technology.

Prof. Kiamba highlighted that the IST Africa Initiative activities are heavily oriented towards priority number 1 on supporting the development of an inclusive Information Society in Africa whose objective is bridging the digital divide and to enhance the use of Information and Communication Technologies as key enablers for poverty reduction, growth and socioeconomic development. It is with this background that the creation of the IST Africa Initiative and its subsequent activities are not only timely but also commendable. Prof. Kiamba noted that the IST-Africa conference and the Living Labs Thematic Working Group held on Tuesday has thematic sessions covering many areas that will address the challenges identified above. It is worthwhile to emphasise that the Consolidated Plan of Action for Africa's Science, Technology and Innovation that is presently undergoing review has a problem cluster on Information and Communication Technologies and Space and Science Technologies. Both the African Ministerial Conferences on Science, Technologies and ICTs expect that the discussions held

during IST-Africa 2013 will focus on partnerships with other African countries, re-focus on projects identified under the above cluster and indeed other clusters under the African Regional Action Plan on the knowledge economy, as mentioned earlier.

Prof Kiamba outlined that it is his sincere hope that the outcome of this conference, and yesterday's Living Lab Thematic Working Group Meeting will accelerate the focused implementation of the AU-EU 8th Strategic Partnership. The Ministry of Education, Science and Technology is also actively involved in Era Net for Africa (ErAfrica), BRAGMA (GMES & Africa) and CAAST-Net+, which are supporting other components of the 8th Africa-EU Strategic Partnership.

In conclusion Prof. Kiamba encouraged participants to work together to continue improving African participation in International Research Collaboration. Mr Møller has given us quite a lot of information on the latest discussions with respect to Horizon 2020, which has progressed from the framework programmes, in particular FP7. It is up to us, as sons of the soil, as we were taught by Mr Yedaly from African Union Commission, to take advantage of that opportunity. In his view, the essence of your Ministries is to create an enabling environment and necessary connections to enable our researchers to do the best that they can for the sake of our countries in Africa.

Prof Kiamba reiterated that the strong political support that comes from Africa and Europe on the importance of the urgency that through cooperation, investment and utilisation of science, technology and innovation, including ICTs, Africa must address unnecessarily debilitating societal challenges that confront our continent. It is through partnerships that we can work together to confront these challenges.

Prof Kiamba concluded by stating that it was a pleasure to support collaboration and partnerships between Europe and Africa as Permanent Secretary of the Ministry of Science and Technology and later the Ministry of Education, Science and Technology. Upon his return to the University of Nairobi he will continue to actively support such collaborations. On behalf of the Cabinet Secretary, he declared IST-Africa 2013 open and wished the participants the best.

## High Level Roundtable on the Implementation of the Information Society in Africa

Paul Cunningham, IST-Africa Coordinator welcomed the panelists and participants to the High Level Roundtable on the Implementation of the Information Society in Africa. Paul introduced the distinguished panel and provided an overview of the format that would be followed. As in previous years the Roundtable will focus on a number of strategic topics, each of the panellists will have an opportunity to respond to those issues that they feel they would like to make a contribution to, then if a colleague makes a contribution they would like to comment on or

clarify, they will have an opportunity to do that as well.



The panellists included Dr Katherine Getao, ICT Secretary, eGovernment Directorate, Kenya; Mr Moctar Yedaly, Head of Information Society Division, African Union Commission; Dr Koi Tirima, Deputy Vice Chancellor, Inoorero University/LIWA, Kenya; Prof. Meoli Kashorda, Executive Director, KENET, Kenya; Mr Jerome Morrissey, CEO, GESCI, Kenya; Mr Daniel Obam, Ministry of ICT, Kenya and Mr. Christopher Kemei, Assistant Director, Licensing - Compliance and Standards, Communications Commission of Kenya.

### Progress in Implementing the Information Society and Knowledge Economy in Africa and the Role of ICT Research and Innovation

Paul invited **Moctar Yedaly, Head of Information Society Division, African Union Commission** to share insight into progress in implementing the Information Society and Knowledge Economy in Africa and specifically

the role of ICT Research and Innovation.

**Moctar** outlined that Africa has made good progress over the last ten years in terms of implementing the Information Society, but still a lot to be done. In relation to the voice market and mobile, GSM mainly, you will see that in some African countries we have reached almost 90% growth, and for instance, Kenya is one of the live examples, really one of the transformative applications. However, if you take out the shining success stories, you find that voice applications in Africa are really yet to be developed, specifically in the area of e-health, education and e-agriculture, all e-governance services actually. This is an area that needs further development.

According to recent reports, the future of ICT and Information Society will be mainly based on mobile technology. Ensuring the necessary infrastructure and appropriate spectrum for developing and delivering mobile applications is critical. Those transformative applications really need to have emphasis on the intervention of e-governance on the policymaker. One of the points that will probably be very challenging in developing those applications will be the issue of the confidence of the cyber space and that is why the African Union has developed the Convention on Cyber Security, which will hopefully be operational in 2014. The African Union Commission is now looking at this issue with 360 degree point of view and has initiated many projects and taken some initiatives that are actually implementing the programme for infrastructure development in Africa, which is the backbone such as country migration deadline of 2015 with support from the African Telecommunication Union and the Pan-African Network for tele-medicine and tele-education which is already operational with more than 10,000 students leveraging it.

With regard to ICT research, Moctar outlined that it is very important that initiatives such as Living Labs are supported. Africa Connect must be initiated and accelerated in terms of having the cooperation of all the stakeholders from the bottom up, participating in the development of the Information Society.

Paul thanked Moctar and invited **Mr Daniel Obam, Ministry of ICT, Kenya** to share a national perspective.

**Daniel** provided some background on the Information Society Summit Process, which started in Geneva with the declaration of principles, which is then tied to the Plan of Action. There are 11 principles those countries who met in Geneva in 2003 committed to, including development of infrastructure to support the Information Society.

From Kenya's perspective, there has been a significant development in infrastructures since 2005 to support the achievement of the Plan of Action. In 2005, for example, Kenya's total international bandwidth was 2 megabits per second and now we are almost in terabytes. The Government has actively support infrastructure development for example in the case of the Teams Project, the Government of Kenya made a deliberate intervention to connect Kenya to the international submarine cables, by funding a cable. A fibre backbone has also been developed within the country so that international bandwidth can be used by various stakeholders. It is interesting that, not only in Kenya, but within the East African community, at one time there was discussion about putting a special common connection but by the time the consultant was hired and the report written, it was concluded that it was not necessary to build a network because countries had already built their own internal infrastructure that would connect to the submarine cables. We are working with other East African governments to try and see that between Kenya and its East African neighbours that the fibre is actually connected for integration.

Then there is the issue of access to information, which is part of the Plan of Action. About two years ago, Kenya launched the Open Government Portal, where information from government agencies is being put online so that it is easier to access this information. These are some of the efforts that the Kenyan Government is supporting to implement the Information Society.

One key actions required of Government was confidence in using ICTs. With the deployment of networks and especially broadband, there are many challenges to be overcome. The Government is working towards putting mechanisms in place so that cyber security issues are addressed to facilitate people to use this Information Society infrastructure to transact their business, as safely as possible.

Now, how does this tie up with innovation? To be able to use the information that these networks bring, we need to have innovative solutions, first of all in terms of content, the access to devices, and even the applications that will be used to access the information on the networks. So, innovation plays a very important role in actually actualising these efforts that the Government is putting in place.

Paul thanked Daniel and invited **Dr Katherine Getao, ICT Secretary, eGovernment Directorate** to provide her insight from the perspective of being responsible for public service delivery in Kenya.

**Katherine** outlined that eGovernment usually requires massive investments in parts of the government. Many of the projects in Kenya are tens of millions or even hundreds of millions of dollars, and these projects are implemented usually with more questions than answers. We are often forced to base what we do on what has succeeded in another country, where some of the technological issues, social issues, organisational and managerial issues are really very different from our own environment. And therefore, just like many ICT projects, we do suffer a substantial failure rate from these expensive projects that use taxpayers money. Therefore, the

issue of research is basic and fundamental to eGovernment projects so that we can answer some of the questions that arise such as technological issues, terrain and the working environment, equipment, issues of the systems and the way that they are used and the way they can be secured, issues of rapid development. An example is, last year the eGovernment Directorate did a survey of the whole country because they wanted to put up some WiMax. By the time that the project was ready for implementation, seven months later, very many new buildings and new infrastructure had come up and therefore it was necessary to do a redesign of the implementation. Recently Katherine was talking to the Department of Physical at the Ministry of Lands and Housing and told them that apart from the types of planning that they do now, they have to add to their portfolio, skyline planning, so that these type of wireless projects can be provided cost effectively.

With raising standards, the issue is that there is often a disconnect between research and practice. Katherine outlined that she was in the university for 22 years teaching and doing research and then went into government. Many of her staff were people she had trained and now she could see the gaps. And the same thing, the kind of research being doing at the University, the kind of projects that are being done by the undergraduates and postgraduates, were completely unrelated to the kind of questions that they want answered in Government.

Katherine outlined that it would make sense to harmonise these so that one group could raise questions and the other could provide answers. The eGovernment Directorate has created a framework, although it is not fully in use, to integrate research into all eGovernment programmes and projects, so they can learn as they go along, and build a knowledge base of use cases and then apply it to other projects that are happening in their own environment. The eGovernment Directorate also does outreach into the universities, to share problems, sending them a list of problems that they have, which they hope will attract some postgraduate students to take up some of those problems as their research projects. They have also tried to influence the development of postgraduate programmes in particular in some universities, so they advise what they should include as part of their content.

Katherine explained that some of the challenges being faced include the fact that because of the way procurement for projects is structured in government, the research or the study part is not included. Another reason is that, for example, as we go through PPPs, the Directorate often have very good ideas that they want to present to the private sector but the first thing the private sector ask for is a feasibility study and often the Directorate has no way of funding that in the midst of procurement, so actually it becomes a barrier to further action. Katherine invited the participants to think about how the academics could fill that gap more cost effectively. But, in the meantime what the Directorate has done is use some private sector corporate social responsibility projects, like the IBM Corporate Social Cause, they have done two studies for the Directorate and have also tried to do some frameworks. This is just a way of partially filling the gap as the Directorate waits for better structures and frameworks to really address this issue.

**Paul** thanked Katherine for her insight. As discussed during the Living Lab Thematic Working Group on Tuesday, Living Labs have an important role in multi-stakeholder partnerships, bringing together the public, the private sector, the education and research sectors to share insight, knowledge and experience, to avoid the mistakes of the past, to reconsider curriculum development, particularly in terms of research carried out in the universities and the role that that has to play for government.

Paul then reverted to **Moctar Yedaly, Head of Information Society Division, African Union Commission** who wished to provide additional input.

**Moctar** highlighted that most of the time people have the tendency to forget that the postal sector is a component of the Information Society and the African Union is now about to give the postal sector a new role to play. The post office will certainly be the platform for most of the e-services particularly in rural areas and remote places. The postal service will probably be the one securing the electronic signature, providing the platform for e-commerce, serving as a tele-centre, e-learning centre, and e-government centre: because they have at least some infrastructure. So, one of the actions that will actually being taken for the postal union, led by Bashir Hussein is making sure that we will not only have the renaissance of Africa but also the renaissance of the postal sector.

Paul thanked Moctar for adding this dimension to the discussion. Paul agreed that the whole issue of multipurpose governmental and public sector infrastructure is something that we all need to think very carefully of. In Ethiopia, for example, the government is rolling out the first 60 of 680 planned local community centres that will provide local internet access, provide training and the Ministry of ICT made the offer to make those centres multipurpose, public sector infrastructures. Paul highlighted that this issue of leveraging the postal service infrastructures is the same, because they are in local communities, they are very important and it is something we are going to be talking more about over the next couple of days.

