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D3.3.1 IST-Africa Training Workshops in Burundi, Rwanda, Mauritius, Senegal, Cameroon and Kenya (Oct ’09 – Mar ‘11)

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1. INTRODUCTION

The IST-Africa partners organised the following FP7 Training Workshops in November 2009, September 2010, November 2010 and March 2011:

- 30 October ’09, Bujumbura, Burundi (MESRS)
- 02 November ’09, Kigali, Rwanda (MINISTR)
- 09 November ’09, Port Louis, Mauritius (NCB)
- 15 September '10, Windhoek, Namibia (MoE)
- 17 September '10, Gaborone, Botswana (MCST)
- 24 November ’10, Dakar, Senegal (MRS)
- 18 March ’11, Nairobi, Kenya (MoHEST)
- 21 March ’11, Yaounde, Cameroon (ANTIC)

The workshops in October and November ’09 focused on Africa 2010 Call and ICT-Call 6. The workshops in September ’10, November 2010 and March ’11 focused on raising awareness of ICT-Call 7 – 9 so that researchers plan their participation in sufficient time to build partnerships.

IIMC provided the workshop programme and training materials for each event and each national IST-Africa partner disseminated the materials and mobilise their national research community to attend.

The goal of the IST-Africa FP7 Training Workshops is to inform researchers and government officials responsible for supporting research at national level in Burundi, Rwanda, Mauritius, Senegal, Kenya and Cameroon about FP7-ICT and specific opportunities to participate, qualify organisations with the necessary track record and research capacity to participate in FP7-ICT, and promote such organisations to potential European partners. Each national IST-Africa partner was responsible for organising the workshop and mobilising the participation of the national research community. IIMC (IST-Africa Co-ordinator) provided the training during these workshops as part of the “Train the Trainer” strategy to support each national partner. The training workshops were very interactive in design, with frequent questions from participants as the workshops proceeded.

The FP7 Training Workshops in Namibia and Botswana were requested by the national partners and organised around other activities in these countries (National Research Symposium in Namibia and IST-Africa 2011 preparation in Botswana).

As part of the IST-Africa FP7 Training workshops, a consultation is held with the research community in each country in relation to mapping research activities and expertise at national level with research areas that can be funded under FP7-ICT. This analysis is then incorporated into the Deliverable 2.2 ICT Initiatives and Research Priorities.

2. TRAINING WORKSHOPS DURING OCTOBER – NOVEMBER 2009

IST-Africa organised FP7 Training Workshops in Bujumbura on Friday 30 October 2009, hosted by Ministry of Higher Education, Science and Technology, Burundi, in Kigali on Tuesday 03 November, hosted by Ministry in President's Office in charge of Information and Communication Technology, Rwanda and in Mauritius on Monday 09 November, hosted by National Computer Board.

Since Burundi, Rwanda and Mauritius were new countries within the IST-Africa Initiative; there was limited or no awareness in relation to FP7 or open Calls at national level within the government agencies or research centres. As a result these workshops covered all the basics: What is FP7, Who can participate, Geographic spread of the Consortium, Calls for Proposals, How to identify relevant research areas, FP7 Instruments, how to prepare a proposal and how proposals are evaluated.

These workshops focused on FP7-AFRICA-2010, which closed in January 2010 and FP7-ICT-Call 6. Based on the thematic areas open, the partners identified the relevant research centres to participate.

2.1 Burundi, 30 October 2009

The training workshop in Burundi was opened and facilitated by Hon. Dr Kibeya, Minister, Ministry of Higher Education and Scientific Research and attended by over 25 participants from the Université du Burundi; Université Espoir d'Afrique; Université Lumière de Bujumbura; Université des Grands Lacs; National Institute for Public Health and National Institute for Environment.

