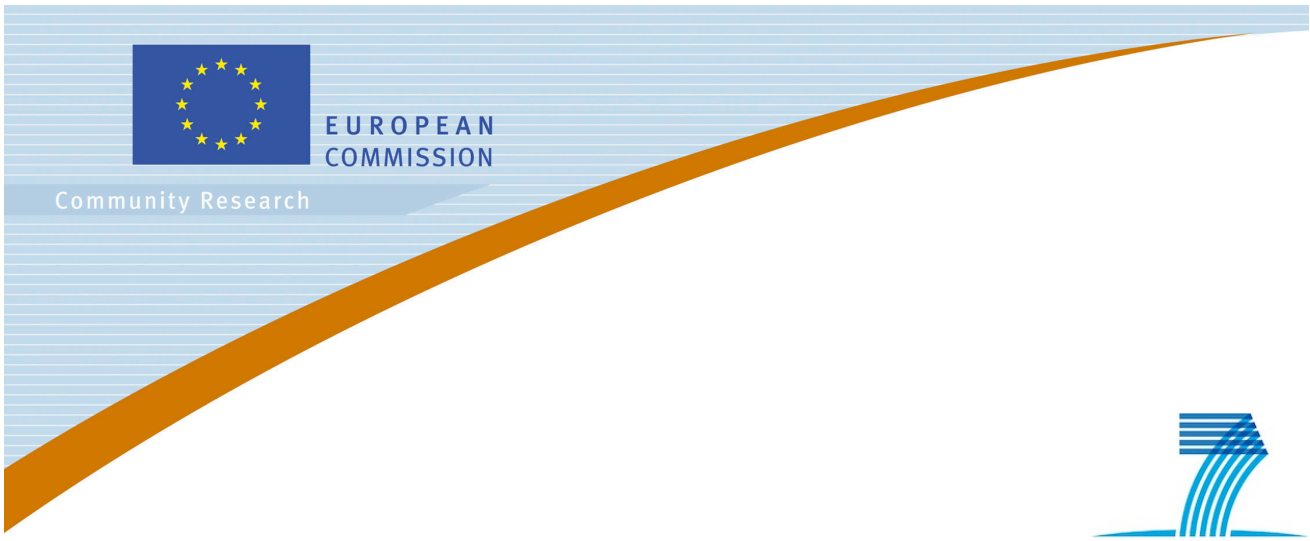

Seventh Framework Programme
FP7

Cooperation Specific Programme - Information & Communication Technologies - Call 7
FP7 ICT Call 7 (FP7-ICT-2011-7)

Strategic Objective 10.3(a)
International Partnership building and support to dialogues

Support Action
SA

euroafrica-ict
www.euroafrica-ict.org

Project Acronym	: **EuroAfrica-P8**
Project Full Title	: **Supporting policy dialogues and cooperation with Africa to enhance ICT cooperative research links between Europe and Africa in the framework of the "Africa-EU Strategic Partnership 8"**
Grant Agreement	: **288309**
Project Duration	: **24 months (Jan. 2012 - Dec. 2013)**

D3.1.1 – Euro-Africa Joint ICT Research Priorities Intermediate Report

Deliverable Status	: **Final**
File Name	: **EuroAfrica-P8_D3-1-1.pdf**
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EuroAfrica-P8 Project Abstract

Africa and Europe have recognized that the development of Science, Technology and Innovation (STI) and the spreading of Information Communication technologies (ICT) to all components of a society are key. The "8th Africa-EU Strategic Partnership" ("Partnership 8" or "P8") interlinks three priorities which can leverage a faster socio-economic development in Africa: Science, Information Society and Space. Partnership 8 Action Plan II lists as a priority the development of an inclusive information society in Africa. In that perspective is being formed a multi-stakeholder implementation group (co-chaired by the African Union Commission, AUC and the European Commission, EC) aiming at enhancing cooperation between the two regions.

EuroAfrica-P8 is a FP7 project funded by the European Commission (DG INFSO) and spanning over 24 months (2012-2013) with the aim of strengthening ICT research and policy links between Africa and Europe under the 8th Strategic Partnership. The project is defined in full continuity with and builds upon the substantial results obtained and the significant momentum created by several previous projects (2006+), designated - over the years - as "the EuroAfrica-ICT Initiative".

The project is gathering partners able to significantly impact the expansion of Euro-African cooperation on ICT research in close liaison with the EC and the AUC and in partnership with key stakeholders in the field.

The Consortium consists of eleven partners having a significant experience of ICT policies in both regions, as well of Africa-EU S&T/ICT cooperation. They enjoy access to important networks and they have previously participated in FP projects. Collectively they complement in each other in such a manner that the consortium is well balanced and qualified to reach the project objectives.

EuroAfrica-P8 main objectives

- Strengthen EU-African policy and ICT research links with the aim of reinforcing the "8th Africa-EU Strategic Partnership" (P8);
- Identify, analyse and map EU-African joint ICT research priorities;
- Provide evidence-based recommendations to the European and African Union Commissions for future cooperation initiatives;
- Provide support and guidance to European and African organisations in their efforts to connect and develop joint research projects in the ICT field;
- Support and sustain the activities of the P8 Africa-EU Implementation Group and the Joint Expert Group (JEG8);
- Enhance the participation of African organisations in FP+ ICT collaborative projects; and
- Achieve strategic coordination with other initiatives/projects/programmes sharing similar or related objectives.

EuroAfrica-P8 main activities

- Provide support and guidance to European and African organisations in their efforts to connect and develop joint research projects in the ICT field through:
    - An interactive, consistent, and dynamic portal website
    - A repository of key information related to EU-African cooperation on ICT research
    - A virtual community of researchers
    - An online database of African research institutes addressing ICT
    - An e-Booklet entitled "Spotlight on African ICT research institutes"
    - Helpdesk services

  - Communication material (quarterly e-Newsletters, video trailer, brochures and posters, etc.)

- Organise cooperation/thematic events synchronised, when possible, with policy dialogue meetings:
  - 4 "Euro-African FP7/ICT awareness/training workshops" aiming at raising awareness on FP7+/ICT cooperation opportunities and at training on best practices: #1 (2012) Southern Africa / #2 (2012) Northern Africa / #3 (2013) West Africa (in French) / #4 (2013) East or Central Africa
  - 2 new editions of the "Euro-African cooperation forums on ICT research" aiming at providing forums for discussions and debates on recent developments & perspectives: #1 (Nov. 2012) Portugal, Europe / #2 (2013) Africa
  - 2 "Euro-African FP7/ICT thematic working group meetings" to be hosted in Europe in 2012 and 2013;

- Identify, analyse and map joint ICT research priorities between the two regions;

- Produce recommendations for future cooperation initiatives;

- Form 5 consortia working on joint EU-Africa EU/FP+ proposals demonstrating the return on investments in e-infrastructures and their supply chains;

- Produce 4 to 6 zoom/case studies (success stories, innovating ICT research/technological developments or results in specific African countries or regions, etc.);

- Publish 2 iterations of an e-Consultation aiming at achieving strategic coordination with other initiatives or programmes sharing similar or related objectives;

- Assist the day-to-day operation of the "Africa-EU Strategic Partnership on Science, Information Society and Space" (P8) multi-stakeholder implementation group and the JEG8 – Improving as much as possible the operation of Partnership 8;

- Ensure the participation in the P8 group meetings of key stakeholders in the ICT field.

Table of Contents

Introduction

The present document is a deliverable of the EuroAfrica-P8 project, funded by the European Commission's Directorate-General Information Society and Media (DG INFSO), under its 7th EU Framework Programme for Research and Technological Development (FP7).

The EuroAfrica-P8 project is divided into Work Packages (WP), each of them being sub-divided into Tasks (T). One of the project tasks (Task 3.1: Identification, Analysis, and Recommendations) has the **main objective** of "*recommending ICT research priorities within the framework of the African-EU Strategic Partnership 8 with a high potential for collaborative R&D leading to new technologies with significant entrepreneurial and social benefits. And thus to support the fast-tracking of an inclusive information society in Africa.*"

Due to the long-term nature of research funding (from idea to call for proposals to funding approval to actual research), this project will focus on medium- to long-term research ideas (3–5 year time horizon). Thus, while there are urgent technology gaps that need research, the focus will be on "*development opportunities with entrepreneurial potential and visionary technology development.*"

The following is a summary of the Task Description from the EuroAfrica-P8 WP:

Context:

The ICT domain is characterised by rapid technological advances and fast adoption of new devices and services. The African continent is at the brink of unprecedented, 24/7 access to broadband Internet while mobile and wireless technologies are rapidly extending access to remote areas. Therefore, ICT research priorities will continuously evolve as both technology and society embrace development while the multi-national ICT industry dominates through commercial interests.

Inputs – data collection:

- Data from previous phases of this and other, related projects;
- New perspectives from academics, industry and government agencies – seeking balanced inputs;
- FP7 ICT challenges of most relevance to the Euro-Africa research collaboration;
- Outcomes from the various EuroAfrica-P8 events: four Regional Awareness Workshops, two Thematic Working Group meetings and the two yearly Forums where views are shared, expert advice is solicited, new directions and critical needs are identified, and creative research ideas are formulated (refer to Work Package 4);
- Interaction with members of the Implementation Group (ICT component) of the Joint Africa-EU Strategic Partnership 8 (WP6) and the result from P8 meetings with EU and African ICT representatives, Regional Economic Communities, members of the Joint Expert Group, etc. that will assist with identification of concrete initiatives of mutual interest;
- A Bibliometric Survey produced by VTT, Finland, that will analyse and measure actual ICT research outputs and efforts between Europe and Africa. This analysis will strive to identify and document the broad European/African ICT research, development and innovation (RDI) trends, landscape and market opportunities as well as zoom in on the narrow areas in terms of "where we are" and "where we want to be".

Proposed Methodology:

- Selecting "three or four most promising research priorities" to focus efforts on areas of the most interest, expertise and potential;
- Using the Bibliometric Survey as input to expert discussions;
- Inviting experts from Europe and Africa to participate in the various project meetings;
- Facilitating work group meetings to focus on short, medium and long-term needs / opportunities;
- Seeking technology ideas that are "disruptive, transformational, with high market value if they were to be commercialized, with social benefit, setting new direction, with hype for the future";
- Refinement and additional views through a continuous dialogue about research priorities, using e-Newsletters and targeted emails with the European and African researchers on the project's Database of African Research Institutes and Virtual Community of Researchers.

Outputs:

- **Substantial description** of three to four **priority ICT research domains** within the FP7 framework with high relevance to experts and stakeholders in both Europe and Africa;
- Within each, a number of **detailed research project ideas** (of mutual interest and benefit) describing the needs, potential long-term benefits, research and technology trends, relevant research capacity in Europe and Africa, and potential beneficiaries of the outcomes;
- **Recommendations** to the EC regarding focused ICT collaboration opportunities in the priority domains.

Links to other EuroAfrica-P8 Work Packages and Tasks:

This Analysis Task learns from and contributes also to:

- Task 3.2 - Produce 4 to 6 zoom/case studies (led by the WB, USA) (success stories, innovating ICT research/technological developments or results in African);
- Task 3.3 - Enhance and update the EuroAfrica-ICT database of African ICT Research Institutes with information relevant to research expertise and focus areas (CERT, Tunisia);
- Task 3.4 - Assist 5 consortia in developing collaborative EU-Africa FP7/Horizon2020 project proposals (led by KTH, Sweden);
- WP 4 - Euro-African Cooperation Events (workshops, thematic work groups, forums);
- WP 5 - Synergies with related programmes and initiatives;
- WP 6 - Assistance to the implementation group of P8.