## How does improved eInfrastructure in Africa (and concrete developments such as AfricaConnect, African Internet Exchange System (AXIS), Progress on developing African national and regional research & education networks (NRENs) and their interconnection to European GÉANT2 network) support the transformation of education and research cooperation?

Paul then proposed that the panel discusses the importance of infrastructure, and the importance of what goes in the infrastructure. So, how does improved infrastructure in Africa and concrete developments like Africa Connect, the African Internet Exchange System, progress in developing research and educational networks and NRENs and their interconnection to GÉANT support the transformation of education and research cooperation? This is a challenge at national level as well as international level.

Paul invited **Moctar Yedaly, Head of Information Society Division, African Union Commission** to provide the first intervention on this topic.

**Moctar** agreed that the NRENs are very important, because this is the opportunity for cooperation at national, regional and global level to make sure that people are exchanging information to help each other to leapfrog on developing things. The African Union point of view with regards to this, again is, globally speaking; Africa should not miss the turn of the ICT and communications, Africa should not miss the turn of research, science and technology, because it has been said that the challenges to our development have mostly been due to the fact that we missed the age of industrialisation. The age of Communication should not be missed leveraging capacity-building and cooperation among us at international level, Africa has a lot of potential in terms of its people and their ideas. All that is missing is that opportunity to make sure they are getting the right information and not starting again reinventing the wheel.

Moctar outlined that the African Union Commission is also making sure that a kind of information system space is appropriately created, to make sure that there is proper connection from the infrastructure point of view, because they need that extra infrastructure to be really connected. The satellite provides the connectivity that is needed, we are creating a kind of ecosystem around the internet exchange points which are very crucial now to the exchange of information. So far, in order to communicate within in Africa we need to go through a third party, which makes the communication very expensive. So the African Union has created the programme of Access so that each and every country has its own Internet exchange point. It is necessary to also build capacity in Africa and local content to keep down the communication costs for universities.

Paul thanked Moctar and invited **Mr Daniel Obam, Ministry of ICT, Kenya** to share a national perspective.

**Daniel** agreed it was necessary to share resources between Africa, Europe and the rest of the world. Connecting with international exchanges helps making resources available. Daniel added to Moctar's point in relation to the cost of communication – based on spending about \$600 - \$700 million every year sending intra-African traffic abroad and then bringing it back, by saving half of that money, Africa would have \$300 - \$400 million to invest it in the kind of effort and collaborative research and innovation facilitated and showcased by IST-Africa. Kenya has had a very good experience since it established National Internet Exchange Point.

Paul thanked Daniel and invited **Prof. Meoli Kashorda, Executive Director, KENET** to provide an NREN's perspective.

**Meoli** expressed his pleasure to participate in the panel and outlined that he represents KENET, the research and education network of Kenya as well as UbuntuNet Alliance, the African research and education network. To provide a context for what research and education networks have been doing, and what has been the impact of all these boosts in infrastructure, the regional infrastructure, what it actually means to our communities, Meoli provided some background in relation to KENET.

KENET is a bottom-up organisation, started way back in 1999 to promote collaboration and partnership to improve the research environment of students and faculty and the people who work in universities and research institutes. What has happened recently is, obviously a lot of infrastructure has come up, but one of the things that has probably not been recognised is that when we discuss research and education infrastructure is that it starts from a campus. So if a university does not have a gigabyte, it does not matter what is available in Mombasa, this is the change we have actually been working on, just to make sure that national university campuses can actually absorb the traffic and can communicate and collaborate.

Meoli gave an example - in January 2009 universities were only absorbing about 70%, that has grown today to just over to gigabytes per second of traffic. Unfortunately over 90 percent of that traffic is headed to Europe and North America, not even to Asia. There is very little local traffic and as students and faculty follows content, this creates challenges. We've got real broadband, there is a great difference between having a national fibre, undersea cable landing in Mombasa, or even the national fibre at so many kilometres, than having it in a campus.

And over the last five years KENET has about 60% of 123 campuses they connect on last mile fibre and probably about 36 of the major university campuses are on at least a one gigabyte link into the KENET backbone.

An NREN is capital intensive, as it is necessary to buy the equipment and to have the engineering capacity to operate it. KENET has been fortunate enough to have a grant from the government of \$22.5 million and the university, the community itself has contributed a similar amount in that same period. This is how the network has stayed sustainable.

KENET undertakes readiness studies to try and establish exactly what the Internet broadband is being used for. Is it changing the learning environment? The original idea was to improve the learning environment and therefore create an innovation platform; KENET asks those questions but doesn't have all the answers because it's ongoing research but what they see is a significant increased use of e-journals, hardly any of the students now use print-based journals, they go to the internet and get the latest journals. The library consortium in Kenya is extremely well organised, they buy journals electronically, and we also see a move towards e-books. It also turns out that there are lots of open educational resources out there, and the students discover it even before the faculty. So they have access to pdfs, they have access to all the open educational resources that are out there, even from the leading professors anywhere in the world. But KENET also sees, especially in our area of ICT, lots of use of digital libraries. We used to struggle with the speed when accessing digital libraries, but these days it is quite easy to get access to those digital libraries.

KENET provides virtual private connections, which means that even when the students are outside the campus, because most of them are off-campus, they can still access some of these university-based resources.

KENET is starting to see lots of collaboration increasing, last week for example we saw examples of co-teaching between US and Kenyan universities, you have joint classrooms using the video conferencing infrastructure because of broadband. We see universities like schools of medicine and these collaborations are not possible without a lot of broadband connectivity. We have seen several PhD theses being defended online, they are able to come to our facility and then for three or four hours they defend their theses. This is increasing, KENET haven't collected all the stories, but the stories are many. We have examples of especially doctoral students being able to use high performance computing infrastructures in other countries, especially South Africa and lots of those countries. And that's why you see KENET is working hard to get these priorities so that our professors can have access to resources easily.

Inside Kenya there is lot of remote teaching starting to happen, so broadband has really changed collaboration. Kenya will soon have direct links for the first time with South Africa, because there is a lot of traffic between the two countries but right now it passes through Amsterdam and London, but that will be able to go directly. KENET promotes the use of ICT aggressively and sees a huge increase in broadband traffic being generated by the national university community.

Paul thanked Moeli for providing this positive insight into developments in research and educational networks and achievements to date.

## **How can Innovation be better supported to ensure faster take up of co-created products and services, in both the public and private sector, and what implications does this have in terms of potential policy changes?**

**Paul** highlighted that East Africa and Kenya in particular, has experienced a dramatic increase in ICT-related innovation, particularly over the last two years, with both independent and university-based innovation spaces, particularly those supporting independent entrepreneurship. So this is a very welcome development that is clearly well-aligned with Kenya's Vision 2030. So, how can this innovation, how can this latent entrepreneurship be better supported to ensure faster take up of the results of co-created products and services in both the public and private sectors? And what implications do these have for potential policy changes?

Paul invited **Dr Katherine Getao, ICT Secretary, eGovernment Directorate** to provide her insight.

**Katherine** confirmed she was very excited by the developments and many success stories in Kenya which are driven to a considerable degree by young people. This has given Kenya worldwide profile and it's something Kenyans are very proud of because it is been done by the young people. Katherine confirmed that she liked the statistics provided by Moctar about the very youthful population, and they want to do business in a new way.

Katherine outlined that as Government they are now seeing that it will soon to necessary to communicate with people in a different manner to traditional letters. In the future we will become people keeping in touch with their friends and family using social networks, who are used to checking their email every couple of seconds and 'Twittering' and communicating in other ways and, of course, Government must follow suit.

Katherine highlighted that Government has to enter these innovations spaces, because they need to produce

technological solutions at the speed of light. It will no longer be planning for three years, then doing a feasibility study for one year and then producing outdated solutions. We really need to begin doing things in a new way. The eGovernment Directorate have an example based a device that they co-created as the Directorate of eGovernment, with the FabLab at the University of Nairobi. This was as a result of a visit to Brazil, where several senior government officials and CEOs of state corporations, noticed that there was a device called a 'cintoria' in Brazil, which is used in public service outlets for citizens to give feedback about the quality of the service. Given that in Kenya there are performance requirements in nearly every government department or State Corporation who is offering services to the public to do a customer survey to find the quality of their services. This outlet had immediate appeal as the citizen rates the service as they receive it rather than a survey later.

The eGovernment Directorate started talking to Brazilian companies to see if they could provide them with the same technology but to Katherine it seemed like a very simple electronic device which could build and customise to Kenyan local needs and the requirements of the Kenyan Constitution which has one of the strongest Bill of Rights in the world, including consumer rights. So the eGovernment Directorate decided to customise it to their own requirements. Katherine met one University Professor, and Vincent, a Computing and Electronics student, and an Electronics student who had dropped out of school after doing his O-levels because of poverty, but has become a very successful innovator of electronic products who was discovered by a TV station somewhere in Kenya, and after his story appeared the University drew him in. He represents the community, and he actually did most of the work, and the eGovernment Directorate have the device and are hoping that it can be disseminated to many government departments. The eGovernment Directorate actually have a living experience, but based on what Katherine learned during the IST-Africa Living Lab Thematic Working Group meeting on Tuesday that this doesn't have to happen by accident, and the eGovernment Directorate are very interested in forming a LivingLab, a govhub where academia and communities can innovate for government because Government spends a lot of money and if products can be created that are amenable to government it already has a market. Katherine sees this as a perfect kind of win-win situation.

Paul thanked Katherine for providing this interesting example of collaborative innovation and invited **Dr Koi Tirima, Deputy Vice Chancellor, Inoorero University/LIWA** to provide her insight.

**Koi** indicated that the discussion to date had been very stimulating and she wanted to start by talking about how linkages are one of the ways that we can really help support innovation a lot better. These linkages can appear as PPPs or frameworks, already in our Government. From the Living Labs workshop on Tuesday it was very clear that the goal and the values of the community and the purpose of the lab is what then creates or generates how the organisation happens. From the LIWA perspective (LIWA Trust is an organisation that came out of private sector specifically, and it looks at linking industry with academia), it appears that industry has been struggling to find ways to innovate products or adopt products for East African communities and the Kenyan market. What has been happening is that they will have a product, again the traffic is going outward to the North, they'll go and work on it in the North and then they'll bring it back. So when you see cars now in Kenya, the team came all the way here, drove them on our roads, and then went back and adopted the technology and then they come back and sell it to Kenyans. So what we are seeing now is that industry is getting really, really tired of doing that and they can see the savings and the cost reduction in working with people in the country. Well what that means though, is that academia really has to rise up to the task by teaching and raising the quality of the curricula. Koi emphasised that it is necessary to make curricula a lot more relevant and to engage with relevant stakeholders.

Roundtables happen around ideas or sectors, one of the sector LIWA supports is manufacturing. It has been very interesting to see that there is a very low level of trust between academia, government, community and industry. What really needs to happen is that for the ideas in these silos to break down and people beginning to sit down together to share information. However, people are afraid that their ideas will be stolen.

Recently in Kenya with the new constitution, Intellectual Property (IP) is actually embedded so there are IP rights. It is necessary for this to trickle down into academia so that people are held accountable for respecting IP whether it comes out of communities as local content, or comes out of academia. Koi emphasised that problem-based learning and project-based learning are becoming very key and require pedagogy that really encourages people from different disciplines to work together. This is becoming more common in manufacturing with degrees in mechatronics, where in the past you had just an electrical degree, a software degree and a mechanical degree.