There was quite a lot of interest in relation to FP7. Thematic areas that were considered to be of most relevance included

Challenge 4: Technologies for Digital Content and Languages

- ICT 2011.4.3 Digital Preservation (Call 9)

Challenge 5: ICT for Health, Ageing Well, Inclusion and Governance

- ICT 2011.5.1 Personal Health Systems (Call 7)

Challenge 6: ICT for a Low Carbon Economy

- ICT 2011.6.3 ICT for efficient water resources management (Call 8)

Challenge 8: ICT for Learning and Access to Cultural Resources

- ICT 2011.8.1 Technology-Enhanced Learning (Call 8)

It was felt that the research community in Burundi could learn a lot from the research results that are currently available from running and finished EU-projects. As part of the Guide to FP7, IST-Africa provides links to relevant projects across the thematic areas, so researchers can learn from

running projects, get a better understanding of the current state-of-the-art in Europe and identify relevant partners who have been successful in past Calls.

2.2 Rwanda, 03 November 2009

The training workshop in Rwanda was facilitated by the Ministry in President's Office in charge of Information and Communication Technology and hosted by the Kigali Institute of Technology and Management. The workshop was well attended with participants from Kigali Institute of Technology and Management; National University of Rwanda; Kigali Independent University; Byumba Polytechnic Institute; Kigali Institute of Education; Kigali Health Institute; Higher Agriculture and Veterinary Institute; Kibungo University of Agriculture, Technology and Education and newly established National Council for Science and Technology. Separate meetings were also held with Rwanda Research Council Association and Rwanda Development Board. There was not a high level of awareness in relation to FP7 and as a result the workshop was very interactive with lots of questions. Thematic areas that were considered to be of most relevance included Trustworthy ICT, Mobile Applications, Digital Libraries, Technology-Enhanced Learning, eHealth and Water Management.

2.3 Mauritius, 09 November 2009

The training workshop in Mauritius was hosted and facilitated by the National Computer Board. Representatives were invited from the Ministry of Education, Ministry of Health, Ministry of Environment, University of Mauritius; University of Technology, Mauritius; Mauritius Research Council and National Information and Communication Technology Evaluation and Research Network (NICTERN). There was very limited awareness of FP7 in Mauritius.

The following mapping between expertise and relevant thematic areas has been undertaken with the institutions:

- **University of Mauritius**
  - Bioinformatics

    The objectives of this group are to study algorithms used in Bioinformatics, to contribute new algorithms, to study how Bioinformatics data is stored and accessed throughout the world, and to look into how Mauritius can contribute to Bioinformatics Data Banks. This can be map to ***Challenge 5 – ICT for Health*** under objective ICT-2011.5.3

  - Efficient Computing

    The main aim of the research group is to propose computer-based solutions that improve the productivity of the individual and, consequently, improve the effectiveness of the organisation the individual belongs to. The current activities are:

  - Consultancy for Aapravasii Ghat Trust fund (Aapravasii Ghat is a UNESCO world heritage centre)
  - Proposal for EDP in Leveraging Web 2.0 in Mauritian Enterprises

This is relevant to ICT ***Challenge 8 ICT for Learning and Access to Cultural Resources*** and under objective ICT-2011.8.2

- IPv6

  IPV6 is the new generation Internet Protocol devised to replace the previous one (IPV4) which cannot provide sufficient internet addresses to cater for future needs. Also IPV6 provides for simpler configuration and better support for real-time data. The objectives of the group are to perform verifications on how the performance of different network-based applications can be improved using IPV6, how the QoS support available in IPV6 can be exploited and also to look into ways of helping the deployment of IPV6 in Mauritius. This is relevant to ICT ***Challenge 1, Network of the Future*** – objective 1.1.

- Context awareness

  Context-Awareness is an emerging area of Computer Science, whereby computer systems can make decisions and take actions based on context information such as location, time temperature or the presence of specific individuals. The objective of this group is to investigate how the use of context-awareness can improve the lives of users and how context-awareness can be put to the service of the Mauritian society. This is relevant to ***Challenge 5 – ICT for health***. The current status is that the University of Mauritius is working on a paper entitled "Access Control Mechanisms for Collaborative Context-Aware HealthCare Services in Mauritius".