This Report:

The present deliverable (D3.1.1 – Euro-Africa ICT Research Priorities; Intermediate Report), prepared by the CSIR Meraka Institute (Project Task Leader), is the first report related to this activity. The intermediate results in this report are:

- Refined Methodology
- Review of past projects and a variety of related documents
- Motivation and selection of ICT research Focus Areas
- Structure for Focus Area and Research Project Descriptions

- Research Ideas from a variety of interactions and events
- Report on stakeholder interactions

Finally – this report outlines the Next Steps for work during 2013.

1 - Methodology: Identification, Analysis & Recommendations

This section provides an enhanced and refined, diagrammatic methodology for Task 3.1: *Identification, Analysis and Recommendations of ICT Research Priorities* in Figure 1.

Items 1 to 5 define specific activities from T3.1 in the WP, while items I to III are concrete outputs from the Task.

Note specifically:

- "Priority ICT research domains" from the Task description are referred to below as "Focus Areas" where this project will focus attention based on prioritisation.
- The circular arrows between activities 3 and 5 indicate an on-going process of interactions – generating new ideas, sharing of results and refining/validating these ideas through interaction with other tasks, events, experts and stakeholders.

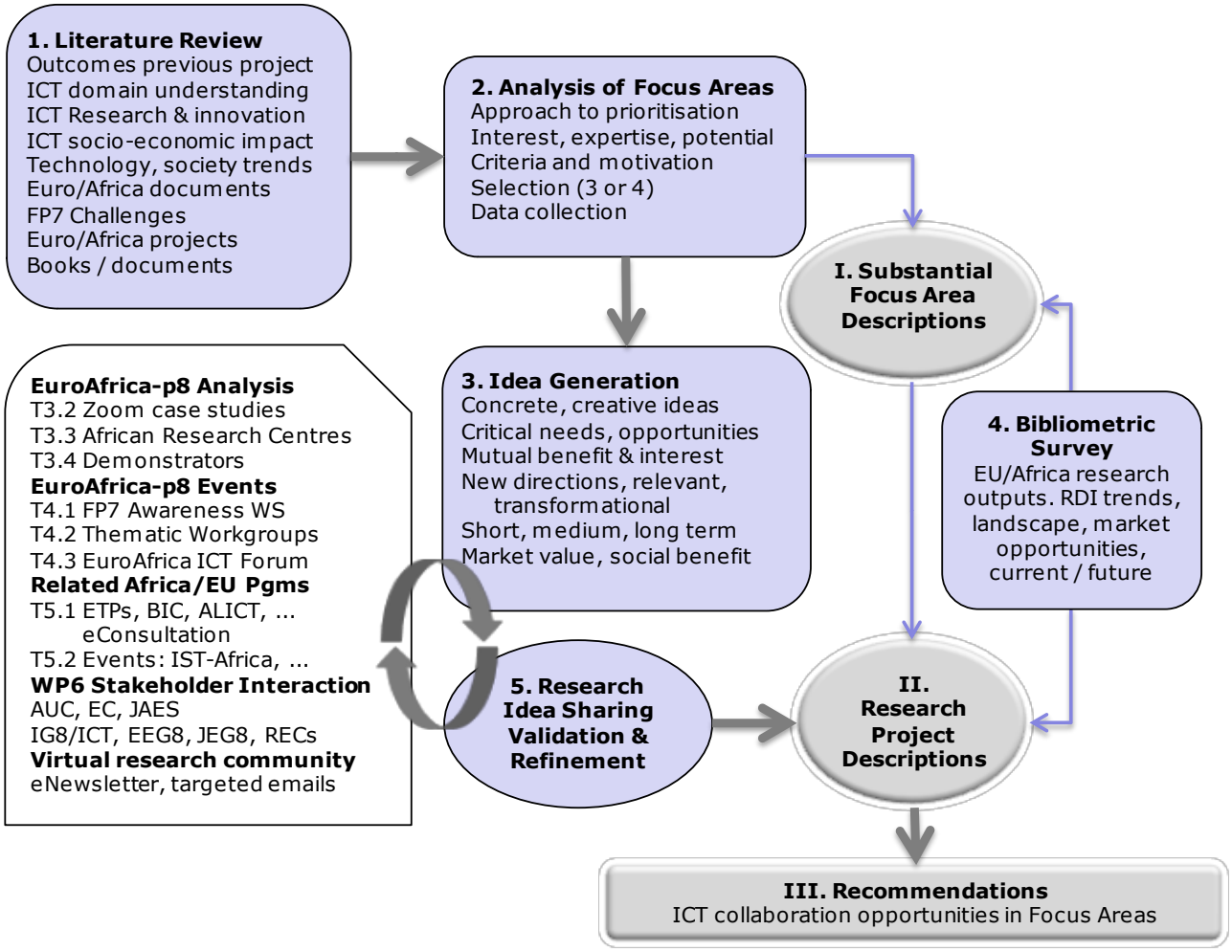


Figure 1: Methodology Block Diagram

2 - Literature Review: Euro-Africa ICT Research

This section gives a review of key literature and documents related to Euro-Africa ICT research as an input to the analysis of ICT research priorities in Section 3.

2.1. Previous phase of the project (EuroAfrica-ICT.org)

2.1.1. Joint ICT Research Priorities

The final deliverable for the EuroAfrica-ICT.org project regarding ICT Research Priorities (AFRICA-EU S&T COOPERATION JOINT ICT RESEARCH PRIORITIES, April 2012, www.euroafrica-ict.org) concluded as follows:

- The key areas for Euro-Africa ICT research were identified in the project as e-Health, e-Learning and m-Applications;

- Developing regions like Africa has the ability to leapfrog intermediate technologies in order to become leaders in new technologies;
- Knowledge transfer in Africa is far from optimised due to a rapidly changing and fragmented ICT landscape, yet there is increased ICT awareness and a cascade of new technology possibilities and consumer expectations. Consequently, a huge diversity of challenges and priorities exist in Africa;
- Many perceived challenges that were identified by stakeholders are generic and not necessarily research related – i.e. lack of ICT infrastructure and lack of network / broadband access as well as issues of institutional, content, standards, policy, regulatory environments and social attitudes;
- These observations pointed to the need for research-based evidence for informed decision taking, the expansion of successful initiatives and the need to support enabling ICT with impact across multiple domains;
- Questionnaires (mass distribution) and discussion forums provided complimentary understanding of research needs for the three key areas, although lacking sufficient detail and inputs from the full spectrum of ICT communities, and often pointing at non-technology related research needs to advance the capacity for socio-economic development. Online questionnaires were experienced as ineffective tools for investigating the complexities of ICT research needs and challenges;
- All areas recognised the need for ICT research to go hand-in-hand with capacity building – both in ICT researchers and institutional capacity to become centres of excellence;
- Standards and norms have yet to be adopted widely – affecting interoperability and the scaling-up of solutions.

The following more concrete challenges for future research were identified (summarised) in the three Key Areas:

e-Health

- Information management, surveillance, interoperability, remote diagnostics, telemedicine/care, business models
- Evidence base for e-Health systems in emerging African markets
- Unique system components for e-Health extension to rural and remote communities.

e-Learning

- Systems, content, teacher training, libraries, delivery platforms, inclusion, social attitudes, interoperability
- m-Learning via mobile devices in energy constrained areas
- Best practice, social context, success factors, educational implications between EU and Africa

m-Applications

- Skills barrier, content authentication, language diversity, scaling, inter-operability, accreditation
- Technical, social, economic processes & interventions to fast-track adoption in EU and Africa
- Computational linguistics processes & solutions, multi-lingual access

In addition, inputs were provided on a number of other topics:

Trustworthy ICT (security, privacy and trust)

- Trust Management for techno-socio business ecosystems in emerging economies and fast growing markets
- Cyber security in Africa as broadband bridges the digital divide
- Financial infrastructure protection given the growth of e-Banking
- Law-enforcement approaches to trans-national cybercrime investigations
- Security related to the Future Internet and developing contexts

e-Governance

- Identify management to control government services to citizens
- Localised e-government solutions with global potential

e-Inclusion

- Social inclusion in health systems to improve access to health services
- Access to e-Learning systems especially in rural areas and including gender sensitivity
- Handicapped access to e-Learning to enable economic activity
- Adult ICT training
- Automated multi-lingual translation and voice text recognition for illiterate and disabled.

ICT Capacity Building

- Strengthening ICT research institutions
- Building capacity to do ICT research from basic to applied
- Partnerships, training and infrastructure for m-Applications.
- Capacity to improve healthcare through localised e-Health services
- Capacity to developed localised eLearning via internet and mobile devices
- Improving access to telecoms infrastructure.

ICT for Environmental Sustainability and Energy Efficiency

- Using a wide spectrum of sensors connected to a community sensor network to inform the community (e.g. via mobile phones) about weather, pollution, traffic volumes, etc.
- E-Waste collection and recycling

e-Infrastructures

- High speed connectivity, grid-computing and supercomputing to enable research
- Scientific data repositories for sharing
- Participating in global, virtual research communities
- Interoperability standards development/

Internet of Things (using the proliferation of mobile devices in Africa)

- Energy-efficient devices and networks
- "Smart systems" for optimised environmental control – buildings, traffic, security etc.

- Information dissemination to the public
- Managing agriculture and the natural environment

2.1.2. Comments from the EC and Reviewers

The key points made by the reviewers of the final report on research priorities can be summarised as follows and will be taken into account in the rest of the report:

- Understand the greatest challenges, true needs & economics of success in Africa and Europe – provide evidence-based recommendations.
- Account for current innovative initiatives across Africa that may be addressing some of the needs and challenges.
- Find both EU and African value-add and synergies in project ideas.
- Dig deeper - identify tangible opportunities and solutions.
- Define a coherent approach to research collaboration between EU and Africa, logically structured and including economic development, energy, infrastructure, capacity, ICT adoption, governance, regulations, standardisation, etc.
- Facilitate the quick emergence of focused ICT research areas.
- Validate and align the themes with EC thematic objectives.
- Is FP7 suitable? What constitutes equitable conditions for access for African participation in collaborative research? Recommendations for Horizon 2020 needed.

2.2. The ICT Domain

The objective of this section is to ensure a common understanding of the scope of ICT, what is meant by research, and why ICT is seen as a driver for socio-economic development.

This discussion is needed because, when people are asked about ICT research priorities for Euro-Africa collaboration (with reference to previous projects), they often include topics such as:

- Capacity building and training,
- Policy development,
- Infrastructure roll-out,
- Development, and
- Commercialisation of solutions,

which are not traditionally regarded as "research.

On the other hand, when we talk about "priorities for collaborative ICT research with socio-economic impact," then we are implicitly extending the normal view [Frascati] of Basic Research as "*acquiring new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view*".

It also goes beyond the view of Applied Research: *original investigation undertaken in order to acquire new knowledge directed primarily towards a specific practical aim or objective*; and it even goes beyond the view of Experimental Development: *Systematic work, drawing on knowledge gained from research and practical experience, that is directed to producing new*

materials, products and devices; to installing new processes, systems and services; or to improving substantially those already produced or installed [Frascati].