Koi highlighted that there is a need from commitment from the key players, we've talked about government and academia having to change the way they do things, and Koi was really excited that Katherine talked about recognition of skills rather than certificates. There is a problem currently where people want to go to school to get a certificate rather than to develop skills for work and yet the market is demanding skills and not really certification: so recognising people that are innovating, whether or not they have a degree, will be the gateway. The new Bills in Kenya should assist in creating innovation streams that start far down and following up, really making use of innovations.

Koi outlined that it is necessary to make science, research and innovation worthwhile, not just in terms of monetary value but also in the way that improves people's lives. It is necessary to teach young people how to think critically, how to analyse, as Catherineroose is doing in Tanzania is doing in her LivingLab in KINU, or how the University down the road is dealing with linking industry with their data lab, mining big data and making it visual for people to see.

There are a lot of good things going on. What impact does it have on policy? What policies do we have that guard or facilitate sharing? Koi highlighted that we have to think about how we are sharing around IP addresses and industrialisation licenses. We have to rethink what common creative licenses are doing in making information available through open sources. How does that impact academic and professional integrity in the institution? So there are a lot of frameworks that we have to re-look at, but Koi thinks one of the biggest things that we can do is admit that we don't always know the answer, but we can work on it as we are moving along.

Paul thanked Koi for her thought provoking intervention and invited **Jerome Morrissey, CEO, GESCI, Kenya** to provide his insight on 21st century skills.

Jerome briefly introduced GESCI (Global e-Schools and Communities Initiative), which was established as a key output of the ICT initiative, which was established by the United Nations a few years ago. GESCI is based in Kenya with international status and a global reach, but right now their biggest cluster of projects are based in Africa. GESCI was established to help Government Ministries to integrate technology for its effective and efficient use in education. They work with several governments in Africa in that endeavour including Kenya.

The African Leadership in ICT for Knowledge Society Development (ALICT) is a programme launched under the 8th Africa-EU Strategic Partnership as a blended learning programme run over seven months, operating in 12 Sub-Saharan African countries currently with participants including middle to senior management, heads of units, heads of functions in different ministries not just in education but right across the board. During the first week in July 180 participants will be graduating with a post-graduate diploma from an Irish university, leading on to a Masters with some additional work.

GESCI has had some experience working with technology hubs which are ground-up and youth-led. While in the short term they may not have a large impact in terms of employment, they have a big impact in terms of inspiration, knowledge and know-how and possible sign-posts to the way forward. While innovation labs, technology hubs or incubator units in universities and colleges all play a part, there also needs to be funding support through dedicated agencies, employment-creation agencies, enterprise-employment agencies. All of these start-ups for young people should all have a certain amount of funding, which allows them to continue the training, to continue the exploitation of creative ideas. The future of Kenya is about a multiplicity of creative enterprises, not about big multinationals coming in and employing, it's the indigenous enterprises which need to be fully supported through policy-making from the government-down is what is going to drive the ICT-enabled industries of Kenya, from Jerome's perspective.

Jerome outlined that feeding through innovation and enterprise you've got to start introducing enterprising attitudes and belief into secondary education, it has to start at that level so that students can go on and choose the right courses at university. Again there is a need for ministerial support, government support for people to choose the right courses at university for technology and innovation. If the innovation hubs are properly funded and structured providing continual training, development skills and addressing the IP rights issues, they can assist in developing innovation that impacts.

In conclusion Jerome said that informal education needs to be validated in some way so that prospective employers know what skills the person already has.

Paul thanked Jermone and invited **Daniel Obam, Ministry of ICT** to share his perspective.

**Daniel** highlighted policy interventions undertaken by the Kenyan Government in late 2012 with the Science, Technology and Innovation Act, which will set up three new institutions including the National Innovation Agency, and the National Research Fund. These interventions will support innovation at a national level.

**Paul** commented that a lot of the work that IST Africa has done over recent years in the area of Living Labs tells us that, wherever those Living Labs are taking place across Africa, what is common is the need for skills development at community level, to support youth employment and employment opportunities for women, to build trust and provide help to those who would otherwise have no opportunities at all. If you look at Uganda where many people would have to go to Kampala to get a job, the only way we are going to keep that local content alive is to provide people with those local skills and those local opportunities.

## **In the context of ICT-enabled services with cross border potential and the need to continue supporting both national and regional Innovation (including challenges such as CyberSecurity, Internet Regulation), how can the demands on the Regulatory Environment be best addressed?**

**Paul** invited the panel to discuss the demands on the Regulatory Environment in terms of supporting ICT-enabled services and Innovation. Regulation in East Africa is seen to be pro-Innovation, which has resulted in international success stories such as mPESA.

Paul invited **Mr. Christopher Kemei, Assistant Director, Licensing - Compliance and Standards, Communications Commission of Kenya** to provide insight from the regulators perspective.

**Christopher** outlined that there are several different aspects to be considered in terms of the Information Society: availability of content and knowledge, access to information in terms of availability, affordability and reliability of the infrastructure and literacy to be able to use the applications available. The World Summit on the Information Society in Geneva came up with 11 actions, which is a very good way of highlighting the role of government. Government must play its role for example by putting in the laws, so we had the example of procurement law does not support experimenting with local solutions and we need to reflect on them. It is necessary to look at what has been achieved - Kenya has recently concluded the development of a national broadband infrastructure, there is great progress in terms of mobile financial services and we are getting to a point where we are empowered from an information perspective. However in the context of Action Plan 7, Kenya needs to look at the level of e-agriculture, e-science as well as the benefits in all aspects of life - not just academia and business, but everybody, even the man back in the village should be able to benefit from ICTs.

Innovations thrive very well in an enabling environment, in non-discriminatory conditions and CCK has made every effort to establish that particular kind of environment in Kenya. The regulatory licensing framework was changed in 2008 to a unified licensing system to make it more flexible. CCK and Central Bank took a deliberate effort to support mobile financial services starting with a maximum transfer of 5,000 shillings per day and then increasing it gradually up to 100,000 shillings based on demand. M-Pesa has transformed quite a bit, it is no longer a mobile management service but a mobile financial services innovative product.

This kind of thing has been replicated in many areas. For example, in traffic management it is very easy to deploy e-applications to manage traffic, because we see a lot of accidents. All of the challenges that you see can actually be solved through ICTs, all that it takes is for researchers to look into these areas and say, 'what innovative product can I come up with similar to M-Pesa?' in an environment of traffic management for example or e-learning or e-agriculture.

CCK is partnering with a number of organisations like KIE, the organisation that manages libraries and the curriculum, to digitalising some of the content. This provides a base upon which researchers and application developers can develop applications that can be used to make it easy for people to access this content.

Christopher outlined that in terms of Cyber Security recently concluded Telecom Policy Forum adopted six opinions, all of which were actually related to Internet Governance. In Christopher's opinion Internet Governance has differences in culture when trying to get a balance between child online protection and freedom of information. COP, Child Online Protection, is being addressed in Kenya within the National Strategy on Cyber Security Master plan which is currently being rolled out. The deployment of key public infrastructure has commenced which is basically trying to monitor attacks within the context of cyber security.

This builds confidence, which is an important component in ensuring that people have confidence in sending money, e-transactions and so on and so forth, being able to communicate in a more secure environment.

Paul thanked Christopher and noted that M-Pesa is a wonderful success story that was realised through a combination of a concerted open innovation policy and support from the Central Bank.

Paul invited **Mr Moctar Yedaly, Head of Information Society Division, African Union Commission** to provide his perspective.

**Moctar** agreed that in the case of Internet Governance there are the differences in culture, but there are others also, in terms of government models. the differences in culture. In some advanced societies, it is said that less government is good for the people. But that means that the people have reached a certain level of maturity, its private sector, its community, its people have changed and reached a certain level where the state mission has more importance on the state ethnics and tribe and so on. For that moment, less government is good for the people. Moctar went on the say that when you look at development, which is very much on the front stage, where the most and the biggest provider of the internet is the government and you want to take him out, this is problematic. This is a matter of the model of governance and so on.

Moctar agreed that African Central Banks are to be commended, not only because they have supported M-Pesa,

but also they have decided a while ago, to open the market for the private sector, specifically the foreign private sector, to come into the countries and invest in ICT with the condition that their money will be expatriated and exported and the Central Banks have actually done well on that.

Moctar outlined that we are facing the situation where the private sector is bringing in very good things in developing ICT, but at the same time the government and the state are facing the issue of the balance of payments. Every year the government has to decide on, shall I buy medication or vaccinations for a 100 million dollars or shall I allow the private sector to give them what they are due in terms of money. We are reaching now the 50 years of licensing, Africans must now review their licensing systems. Yes, ICT must be driven mainly by the private sector, but which private sector? That is the question we need to balance among exporting the currencies we don't have and see the balance of payment with the impact of the ICT economy altogether. And bring out the new licensing framework in the next 5 or 10 years because the licensing is finishing now, some of them were given for 10, some of them were given for 15 and get that new licensing system.

Paul thanked Moctar and invited **Prof. Meoli Kashorda, Executive Director, KENET** to provide his perspective as an NREN.

Meoli focused on the ICT value chain in Kenya and why you see so much innovation. In Kenya they regulate very little, and Meoli focused on the things that are regulated. Giving an example, in the late 90s after Kenya liberalised their communication they left the Internet to be controlled by the incoming operators. One of the things the KENET member institutions used to say was that every time you tell them they can do this or that, they will say, 'you know the government has got to open up this area'. And so KENET used to ask them, which regulations control do you want on your campus in terms of ICT? And there was never any, not in infrastructure, not in anything. Today most of the content regulation does not happen.

Meoli outlined that the focus at KENET is to get broadband to the institutions and broadband to a campus for students that is at least one gigabyte. That has nothing to do with the internal capacity, but they want to promote that. The one gigabyte obviously goes into a courier network which is wireless and all that. For example, to do broadband, you can't keep developing your own infrastructure. In Kenya they have 5 companies that are rolling out fibre, in general they roll out fibre next to each other. The thing is for KENET or any other institution is there is a lot of choice and many believe that the prices and affordability will be resolved just because you have many of them, and the truth is KENET lease a modest number of lines, for example 100-150 leased lines, mostly broadband leased lines with at least 100 megabytes. There are variations in price and as soon as you go out of Nairobi or out of the urban areas the price rises by up to ten times. This is a problem due to limited regulation that the service providers are not forced to publish prices which would highlight these differences in pricing.

In the rural areas, KENET tries to reach out. Kenya is one of the lucky countries where you can do long-range WIFI so even without LTE and all those new technologies you can at least provide a 20 megabyte link into a new campus or into a new institution, which is good for building up capacity. But then as soon as you want to do courier class (150 megabyte capacity), you realise that just the licensing adds close to a 100 dollars per megabyte. So KENET have been dealing with those kinds of issues of pricing, because an NREN makes sure that to the student and to the faculty the broadband is free. So unless you are able to absorb all of the costs and make it almost affordable, then broadband reach becomes limited.

Meoli went on to say that once you open up broadband, you do not know what the students and lecturers are going to do. Innovation is normally because you've put a good learning environment, a good research environment, you do not have to prescribe what you really want. We have seen the huge uptake of applications, applications that even surprise all of us. So KENET's idea is to put it there and to let the students start to play with broadband right from the start. And most likely, in the next 5 years, they are the ones who will be generating the next generation of innovations, especially broadband innovations in the ICT space.

Paul thanked Meoli for providing this insight into activities on the ground.