- Intelligent systems

  The group concentrates on research in fields such as Biometrics, Computer Vision, Artificial intelligence and Human Computer Interaction

- Mobile and Ubiquitous Computing

  The main objective of this research group is to use these technologies to enhance the quality of life of human beings. The research group will investigate the human, social, technical, hardware and software issues involved with mobile and ubiquitous computing. Research projects in different areas including infrastructure development, identifying new concepts and building ubiquitous applications will be undertaken. The group will also address the issue of expert human resource development in this area. The focus will be making the group "one of the best in the region" to start with.

➢ **University of Technology, Mauritius**

- Implementation of a USSD API
- Impact of broadband on the Mauritian economy
- Digital Propagation models for Mauritius
- Optimisation of mobile applications protocols
- A technology independent framework for partitioning & retracting context awareness

applications in pervasive environments

- IP traceback
- IS outsourcing for SIDS
- Data mining using agent technology in distributed systems
- Web Caching algorithms for highly customizable portals
- ERP for SMEs
- Learning difficulties in geometry
- Web pages optimal search
- Mobile power optimization
- Mathlab tool development on options

- **Mauritius Research Council**

  - Adaptive Coding Techniques for Time Varying Channels

  Adaptive coding techniques for time varying channels such as HF (2-30) MHz have been under investigation for several decades [Honary 1981, Katakol 1987, Zolghadr 1989, Bate 1992, etc…]. Forward error correction applied to these channels are designed to give the desired performance for the worst channel rate. Hence when the channel is relatively error free unnecessary error correction power and redundancy is being employed. This naturally reduces the overall information rate. In order to transmit data efficiently in a time varying channel an ideal error control scheme should achieve a lower average output bit error rate than that obtainable with a fixed rate system. This is done by matching the code to the changing channel conditions.

  A number of embedded coding techniques employing block codes for time varying channels have been proposed and investigated. A novel statistical channel evaluation technique based on the trellis of block codes has also been devised. The HF link has been established with a receiver station in Mauritius and measurement of data from UK has shown that it is working as expected.

  - Developing successful entry strategies for BPO operations in Mauritius

  The main objectives of this project are to identify actions required to enhance the competitiveness of Mauritius as a Global BPO service provider and profile the country to become a natural offshore location for major companies and business partners for outsourcing business services.

  The scope of the project is to:

  - Understand BPO and its business scope for Mauritius

- Briefly study the global BPO industry and identify sub-sectors compatible with capabilities available in Mauritius
- Generic BPO centre selection criteria
- Review and analysis of Mauritius as an offshore BPO service centre
- Proposition of effective enabling policies for Mauritius and recommendations.
    - Electronic Commerce tools and methodology using web-based technologies
    - Evaluation of the importance of corporate e-learning in providing a competitive edge to Mauritian companies

E-Learning enables learners to access, at any time and from anywhere, learning materials, forums with fellow learners, assistance and feedback from a trainer or tutor as well as assignments and tests. This implies a shift in the focus of training from trainer-centred to learner-centred.

The focus of the study was to assess the following:

- awareness of e-learning,
- readiness and barriers to embark and sustain e-learning initiatives,
- possible areas to implement e-learning.

This is relevant to ***Challenge 8*** – Technology-Enhanced Learning

- Information and Communications Technology Thematic Working Group

The Council constituted a Science & Technology Think Tank with a view to revising its research priorities. The Think Tank recommended that the future priorities of MRC be centered on nine themes, which are as follows:

- Land and Land Use
- Water Resources
- Energy and Energy Efficiency
- Marine Resources
- Biomedical Research
- Biotechnology
- Manufacturing Technology
- Science & Technology Education
- **Information & Communications Technology**
    - IT Security
    - MU-CERT

- **NICTERN**

National Information and Communication Technology Evaluation and Research Network (NICTERN) comprise of people tasked with responsibilities of analysing collected data, undertaking research on various aspects of the NICTSP and produce, on a biennial basis, a Mauritius State of the ICT Report which would be an integrated document that would cover not just progress made on the different dimensions of interventions, but also recommend further course of action.