> **Reference**: [Frascati] *Proposed Standard Practice for Surveys on Research and Experimental Development.* Frascati Manual, 2002, OECD.

In general, the term Information and Communication Technology (ICT) relates to the electronic computing equipment and the related software that convert, store, protect, process, transmit and retrieve mostly digitised information [ICTEE, p28].

> **Reference**: [ICTEE] *Impacts of Information and Communication Technologies on Energy Efficiency*, Final Report, Sep 2008, EC DG INFSO, ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/sustainable-growth/ict4ee-final-report_en.pdf.

Another often quoted definition is: ICTs include any **communication device** -- encompassing radio, television, cellular phones, computer and network hardware and software, satellite systems and so on**, as well as the various services and applications associated with them**, such as videoconferencing and distance learning.

In this report, the focus is on research towards ICT as a driver for socio-economic impact, and therefore, for practical purposes, the ICT Domain will be divided into:

- **ICT Technologies**: Hardware (HW), software (SW), connectivity, data and applications
- **ICT Impact Areas/Themes** such as Health, Education and Government.

A working definition of **socio-economic impact** is:

> The difference made in the economy, environment and society resulting from the implementation and exploitation of ICT knowledge and solutions.

From this perspective, it is clear that ICT by itself does not have an impact on society or the economy – it requires and enabling ecosystem that includes society, industry and government.

The following sections will explore these concepts in more depth – striving to achieve sufficient clarity while acknowledging that volumes of literature explore the more subtle aspects of all these topics.

2.2.1. The Concept of ICT Research

Two classic references explore the concept of ICT Research, namely:

> ***References:***
> [Hevner] *Design Science in Information Systems Research.* Hevner, AR et al. MIS Quarterly, Vol 28 No 1, pp 75-105. March 2004.
> [March] *Design and natural science research on information technology.* March ST and Smith GF. Elsevier. Decision Support Systems 15 (1995) pp 251-266.

Figure 2 below [Hevner] presents the view that ICT / Information Systems (IS) research is not just about the technology: It adds to the "Knowledge Base" as well as the "Application Environment" where it needs to be relevant, effective and make business sense.

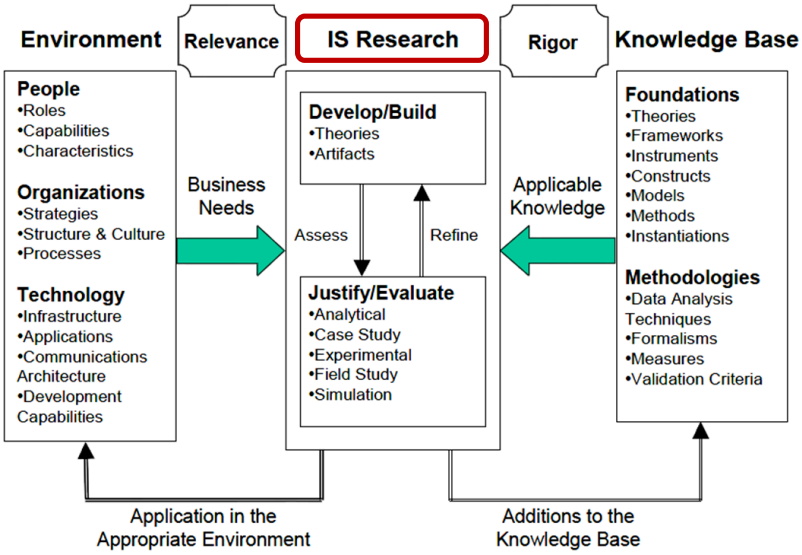


Figure 2: ICT Research / Information Systems (IS) Research [Hevner]

The key points from these reports, related to the current discussion, are:

1) *ICT research is broader than basic research* – it requires the whole innovation value chain of research, development and implementation where the impact is felt.
2) ICT research is about ***innovation*** where technology, people & societies/organisations meet.
3) ICT research includes:
   a) ***Design Science*** (effective problem solving), and
   b) ***Behavioural Science*** (finding solutions relevant to the context).
4) In addition, it includes research to understand/develop the *ecosystem* and factors for successful innovation, and finally
5) It is also about preparing to *transform* the future as ICT has uniquely demonstrated through innovations such as the internet and mobile phones.

This view of ICT Research brings it much closer to the definition of innovation.

2.2.2. The Concept of Innovation

Technological innovation activities [Frascati] are all of the scientific, technological, organisational, financial and commercial steps including investments in new knowledge, which .... lead to the implementation of technologically new or improved products and processes.

Or from the IBM definition: Innovation is the successful commercialisation or application of new ideas, products, technologies or solutions to create tangible value for clients, business or society.

Therefore, Innovation can be depicted as in Figure 3 below where a societal challenge, need or opportunity is eventually transformed into socio-economic value for the end-users.

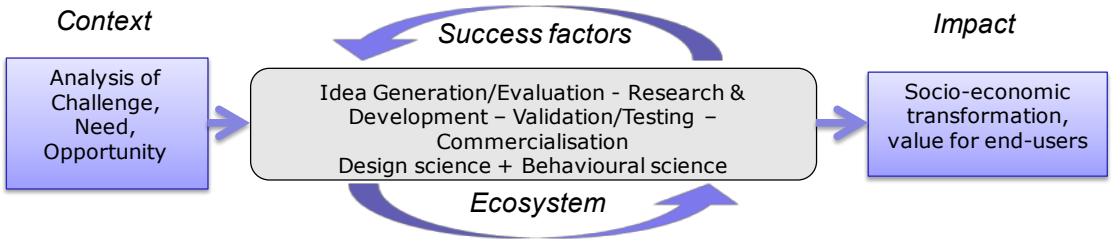


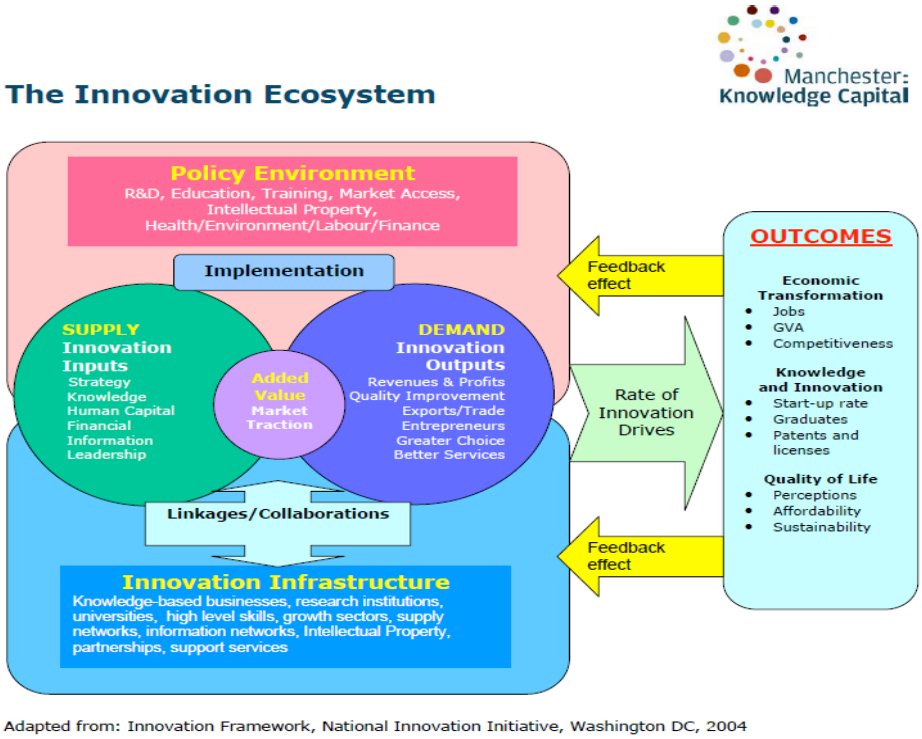
Figure 3: Successful Innovation

Successful innovation, in turn, depends on much more than excellent research, as demonstrated in the Figure 4 below:

The innovation ecosystem models the economic dynamics of the complex relationships that are formed between actors or entities whose functional goal is to enable technology development and innovation.

The key points to realise from this picture are:

- **Innovation** drives Economics, Knowledge and Quality of Life
- **Implementation** depends on the Policy Environment
  - Government regulations, funding, intellectual property rights
- **Added value** can only be achieved if the Innovation Infrastructure is in place
  - Including research capacity, ICT infrastructure, partnerships, businesses



Adapted from: Innovation Framework, National Innovation Initiative, Washington DC, 2004

Figure 4: The Innovation Ecosystem

Consequently, in terms of the desire for impact through ICT, it would be more appropriate to refer to ICT *Research & Innovation* for socio-economic impact.

2.2.3. The Global context of ICT as a driver for socio-economic growth

ICT4D (Information and Communications Technologies for Development) is an initiative aimed at bridging the digital divide (the disparity between technological "have" and "have not" geographic locations or demographic groups) and aiding economic development by ensuring equitable access to up-to-date communications technologies.

The United Nations, through its UN Development Programme, actively promotes ICT4D as a powerful tool for economic and social development around the world.

> **Reference:** http://whatis.techtarget.com/definition/ICT4D-Information-and-Communications-Technologies-for-Development, 26 Nov 2012

The following is a practical description of the generally accepted concept of ICT as a driver for socio-economic growth:

- When Internet penetration rises by 10% in emerging economies, GDP increases by 1 to 2%.

- The GDP growth rate of a developing country can be boosted by 0.59 % per annum for every 10 mobile telephones added per 100 inhabitants.
- For the U.S. economy, every $ invested in broadband provides a tenfold return. Faster broadband deployment in Europe could create 1 million jobs and growth of €850 billion through 2015.
- "ICT has been the main driver of Kenya's economic growth over the last decade. … Since 2000, Kenya's economy grew at an average of 3.7%. Without ICT, growth would have been a lacklustre 2.8%".

References:
ICT for Economic Growth: A Dynamic Ecosystem Driving The Global Recovery - World Economic Forum, 2011
Kenya Economic Update, December 2010
Worldwide Worx Report

A most recent finding is that ICT plays a vital role in advancing economic growth and reducing poverty. A survey of firms carried out in 56 developing countries finds that firms that use ICT grow faster, invest more, and are more productive and profitable than those that do not. ICTs can be used to directly influence the productivity, cost effectiveness and competitiveness in industries, which is the advantage developing countries can build their economies upon. Catching up on developed economies in terms of application of technology and resulting economic benefits had never been easier. On the other hand, **the results for not being able to adopt ICTs can also be disastrous.**

Reference: *ICT as an enabler of Socio-Economic Development;* Author: Tahir Hameed; School of Engineering, Information & Communications University, 305-732, Daejeon, Republic of Korea.

Finally, with reference to the ITU publication "Measuring the Innovation Society," ICT impact can be achieved by improving three main domains: ICT Readiness, ICT Use and ICT Capacity – as summarised in Figure 5.