## **Skills Gaps - What concrete actions can be taken to better align third level curricula to accelerate the development of the Information Society and Knowledge Economy in Africa?**

Moving on to the next topic of discussion, **Paul** outlined that there is clearly a skills gap in many countries, particularly in the areas of analytical business and ICT skills and this often results in a mismatch between the capacity of graduates and the requirements of both public and private sector employers. It also has constraints in terms of the capacity of potential entrepreneurs to create self-employment. Paul invited the panel to discuss what concrete actions can be taken to better align third level curricula (including a commitment by HEIs to support entrepreneurship and engage with local communities through Action Research to attract necessary FDI and accelerate the development of the Information Society and Knowledge Economy in Africa?

Paul invited **Mr Daniel Obam, Ministry of ICT** to provide some brief remarks.

Daniel outlined an experience from his department whereby students do internships. They have noticed a wide variance in skills and agrees that it is necessary to standardise the curriculum to ensure that students graduating have practical skills that can be used in the work place as well as theoretical knowledge. He also outlined that it is becoming very difficult for students to get the necessary work experience prior to graduating. He noted that in Germany there seems to be a very good connection between the German academic institutions and the German industry. They are able to seamlessly integrate the students with the work environment, regardless of the kind of work they are going to do. So, perhaps one of the ways of addressing this skills gap is to try and integrate. It is necessary to look at what the industry wants from an engineer, so that the universities don't just train engineers that cannot be used outside the university. Industry needs to get more involved perhaps in developing the curriculum or invalidating the curriculum so that we don't have this skills gap every year.

Paul thanked Daniel and invited **Mr. Christopher Kemei, Assistant Director, Licensing - Compliance and Standards, Communications Commission of Kenya** to provide his insight.

**Christopher** agreed that it is necessary to undertake a comprehensive assessment of this skills gap. At the CCK they have already noted a perception of the mismatch and are willing to partner with other organisation to carry out a comprehensive assessment, which would be a good starting point.

Christopher believes that there is a need for institutions of higher education to carry out a demand assessment particularly on emerging ICT industry demands, and re-engineer their curriculum to match with this changing environment. If this is not done, the mismatch is going to continue to be in existence. There may also be a case for reintroducing the middle-level colleges, when in fact in the industry, the demand for graduates from those middle-level colleges is increasing. In the past we had hands on people trained for rigging or establishing of masts, when today everyone is a graduate and you employ them and they say, 'look, I have a graduate degree, I'm not going to do A, B, C, D'. Yet the industry actually requires the practical skills.

Christopher concluded by saying that when we talk about benefits of ICT in all aspects of life, we are basically talking about e-applications. He suggested that when students are doing their masters projects or even their undergraduate projects academic institutions insist that they come up with a project that relates to one of the e-applications. This could lead to the development of more local products and society would benefit from this research. It's not just research for research's sake, but research that can be applied to improve lives. Christopher appealed that we re-orient our education system to focus on things that make direct impact in peoples' lives.

Paul thanked Christopher and invited **Mr Jerome Morrissey, CEO, GESCI, Kenya** to provide some remarks.

**Jerome** agreed that there is a skills gap and that analysis needs to be undertaken. However, he believes that there are three aspects to be addressed - identification of skills gaps, creation of new employment opportunities and reform of technical and vocational skills areas. He agrees with Koi that it is necessary to build linkages, coordination and joined up thinking by governments and government agencies. There needs to be a mechanism that facilitates quicker responsiveness so that education providers can provide the kind of courses required by industry. It is also not always about the universities, the enterprise culture, enterprise and entrepreneurship is part of that system.

Jerome agreed with Daniel and Christopher in relation to the relevance of the technical schools where students learnt practical skills, decision making and collaborative teamwork skills. He agreed with Christopher in relation to the requirement for investment in technology, infrastructure and course development in polytechnics. In Canada the community college works well whereby skills are provided with a diploma linked with a placement in industry. For Jerome, the key points are responsiveness, working together where jobs are created; technical skills revitalised, and reformed, brought back into the core. Focus on skills and that is where you link in to the hubs, to the ICT centres, as Paul spoke about in Ethiopia for example. It is necessary to have people coming in with an enterprise culture, then where the other agencies start engaging with these young people to exploit ideas and to create mass micro-enterprises.

GESCI undertook a demonstration project within a project funded by Finland to illustrate the power, potential storytelling ability and creative abilities of 12 young people. Using space provided by the Kenyan Institute for Curriculum Development, they trained 4 teachers in key areas of media using skills and technology, namely animation. They were taught the traditional animation skills. Four students were taught sound and music creation, 4 students graphics and image-making and 4 students on computer games development. Jerome showed a short film that was made in less than 3 months in skills training and incorporation of technology, with the latent and potential skills of these young people.

Jerome also discussed the potential opportunities that open up as a result of the transfer from analogue to digital television for creation, for animation, for all types of other cultural industries. There is the potential to develop the cultural industries, now that technology and the application of IT is so cheap and mobile. There should be

a partnership of creators, producers, directors, partnerships between colleges who are responsive enough and quick enough to provide the types of training that are required and the funding through government agencies who will enable this to happen.

Paul thanked Jerome and invited **Dr Katherine Getao, ICT Secretary, eGovernment Directorate** to present.

Katherine commenced by stating that in her opinion she feels that the way that we are educating globally is totally outdated, it is designed for the industrial age and not for the knowledge age and that is why there is such a mismatch. Education today takes too long, it is too wasteful as we are learning a lot of things which we never use. Katherine believes that part of the change has to take place in education that allows people to self-educate, that gives them just the right set of basic skills so that the rest of their lives they spend self-educating, because the world is changing so fast. There was a point mentioned about repackaging education so that people can get it just in time, and Katherine believes that many of the things that are being said, the change to community college and so on, recognition of that, you can no longer have the career for life, most of us will not be educated over this long period of time anywhere between 12 to 16 years, to get a job. People should be going in and out of education, maybe from a very early age. Katherine hopes that we will find our way in reforming education just as we found our way in the move from the agricultural age to the industrial age and they changed the education system from apprenticeship to a more formal education system which not only taught skills for the industrial age, but also taught people to sit in formalised settings for long periods of time and listen to a teacher or somebody else in authority, and do the same thing over and over again. So they were perfectly socialised for the workplace. Katherine hopes that we are both educating and socialising people for the way that the world is changing now which requires different skills.

Paul thanked Katherine for her thought provoking intervention and invited **Dr Koi Tirima, Deputy Vice Chancellor, Inoero University/LIWA** to provide brief comments.

**Koi** commenced by stating that the GESCI movie that Jerome showed illustrates that what we can do by just exposing people to skills rather than to knowledge. Koi agrees that we have to change the way we think about learning. The definition of learning really is a change in behaviour, not an acquisition of data. We need to look at the transferrable skills that people need?

Koi outlined that entrepreneurship training and not just textbook entrepreneurship training requires real mentoring, real handholding practical kind of entrepreneurship training. Technical skills and multi-disciplinary skills are required to facilitate people being able to weave in and out of careers or professional paths because they have a set of skills that can apply in different areas and in different places. Then, effective and strategic leadership skills. Koi agrees that we are in a transition and over the next 5 years, we are really going to make that significant shift from an industrial age to a knowledge economy. We need to look at how we are preparing our students and children for these changes and the type of leadership skills required.

Koi believes that from an academic perspective we really need to catalyse this shift. Firstly we need to utilise participatory, applied and action based research to leapfrog as was done with M-Pesa. Koi outlined that we need to demystify research entirely and make it relevant. This is why Living Labs creates such a great idea for test beds.

Koi recommends that a clear focus needs to be achieved rather than every university trying to do everything for all students, which is counterproductive. The second challenge is around attachments and supervision. Koi suggests that it is necessary to change the policy around supervision of students and research. Links with industry could be deepened by requiring faculty members to spend time in industry and accepting that within academia as they do in Germany and Denmark, people who may not have a PhD, but can step into the classroom and supervise research because of their expertise.

Koi outlines that one of the biggest impediments is that we do not currently value applied research, cross-disciplinary research and are just beginning to recognise social science research. Koi suggests that policies within institutions of HEI need to be changed, but that also has to be rewarded by the Government, where somebody get tenure, not based on their publications but based on their involvement in social Living Labs and collaborative action research problems. Koi outlined that we need to recognise that skills requirements are changing all the time - 10 years ago there was no degree or programme you could have taken to become a web designer. To allow for innovation, we have to allow very flexible learning, we have to allow people to take units from this institution and units from that institution and across here and almost tailor-make their own degrees based on where they see themselves going and where we see them getting in to.

Paul thanked Koi and invited **Prof. Meoli Kashorda, Executive Director, KENET** to provide some remarks.

**Meoli** agrees that the youth unemployment problem is huge. It troubles him as a university educator of many years is to see an engineering graduate take 2 years, on average, to get a paid job. University students are currently trained for two things: 50% is to train them to think, critical thinking skills and problem-solving skills and

40% is for the career they are going to have. KENET has taken graduates and provided them with an intensive one year training and the KENET IP network is run successfully by young people, fresh graduates that are being converted into high end network engineers or even programmers. It is necessary to think about how this can be scaled up as one of the current problems is that industry do not have the training courses for fresh graduates.

## **How can Public Private Partnerships [PPP] and shared services models be better leveraged to support Public Service Delivery, and better exploit the potential of Open Data?**

Paul invited **Dr Katherine Getao, ICT Secretary, eGovernment Directorate** to provide a brief insight into how can Public Private Partnerships [PPP] and shared services models be better leveraged to support Public Service Delivery, and better exploit the potential of Open Data.

**Katherine** outlined that we need more dynamic applications of data. For example in the supermarket, you have a lot of shopping malls in Kenya and each one has its own separate till, the parking system is separate, everything is separate. If they integrated all this data into the same framework, information about the use of their stores, and the use of their products and the use of their services, this would probably lead to more business opportunities. And that is the same kind of thinking that Katherine would like to see in Government, but we need to think about how it is going to work economically, technically, legally and organisationally.

## **Conclusion**

**Paul** summarised the key points as leveraging action learning, Living Labs, generational leapfrogging, transferable skills, collaborative innovation and the critical role of applied ICT research.

Paul thanked the panelists for a very stimulating dialogue, which he hopes will continue to stimulate discussion between all of the participants over the next few days, during coffee breaks, during lunch and particularly during the conference programme. He highlighted that there are two other roundtables taking place on Thursday, one Senior University Leadership, and the second Supporting Entrepreneurship in Africa.

Paul invited the participants to give the speakers a búla bos (clap) in recognition of their appreciation of their contribution.

## Senior University Leadership Roundtable on ICT Education, Innovation and Research

This Roundtable Panel took place on Thursday 30th May (14:00 – 15:30). Moderated by **Paul Cunningham** (IST-Africa Coordinator), the panel consisted of representatives of Moi University (Dr. Edwin Ataro, Head of Electrical and Communication Engineering Department), Technical University of Kenya (Prof. Ogembo Kachieng'a, Deputy Vice Chancellor for Research), KCA University (Prof. Ddembe Williams, Dean, Faculty of ICT), University of Nairobi (Prof. William Okello-Odongo, Director, School of Computing and Informatics), Jomo Kenyatta University of Agriculture and Technology (Dr. Waweru Mwangi, Director, Institute for Computer Science and IT) and Strathmore University (Prof. Izael Da'Silva, Deputy Vice Chancellor, Academic Affairs).