To date the NICTERN has developed a Mauritius ICT Indicators Web Portal[1], which is a one-stop shop access for information on indicators about the development of the Information Society and the Information Economy in Mauritius. It provides decision makers with early, accurate ICT indicators that will help them in setting the policies and strategies related to the ICT sector.

[1] http://www.gov.mu/portal/sites/indicators/index.html

3. TRAINING WORKSHOPS DURING SEPTEMBER – NOVEMBER 2010

IST-Africa organised FP7 Training Workshops in Windhoek on Wednesday 15 September '10, hosted by Ministry of Education as part of the National Research Symposium and in Gaborone on Friday 17 September '10, hosted by the Department of Research Science and Technology, Botswana and in Dakar on Wednesday 24 November '10, hosted by the Ministère de l'Enseignement Supérieur, des Universités et des Centres Universitaires Régionaux et de la Recherche Scientifique, Senegal.

3.1 Namibia, 15 September 2010

The training workshop in Namibia was facilitated by the Department responsible for Research, Science and Technology within the Ministry of Education as part of the National Research Symposium. Representatives attended from the University of Namibia and Polytechnic of Namibia.

Following consultation with representatives from both institutions during an FP7 Training Workshop in September 2010, the following mapping of expertise was identified:

Challenges	**Universities with expertise**
Challenge 1: Pervasive and Trusted Network and Service Infrastructures	Polytechnic of Namibia (Cloud Computing, Future Networks, Trustworthy ICT)
Challenge 3: Alternative Paths to Components & Systems	University of Namibia/MRC
Challenge 4: Technologies for Digital Content and Languages	Polytechnic of Namibia (Digital Preservation)
Challenge 5: ICT for Health, Ageing Well, Inclusion and Governance	Polytechnic of Namibia (VPH). University of Namibia (Governance)
Challenge 6: ICT for Mobility, Environmental Sustainability and Energy Efficiency	University of Namibia (Water Management)
Challenge 8: ICT for Learning and Access to Cultural Resources	Polytechnic of Namibia (Mobile Learning, Indigenous Knowledge in relation to Cultural Resources)

3.2 Botswana, 17 September 2010

The training workshop in Botswana was facilitated and hosted by the Department of Research Science and Technology, Ministry of Infrastructure, Science and Technology. Representatives attended from University of Botswana; BOTEC, DRST, National Technology Research Centre and Cable for Africa. Thematic areas that were considered to be of most relevance included Networks (Future Networks, Cloud Computing, Trustworthy ICT); Smart components; Networked Media; eHealth; Language Technologies; Technology Enhanced Learning and Digital Preservation.

During the Workshop, the following priorities under FP7-ICT Call 8 and 9 were identified as being relevant to the research community in Botswana:

Challenge 1: Pervasive and Trusted Network and Service Infrastructures (Call 8)

- ICT 2011.1.1 Future Networks - Cable for Africa
- ICT 20011.1.2 Cloud Computing, Internet of Services and Advanced Software Engineering - Cable for Africa
- ICT 20011.1.4 Trustworthy ICT - Cable for Africa
- ICT 20011.1.6 Future Internet Research and Experimentation (FIRE) (b), (c), (e) - National Technology Research centre

Challenge 3: Alternative Paths to Components & Systems (Call 8)

- ICT 2011.3.2 Smart components and smart systems integration (b) - BOTEC

Challenge 5: ICT for Health, Ageing Well, Inclusion and Governance (Call 9)

- ICT 2011.5.2 Virtual Physiological Human (a), (b), (d) - School of Medicine, University of Botswana

Challenge 6: ICT for a Low Carbon Economy (Call 8)

- ICT 2011.6.1 Smart energy grids – University of Botswana, Energy Dept

Challenge 8: ICT for Learning and Access to Cultural Resources

- ICT 2011.8.1 Technology-Enhanced Learning (Call 8) - University of Botswana, BOTEC, Teacher Training College
- ICT 2011.8.2 ICT for access to cultural resources (Call 9) - University of Botswana

3.3 Senegal, November 2010

IST-Africa organised the FP7 Training Workshop in Dakar on Wednesday 24 November '10, hosted by Ministère de l'Enseignement Supérieur, des Universités et des Centres Universitaires Régionaux et de la Recherche Scientifique, Senegal. This workshop focused on FP7-ICT-Call 7 - 9.