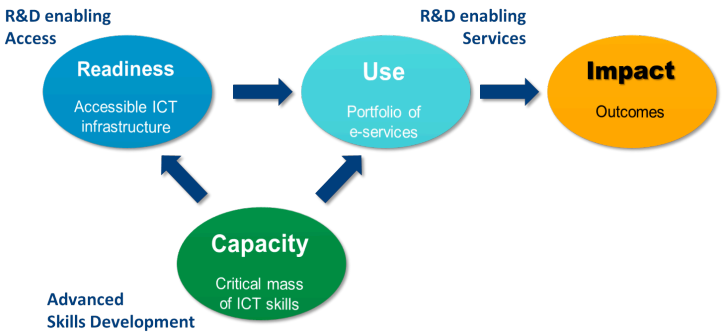


Figure 5: The 3 levers for creating impact via ICT

Reference: ITU – *Measuring the Information Society*, from South African DST RDI Roadmap documents.

2.3. EU Reference Documents

The following is a selection of reports and references that provide background on ICT research and innovation perspectives in Europe. Only key insight and directions are summarised.

2.3.1. A Digital Agenda for Europe

The following are key points from the Digital Agenda for Europe (DAE) (http://ec.europa.eu/digital-agenda/):

Objective: The overall aim of the DAE is to deliver sustainable economic and social benefits from a digital single market based on fast and ultra-fast internet and interoperable applications.

- The ICT sector is directly responsible for 5% of European GDP, with a market value of € 660 billion annually, but it contributes far more to overall productivity growth (20% directly from the ICT sector and 30% from ICT investments).
- The great potential of ICT can be mobilised through a well-functioning virtuous cycle of activity (regional integration, increased services, roll-out of ICT infrastructure/networks) that overcomes challenges (inside the circle) as illustrated below in Figure 6.

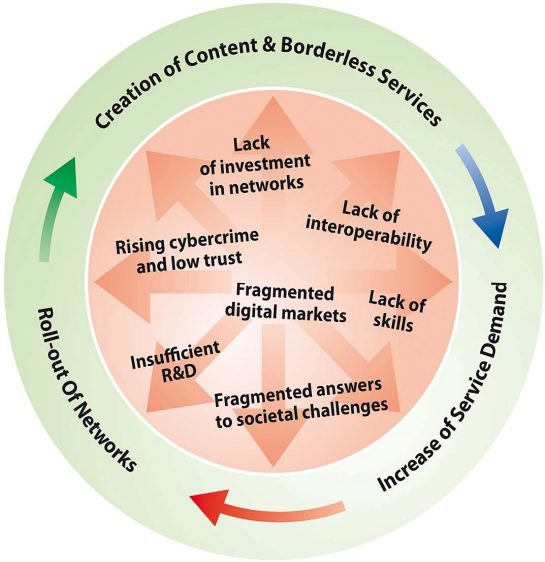


Figure 6: Mobilising the potential of ICT

The DAE action areas include:

(1) A vibrant digital single market
(2) Interoperability and standards
(3) Trust and security
(4) Fast and ultra-fast internet access
(5) Research and innovation
(6) Enhancing digital literacy
(7) ICT-enabled benefits for EU society

(8) International aspects in all action areas

The Research and innovation pillar of the DAE focuses on maintaining Europe's competitive edge in ICT R&I through increased coordination and elimination of Europe's fragmented efforts. It recognises that Europe must master both the development and use of Information and Communication Technologies (ICTs) to generate sustainable economic and social benefits.

ICTs play a crucial role:

- improving **competitiveness** throughout the economy in the face of globalisation, boosting innovation, creativity and efficiency - see the Economy & Work theme;
- **scientific and technological development** in areas as diverse as medicine and physics;
- **modernising sectors** as diverse as education, security, energy and transport, and making Europe's large public sector more efficient - see, for example, the education & training, eGovernment, transport and safety themes;
- **tackling social challenges and improving quality of life** while meeting the challenge of an ageing society - see the Quality of Life, eInclusion and Regions themes).

Reference: http://ec.europa.eu/information_society/tl/research/index_en.htm.

2.3.2. FP7 Work Programme for ICT - 2013

The FP7 Work Programme 2013, Cooperation Theme 3, ICT – Information and Communications Technologies, provides the current FP perspectives on ICT research and international collaboration.

Objective: Improving the competitiveness of European industry and enabling Europe to master and shape future developments in ICT so that the demands of its society and economy are met. Activities will continue to strengthen Europe's scientific and technology base and ensure its global leadership in ICT, help drive and stimulate product, service and process innovation and creativity through ICT use and value creation in Europe, and ensure that ICT innovations are rapidly transformed into jobs and growth for the benefits of Europe's citizens, businesses, industry and governments.

Policy and socio-economic context: ICT innovations are both a driver and support for deep transformations in the society, including:

- Internet and cloud computing
- Micro and nano-electronics
- Advanced technology interfaces
- More intelligent and smart environments
- Responding to major societal challenges such as health and energy
- Web-based social networking

There is a need for a new approach to innovation – more translation of basic research into innovative products for global markets.

The approach involves a continuing commitment to Europe's presence in basic ICT technologies and infrastructures as well as a new phase of ICT's contribution to major socio-economic challenges in Europe through the following **FP7/ICT Challenges**:

(1) Pervasive and trusted network and service infrastructures
(2) Cognitive systems and robotics
(3) Alternative paths to components and systems
(4) Technologies for digital content and languages
(5) ICT for health, ageing well, inclusion and governance
(6) ICT for a lower carbon economy
(7) ICT for the Enterprise and Manufacturing
(8) ICT for learning and access to cultural resources
(9) Future and Emerging Technologies
(10) International Cooperation

International cooperation activities in this Work Programme have three main objectives:

- to jointly respond to major global technological challenges by developing interoperable solutions and standards,
- to jointly develop ICT solutions to major global societal challenges, and
- to improve scientific and technological cooperation for mutual benefit.

2.3.3. ICT Research and Innovation in a Globalised World

Reference*: ICT research and innovation in a globalised world – A contribution for thinking strategically the role of international cooperation in EU ICT research and innovation*. ISTAG Working Group on International Cooperation, March 2012, http://cordis.europa.eu/fp7/ict/istag/reports_en.html

A central objective of the Europe 2020 Innovation Union flagship is to improve the work with international partners. However, International Cooperation (InCo) in Science, Technology and Innovation (STI), particularly in ICT research, has not reached an adequate and satisfying level.

The question: "Why should the EU improve international cooperation in the field of R&D with other technology- and R&D-intensive countries?" is answered as follows:

- Strengthen competitiveness and tackle global societal challenges
- Respond to the global character of ICT-technology and the market
- Exploit growth and innovation potential
- React on ICT research & development trends outside the EU
- Learning from ICT-innovation strategies from outside of EU
- Support European ICT-companies to internationalize (especially SMEs)
- Support development and catch-up processes in less-developed countries
- Create mutual benefit

The Strategic Approach at INCO includes identification of region-specific priorities and drivers for collaboration. This will require considerable effort in information and intelligence gathering to conduct strategic assessments – analysing inter alia:

- STI capacity, synergies with Europe, economic performance of the region, market situation
- Interests of potential partners, interests of EU partners
- Added value of EU actions on existing national / stakeholder actions

- Prospects of finding the right balance of mutual benefit
- IPR, pre-competitive and competition risks
- Potential mechanisms / instruments for action.

ISTAG recommends speeding up the whole R&D funding process in the EU since it is necessary that EU support programmes reflect the (short) innovation cycle in the ICT-sector.

Technology Areas for Collaboration – European ICT Platforms:

1) Future Internet
2) Cyber Security
3) Micro-Electronics
4) Wireless Sensor Networks
5) Future Urban Mobility/e-Mobility
6) ICT for Inclusion and Well-being
7) Software – Focus Enterprise Software
8) Robotics

The Recommendations from this report include:

- **Strengthen** international cooperation in STI in Horizon
- **Develop a new strategy for addressing International Cooperation in STI**: Develop criteria and define customised goals and instruments. This includes in-depth analyses that focus among others on the STI capacity and economic performance of the target country, possible synergies, interests of the different partners, as well as issues of common concern like IPR, market access and risks.
- Make the **EU ICT Platforms (ETPs)** a dedicated topic in the policy dialogues
- Keep European R&D programmes **open** for participation from external partners and further simplify the applied instruments.
- Develop **customised ICT instruments** for H2020
- Focus on the Technology Areas for Collaboration (see above)

2.3.4. Horizon 2020

The Horizon 2020 research funding programme should be adopted in mid-2013 and officially launched on 01/01/2014. Research and Innovation is still key, despite the economic crisis.

Reference: www.ec.europa.eu/research/horizon2020

Horizon 2020 has three priorities:

- Excellent science,
- industrial leadership, and
- addressing societal challenges.

International cooperation is reassessed as an objective - to remain the most open funding programme in the world.

ICT in Horizon 2020 will see a proposed increase of 46% of dedicated budget when compared to FP7.

2.4. African Reference Documents

2.4.1. eTransform Africa report (World Bank)

This new flagship report – eTransform Africa – produced by the World Bank and the African Development Bank, with the support of the African Union, identifies best practice in the use of ICTs in key sectors of the African economy (www.eTransformAfrica.org). Under the theme "Transformation-Ready", studies about the growing contribution of ICTs in 8 cross-cutting and sectoral areas were commissioned:

Agriculture, Climate Change Adaptation, Education,
Financial Services, Government Services, Health,
ICTs in enhancing African regional trade & integration, and
The need to build a competitive ICT industry to boost innovation, job creation and the export potential of African companies.

The Transformational Power of ICTs is illustrated by the following observations:

- The mobile phone has revolutionised communications in Africa.
- Africa's "mobile decade" has driven its economic growth.
- ICT can empower the lives of Africans and are driving entrepreneurship, innovation and income growth.
- It's not about the phone or the computer; it's about the applications and the innovation they deliver.
- ICTs can ease cross-border communications, financial transactions, and sharing of data and information and have a catalytic impact on regional integration and trade facilitation.
- The deployment of ICTs and the development of applications must be rooted in the realities of local circumstance and diversity.
- Governments have an important role to play in creating an enabling environment and acting as a lead client for large-scale ICT-based programmes.
- Effective use of ICTs require cross-sectorial collaboration and a multi-stakeholder approach, based on open data and open innovation.
- Africa is still at the beginning of its growth curve and, to date, most ICT applications have been pilot programmes. Now is the time for rigorous evaluation, replication and scaling up of best practice.

2.4.2. IST-Africa Project Reports

The IST-Africa project (2006-2013) has produced at least three relevant, recent reports (available at www.ist-africa.org) based on their interactions with IST-Africa Partner Countries. The following gives the goals of each report and extracts of some of the findings:

Guide to ICT Policy in IST-Africa Partner Countries

Version 2.0, 31 January 2012

- The goal of this guide is to share the current status of National ICT policies in each of the current IST-Africa Partner Countries, identify what has been achieved to date and provide insight into what implementation challenges remain. This report reflects analysis of existing National ICT Policies for twelve of the IST-Africa Partner Countries including Botswana, Burundi, Cameroon, Kenya, Lesotho, Mauritius, Mozambique, Namibia, Senegal, South Africa, Tanzania and Uganda.

Guide to ICT-related Bilateral Cooperation in IST-Africa Partner Countries

Version 2.0, 31 January 2012

- The purpose of this study is to provide a starting point for a central repository of ICT projects and activities across Africa. It focuses on current ICT related bilateral cooperation in Africa.