The panel started with a discussion of ***alignment of current research priorities of the Education and Research sector in Kenya with the goals of Vision 2030***, and what needs to be done to ***better align curriculum development with the needs of public and private sector employment and self-employment***.

The goals of Vision 2030 are to be a middle-income country with a high quality of life by the year 2030. Clearly the education and research sector has an important role to play in this regard around 3 key pillars. There has been considerable progress in terms of new laws, policies and guidelines and Achieving flagship projects like Konzo City and developing Silicon Savannah is key to the goals of Vision 2030.

Most Kenyan universities are reconsidering their role, particularly in relation to alignment of curriculum development with the needs of entrepreneurs, and public and private sector employment. An example was given of one university recently inviting private and public sector input in reviewing their engineering curriculum.

There was general agreement between the panellists that there is currently misalignment between research priorities and Vision 2030, insufficient use of ICT in manufacturing, agriculture and agri-business and a need for collaboration and coordination with the public and private sector to ensure that graduates have the necessary skills required by employers. The idea of guest lecturing by public and private sector stakeholders was also proposed, as was supervision of research projects.

The panel then moved on to ***discuss institutional ICT research capacity, track record and research priorities going forward***.

The use of the Triple Helix and potential complementarity of the roles of different stakeholder groups in a research context was discussed, as was the potential win-win cooperation opportunities that should be exploited between education and research stakeholders and the public and private sectors.

The potential role and value of open education resources, and the critical importance of community engagement, end-user involvement and multi-stakeholder partnerships in carrying out effective Action Research was also discussed at some length.

Challenges associated with moonlighting lecturers who repeat the same lectures in multiple institutions, a lack of current emphasis on the need to carry out research in parallel with teaching activities, a tendency of HEIs to poach lecturers from one another and the importance of finding areas of mutual interest and complementarity for joint industry and HEI research to be carried were also discussed.

The panel moderator shared the experience of research funding in Ireland, and the great emphasis placed by the Irish Government and Science Foundation Ireland (SFI) on cross-institutional Centres of Excellence, to break down national research borders.

The critical importance for Kenya and Africa of significantly increasing the number of scientific publications, balancing academic teaching responsibilities with adequate time for research and postgraduate student supervision and the significant contribution being made in Kenya by LIWA (Linking Industry with Academia) in terms of facilitating cooperation and interaction between education and research and industry was also discussed. Ways of trying to incentivise greater focus on research and in particular, international examples of fostering research cooperation between the education and research and public and private sectors were also shared.

A related point shared was the potential opportunity presented by Open Education Resources, with much standard curriculum available, allowing lecturers to spend more time on research, case studies and other ways of differentiating lectures.

There were considerable contributions from the floor as well as panellists which was very welcome. Critical contributions from the floor was to encourage greater engagement with students in relation to their educational requirements, the importance of achieving greater gender balance amongst senior university leadership and the need for a greater focus on exploitable research results, whether in Innovation Spaces, in education and research institutions or in the public and private sectors.

The importance of Action Research (where students and lecturers engage with local communities, engage with end-users, engage with the public and private funding sectors and they are carrying out research that is based on real-life challenges) was reiterated on a number of occasions by a number of participants.

Amongst the useful insights shared was the theoretical nature of the education system in Kenya and many African countries – “get an A in high school, graduate with a first class degree and you think you are going to get a first class job” “and a first class life!”.

The comment was made that many engineers are plateauing in their jobs and not stretching themselves intellectually, and this talent is not in manufacturing or industrial consulting. Some of the best engineering students are already starting to invest or innovate while in their third year, and it is important to try to foster that talent and direct it towards considering innovation and entrepreneurship as a career.

A key challenge identified was access to low cost capital. Universities and the public sector potentially could play a role in this regard by facilitating guarantees for loans and access to equity for good projects. There is a need for greater practicality in education in Kenya and Africa in general. Getting a degree is no longer enough.

The potential opportunities to both leverage the African diaspora and to attract some of the diaspora back home was also discussed at some length, with contributions from both panellists and participants. Obviously having local talent working in international universities opens opportunities for cross-border collaboration, and European Framework Programme activities such as Marie Curie also open the door to exchanges of talent between Europe and Africa for 6 – 12 months to strengthen research and teaching capacity, exchange international good practices. Such exchanges could also provide opportunities to explore attracting senior talent back home, through establishing national Centres of Excellence in different disciplines.

South Africa was given as an example of a national innovation ecosystem, where a certain percentage of the budget of all public universities is dictated by their level of engagement with local community. This engagement ensures that research is practical and solution oriented, there are opportunities for skills transfer supporting local entrepreneurship and a greater awareness in students and faculty alike that there is the requirement for adaptation of research results. Even brilliant ideas may fail to flower in the wrong climate.

The example of Brazil was also given in relation to developing a new industry, in this case the petroleum industry in the 1970s, which has had major economic impact. A similar approach could be considered in Kenya, with incentives for academics to cooperate with the public and private sector in terms of tenure track for example.

The roundtable ran quite long due to the rich discussion and invaluable contributions and concluded with an invitation to continue the dialogue in the Roundtable on Entrepreneurship.

## Roundtable on Supporting Entrepreneurship in East Africa

This Roundtable Panel took place on Thursday 30th May (16:00 – 17:30). Moderated by **Paul Cunningham** (IST-Africa Coordinator), the panel consisted of representatives of Independent Innovation Spaces (Catherinerose Barretto, KINU, Tanzania; Rachel Gichinga, iHub, Kenya), HEI based Innovation Spaces (Emmanuel Kweyu, @iLabAfrica, Strathmore University, Kenya; Martin Tubula, Inoorero University, Kenya), and other organisations (Mary Kiguru, Kenya Methodist University, Kenya – focusing on BPO training; Simon Stumpf, Ashoka East Africa, Kenya – focusing on fostering Social Entrepreneurship) supporting Innovation and Entrepreneurship, especially at the pre-incubator and incubator stages of development.



Each panelist briefly introduced the activities of their respective organisations.

Launched in July 2012, **KINU** provides dedicated and co-working space, application testing facilities, workshops and training for over 700 members of the technology community in Dar es Salaam, with a particular focus on supporting early stage start-ups and women entrepreneurs. KINU cooperates with relevant stakeholders in a range of ICT entrepreneurship activities (e.g. hackathons).

Launched in 2010 as Technology pre-incubation and collaborative working space, **iHub** now has over 10,000 White (Virtual), 250 Green (shared space) and 14 Red (dedicated space) registered members registered. iHub hosts regular community events and other activities include iHub Research (March 2011), m:lab (June 2011), Pivot25/Pivot East (mobile app competition), UX Lab and Supercomputing Cluster (2012). 48 companies have been established since its launch.

Established in January 2011 as a Centre of Excellence in ICT Innovation, Entrepreneurship & Incubation, and Policy Research for Africa, **@iLab Africa** is hosted by the IT Faculty at Strathmore University. @iLabAfrica has successfully built action research partnerships, launched an entrepreneurship focused Master's programme (MSc. TID) and established @iBizAfrica as an Incubator in January 2012.

**Inoorero University** has established a **Regional Centre for Enterprise Development**, which provides business-mentoring courses to support SMEs in Kenya and East Africa. In partnership with the International Labour Organisation (ILO), Inoorero has developed a Practical Enterprise Training Course offered to Kenyan entrepreneurs from February 2013 as a four-month part-time programme. Inoorero also offers a 3-month Personal Development Skills course for school leavers to equip them with 21st Century Skills for university or employment and develops tailored industry training.

**Kenya Methodist University (KeMU)** is the first East African institution to be licensed to establish an **International Center for Outsourcing Studies (ICOS)** by the BPO Certification Institute, Inc. (BCI). KeMU will spearhead BPO education in Kenya by offering market driven courses.

**Ashoka** envision a world where Everyone is a Changemaker. A world that responds quickly and effectively to social challenges, and where each individual has the freedom, confidence and societal support to address any social problem and drive change.

Ashoka East Africa is part of a global organization that fosters the most effective social entrepreneurs and helps to facilitate a shift in existing conditions of education, nutrition, youth development and business practices. Ashoka was the first organization to publicly recognize social entrepreneurs as a major driving force in transforming human welfare in the East African region. Since 2001, when two Ugandans were recognized as Ashoka Fellows, the region is now home to 43 Ashoka Fellows who are creatively restructuring society's health, environment, human rights, education, civic engagement and economic development in Uganda, Kenya and Tanzania.

The panelists then discussed challenges associated with ensuring services provided by their organisations are aligned with the evolving needs of ICT entrepreneurs in East Africa, and how these needs changed over time.

**Catherinerose** spoke about the importance of providing emotional support to entrepreneurs (celebrating birthdays, securing deals or investment, providing a listening ear for the bad days), actively listening to community members to understand their actual training requirements, and . Community Managers actively engaging with the entrepreneurial community and the

**Mary** spoke about the alignment of the establishment of ICOS with Kenya's Vision 2030, and the advantages of Kenya relative to both China and India in terms of language skills, time zone etc. She also spoke about the lack of necessary BPO skills required to drive the growth of the BPO industry in Kenya and a lack of understanding by the general public of potential opportunities offered by BPO. Acknowledging the important role that parents play in choosing career and education paths for their families, she noted the cultural and communication challenges associated with changing mindsets towards focusing on the skills required for the job opportunities that exist and can help grow the economy.

**Rachel** discussed the challenges of retaining that personal connection with individual entrepreneurs when managing significant growth and a large scale community and focusing on service delivery. Starting from the perspective of providing space and a community where entrepreneurs could support one another, iHub has diversified its activities over the following three years and engaged with international partners to understand their expectations to support collaboration. Rachel also discussed the importance of balancing demand driven (e.g. research) and experimental (e.g. high performance computing) innovation and the opportunity to address the "Jua Kali" or informal economy (which literally means fierce sun in Swahili) and support entry into the formal economy through innovation and the development of value added services or products. She also mentioned the BRCK backup generator for the Internet that was recently crowd funded by Ushahidi, as an example of infrastructural related support for innovation.

**Emmanuel** explained that @iLabAfrica has had similar experiences to KINU and iHub. They started with free space from Strathmore University and then focused on securing partnerships, and revenue streams including contract research. Emmanuel discussed the challenges associated with moving from a research centre to reinventing themselves as an innovation centre, partnering with the private sector and engaging with other stakeholders in common activities across East Africa, which has helped them extend their network. Many of the initial entrepreneurs supported focused on mobile applications, and needed support to address mobile payments. Emmanuel picked up a point made earlier by Catherinerose, agreeing that many entrepreneurs tended to be quite introverted initially, lacking some of the social skills required to engage with clients, partners and other entrepreneurs. He also agreed with the importance of pitch skills and the need

**Simon** used the analogy of an orchestra, where people initially thought of different innovation spaces as focusing on different instrumentalists (e.g. violin school, clarinet school) thus meeting different market needs and niches. Then people started to realize that there was value to be had through creating a virtual orchestra (e.g. Innovation Space managers linking together to share experiences). Simon suggested that collaborating to develop the overall innovation eco-system was a worthwhile goal, and that stakeholders need to focus on supporting socio-economic development under Vision 2030 through supporting development of 21st century skills and raising awareness of social entrepreneurship through young people to create ChangeMaker potential.

**Emmanuel** intervened to direct the discussion towards encouraging leading African entrepreneurs to invest some time and effort into social entrepreneurship. Emmanuel described the example of a trial involving the Clinton Foundation to increase the speed of access to HIV tests for new borns to a matter of days from several months, through adding barcodes to DNA samples and leveraging mobile applications. Such success stories might encourage local entrepreneurs to get involved and support Innovation Spaces and young entrepreneurs. He appealed for stakeholders to trust and support Innovation Spaces in helping reduce the failure rates amongst entrepreneurs, and agreed with Simon that encouraging young people to participate in social entrepreneurship was important.