Several organisations from Senegal have previously participated in the Framework Programme, for example

- Centre de Suivi Ecologique - Integrated Risk Management for Africa (IRMA); Quantifying Weather and Climate Impacts on Health in Developing Countries (QWeCI)
- Institut Pasteur de Dakar - International network for capacity building for the control of emerging viral vector borne zoonotic diseases (ARBO-ZOONET); Quantifying Weather and Climate Impacts on Health in Developing Countries (QWeCI)
- Institut Senegalais de Recherches Agricoles - Functional Diversity: An ecological framework for sustainable and adaptable agro-forestry systems in landscapes of semi-arid and arid eco-regions (FUNCiTree)
- Ministère des Mines et de l'Industrie - African-European Georesources Observation System (AEGOS)
- Université Cheikh Anta Diop de Dakar - Collaborative HIV and Anti-HIV Drug Resistance Network (CHAIN); Migration between Africa and Europe (MAFE); Quantifying Weather and Climate Impacts on Health in Developing Countries (QWeCI)
- Ministère de l'Enseignement Supérieur et de la Recherche Scientifique (MESUCURRS) - IST-Africa 2010 – 2011; CAAST-Net
- Panos Institute - EuroAfrica-ICT

Senegal has six public institutions of higher education (Université Cheikh Anta Diop de Dakar, Université Gaston Berger de Saint-Louis, Université de Thiès, Université de Bambey, Université de Ziguinchor, Ecole Polytechnique de Thiès) and the main research laboratories in Senegal are located in two universities - University Cheikh Anta Diop and Universite Gaston Berger.

The workshop was well attended by representatives from all relevant research centres and it was very interactive with lots of questions and discussion.

During the workshop, the following mapping of expertise was identified:

Challenges	**Universities with expertise**
Challenge 1: Pervasive and Trusted Network and Service Infrastructures	Université Cheikh Anta Diop (Sensors), Université Gaston Berger (Networking), Ecole Polytechnique de Thiès (Trustworthy ICT, Networked Media and search systems)
Challenge 2: Cognitive Systems and Robotics	Université Cheikh Anta Diop (Robotics)
Challenge 3: Alternative Paths to Components	Photonics

& Systems	
Challenge 4: Technologies for Digital Content and Languages	Université Gaston Berger (Language Technologies, Semantic Web, Intelligent Technology), Université de Bambe & Universite de Ziguinchor (Information Management)
Challenge 5: ICT for Health, Ageing Well, Inclusion and Governance	Université Gaston Berger (Mathematical models for eHealth). Université Cheikh Anta Diop (Image processing - eHealth)
Challenge 6: ICT for Mobility, Environmental Sustainability and Energy Efficiency	Université Cheikh Anta Diop (Water Management and Sensors), Ecole Polytechnique de Thiès (Water Management), Ecole Superieure Polytechnique de Dakar-UCAD (Energy efficient design & solar energy)
Challenge 8: ICT for Learning and Access to Cultural Resources	Université Cheikh Anta Diop (TEL & Digitisation), Université Gaston Berger (Digital processing & Digitisation), Ecole Polytechnique de Thiès (Cultural resources), Ecole Superieure Polytechnique de Dakar-UCAD (TEL)

4. TRAINING WORKSHOPS IN MARCH 2011

IST-Africa organised FP7 Training Workshops in Nairobi on Friday 18 March '11, hosted by Ministry of Higher Education, Science and Technology, Kenya and in Yaounde on Monday 21 March '11, hosted by Agence Nationale des Technologies de l'Information et de la Communication, Cameroon.