Guide to ICT Initiatives and Research Priorities in IST-Africa Partner Countries

Version 2.0, 31 January 2012

- A survey has been undertaken to provide an overview of the ICT Environment and ICT related initiatives currently on-going at a national level based on consultation of all key research actors. The findings outline the rich mix of ICT related activities being undertaken in different African countries and the depth of research institutions that exist.
- Tables 1 and 2 in the report provide an overview of the main institutions, research areas of interest and mapping to current Challenges under the FP7-ICT Work Programme for 2010 – 2012, based on consultations undertaken during 2010 - 2011.
- Table 2 clarifies the strong clustering of interest across most IST-Africa Partner Countries in four key areas:
  (1) Pervasive and Trusted Network and Service Infrastructures,
  (2) ICT for Learning and Access to Cultural Resources, followed by
  (3) ICT for Health, Ageing Well, Inclusion and Governance and
  (4) ICT for Mobility, Environmental Sustainability and Energy Efficiency.
- Like the smaller clusters around Technologies for Digital Content and Languages (Burundi, Egypt, Namibia, Senegal and South Africa) and ICT for Agriculture (Kenya, Lesotho, Tanzania and Uganda), it is perhaps surprising that these clusters are not more pan-African in nature. It is certainly likely that these smaller clusters will continue to grow over the coming years.

Comment: *Table 2 mentioned above identifies FP7 Challenges 1, 5, 6 and 8 (see Section 2.3.2 above) as the most frequent topics for "Research Areas of Interest" in the 14 surveyed African countries, with Challenges 3 and 4 mentioned less frequently, Challenge 2 mentioned once and ICT for Agriculture appearing as a prominent topic not directly covered in the FP7 Challenges.*

2.4.3. Success stories: ICT with socio-economic impact

The following is a collection of success stories regarding actual use of ICT (references at the end):

m-Agriculture in Action

Ekgaon: provides mobile tools allowing 11,000 farmers in rural India to access market price information, weather alerts and advice on crop management and agricultural best practices.

eSoko: created in Ghana and now used in 16 African countries, provides a wide range of information to farmers, including commodity prices. The service also allows farmers to communicate buy-and-sell offers for their products.

mPayment: MoBiashara in Kenya, Nigeria, Uganda and South Africa allows farmers to compare prices and purchase agricultural inputs using mobile money reducing transaction costs and increasing profits.

mCredit: Kenya-based Musoni, a microfinance bank, now allows users to make payments on their microfinance loans via mPesa reducing travel and transaction costs and improving data collection.

mInsure: Kenya's KilimoSalama, a venture between Syngenta Foundation for Sustainable Agriculture, UAP Insurance, and Safaricom, allows farmers to insure against crop failure –an automated weather system detects weather irregularities and automatically disburses a payment to the user's mPesa account.

Education

Software Industry: Makerere University will work towards a stronger local private sector industry focussing on software solutions.

Education Industry: ICT should enable universities to operate 24-7 via online tutors who could operate from their homes, thus providing employment from home.

Private Sector-University partnerships: ICT provides opportunities for Universities to engage in business with the private sector and increase on the tax base.

Outsourcing Services: The other opportunity for universities in the area of outsourcing is data and call centres business, software development and customization, customer care and support.

m-Health and Finance

The following are case studies from Bangladesh, Tanzania, Kenya, India and South Africa.

Supply Chain Settlement and Credit: Supply chain participants transact using electronic means between their mobile financial service accounts in order to fast-track payment settlements.

Performance-based Funding (PBF): Where health workers for example can be paid for the job done using their mobile financial service.

Supply Chain Settlement and Credit: Supply chain participants can settle payment electronically between their mobile financial service accounts.

Salary Disbursement: Healthcare employers can pay a healthcare worker automatically into the healthcare worker's mobile financial service account.

Mobile Pre-paid Savings: The majority of the world's population has no access to healthcare insurance. Access to mobile-based savings may assist with this issue. Patients can accrue assets in a prepaid mobile savings account to prepare for upcoming healthcare costs.

References:

Multiplying Agriculture by the Power of Mobile.
http://www3.weforum.org/docs/WEF_TC_MFS_mAgriculture_Briefing_2012.pdf.
Amplifying the Impact: Examining the Intersection of Mobile Health and Mobile Finance -- A discussion guide for collaborative insight presented by the World Economic Forum, in partnership with the mHealth Alliance.
http://www3.weforum.org/docs/WEF_HE_IntersectionMobileHealthMobileFinance_Report_2011.pdf
ICT as an Engine of Economic Growth in the Congo.
http://www.congovision.com/science/ICT-EEGCONGO.pdf

2.5. Euro-Africa Collaboration Reference Documents / Initiatives

2.5.1. African Union and Euro-Africa Partnership Documents

The following are listed without giving details – they can be found on the EuroAfrica-ICT Initiatives website (http://euroafrica-ict.org/africa-eu-relationships/).

1) The 1st EU-Africa Summit (Cairo, Egypt - 2000) - The Cairo Process
2) Reinforcing the partnership between Europe and Africa (2000-2005)
3) The EU Strategy for Africa (2005)
4) The 2nd Africa-EU Summit (Lisbon, Portugal - 2007) - The Joint Africa-EU Strategy (JAES) & its 1st Action Plan
5) The 3rd Africa-EU Summit (Tripoli, Libya - 2010) - The 2nd Action Plan
6) The Strategic Partnership 8 on "Science, Information Society and Space" - The so-called Partnership 8 (P8)
7) The 4th Africa-EU Summit (Brussels, Belgium - 2013)

And supporting documents:

1) Key Deliverables of the JAES 2nd Action Plan 2011-2013 (July 2012)
2) Africa-EU Joint Task Force Meeting (Brussels – 2012)
3) The Africa-European Union Strategic Partnership – Meeting Current and Future Challenges together (2011)
4) Partnership 8 – Leaflet (2010)
5) Partnership 3 – Leaflet (2010)
6) 3rd Africa-EU Summit: "Investment, economic growth and job creation" (2010)
7) 2nd JAES Action Plan (2011-2013)
8) 3rd Africa-EU Summit – Tripoli Declaration (2010)

9) MoU AUC-EC (2010)
10) JAES Key deliverables (2010)
11) 1st JAES Action Plan (2008-2010)
12) AUC-EC Joint Statement on the Implementation of the Partnership 8 (2008)
13) AUC-EC Book of Lighthouse Projects (2008)
14) Partnership 8 (2007)
15) The Africa-EU Strategic Partnership – JAES (2007)
16) 2nd Africa-EU Summit Lisbon Declaration (2007)
17) ARAPKE - A Framework for action (2005)

Acronyms:

- ARAPKE – African Regional Action Plan for Knowledge Economy
- AU – African Union
- AUC – African Union Commission
- CPA – Consolidated Plan of Action
- DG – Directorates General
- EC – European Commission
- ENP – European Neighbourhood Policy
- EU – European Union
- ICT – Information and Communication Technologies
- JAES – Joint Africa-EU Strategic
- JTF – Joint Task Force
- MDG – Millennium Development Goals
- MoU – Memorandum of Understanding
- MS – Members States
- NEPAD – New Partnership for Africa's Development
- OAU – Organisation of African Unity
- P8 – Africa-EU Strategic Partnership on Science, Information Society and Space
- RECs – African Regional Economic Communities
- S&T – Science and Technology
- TDCA – Trade and Development Cooperation Agreement
- UN – United Nations

2.5.2. List of Related Euro/Africa ICT projects

The following is a list of Euro/Africa collaboration projects with ICT as either the main focus or included in a broader spectrum of topics. The purpose is to demonstrate that a significant level of activity within the ICT research focus has been going on since at least 2005:

- *The START FP6/IST project (2006-2007) - www.euroafrica-ict.org*
- *The EuroAfrica-ICT FP7/ICT project (2008-2009) - www.euroafrica-ict.org*
- *The EuroAfrica-ICT.org FP7/ICT project (2010-2011) - www.euroafrica-ict.org*
- *The EuroAfrica-P8 FP7/ICT project (2012-2013) - www.euroafrica-ict.org*
  (The 4 above projects are well-known under the name of the 'EuroAfrica-ICT Initiative')
- *The BELIEF II Project (2007-2009) - www.beliefproject.org*
- *The FEAST project (2008-2009) - www.feast-project.org*
- *The GLOBAL FP7/RTD project (2008-2010) - www.global-project.eu*
- *The ERINA4Africa FP7/INFRA project (2009-2010) - www.erina4africa.eu*
- *The eI-Africa FP7/INFRA project (2009-2011) - www.ei-africa.eu*

- *The EPIKH Marie-Curie project (2009-2013) - www.epikh.eu*
- *The CHAIN FP7/INFRA project (2010-2012) - www.chain-project.eu*
- *The CHAIN-REDS FP7/INFRA project (2012-2014) - www.chain-project.eu*
- *The AfricaConnect EDF project (2011-2014) - www.africaconnect.eu*
- *The eI4Africa FP7/INFRA project (2012-2014) - www.ei4africa.eu*
- *The MIRA INCO-Net project (2008-2012) - www.miraproject.eu*
- *The CAAST-Net INCO-Net project (2008-2011) - www.caast-net.org*
- *The ERAfrica ERA-Net project (2010-2013) - www.erafrica.eu*
- *The PAERIP FP7/INFRA project (2011-2013) - www.paerip.org*
- *The ESASTAP & ESASTAP-Plus project (2005 – 2012) – www.esastap.org.za*
- *The ESASTAP Plus project (2012-2015) - www.esastap.org.za*
- *The CAAST-Net Plus INCO-Net project (2013+) - www.caast-net.org*
- *The MED-SPRING INCO-Net project (2013+)*
- *The Ideal-ist ICT Partner Search Network (1996+) – www.ideal-ist.eu*

These projects have already developed a substantial set of activities supporting the development of policy dialogue meetings and the strengthening of cooperation between Europe and sub-Saharan Africa on ICT research and e-Infrastructures.

3 - Analysis of Euro-Africa ICT Research Focus Areas

This section gives a description of the approach regarding research priorities for Euro-Africa ICT collaboration as a first step towards ICT research recommendations.

The Objective for ICT Research Recommendations is: *To promote collaborative R&D leading to new technologies, with entrepreneurial & social benefits, towards fast-tracking an inclusive Information Society in Africa*.

Prioritisation is required to focus effort in this project. However, the ICT domain is very dynamic and there will be an on-going need to revise and update prioritisation since new opportunities and challenges can appear in a short period.

The particular challenge with this objective is that Africa is a huge and diverse continent, with a diversity of needs, stages of economic development, access to ICT infrastructure and capacity to use ICT. Consequently there is a vast scope of research ideas and a sensible way to explain prioritisation for EU/African ICT research collaboration needs to be developed.

3.1. Approach to ICT Research Prioritisation

The following considerations are relevant when looking for Joint Euro-Africa Research Priorities:

- Africa and Europe are big and diverse continents so any list of continental research priorities would be automatically generalise regional differences.
- Prioritisation needs to be explained through an understanding of the true needs and economics of success.

- While the main focus is on Africa, it is still necessary to find value-add and synergies with ICT research needs in Europe.
- In order to accommodate the rapid pace of technology development in ICT, it is necessary to have a systematic ways to include new topics/ideas as they emerge and to evaluate their potential importance.
- Research topics cannot stay fixed for many years due to the speed of change in ICT globally. Consequently, Futures Thinking needs to be applied when sourcing ideas.
- Finding a coherent approach to research collaboration when Focus Areas have been identified. This includes:
    - Learning from experience through case studies and success stories.
    - Exploring new ways to get African researchers involved?
    - Being aware of current programmes and initiatives
    - Finding research partners, eg through the Database of African Research Institutes
    - Targeting funding opportunities open to African and EU participation, and available in time.
- Finally, research priorities should not only address needs, challenges and opportunities, it should also consider the technical or social issues that may have a negative impact on socio-economic development, eg cyber security.