**Rachel** suggested that in Kenya there is such an immediate need for money, that there is a strong focus on making cash. She has noticed that when iHub does an event focused on social entrepreneurship, there is more international than Kenyan participation, and that in the Pivot East Competition, most of the participants in the social category are women. She suggested that people need to consider how to strike a balance between commercial and social entrepreneurship, where one funds the possibility to do the other.

**Mary** returned to the need of establishing a new innovation and entrepreneurship oriented culture in HEIs, and integrating active research in a more systematic way to identify and develop solutions that address community needs. She suggested that there is a greater need for institutionalize what is called Impact Sourcing, where digitized work can be given to disadvantaged people who would otherwise not have employment, with the necessary skills transfer to support sustainable employment opportunities. Mary also mentioned the success of a local micro-finance institution in supporting women to become successful entrepreneurs. These women were then researched by HEI students to better understand what helped make them successful. She also mentioned

the importance of leveraging Living Labs methodologies in this regard.

**Martin** and **Catherinerose** agreed that encouraging mentorship and developing role models are critical to develop the innovation eco-system at national and regional level in East Africa. Simon also noted that social entrepreneurs also need role models, mentors and encouragement.

The issue of sustainability for both entrepreneurs and Innovation Spaces is a pressing issue that never goes away. **Emmanuel** noted the difficulties in making decisions about which entrepreneurs can be supported due to limited resources. He also acknowledged the importance of developing multiple revenue streams to achieve sustainability through long term engagement with partners. Emmanuel also discussed the need to change the mindset of university leadership to understand the value proposition that Innovation Spaces can offer to hosting HEIs, in terms of supporting the needs of students and graduates.

**Rachel** discussed the need for grant funding for working spaces, and the important role of corporate partnerships in accessing additional funding to achieve sustainability. She acknowledged the importance of grant funding to start most of iHub's activities but stressed that areas such as research, consulting and high performance computing are profit oriented and making a contribution of 20% of profits to support the not-for-profit activities that are unlikely ever to break even.

**Mary** explained KeMU's approach to developing networking skills for its students, particularly computer science students. They are at the initial stages of applying a multi-disciplinary approach to supporting team building by bringing together business students with computer science and engineering students to address business planning and financial analysis issues for example. KeMU are then inviting industry players and venture capitalists to meet with promising students addressing mobile applications for example to learn more about what they are doing.

**Catherinerose** described the hybrid model of KINU of free services, consulting that contributes towards the bottom line, the need to target young children to help them build analytical and entrepreneurship skills and the significant challenges being addressed in Tanzania.

In conclusion, there was a general consensus that there was a need for something different, agreement that social and commercial entrepreneurship are not mutually exclusive, and that it was possible to find ways of identify cooperation opportunities between all key stakeholders (including HEI hosted or independent Innovation Spaces) supporting entrepreneurs for mutual benefit. The panel agreed that this was the start of a process of culture change going forward.

# Closing Plenary

The Closing Plenary Session of **IST-Africa 2013** focused on providing an overview of current Initiatives supporting ICT and Science Technology and Innovation.



The session was very well attended, chaired by Dr. Eric Mwangi, Ministry of Education, Science and Technology, Kenya and incorporated presentations from Mr Stéphane Hogan, Science Counsellor at the EU Delegation to the African Union (Horizon 2020), Mr Moses Bayingana, ICT Expert, Information Society Division, African Union Commission (African Internet Exchange System - AXIS), Vincent Kaabunga, IEEE Kenya Section, Kenya (IEEE's Information Society Activities in Africa), Grace Wandera, Strategy, Vision 2030 Secretariat, Kenya and Prof. Shaukat Abdulrazak, National Council for Science and Technology, Kenya (Future of Innovation and ICT Research in Kenya).

## Horizon 2020 presented by Mr Stéphane Hogan, Science Counsellor at the EU Delegation to the African Union



**Stéphane** introduced himself as Science Councillor from the European Union to the African Union, currently based in Addis Ababa with the role of fostering collaboration between Europe and Africa. It covers all areas including ICT, which is a new field for Stéphane so he was very pleased to have the opportunity to participate in IST-Africa 2013, to meet the stakeholders and learn about the many ICT activities ongoing.

Stéphane's presentation focused on new approach to international cooperation that is been developed by the European Commission in the context of Horizon 2020. International Cooperation in FP7 incorporated bottom-up and top-down activities. During FP7 42 Africa countries participated with over 1,000 participations in 400 research projects with the majority of projects focused on health, agri-food and environment and some projects in ICT. In terms of

participations there are several Africa countries in the top 20 countries funded under FP7. Stéphane highlighted three large strategic projects including the EDCTP (Europe and Developing Countries Clinical Trials Platform) which has received funding from the European Commission and Member States to enable funding of dozens of clinical trials on poverty-related diseases in Africa, the nuclear reactor experiment which is a very ambitious experiment and expensive initiative involving many international partners and GÉANT, providing connectivity to higher education institutions.

Stéphane outlined that in the preparation for Horizon 2020, the Commission Services is reviewing its strategy for international cooperation in international research and innovation, bearing in mind that innovation is being emphasised more and more in the past few years with the goal to strengthen Europe's position, tackle challenges and also support external policies through an open international research-funding programme in the world. It is envisaged that Horizon 2020 will continue to be open to participation from anywhere across the world, not only academia, but also industry, independent research organisations, big or small companies. The list of countries receiving automatic funding in the event of a successful proposal has been slightly reviewed. The BRICS countries (Brazil, Russia, India, China and South Africa) and Mexico will no longer receive automatic funding but they can still get funding if that their participation to the project has to be demonstrated to be essential to the project. In terms of other African countries if an African institution is successful in a project, as a participant in a

project, they will get funding automatically in the same way as in FP7.

In terms of targeted thematic actions, areas will be identified that make sense based on a broader policy agenda while incorporating a diversified differentiated approach by country or by region, depending also on the partners involved. The Commission Services hope to develop multi-annual roadmaps to try and map out how cooperation will be undertaken with each country or region amongst its strategic partners. Horizontal cooperation activities such as IST-Africa will continue as the Commission Services see a lot of value in the network, training and collaboration approach systems that have been put in place.

Coordination involves discussions with partners such as the OECD, the UN, the WHO. The Commission Services also wants to continue to promote some common principles when funding research and that includes promoting a level playing field, having mutually agreed principles to build trust and confidence, and also to address a number of issues including integrity and research, ethics, peer review, the role of women in science, research careers, IPR issues and open access. It is also necessary to tighten up the links with bilateral activities being supported by European Member States.

Stéphane summarised the key novelties or evolutions as being the general openness of Horizon 2020 is maintained, with slight restrictions on the funding issues; target activities where the Commission Services wants to have more scale and scope and achieve greater impact; the development of multiannual roadmaps with key partner countries and regions; stronger partnerships with Member States and common principles for the conduct of research and international cooperation.

Moving to the specifics of Horizon 2020, Stéphane outlined the three major pillars: Excellence in Science; Industrial Leadership and Societal Challenges. Under Excellence in Science there is increased funding proposed for the European Research Council. It is proposed to continue to support mobility and careers of researchers, with the well-known Marie Curie actions, which also include a strong international opening, both for African researchers for instance to come to Europe, and also for the reverse. Over 100 European researchers who have benefited from these grants to come to do research in Africa. Industrial Leadership includes development of leadership in enabling industrial technologies, more access to risk-finance, especially for small- and medium-sized companies. Promotion of innovation for SMEs is considered to be an important policy. Societal challenges include health, food security, agriculture, marine research, economy, secure, clean and efficient energy, smart, green and integrated transport, climate action, resource efficiency of raw materials, and of particular interest to this forum, inclusive, innovative, knowledge societies.

The Commission Services is striving to develop a set of simpler, more coherent participation rules, replacing different methods of calculating overheads to a single rate, and to try to get funding to the participants quicker. The funding instruments will have a strong emphasis on the collaborative projects including where relevant a certain degree of third country participation in one or more regions of the world. The first calls are currently being prepared for launch in January 2014 and will cover two years, so it will be big work programmes. There will also be some focus areas with dedicated calls. There is more interaction between DG Research, DG CONNECT and the other DGs which are directly controlling the funds, managing the funds, along with the other Director Generals of the European Commission managing other policy areas: health policy, development policy and so forth.

Stéphane thanked the participants for their attention and emphasised that policies for international collaboration and research are as important as ever.

### **African Internet Exchange System (AXIS) presented by Mr Moses Bayingana, ICT Expert, Information Society Division, African Union Commission**

**Moses** commenced by referring to the discussion on the first day in relation Africa paying over 600 million US dollars for transiting its own traffic. The African Internet Exchange Project was designed to address this and the African Union Commission started implementing this project in 2012 as one of the 8th Africa-EU Strategic Partnership projects. Moses explained that an internet exchange point (IXP) is a physical point where internet traffic can be exchanged. It is a way of keeping local internet traffic local, benefits include cost savings, improved quality of services, and it encourages having local and international internet traffic.

Moses provided a snapshot of the IXP density around the world - there are 91 countries with internet exchange points, 107 countries without. America, Europe and Brazil have the highest density of IXPs. In Africa there are 6 internet exchange points and if you look at the distribution



by region, the Southern region is ahead, then the Eastern region, then Western, then North and Central there aren't any. So the African internet exchange point centrally may not even be operational, Moses thinks the RFC has one but the reports they have been receiving is that it has been established but not operational. AXIS aims at establishing national internet exchange points where they do not exist and also to support the establishment of regional internet exchange points. This will support regional traffic by keeping it local within Africa.

Moses outlined that to date best practice workshops have been conducted in order to mobilise national actors to be able to build consensus to be able to establish these internet exchange points. So far this has been undertaken in 11 countries: Benin, Burkina Faso, Burundi, Gambia, Guinea, Mali, Mauritania, Namibia, Niger, Senegal and Swaziland. So there the AUC has built consensus, committees have been established, constitutions have been developed for the IXP entity and work is in progress.

After building consensus, technical trainings are conducted on build capacity on technical aspects of setting up and administering internet exchange points. So far the AUC has done this in six countries (Burkina Faso, Burundi, Gambia, Guinea, Namibia and Togo). The next step is to provide the necessary equipment to enable the IXPs. The focus to date has been on empowering national IXPs and later in 2013 the process in relation to supporting regional IXPs will commence.

## **IEEE's Information Society Activities in Africa presented by Vincent Kaabunga, IEEE Kenya Section**

**Vincent** expressed the pleasure of IEEE Kenya Section to participate as a technical co-sponsor for **IST-Africa 2013**.

IEEE is the world's largest professional association that is working to advance technology for humanity; there are over 435,000 members across the globe in 160 countries. Today IEEE is expanding in many ways, including the people that are a part of IEEE, the communities that they work in, the nations they are representing, the collaborations that they support, intellectual property and a lot more. In advancing technology, the collaboration allows sharing ideas in the various technical fields that we have and the fields and disciplines that we support. Today, the technologies we imagine are to create new solutions, new disciplines our collaborations are carrying and facilitated through the IEEE family, our technical societies and our councils and new doors are opening for innovation in many areas of technology.

Vincent highlighted IEEE's work in the development of standards. Education programmes are provided to members as lifelong continuing education to maintain their skills and proficiency. Triengineering.org for examples provides lesson plans to teachers to allow students to investigate and explore the wonders of engineering, computing and technology. There is also a teaching service programme with demonstrations for the teachers, who will teach the pre-university students.