4.1 Kenya, 18 March 2011

The workshop in Kenya was facilitated and hosted by the Ministry of Higher Education, Science and Technology and formally opened by the Director. The workshop was well attended with participation from all relevant universities and research centres including Strathmore University; Moi University; University of Nairobi; Mombasa Polytechnic University College; Jomo Kenyatta University of Agriculture and Technology; Kenya ICT Board; Kenya Agriculture Research Institute; Kenya Medical Research Institute; Kenya Wildlife Service; Multimedia University College; Presbyterian University of East Africa; Kenya Polytechnic University College; Kenya Methodist University; United States International University; Mt. Kenya University and Egerton University.

While there has been some participation from Kenyan organisations under DG Research Calls, there has been limited participation under FP7-ICT. The workshop was very interactive in style with lots of questions being asked and experiences shared.

During the workshop, the following mapping of expertise was identified:

Challenge 1: Pervasive and Trusted Network and Service Infrastructures

ICT is a cross cutting issue that should be responsive to end-user friendliness and capacity building. Its importance in the current world order, relevance in ensuring global linkages and networking requires deliberate establishment of requisite ICT infrastructure. Along with this development comes the issue of security and sustenance of 'healthy' networks. Through research, the universities and research centres envisages developing or enhancing systems that will promote the integrity of the infrastructure. Issues that are being addressed include: network design (architecture), use of wireless technology, data encryption and virtualization.

The following institutions are undertaking activities relevant to this challenge:

- Moi University
- University of Nairobi
- Strathmore University
- Jomo Kenyatta University of Agriculture and Technology
- Kenya ICT Board

Challenge 4: Technologies for Digital Content and Languages

Universities in Kenya are in the process of establishing and inculcating an interactive Web culture for education research, worldwide visibility, ranking and marketability. Most of the universities websites are currently being re-designed in a manner that is responsive to visibility and competitiveness in terms of content, currency, accessibility and reliability of information. The Universities have also made efforts to acquire and implement relevant Information Systems. The implementation is informed by research carried out within the institutions to establish user priorities and needs. Current initiatives to automate the university libraries are aimed at enhancing research capacity by increasing access not only to existing print material but also e-resources available locally and internationally. Other initiatives include development of active Learner-centred online environment for collaborative problem solving and open source technologies.

Institutions involved in addressing this challenge include:

- Moi University
- Strathmore University
- University of Nairobi

Challenge 5: ICT for Health, Ageing Well, Inclusion and Governance

Since independence, the Kenya Government has made strides eradicating decease among its populace. However, given the challenges of a developing economy, a lot of efforts will be required to attain and sustain a healthy society.

Issues currently being addressed under health research in Kenya include:

- Use of ICT in maternal/primary health care
- Development of relevant health information systems
- Demographic data capture
- Telemedicine
- M-Health
- Bioinformatics

The following institutions are undertaking research in relation to this challenge:

- Moi University
- Kenya Medical Research Institute
- Strathmore University

Challenge 6: ICT for a low carbon economy

The use of remote sensing techniques and geographic information systems to plan and manage fleet in organisations is gradually picking up in Kenya. Companies have realised that with such technology, it is possible to monitor fleet movement (speeds and location), fuel consumption and

idle times with a view to improving efficiency.

Research is currently being undertaken by engineering and computer science faculties in the following universities to address this challenge.

- University of Nairobi
- Moi University
- Jomo Kenyatta University of Agriculture and Technology
- Mombasa Polytechnic University College

The session was well attended with a good level of discussion.

4.2 Yaounde, 21 March '11

The workshop in Yaounde was facilitated and hosted by the Agence Nationale des Technologies de l'Information et de la Communication, Cameroon and formally opened by the Director General. The workshop was well attended with representatives from all relevant universities and research centres including University of Yaoundé I; Douala University; Dschang University; Ngaoundere University; University of Buea; University of Maroua; Ministry of Higher Education (MINESUP); Ecole Nationale Supérieure Polytechnique (ENSP) Yaoundé and Siantou University.