3.2. ICT Research - Categories

For the purpose of this project, and as a way to indicate ICT focus areas for the Research Centres in Africa that are being mapped through Task 3.3, the following ICT categories will be used to describe the ICT Domain:

1) ICT for Health, Ageing and Well-being
2) **ICT for Environment & Energy** - Sustainability, efficiency and managing climate change effects, water, air pollution and disasters, geo-spatial applications, mining applications, astronomy
3) ICT for Learning, Skills Development and Education
4) **ICT for Agriculture** - irrigation, farming, weather information and alerts, planning, etc
5) **ICT for Governance, Government Services to Citizens** (including ICT policies and regulations)
6) **ICT Infrastructures** - Networks (fixed, wireless, mobile, satellite), National Research Networks, Access to Infrastructure, network usage
7) **ICT Libraries** - Digital Library Services, Digital Content, Indigenous Knowledge Systems, etc.
8) **ICT for Inclusion** - Adoption, accessibility, independent living, disabilities and social inclusion of youth, women and the elderly in the Information Society
9) **Future Internet** - the evolution of networks, infrastructures, equipment and services towards broadband systems, high capacity, novel architectures, satellite integration etc.
10) **ICT for Development** - Innovation, Entrepreneurship, Rural Development, Living Labs, Incubators
11) **ICT for Business** - Financial Systems, eCommerce, trade, manufacturing, industry applications, service economy, supply chain, asset management
12) **ICT for Transport** - Intelligent transportation systems
13) **Trustworthy ICT** - Information security, privacy, cyber crime

14) **ICT Technology - Software**: engineering, computing, cloud, High Performance, Artificial Intelligence
15) **ICT Technology - Hardware**: Computers, devices, sensors, embedded, processors, satellite systems,
16) **ICT Technology - Connectivity**: Network management, sensor networks, control systems, integration, monitoring, diagnosis, smart grids, smart systems, architectures, Internet of Things, web
17) **ICT Technology - Processing**: Mobile and Computer Services and Applications, middleware, platforms, large databases, robotics, multi-media, gaming, earth observation, human language technologies, Living Labs, Content creation

3.3. Unique Characteristics of the ICT Domain

The following aspects make the ICT domain unique:

- Rapid advances in technology, increasingly faster devices and rapid uptake of new technologies where ICT infrastructure becomes available.
- The potential of to improve efficiency & effectiveness.
- Its ability to transform the way we are doing things.
- An increasing Digital Divide through lack of investment can have a serious negative impact on socio-economic development.

3.4. ICT Trends in Africa and Europe

The following is an analysis of trends in **Africa** based on the results from Section 2 as well as a variety of interactions during Euro-Africa events:

- ICT has the potential to transform business and government, driving entrepreneurship, innovation & economic growth
- While the Digital Divide with common challenges is prominent in most of Africa, there is also Digital Diversity within Africa between countries and regions.
- Broadband roll-out is happening with the advent of undersea cables that connects especially countries on the east and west coasts of Africa, while fibre networks are already extending this capacity to major centres within countries. However, there are still vast rural areas without access and the cost is generally relatively high.
- There is a key role for government in terms of legislation, regulation, liberalisation of industry and spectrum management.
- Governments have an important role to play in creating an enabling environment and acting as a lead client for large-scale ICT-based programmes.
- Africa is lacking regional integration while projects such as AXIS and AfricaConnect are focusing on the establishment of regional Internet exchange points and connections national education and research networks (NRENs) between countries.
- There is an increasing awareness of the need for Trustworthy & Secure ICT with Africa being the target and host of large volumes of phishing attacks and other security risks.
- Mobile devices proliferate and dominate in the continent. There is a large spectrum of success stories with mobile applications that increase the Access and Use of ICT.
- The financial sustainability of infrastructure is limited in rural areas.
- There is a huge shortage of ICT skills and capacity.

- ICT can empower the lives of Africans and are driving entrepreneurship, innovation and income growth.
- It's not about the phone or the computer; it's about the applications and the innovation they deliver.
- ICTs can ease cross-border communications, financial transactions, and sharing of data and information and have a catalytic impact on regional integration and trade facilitation.
- Localisation of solutions and digital content is required, due to the diversity of languages and local conditions.
- Effective use of ICTs requires cross-sectorial collaboration and a multi-stakeholder approach, based on open data and open innovation.
- The big Telcos and industry dominate ICT infrastructure and devices, while excellent local innovation and SME entrepreneurs are benefiting from the ICT "revolution."
- Africa is still at the beginning of its growth curve and, to date, most ICT applications have been pilot programmes. Now is the time for rigorous evaluation, replication and scaling up of best practice.

Europe: While Europe is clearly more advanced in the Use, Readiness and Capacity for ICT, the DAE indicates that there is much room for improvement and significant opportunities for the use of ICTs to generate sustainable economic & social benefits (Digital Agenda for Europe) through:

- ICT for improving competitiveness,
- Science & technological development,
- Modernisation of sectors, and
- Tackling social challenges/quality of life.

In addition, Europe still has some of the following challenges common to Africa:

- Extending internet and broadband to rural areas,
- Cross-border connectivity, standards and regulations,
- Support to ICT SMEs,
- Trust and security,
- Enhancing digital literacy,
- Fragmented answers to societal challenges,
- Lack of skills.

Therefore, the scope of common challenges in Europe and Africa indicate that there is significant potential for common solutions and market opportunities.

3.5. Challenges with Euro-Africa ICT Research Collaboration

Certain African countries already have significant participation in FP7 ICT projects, notably South Africa. However, while FP7 is open for participation by African countries (as for any Third Country according to the EU definition), there are significant challenges that African ICT researchers and organisations have to overcome, i.e.:

- To provide own co-funding (25% for universities and science councils);
- Clarity on what unique expertise / facilities / applications they offer to projects;
- Networking with EU researchers in order to build credibility for inclusion in consortia;

- Funding to travel to conferences and other academic / networking events;
- Dealing with the complexity of the FP7 programme – funding, reporting;
- The time from proposal submission to notification whether a proposal has been accepted – this can typically span multiple financial years and make planning difficult;
- Lack of industrial R&D opportunities and funding – while some multi-nationals do R&D in Africa and establish R&D labs in the continent, many do their research in Europe;
- "Brain drain" with African researchers that choose to stay in Europe rather than building research capacity in their home countries (especially if the research infrastructures or enabling environment is inadequate); and
- Government policies that are not conducive to research collaboration.

These challenges provide the basis for a future discussion / reflection on how to overcome them.

3.6. Prioritisation of ICT Research Focus Areas

This section provides a framework to identify priority themes (Focus Areas) for EuroAfrica ICT research collaboration by first developing criteria for prioritisation and then selecting and motivating the choices based on the analysis in Section 2.

3.6.1. Criteria for prioritisation of Focus Areas

The following prioritisation criteria for ICT research Focus Areas are deduced from the objectives of ICT research collaboration between Europe and Africa:

1) Is their potential for wide socio-economic benefit (regional, cross-border)?
2) Is it addressing African challenges with EU relevance?
3) Are there interest + expertise in both continents?
4) Is ICT a critical "enabling technology" for the domain?
5) Is there scope for NEW collaborative R&D (i.e. scope for innovation and not just a matter of political will, budget, capacity or infrastructure deployment)? Is the domain not effectively covered by large industry/government?

3.6.2. Selection of Focus Areas

The EuroArica-P8 project partners selected the 6 Focus Areas indicated in Figure 7.

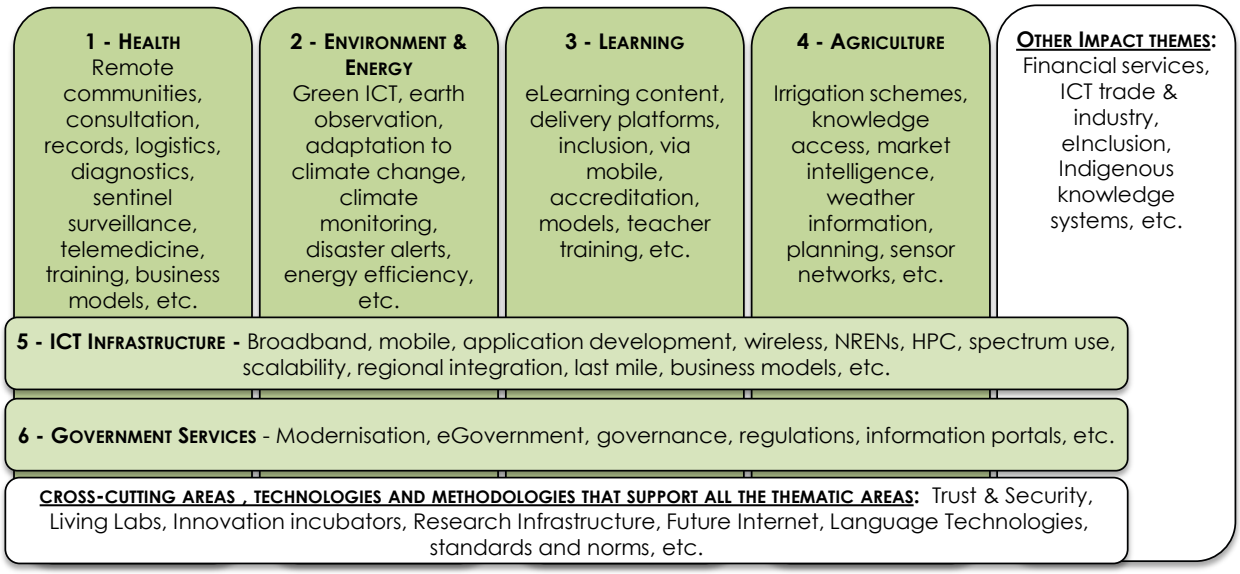


Figure 7: Focus Areas for collaborative ICT research

The project WP required the selection of 3 or 4 Focus Areas, but the partners regarded this as too limiting, and instead chose 4 vertical thematic areas (1 to 4 in Fig 7) and two cross-cutting thematic areas (5 and 6 in Fig 7). While these 6 areas are prioritised, the other impact themes and cross-cutting/technology areas are also considered important and will be tracked either as a "watching brief" or in partnership with other initiatives (FP7 projects). Technologies and processes like Future Internet, Living Labs and Information Security are relevant to R&D in most of the vertical Impact Themes and therefore still relevant to all Focus Areas.

Motivation for selection:

For socio-economic impact (towards the Knowledge Society), we need to focus on Thematic Areas where ICT is an enabling technology rather than technology areas per se. The themes Health, Learning, Environment & Energy, and Agriculture are generally recognised as important for Africa while none of this is possible without Focus Area 5 (ICT Infrastructure) and most of the themes also require Focus Area 6 (ICT Governance) for success.

The following table gives an analysis of the importance of these Focus Areas against the prioritisation criteria.