Vincent outlined that collaboration is the cornerstone of technological career development, and IEEE is a committed expediter of collaboration. Collaboration is about bringing people, ideas and technology together for mutual benefit, and this is how we create new markets, run local programmes and foster innovation. IEEE is actively working to expand its impact in Africa and to support the growth of engineering, computing and technology. During April 2013 there was a presidential delegation from IEEE headquarters to Kenya, Zambia and Ethiopia, led by IEEE President Peter Stucker, including past President Gordon Day, Executive Director of the IEEE foundation, Director of Education Activities and the Director of Social Innovations to learn first hand what is required from the local IEEE chapters at national level. One of the challenges discussed included difficulties for educational institutions to access IEEE Xplore and the chapters are now looking at bring institutions together to form a consortium to access this knowledge repository similar to what South Africa has achieved. IEEE has a partnership with UNESCO signed in 2012 to promote engineering programmes.

In Kenya IEEE has agreed online access to Microsoft software development programme for student members. The Kenya chapter runs programmes through its Graduates of the Last Decade Affinity Group and has some



projects running to aid the visual impaired, to access content using local mobile devices, and a new energy solution for a school Machakos. IEEE Spark is targeted at students aged 14 - 18.

In closing, Vincent quoted a very famous IEEE past president saying "Great improvements invariably involve the cooperation of many minds".

## Role of ICT in Vision 2030 presented by Ms Grace Wandera, Director of Strategy, Vision 2030 Secretariat



**Grace** expressed her pleasure to represent the Vision 2030 Delivery Secretariat, which is the coordinating arm of the implementation of the National Policy in Kenya at **IST-Africa 2013**. Grace outlined that she was also pleased to participate in a personal capacity as she supports a foundation called Stem Africa which support young girls in Science, Engineering, Technology and Math.

Grace believes that Science, Technology and Innovation are key global resources for wealth and job creation. The activities that she has seen within the conference, through the discussions, the roundtables and exhibitions, clearly show that this is a significant area that is going to contribute to Kenya's long-term dream of mainstreaming all the sectors of the economy and to ensure acquisition of science and technology for socio-economic development.

Grace outlined that within Vision 2030 there are three goals - for Kenya to be a globally competitive country, to be a prosperous nation and for everyone to have a high quality of life. The Vision 2030 Secretariat believe that this is not possible without Science, Technology and Innovation and therefore STI and ICT are a big part of the policy framework.

Grace highlighted that the Vision 2030 is not only about economic development, but it is a holistic policy that covers all aspects of national development with a number of pillars - the social pillar, which deals with education, health, and urbanisation; the economic pillar, with agriculture, manufacturing, the IT-enabled services, BPO services, wholesale and retail and the financial sector and the political pillar. Within the IST-Africa 2013 Programme all pillars have been discussed.

The flagship ICT project within Vision 2030 is the Konza Technopolis, which aims to bring bringing together Science, Technology and Innovation in one centre, to support the creation of local solutions for other sectors such as agriculture, health, education. Business outsourcing and technology-enabled services are addressed within the economic pillar as mechanisms to address job-creation. Food security is another challenge to be addressed and Grace was pleased to see apps in the Exhibition focused on supporting the agriculture sector. Grace highlighted the importance of capacity building and the role that TIVITs and the new TIVIT Bill can have in building capacity in technical skills to address the shortage of engineers and technicians. The quality of education is seen to be key in achieving Vision 2030.

Within government itself there is an eGovernment strategy that focuses on Government to Consumer, Government to Business, and Government to Government. A number of innovative projects have commenced addressing the filing of tax returns, tracking of national identification and passport applications, dispersing exam results and candidate elections via mobile platforms, improving the customs system through the Simba system. Internally, there are also activities to breaking the silo approach that government has in terms of information sharing across departments.

Grace highlighted that Kenya is making progress in terms of increasing support for Science, Technology and Innovation. In conclusion Grace outlined that technology does not occur through happenstance, it is achieved through years of deliberate, sustainable investment, cutting edge research and development and therefore, for Kenya, following approaches such as the triple helix approach where government, universities and industry are working together is an imperative. The Government of Kenya partnered with IBM to set up the first Research Lab in Africa in Nairobi to drive Science, Technology and Innovation and improve competitiveness.

Grace looks forward to see the deliberations that have happened during **IST-Africa 2013** come to fruition and help policymakers unlock the inefficiencies that exist and enable them to plough back the savings and resources into sustainable development.

## Future of Innovation and ICT Research in Kenya presented by Prof. Shaukat Abdulrazak, National Council for Science and Technology, Kenya



**Prof. Shaukat** outlined that Vision 2030 has expectations that over the next 18 years Kenya will see growth of at least 10% per annum in terms of GDP. Science, Technology & Innovation and ICT are at the foundation of Vision 2030 pillars. ICT is seen to be essential for any knowledge-based economy. Kenya is looking forward to improving eGovernment services through a number of flagship projects. Ongoing initiatives include the transparency construction infrastructure, which includes among other things, the digital villages at the constituent level to provide avenues for utilisation of the optic cables, to facilitate online delivery of the government services. Kenya is now being divided into 47 counties and it is important to make sure that service delivery at those levels are more effective and efficient. The broadband subsidy for universities and colleges has been expanded to 22 public universities, 9 university colleges and more than 500 technical or mid-level colleges.

Another flagship project highlighted by Prof. Shaukat is the government common core network for processing and information flow with the main objective of improving the inter-ministerial database and exchange of information. This will link with the e-government set-up, national terrestrial fibre optic network, and computerised maintenance management systems to manage the roads, bridges and pavements. The Konza Techno-City builds on international best practise and aims to be an economic driver as part of Kenya's vision to be globally competitive.

Prof. Shaukat outlined that Kenya has made good progress in supporting ICT, Research and Innovation. The mobile cellular market has been liberalised and SafariCom partnered with Vodafone. Local area networks have also been enabled in ministries and we are moving towards that, making them more efficient in terms of becoming paperless. The Government has recently enacted the Science, Technology, Innovation Act 2013, among other things it has also upgraded the National Council for Science and Technology to a Commission that advises, promotes and coordinates and, of course, regulates matters of science and technology in the country.

Prof. Shaukat highlighted that the National Research Fund and Kenyan Innovation Agency are now being set up. Since 2008, through the Science, Technology, Innovation Grant, the National Council has funded 975 research projects, to be precise 975. During the National Science, Technology and Innovation Week earlier in May, 50 of the 78 ICT-related projects were showcased in the Exhibition to sensitise the public to the innovations being supported. One of the innovations includes a mobile phone charger in your shoe.

Prof. Shaukat outlined that the Government has expanded basic education, secondary education to embrace ICT. His Excellency, the President, during his campaign manifesto promised a laptop for every child, innovators in the country got excited with this and they came up with a tablet which is being operated by solar. Well known challenges include the wide digital divide between rural and urban areas, the high cost of ICT utilisation and maintenance, legal frameworks to implement automated services, including electronic transactions, cyber crime and e-waste.

Prof. Shaukat outlined that going forward it is necessary to create an innovation ecosystem, that breaks down the silo mentality, based on a quadruple helix (government, research/academic, industry, societal). It is critical that research going forward is focused on addressing societal challenges. The Ministry of ICT and Ministry of Education, Science and Technology are working closely together to re-examine the curriculum and provide necessary training for teachers. It would be beneficial to expand the fibre optic network to cover virtually all hospitals, schools and police stations to allow information to be relayed and to be able to work more efficiently. Within the country structure there are discussions to have at least one university per county and well as ICT incubation hubs thus facilitating a digital economy empowered by local youth. It is necessary to demystify technology and innovation in rural areas and provide sufficient mentoring and information on Intellectual Property Rights to support start-ups to realise their ambitions.

Prof. Shaukat highlighted that Kenya is actively mobilising resources for ICT. Under the new Bill, 2% of the GDP is now allocated to Science Technology and Innovation so now it is a matter of ensuring the government can implement this. The Government can create an enabling environment and encourage venture capitalists to provide additional support.

## Acknowledgement of Support

On behalf of the IST-Africa consortium of 18 African partner governments, **Paul Cunningham** thanked the Ministry of Education, Science and Technology of Kenya for hosting **IST-Africa 2013** Week. Paul acknowledged the support provided by Prof. Crispus Kiamba, Dr. Eric Mwangi, the fantastic work undertaken by Jacob Njagi and the support provided by Richard Liahona, Gatama Gichini, Regina Kariuki, Susan Mbai, Jennifer Kibe and all the team at the Ministry and the National Council for Science and Technology.

Paul acknowledged the significant support provided by Prof. Meoli Kashorda of KENET, Dr. Koi Tirima, Inoorero University and Dr. Katherine Getao, ICT Secretary, eGovernment Directorate in mobilising the national community.

Paul thanked the European Commission and African Union Commission for their ongoing support and thanked KENET, SPIDER and IEEE Kenya Section for their support for the event.

Paul then handed back to Prof. Shaukat to officially close **IST-Africa 2013**.

## Official Closing Remarks

In closing **Prof. Shaukat Abdulrazak** thanked the delegates from European Commission, African Union Commission, African and European Member States, conference participants, and all the team that organised these activities and provided support in many ways. He thanked the conference participants for their active participation during **IST-Africa 2013** Week. This event started with the IST-Africa Living Labs Thematic Working Group Meeting on 28 May, followed by three days of interactive plenary, thematic sessions and workshops. A significant range of ICT Innovation has been showcased by government, research/academia and the private sector through the Scientific Programme and the demonstrations in the Exhibition.

Prof. Abdulrazak highlighted that the key outcomes of **IST-Africa 2013** Week has been the high level of information exchange, the encouragement provided for the wider adoption of Living Labs to support Collaborative Innovation, Entrepreneurship and Action Research, updates on the latest ICT research being undertaken in Africa and Europe as well as on national and regional ICT policies and initiatives, learning about opportunities for international research cooperation under instruments such as Horizon 2020, hearing about policy developments from the African Union Commission and European Commission and the establishment of personal contacts and networks that could lead to research collaboration on ICT and Innovation projects that address social and industrial challenges. The **IST-Africa** Consortium also facilitated strategic side meetings between the European Commission and African Union Commission, and in preparation for Horizon 2020, a series of strategic consultation meetings between the European Commission, KENET, Vice Chancellors and Head of ICT Departments of Kenyan HEIs, African Member States and other relevant stakeholders.

Moving forward, Prof. Abdulrazak encouraged the participants and the represented national governments to disseminate the outcomes for this event in terms of knowledge, contacts and access to the proceedings and to actively support the establishment of wider networks to assist in the generation of new project initiatives.

Prof. Abdulrazak thanked the IST-Africa coordinators, Paul Cunningham and Miriam Cunningham, the IST-Africa partners, the International Programme Committee and the local team within the Ministry of Education, Science and Technology, Kenya for the significant work that went into making **IST-Africa 2013** Week such a success and the European Commission for the support provided to the **IST-Africa Initiative**. He declared the conference officially closed and wished the participants all the best as they travel home.

# Awards

The Awards for Best Paper, Runner-up Paper, Best Demonstration Stand and Runner-up Demonstration Stand were announced by Mr **Jacob Njagi**, Ministry of Education, Science and Technology and presented by **Prof. Shaukat Abdulrazak**, CEO, National Council for Science and Technology, Kenya during the Closing Plenary Session of **IST-Africa 2013**.