Cameroon participated in several short listed projects under Africa 2010 including Africa Build & Biotechnology for Africa's sustainable water supply. Cameroon is participating in Erasmus Mundus External Cooperation Window for African, Caribbean and Pacific Group of States and was participating in the FP7 SICA IRMA - Integrated Risk Management for Africa.

The participants discussed issues related to participation in previous projects and challenges encountered. There is a high level of interest in participating in FP7 and the session was very interactive with lots of questions.

Based on a consultation process, each University has identified their areas of research expertise and track record and has developed an organisational profile. Existing relationships with European research institutions have also been identified. A summary of these findings are provided below:

- ***Department of Computer Engineering, National Advanced School of Engineering, University of Yaounde I***

  - Research Expertise

    - Simulation of flows in porous media; E-learning concepts and tools; Software testing concepts and tools; Network protocols; Health statistics; Remote system administration based on GSM protocol

  - Existing relationship in place with INRIA, France; IRISA (Rennes-France) & GDAC (Canada)

- ***Laboratoire d'Imagerie Spatiale et d'Informatique (LISI) & Department of Mathematics and Informatics, Université de Douala***

  - Research Expertise

    - Distance learning environments (Optimal design of interfaces, traffic characterization and modelling, coding and compression of data for optimal transmission, synchronization and authentication of learners)

    - Traffic engineering for integrated services networks (Development of new traffic models that capture the self-similar property of network traffic; performance impact of self-similarity; QoS characterization and provisioning in the presence of self-similar traffic; Application to network intrusion detection (anomaly detection))

    - Geographic Information Systems for environmental management (Remote sensing, processing of remote sensing images)

    - Mathematical modelling for epidemiology

  - Existing relationships in place with Université Paris-Est (Marne-La-Vallée), France in relation to Geographic Information Systems for environmental management & University of Siegen and the University of Technology of Ilmenau, Germany in relation to Traffic engineering for integrated services networks.

- ***Department of Mathematics and Informatics, Université de Dschang***

  - Data mining, Distributed systems and services, Scientific calculations, Multi-agent systems, research on sensors; Parallel Processing; Digital signal processing; Technology-enhanced Learning

  - Existing relationships in place with AUF: Agence Universitaire de la Francophonie; Université de Paris 13; Cisco Systems

- ***Department of Computer Science, University of Buea***

  - System Modelling: Organisational Change Management; Agent Modelling and the Dynamics and Transmission of Malaria, Semantic issues in systems); Programming Language Technology (Formal Methods, Transformation Systems, Tools and Semantics);

This in turn is mapped to the Challenges of the ICT-FP7 Work Programme with the following findings:

Challenges	**Universities with expertise**
Challenge 1: Pervasive and Trusted Network and Service Infrastructures	National Advanced School of Engineering (Network protocols); Department of Mathematics and Informatics, Université de Douala (Mathematical modelling for epidemiology) Department of Mathematics and Informatics, Université de Dschang; Department of Computer Science, University of Buea; Department of Mathematics and Informatics, Université de Dschang (Digital signal processing & distributed systems)
Challenge 5: ICT for Health, Ageing Well, Inclusion and Governance	Department of Mathematics and Informatics, Université de Douala (Mathematical modelling for epidemiology); Department of Computer Science, University of Buea (Modelling);
Challenge 6: ICT for Mobility, Environmental Sustainability and Energy Efficiency	National Advanced School of Engineering (Flows modelisation and simulation); Laboratoire d'Imagerie Spatiale et d'Informatique (LISI), Université de Douala; Department of Mathematics and Informatics,
Challenge 8: ICT for Learning and Access to Cultural Resources	National Advanced School of Engineering (E-learning concepts and tools); Laboratoire d'Imagerie Spatiale et d'Informatique (LISI), Université de Douala; Department of Computer Science, University of Buea; Department of Mathematics and Informatics, Université de Dschang (Technology-enhanced Learning)
Research Infrastructures (Capacities Programme)	Department of Computer Science, University of Buea