Table 1: Evaluation of Focus Areas against Prioritisation Criteria

Focus Area (FA)	Socio-economic	Africa & EU benefit	Interest, expertise	ICT is enabling	Scope for NEW research
1. Health	High	High	High	High	High
2. Environment & Energy	High	High	High	High	High

3. Learning	High	High	High	High	High
4. Agriculture	High	Medium – different climate & state of modernisation	Medium – less EU interest, high Africa potential	High	High
5. Infrastructure	High	Medium – mostly Africa but also EU access potential	High	High	Medium – beyond provision also new wireless technologies, regional protocols
6. Government Services	High	High	Medium – Cultural and modernisation differences	High	High

ICT infrastructure is fundamental and cross-cutting to all Thematic Areas. While this requires mostly government and industry investment, policy and partnership, there remain many research questions relating to business models and technology selection for extension to rural areas and schools as well as regional integration and innovative spectrum allocation.

Government Services remain essential to the Access to and Use of ICT, including the modernisation of government, increased efficiency of policies, best practice for industry liberalisation, broadband cost structures and industry incentives.

Agriculture is a Focus Area is probably of more interest / benefit to Africa than to Europe (therefore list as "medium" above"). It is prioritised here as a focus area because of its paramount importance in Africa where much of the continent depends on Agriculture for subsistence and (with reference to eTransform Africa) huge benefits can be obtained from ICT solutions However, irrigation, water management, planning etc is equally important in the European farming industry although this was not listed of high importance from the ICT perspective in Europe.

Other Thematic Areas:

Trustworthy ICT is clearly relevant and important to both Europe and Africa, and gaining importance eg through its inclusion in the ISTAG report on Research and Innovation under Technology Areas for Collaboration. The EuroAfrica-P8 projects is already partnering with the BIC project (Building International Collaboration for Trustworthy ICT) that is analysing and promoting global priorities for research in this critical domain that cuts not just across Europe and Africa, but across the globe and that is fundamental to ICT Infrastructure (FA5).

The next section shows a mapping against FP7 and other priorities.

3.6.3. Mapping against FP7 Challenges

The following table gives a mapping of the selected Focus Areas against the FP7 challenges in the 2013 ICT call as well as the result of the IST-Africa analysis of FP7 Challenges most relevant to governments in their partner countries in Africa. In addition, the 6 Focus areas are

mapped again the 8 ICT domains selected for the eTransform Africa study and the 8 technology areas selected for EU InCo ICT Research and Innovation.

The table illustrates a high correlation between the Project Focus Areas and the most important FP7 challenges identified by IST-Africa as well as the eTransform Africa report. There is less although still significant correlation with the InCo ICT Research & Innovation Technology Areas for Innovation (Section 2.3.2) which is to be expected since these are technology rather than thematic areas.

A final point worth commenting on is related to FP7 Challenge (7) below, related to the eTransform Africa focus on ICT Competitiveness. This is clearly an important domain for Euro-Africa collaboration since it relates to the need for increased entrepreneurship in ICT. However, this is seen as more of a commercial / industrial issue than research.

Table 2: Mapping of Focus Areas

Project Focus Areas (FA)	**FP7 Challenges**	**IST-Africa wrt FP7**	**eTransform Africa**	**INCO ICT Research and Innovation**
1. Health	(5) ICT for health, ageing well, inclusion and governance	Strong	Health	(f) ICT for Inclusion and well-being
2. Environment & Energy	(6) ICT for a lower carbon economy		Climate change	
3. Learning	(8) ICT for learning and access to cultural resources	Strong	Education	
4. Agriculture		Medium	Agriculture	
5. Infrastructure	(1) Pervasive and trusted network and service infrastructures	Strong		(a) Future Internet (b) Cyber security (c) Wireless sensor networks
6. Government Services		Strong - linked with (1)	Modernizing Government	
	(2) Cognitive systems and robotics	Weak		(h) Robotics
	(4) Technologies for digital content and languages			
	(3) Alternative paths to components and systems	Weak		
	(7) ICT for the Enterprise and Manufacturing		ICT competitiveness	(g) Software – focus enterprise software
	(9) Future and Emerging Technologies			
			Financial Services	
			Regional trade and integration	

				(d) Micro Electronics
				(e) Future urban mobility

3.7. Structure for Focus Area Descriptions

The following is a proposed structure for Baseline Focus Areas Descriptions – to be done in the next phase of this project.

Structure for
Baseline Focus Area Descriptions

1. Definition / scope of the Focus Area
2. Relevance and impact of the Focus Area
3. Background information
   3.1. Technology and societal trends and statistics
   3.2. Needs / Challenges / Issues (Global / European / African)
   3.3. Bibliometric Survey of academic activity in Europe and Africa
   3.4. Key reference documents
4. EU/Africa stakeholders
5. Relevant Africa / EU experts and organisations
6. Current projects / initiatives / success stories

The Focus Areas Descriptions will serve as an input to Idea Generation, Idea Validation & Refinement and finally Research Project Descriptions.

3.8. Structure for Research Project Idea Descriptions

The Task 3.1 Description calls for a number of detailed research project ideas (of mutual interest and benefit) in each Focus Area, describing the needs, potential long-term benefits, research and technology trends, relevant research capacity in Europe and Africa, and potential beneficiaries of the outcomes. It also refers to seeking technology ideas that are "disruptive, transformational, with high market value if they were to be commercialized, with social benefit, setting new direction, with hype for the future."

In addition, the project ideas should be clear, evidence based and in a format that can be used to motivate for funding.

Therefore, the following Structure is proposed for Project Idea Descriptions that will be done in the next phase of the Task:

Structure for Research Project Ideas

1. Title
2. ICT Domain Category(ies)
3. Objective / Targets /
4. Long-term benefits (transformational / new direction / high value / disruptive)
5. Background Information
   - 5.1. Description of the gap/need/challenge/opportunity
   - 5.2. Which communities/regions/states in Europe and Africa will benefit
   - 5.3. Social / cultural aspects that influence the research
   - 5.4. Research and technology trends
   - 5.5. Current research, initiatives and projects
   - 5.6. Relevant research capacity in Europe and Africa
   - 5.7. Infrastructure requirements (physical, services)
   - 5.8. Key stakeholders
   - 5.9. Implementation environment: policy, regulation, legislation, standardisation
6. Methodology and main activities
7. Expected outcomes and impact
   - 7.1. Knowledge and innovation
   - 7.2. Potential for entrepreneurship
   - 7.3. Quality of life improvements
8. Funding requirements and opportunities

4 ICT Research Ideas from EuroAfrica-P8 Events

The following gives a brief summary of the outcomes of EuroAfrica-P8 events during 2012 where research priorities were debated.

Note: The results are given in short form (not full sentences) since the intention was to capture as many ideas as possible without the need for detailed descriptions.

4.1. FP7 Awareness Training Workshop, Lesotho

June 2012, Maseru, Lesotho: Awareness Training Workshop

4.1.1. e-Agriculture

- **Challenges**: Poverty, resources for entrepreneurs, access to info: guidelines, troubleshooting, market prices (illiteracy, languages), community watch (crime & crisis), weather information, water management.
- **Role of ICT**: sensors, www information, cooperation support, mapping / early warning, local languages and audio-visual interfaces, tele-consultations, animal tracking, public procurement info.

- **Short-term research ideas**: Survey of solutions, sell & buy forums, rural entrepreneurial support, market information database, forum for sharing best practice, mobile phone applications, consumer protection.
- **Long-term research ideas**: Documentation of indigenous knowledge, learning materials for farmers, rural trade partnerships, remote farming, monitoring standards
- **Success factors**: Political awareness, coordination between sectors, ICT strategy, public procurement models and public-private partnerships.

4.1.2. e-Infrastructure

- **Challenges**: Broadband to all at competitive cost, creation of local content, enabling a research culture, motivating cooperation (local and international).
- **Role of ICT**: Define a long-term goal (broadband for all), identify show-stoppers, bring players together, identify local assets (government, students, …).
- **Short-term research ideas**: Regular meetings of a variety of stakeholders, set a roadmap, start implementing.
- **Long-term research ideas**: Best practice for broadband in developing countries, replicable models with reliability, robustness, security of ICT systems that consider the local situation.
- **Success factors**: Government support, motivated students at universities, research institute to do technology transfer, private sector business models.
- **Project Idea**: Lesotho Broadband Initiative – further pursued by KTH, Fraunhofer and DST Lesotho.

4.1.3. e-Health

- **Challenges**: Capacity building (knowledge, awareness, training), overcoming illiteracy, local languages, complicated interfaces. Health management information systems (medical records, drug monitoring), health monitoring, disease control, interoperability of systems, policy & strategy.
- **Role of ICT**: Creating an enabling ecosystem, international interoperability, regional/national integration, involve whole medical community, cooperation with researchers, access to power/energy, easy-to-use programmes.
- **Short-term research ideas**: Enabling ecosystem: integrate in medical curricula, ICT awareness, harmonising technology and data, harmonizing treatment guidelines, medical records/statistics to influence decisions (eg medical specialists), telemedicine capacity, social media for peer-peer awareness, eLearning for health, ICT support to diagnostics and medication.
- **Long-term research ideas**: e-Health policy/strategy, innovation and research (root causes), health evidence for disease control, drug monitoring systems.
- **Success factors**: Collaboration, overcome silos, use ICT as a tool, awareness to avoid resistance, community driven projects, involving professional nurses/doctors, overcome social/cultural barriers and belief systems, planning for sustainability, capacity building.

4.1.4. e-Learning

- **Challenges**: ICT skills among educators, learners more tech-savvy, teachers not trained in problem solving, inadequate infrastructure (connectivity, computers, vandalisation), energy

supply for ICT (expensive, unreliable), regional illiteracy, local digital content, lack of government policy on ICT in education.

- **Role of ICT**: Technology capacity building, access to ICT (loans), increase bandwidth, provide clear benefits, coordination between departments (education, science, communications, etc), affordable connections.
- **Short-term research ideas**: Teacher training to include ICT, retaining ICT staff in schools, policing of internet use in education, alternative energy sources (cost effective), encourage local content development, local language translation, study ICT integration in schools (learn internationally), best practice ICT policies, evaluate blended learning (traditional/technical).
- **Long-term research ideas**: Raising national ICT literacy levels, study of factors affecting acceptance of eLearning, set up own "Silicon Valley" for e-Learning development.

4.2. FP7 Awareness Training Workshop, Tunisia

October 2012, Tunis, Tunisia

4.2.1. e-Infrastructure

- **Challenges**: Provide support for new generation of telecom services and end-to-end environment to deliver expected service, integrate new technologies and standards, allow sharing of resources, systems and infrastructures, provide solutions to improve the income/cost ratio, enable service assurance for users and revenue assurance for telecom.
- **Role of ICT**: Improve and use technical standards/solutions, operate new generation of networks for new generation of services, upgradable user devices and application compliant, take advantage of mutualisation and sharing technical, business/law paradigms, using a global integrated Telecom IS, going through new concepts of virtualisation and cloud computing/communicating, having the ecosystem follow expected or provided solutions.
- **Short-term**: Provide ICT anywhere, anytime, anyhow in relation with the Business model, ensuring a fair use with respect to the contractual service level, having services provided in correlation to the expectations (added value), insuring the interoperability between access, network and service provisioning, insuring the openness of the network to other actors (SP, partners, etc.).
- **Long-term**: Enabling the infrastructure capacity to follow expectations, integrating evolutions of standards, protocols and recommendations, improving the engineering capability of network systems to better serve subscribers, simplifying access and network architectures to ease engineering, allowing better flexibility and stabilisation for architecture schema evolution, migrating towards new generation of sets and equipment.
- **Success factors**: Collaboration between universities and companies, government motivate companies to invest in research, public projects to prompt private involvement, motivating cooperation (local and international), and setting up sharing mechanisms between telecom actors.