All papers submitted to **IST-Africa** are double-blind peer reviewed by members of the International Programme Committee. As part of this process the reviewers nominate a shortlist of papers to be considered for the Best Paper and Runner-up Paper Awards.

The Best Paper was awarded to "Cloud Computing for Development – Improving the Health Information System in Ghana", authored by Denis L. Adalety Ghana Health Service; Olav Poppe & Jørn Braa, Department of Informatics, University of Oslo, Norway.

The Runner-up Paper was awarded to "Embedding Business Model for Sustainable Collaborative Innovation in African Living Labs", authored by Vincent Grezes & Antoine Perruchoud, HES-SO Valais Switzerland and Harry Fulgencio, LIACS, Leiden University, The Netherlands.

There were a lot of dynamic technology applications from local entrepreneurs, Innovation Spaces and HEIs showcased on the Exhibition at **IST-Africa 2013**. A number of judges visited all stands to assess the demonstrations and to select the Best Demonstration Stand and Runner-up Demonstration Stands

The Best Demonstration Stand was awarded to NAILAB - My Order presented by Angela Ouma.

The Runner-Up Demonstration Stands were awarded to three stands: Jomo Kenyatta University of Agriculture and Technology - ChamaApp presented by Lilian Nyarera, Autonomous System Research - Haptic Audio Augmented Navigation Device presented by Moses Mwuara and Egerton University - ICT in JUAKALI - presented by Maureen Maina.



# Networking Events

**IST-Africa 2013** provided plenty of opportunities for delegates to network, continue building relationships with old acquaintances and build new friendships and partnerships.

On Wednesday evening, delegates participated in a Gala Dinner with support from **IST-Africa** and **SPIDER**. This provided an excellent opportunity to commence new relationships as well as enjoy Kenyan cuisine and dance. The photos below provide an insight into this special event.



# Participants

There were over 450 participants at **IST-Africa 2013** from Europe, Africa, Cambodia and US. The organisations represented are listed below.

## European Organisations

Organisation	Country
Adcon Telemetry	Austria
Pessl Instruments GmbH	Austria
Progis Software GmbH	Austria
UNIDO	Austria
Vienna University of Technology	Austria
eGovLab	Belgium
Institute of Tropical Medicine	Belgium
InterDisciplinary Centre for Law and ICT (ICRI)	Belgium
Ministère de la Communauté française de Belgique	Belgium
DG CONNECT, European Commission	Belgium
Stockholm University - DSV	Belgium
University of Cyprus	Cyprus
Aalto University	Finland
The Pharmacy of Kaivopuisto	Finland
University of Helsinki	Finland
VTT	Finland
Astrium	France
CIRAD	France
IRD	France
LINPICO	France
RENATER	France
Sigma Orionis	France
University of Koblenz Landau, Campus Landau	Germany
Centre for Research and Technology Hellas	Greece
IIMC Ltd	Ireland
CNR/IOM Democritos	Italy
Fondazione Bruno Kessler	Italy
Global Forum on Agricultural Research	Italy
University of Catania and INFN and COMETA	Italy
IPv6 Forum - SnT University of Luxemboug	Luxembourg
TNO	Netherlands
University of Oslo	Norway
Fraunhofer Portugal Research Center for Assistive Information and Communication Solutions	Portugal
Instituto de Medicina e Higiene Tropical	Portugal
i2CAT	Spain
Universidad Politecnica de Madrid	Spain
KTH	Sweden
Linköping University	Sweden

Organisation	Country
Stockholm University	Sweden
Swedish Program for ICT in Developing Regions	Sweden
University of Applied Sciences Western Switzerland	Switzerland
University of Reading	United Kingdom
Ashburn Institute	Ukraine

## African Organisations

Organisation	Country
Consult IT (Pty) Ltd	Botswana
Ministry of Health	Botswana
Ministry of Transport and Communications	Botswana
Office of the President	Botswana
Southern African Development Community (SADC)	Botswana
Ministry of Higher Education and Scientific Research	Burundi
National Agency for Information and Communication Technologies (ANTIC)	Cameroon
Ministry of Communications & IT	Egypt
African Union Commission	Ethiopia
Ethio Telecom (Telecommunication)	Ethiopia
European Commission	Ethiopia
ICT in Development	Ethiopia
Ministry of Science and Technology	Ethiopia
UN Economic Commission for Africa	Ethiopia
United Nations Economic Commission for Africa (UNECA);	Ethiopia
Ministry of Environment, Science, Technology and Innovation	Ghana
@iLabAfrica, Strathmore University	Kenya
Africa Nazarene University	Kenya
African Telecommunications Union	Kenya
Afroes	Kenya
Agoro Oyombe Secondary School	Kenya
AkiraChix	Kenya
Ashoka	Kenya
Autonomous Systems Research	Kenya
Cape Peninsula University of Technology	Kenya
Catholic University of Eastern Africa	Kenya
Coffee Research Foundation	Kenya
Commission for University Education	Kenya
Communications Commission of Kenya	Kenya
Computer Aid International	Kenya
Egerton University	Kenya
eGovernment Directorate	Kenya
eGy Africa	Kenya
eLimu	Kenya
Embassy of Finland	Kenya
French Institute of Research in Africa	Kenya

<b>Organisation</b>	<b>Country</b>
Geothermal Development Company	Kenya
GESCI	Kenya
GigiWapi	Kenya
Great Lakes University Of Kisumu	Kenya
Hope FM	Kenya
IEEE Kenya Section	Kenya
iHub	Kenya
iHub Research	Kenya
Independent Electoral and Boundaries Commission	Kenya
Inoorero University	Kenya
IPv6 Forum Kenya	Kenya
IRD	Kenya
ISOC Regional Development Manager for Africa	Kenya
Jaramogi Oginga Odinga University of Science and Technology	Kenya
JKUAT Institute of Computer Science and Information Technology	Kenya
Jomo Kenyatta University of Agriculture and Technology	Kenya
KCA University	Kenya
KENET	Kenya
Kenya Agricultural Research Institute	Kenya
Kenya Education Network (KENET)	Kenya
Kenya Human Rights Commission	Kenya
Kenya Medical Research Institute	Kenya
Kenya Methodist University	Kenya
Kenyatta University	Kenya
Kisii University	Kenya
KISII UNIVERSITY	Kenya
Maasi Mara University	Kenya
Maseno University	Kenya
Masinde Muliro University of Science and Technology	Kenya
Mawingu	Kenya
M-Changa	Kenya
M-Farm	Kenya
Microsoft	Kenya
Ministry of Education Science and Technology	Kenya
Ministry of ICT	Kenya
Ministry of Planning	Kenya
Ministry of Public Health and Sanitation	Kenya
Mnistry of Education, Science and Technology	Kenya
Moi University	Kenya
M-shamba	Kenya
My Order	Kenya
Nailab	Kenya
National AIDS/STIs Control Programme	Kenya
National Council for Science and Technology	Kenya

<b>Organisation</b>	<b>Country</b>
National Environmental Management Authority	Kenya
Nokia	Kenya
Nyandarua Institute of Science and Technology	Kenya
Osafric Water Conservation	Kenya
Pan African Agribusiness and Agroindustry Consortium	Kenya
Primemonitors	Kenya
Pwani University	Kenya
RCMRD	Kenya
Scrobber	Kenya
Soko	Kenya
Strathmore University	Kenya
Taita Taveta University College	Kenya
Technical University of Kenya	Kenya
TechSavvy.or.ke	Kenya
Ukall	Kenya
UNIDO	Kenya
United States International University	Kenya
University of Eastern Africa	Kenya
University of Eldoret	Kenya
University of Nairobi	Kenya
University of Nairobi Science Park	Kenya
USIU	Kenya
Value Edge Limited	Kenya
Vision 2030 Secretariat	Kenya
WebDesk	Kenya
Wezatele	Kenya
Department of Science and Technology	Lesotho
Science & Mathematics Educators' Federation - Lesotho National Commission for Unesco	Lesotho
The National University of Lesotho	Lesotho
National Commission for Science and Technology	Malawi
UbuntuNet Alliance for Research and Education Networking	Malawi
University of Malawi	Malawi
AfriNIC	Mauritius
Central Information Systems Division	Mauritius
Ministry of ICT	Mauritius
National Computer Board	Mauritius
Ministry of Science and Technology	Mozambique
National Institute for ICT	Mozambique
University of Namibia	Namibia
ECOWAS Commission	Nigeria
University of Ibadan	Nigeria
Carnegie Mellon University Rwanda	Rwanda
East African Communications Organization	Rwanda
Ministère de l'Enseignement Supérieur et de la Recherche	Senegal

<b>Organisation</b>	<b>Country</b>
Central University of Technology	South Africa
CSIR	South Africa
Department of Science and Technology	South Africa
InfoEd Global	South Africa
McNulty Consulting	South Africa
Meraka Institute	South Africa
Nelson Mandela Metropolitan University	South Africa
NEPAD Planning and Coordinating Agency	South Africa
Rhodes Univeristy	South Africa
SAP Research Pretoria	South Africa
The University of the Western Cape	South Africa
Tshwane University of Technology	South Africa
University of Fort Hare	South Africa
University Of Johannesburg	South Africa
University of KwaZulu-Natal	South Africa
Sudan university of Science and Technology	Sudan
University of Khartoum	Sudan
Ministry of Information and Communications Technology	Swaziland
Commission for Human Rights and Good Governance	Tanzania
Iringa University College	Tanzania
KINU	Tanzania
Ministry of Communications, Science and Technology	Tanzania
Moshi University College of Cooperative and Business Studies	Tanzania
Muhimbili University of Health and Allied Sciences	Tanzania
Sida	Tanzania
Tanzania Commission for Science and Technology	Tanzania
TCRA	Tanzania
TIRDO	Tanzania
Tumaini University	Tanzania
CERT	Tunisia
Ministere de l'Enseignement Superieur et de la Recherche Scientifique	Tunisia
CIPESA	Uganda
Gulu University	Uganda
Icon Frontiers Uganda Limited	Uganda
Makerere University	Uganda
MUBS	Uganda
Parliament of Uganda	Uganda
The Inter-University Council for East Africa	Uganda
Toro Development Network (ToroDev)	Uganda
Transparency International Uganda	Uganda
Uganda National Council for Science & Technology	Uganda
Women of Uganda Network	Uganda
COMESA	Zambia
National University of Science and Technology	Zimbabwe

**Other Organisations**

<b>Organisation</b>	<b>Country</b>
Open Institute	Cambodia
Elerai Global Services	United States
Kepler Space Institute and Asburn Institute	United States



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### Exhibition

**IST-Africa 2013** Exhibition showcased applied ICT research results and applications through technology demonstrations.

### Demonstration Stands

Stand Name	Organisation	Country
IST-Africa Initiative	IST-Africa Consortium	
African Leadership in ICT Course	GESCI	Kenya
mShamba	mShamba	Kenya
ICT for Agriculture	Progis Software GmbH	Austria
Autonomous Systems Research	Autonomous Systems Research	Kenya
Chandaria Innovation Centre	Kenyatta University	Kenya
iHub	iHub	Kenya
Nailab	Nailab	Kenya
Jomo Kenyatta University of Agriculture and Technology	Jomo Kenyatta University of Agriculture and Technology	Kenya
Kenya Methodist University	Kenya Methodist University	Kenya
Egerton University	Egerton University, Computer Science	Kenya
USIU	United States International University	Kenya
IEEE	IEEE Kenya Section	Kenya

**Conference Portal & Delegate Showcase**  
[www.IST-Africa.org/Conference2013](http://www.IST-Africa.org/Conference2013)

**IST-Africa 2013 Additional Supporting Organisations**