4.2.2. e-Learning

- **Challenges**: Formal learning - providing education in geographical areas where there is no infrastructure for classical learning, Where access to material infrastructure is affordable, Distance learning in areas where not enough competences exist for a specific topic,

Generalization of e-govt. facilitating access to ICT based learning, introducing new ways of learning based on ICT, changing the culture of the community targeted by the ICT learning, insisting on ICT competence development for those people. Informal learning - lifelong learning independently of time and location, introducing new ways of learning based on ICT.

- **Role of ICT**: Well-designed and implemented telecommunication infrastructure (DSL and mobile), dissemination of success stories, generalization of ICT usage since early stages education, strategy to build up trustworthy tools in ICT for learning, develop database related to institutions (universities, schools, etc.) delivering specific formal diplomas, develop new innovative infrastructures for learning, using ICT based learning to learn English.
- **Short-term**: Improving learning platforms to support wireless communications, Mobile learning (supporting the usage of new mobile devices), Design of new and innovative ways for learning using Web2.0 and social media, Support context aware learning (Context = technical context / learning context).
- **Long-term**: Pervasive learning, awareness to the context in a proactive manner, smart classroom and smart university.
- **Success factors**: Funding, competency of HR (human resources), easing patenting IPR, easing research management for the researchers (subcontracting research management).

4.2.3. e-Governance

- **Challenges**: Keeping/ maintaining citizens (patients) records, Managerial competencies of public servants, Citizens empowerment (participation-transparency), New easy services channels (for example: mobile), Availing governmental information, Government to government collaboration (interoperability), Government procurements, Government inventories.
- **Role of ICT and Short term**: Development of national databases for citizens (patients) records, e-learning tools for enhancing management skills for public servants, e-participation and e-transparency platforms, providing public services through websites, mobile, De-materialization of processes, open government data portals and platforms, Integration of e-services through government institutions, collaborative tools for government, e-procurements systems, Inventories management systems.
- **Long-term:** Five (5) years is too long for ICT, Smart cards for every citizen, Zero paper public services.
- **Success factors**: Linkage to society needs, University-government-private sector partnership, Stakeholders involvements, Deploy-ability.

4.2.4. African Development Bank: Africa's ICT Trends and AfDB ICT Strategy

The Bank's presentation at the Workshop included an analysis of African ICT trends and the AfDB's ICT strategy which relies on three pillars:

- **Regional/National ICT Infrastructure**: aimed at improving the connectivity (extending ICT broadband infrastructure to deliver mobile and Internet services to underserved areas, and expanding regional/national ICT broadband infrastructure).
- **Policy and Regulatory frameworks**: focusing on creating enabling policy/regulatory environment to leverage private investment and forging PPPs for improved connectivity and affordable access to broadband services.

- **ICT Applications**: concentrating on completing the integration of ICT in the delivery of services by scaling up ICT applications in government services, key socio-economic sectors and regional integration.

4.3. Thematic Working Group, Cameroon

This Thematic Working Group meeting was held on 13 November 2012 in Yaoundé, Cameroon in parallel with the AfriComm 2012 Conference. Refer to EuroAfrica-P8 project deliverable D4.2.1 (Euro-African FP7/ICT Thematic Working Group Meetings - First Event) for a complete report.

ICT Infrastructure (FA5) Project Idea: The purpose of the workshop was to stimulate a dialogue between key stakeholders in the field and to reach an agreement about a feasibility study using strictly non-commercial research and education networks to conduct a demonstration illustrating the key benefits of a transcontinental broadband connection between West, Central and East Africa. This initiative, which was named the *Crosslink Initiative* during the workshop, would illustrate a significant step forward towards the inclusion of – in particular — land-locked African countries in the Information Society.

The Crosslink Initiative will explore the demonstration of applications in thematic areas, most likely Health (FA1) and Learning (FA3).

Follow-up actions include getting letters of support and developing a project concept.

4.4. 2012 Africa-EU Cooperation Forum on ICT, Portugal

The 2012 Africa-EU Cooperation Forum on ICT was held in Lisbon, Portugal on 28, 29 November 2012.

A full account is given in the Event Report (http://euroafrica-ict.org/files/2012/12/EuroAfrica-ICT_P8_Forum_Event_report.pdf) .

The EuroAfrica-P8 Focus Areas were substantially covered in Plenary and Thematic Sessions with presentations and panel discussions, and these outputs will serve to enrich Focus Area Description and research project Idea Generation / Refinement in 2013.

The Conference Main Outputs includes the following common themes:

- ICT provides socio-economic benefits for both Europe and Africa.
- The strong role and need for guidance from and interaction with the EC and AUC.
- The importance of big industry and global organisations in Africa.
- There are many current success stories with growing impact.
- Reality about the challenges – funding, diversity, languages, culture, regulatory limitations, distances to travel, lack of infrastructure, shortage of human capacity, etc.
- Beautiful dreams of what is possible with collaboration.
- ICT is a central enabler in all spheres of life.
- ICT has innovation and transformational potential
- The Digital Advantage is possible for both continents and provides inspiration.

- Networking at the Forum was a highlight.

The parallel meeting, i.e. EEG8, REC, IG8/ICT, BIC and AXIS meetings provided unique opportunities for researchers and stakeholders from the two continents to meet and exchange ideas.

In particular, the IG8/ICT meeting on 30 November 2012 provided an opportunity for Researchers, Academics, Industry and the RECs to reflect on success factors and challenges, as well as recommendations, for future, enhanced Euro-Africa collaboration.

5 Research Idea Validation & Refinement

The T3.1 Description refers to interaction with the implementation group of the Euro-Africa Partnership 8 (WP6) and the result from P8 meetings with EU and African ICT representatives, Regional Economic Communities, the Joint Expert Group, etc that will assist with identification of concrete initiatives of mutual interest.

Until now, most of these interactions were of a more general nature, understanding operations and building relationships. Future interactions will be much more focused on concrete project ideas.

5.1. EuroAfrica-P8 Analysis

T3.2 - The following Zoom Case studies delivered by the World Bank (short summaries from the eTransform Africa report) provide success stories and insights relevant to Focus Areas 4, 1 and 3 respectively:

1st case study on e-Agriculture/Egypt
2nd case study on e-Health/Ethiopia
3rd case study on e-Education/Uganda

T3.4 – Demonstrators - The objective is to stimulate policy and regulatory dialogue by mid-wifing at least five project proposals involving high quality demonstrators illustrating the return on investment in ICT research and education involving various regions in Africa.

The task developed selection criteria and potential project ideas in Governance, Healthcare, Education, Environmental Monitoring and ICT / Energy Infrastructure.
One proposal was prepared for funding in the FP7 ICT 2013 call, Objective 10-1.7(d) – Future Internet Research and Experimentation Testbeds with social integration applications.

5.2. EuroAfrica-P8 Events

Refer to the 2012 FP7 Awareness Training Workshops (Lesotho and Tunisia), Thematic Workgroup Meeting (Cameroon) and '2012 Africa-EU Collaboration Forum on ICT' (Lisbon) where research priorities were presented, debated and enriched.

5.3. Related Africa/EU Programmes

The EuroAfrica-P8 partners contributed to a number of FP7 projects. Research priorities were more specifically presented and debated at IST-Africa in Tanzania, 9-11 May 2012.

In addition, EuroAfrica-P8 partners are or have been involved in all of the FP7 projects listed in Section 2.5.2 above.

5.4. Interaction with Stakeholders

During the year, the EuroAfrica-P8 projects participated in and contributed to the following meetings:

- Joint Expert Group 8 (JEG8) meetings in Tanzania and Cape Town.
- EEG8 Meetings in Helsinki and Brussels.
- REC Steering Committee meeting in Lisbon.
- IG8/ICT Meeting in Lisbon.

These interactions were more general in nature, but the participation resulted in much stronger relationships with the key stakeholders and agreement to present and debate ICT research priorities and ideas at future interactions.

6 - Next Steps

The following gives the next steps with respect to the Methodology towards project completion and the final delivery by the end of 2013

1) Substantial Focus Area Descriptions

a) Bibliometric Survey by VTT, Finland.
b) Complete baseline Focus Area Descriptions as input to future Focus Area workshops
c) On-going horizon scanning for updates to the Focus Area Descriptions
d) Thematic Working Group meeting in The Hague, Netherlands, on 14 February 2013 – focusing on eHealth.

2) Idea Generation

a) Clustering of research ideas for Focus Areas and further workshops in order to select a number of Research Topics that can be developed into more complete Research Topic Descriptions

3) Research Idea Validation and Refinement

a) Refinement and additional research ideas through a continuous dialogue about research priorities, using e-Newsletters and targeted emails with the European and African researchers on the project's Database of African Research Institutes and Virtual Community of Researchers
b) E-Consultation managed by FCT, Task 5.1

c) Further and more focused interaction with stakeholders: EC, AUC, JAES
d) Further interaction with FP7 projects and related Euro-Africa events.

4) Research Project Descriptions

a) Select a number of Research Projects per Focus Areas and develop substantial descriptions.

5) Recommendations

a) Provide recommendations to the EC regarding future research collaboration and how to increase African participation in EU-funded, collaborative research proposals and projects.
b) Discuss with the EC optimal ways of sharing ICT Focus Area and Research Project Descriptions in a timely fashion to influence future Calls for Proposals.

6) Deliverables

a) D3.1.1 Preliminary Report (this report) – January 2013.
b) D3.1.2 Final Report – December 2013

7 Conclusions

This Intermediate Report responds to the Main Objective of Task 3.1, i.e. recommending ICT research priorities within the framework of the African-EU Strategic Partnership 8 with a high potential for collaborative R&D leading to new technologies with significant entrepreneurial and social benefits. And thus to support the fast-tracking of an inclusive information society in Africa.

The Methodology was refined and presented in a diagram that indicates the flow of activities and inter-connections between them. This report follows Methodology through Literature Review, Analysis of Focus Areas and Idea Generation with some Research Idea Sharing, Validation & Refinement.

In particular, the domain of ICT is defined in some detail, leading to an exploration of what is meant by "ICT research for socio-economic development" – concluding that a more appropriate term would be "ICT Research & Innovation for socio-economic impact" since the development means impact and this means solutions are not just researcher, they are also implemented. In turns, this implies that Research Ideas must take into consideration that the whole, support Innovation Ecosystem is required for success.

While the diversity and size of Europe and Africa make it really challenging to come up with definitive Priority Research Areas – here called Focus Areas – this was done against a set of criteria while taking cognisance of the literature review (Section 2) as well as arguments in favour of thematic rather than technology focus areas. However, these are not seen as "exclusive" and the project will endeavour to keep a watching brief on other areas that may emerge as really important to both continents (given the speed of change in the ICT domain).

In some case, these will be addressed through partnership with related FP7 projects. The next phase will develop more detailed Focus Area Descriptions.

A huge number of research ideas have already been harvested through EuroAfrica-P8 and related events, and some have been refined and validated, but a main focus under Next Steps will be to generate ideas, validate and refine them, and develop Recommendations for the EC to enhance ICT Research Collaboration between Europe and Africa.