Enhancing Scientific Cooperation between the European Union and Central America

Fortaleciendo la cooperación científica entre la Unión Europea y América Central

"Europe, Caribbean & Central America: partners in ICT R&I"
Visions, Innovation & Priorities workshop

Setting up the S&T dialogue through a continuous exchange of knowledge and flow of information (proceedings)

ENLACE (Enhancing Scientific Cooperation between the European Union and Central America) is a project co-funded by the European Commission in its 7th Framework Programme under the Grant Agreement no 244468 running from 1st Nov. 2009 to 30th Oct. 2013.

Version	Date	Comment	Authors
1.1	-	-	MENON
1.2	28-July		CSUCA
1.3	07/08	Comments + corrections	MENON
1.4	30/08	Revision	CSUCA
1.5	15/09	Final Revision	APRE-MENON

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EXECUTIVE SUMMARY

The Fourth Bi-regional Dialogue of ENLACE Project was held in Antigua Guatemala, on 28 and 29, May, 2012. This event had the objective to set up research priorities on Information and Communication Technology (ICT) topics, of mutual interest between Europe, Central America and the Caribbean.

In order to achieve the objective more concretely, four research areas on ICT were prioritized as follows:

1. Technology-enhanced learning (e-learning);

2. E-infrastructure (for sustainable development and disaster management);

3. Living Labs and ICT-based innovation models (including smart cities, transport and e-governments) and;

4. ICT for health. These areas were considered due to the relevance they have in the three geographical regions involved in the dialogue.

The expert's Dialogue gathered speakers coming from different regions and sectors, such as European experts and academic researchers from public and private universities of Central America and the Caribbean. The dialogue event was structured in three parts. The first part was a general background introductory session containing the following topics:

- EU-LAC Joint Initiative for Research and Innovation (JIRI),
- International Cooperation in ICT: Challenges and Opportunities,
- How to Increase cooperation in ICT

The second part was devoted to the bi-regional dialogue, which was carried out in four parallel sessions. In these sessions, each expert made a presentation of what he/she considered were the priorities of research in its own expertise area (this presentation was made using a template previously sent by the organization of the event). In each group, a

rapporteur was appointed to be in charge of moderating the discussion and consolidate the minutes of the dialogue.

The last part of the event was the presentation of the results of each parallel session. The rapporteurs consolidated the discussions and prepared a presentation for the plenary session, which took place on 29, May. The workshop allowed fruitful knowledge exchange and the identification of common areas of interest of European, Central American and Caribbean ICT research groups which are presented at the end of this document. Common understandings of similar problems emerged, even if perspectives remain sometimes different. Research networks such as C@ribnet, RedCLARA and GEANT were highly encouraged among the participant experts as merging forces. Building up from existing initiatives such as these, will allow leveraging efforts and avoiding overlapping and double efforts.

One major remark underlining ICT initiatives is their lack of continuity and sustainability, especially in areas such as disaster management. To counterbalance this, EU-born innovation methodologies such as the one of Living Labs can be helpful as drivers for improving social cohesion within CAC[1] countries. Involving CAC policy makers in research cooperation is critical, as they can push for policies facilitation cooperation: to this end, key actors from the CAC region such as CARICOM, CKLN, and CSUCA must be kept involved in the discussion.

[1] CAC: Central America and Caribbean

INTRODUCTION

Intervention of Alfonso Fuentes Soria. General Secretary of CSUCA

The aim of the Workshop, organized by ENLACE and EUCARINET projects with the support of the 7th Framework Programme (FP7) of the European Union[2], was to strengthen the international visibility of Caribbean and of Central American research potential in the field of ICT and to increase the collaboration possibilities with Europe.

The specific objectives of the gathering were:

a) To identify specific ICT research lines and scientific priorities of common interest and benefit to the three regions;
b) To discuss challenges and solutions for EU-Central America and EU-Caribbean cooperation that can guide the work of the ENLACE and EUCARINET projects in the next years.

The workshop covered four different ICT Thematic Areas identified as elements of mutual interest through prior exercises developed by ENLACE and EUCARINET. The selected sub-themes were as follows:

- **Technology-enhanced learning (e-learning)**
- **e-infrastructure (sustainable development and disaster management)**

[2] http://cordis.europa.eu/fp7/home_en.html

- **Living Labs and ICT-based innovation models (including smart cities, transport and e-governments)**
- **ICT for health**

Identifying and defining bottom-up **research lines and scientific priorities** can be the basis for fostering new cooperation opportunities for EU and LAC research actors in FP7 and beyond. To this end, the final plenary session was axed under the following questions:

- What are the main challenges for engaging researchers from the CAC region?
- What solutions/ideas can we envisage to improve the situation?
- How to make sure that the message reaches the ICT EU-LAC working group and the national policy makers?
- What mechanisms could we setup to make sure that CAC countries are included in the dialogue?

These research lines and questions were built on the priorities that the experts pointed out, shared and agreed upon during the Workshop. These research priorities will be transferred to the European Commission and they could evolve in future opportunities and topics open to International Cooperation under specific thematic areas within the Research and Innovation funding Programmes.

Caribbean, Central American and European experts during the ICT event. Antigua, Guatemala May 2012.

Why combining Central America and the Caribbean?

These areas potentially have several common elements and priorities in terms of research environment and needs. The parallel sessions encouraged and fed the scientific and political dialogue among the stakeholders involved at regional, intraregional as well as international level.

THE EXPERTS DIALOGUE

Methodology of the Experts Selection

The collection and selection of the profiles for the 12 Central American Experts that participated in the Fourth Regional Dialogue, was led by the General Secretariat of CSUCA. In order to find the most suitable experts the selection process had to be carried out in two ways, these were:

1. A wide call was made among Research Directorates of the 19 Central American Universities that comprises CSUCA.
2. A request for recommendation was made to ENLACE partners, as well as the Commission for the Scientific and Technological Development of Central America (CTCAP, Acronym in Spanish).

The professional characteristics required from the candidate to participate in the selection process were the following:

a) Compulsory: science and technology experts, representative for their respective regions, English speaking, familiar with international cooperation, sound knowledge of the thematic area and good communication skills;

b) preferable characteristics: knowledge of the industrial and private sector.

A total of 47 CVs were received and qualified according to the criteria explained above. From the selected ones a list was made followed by an invitation to participate in the Dialogue event. Not all the researches invited accepted to attend the event; in that case, other names were taken from a substitutes list.

After the list of 12 Central American representatives was completed, concept notes were sent as well as other practical information, in order to familiarize the participants to the methodology of the dialogue and topics such as FP7 and ENLACE project.

Likewise, the Caribbean ICT expert task force made de final decision for the 12 Caribbean experts attending. Practical information was later send to all participants.

INCREASING COOPERATION ON ICT- CASES AND EXPERIENCES

The international cooperation aspect of the ICT programme is grounded on advancing European competitiveness while collaborating with interests in other regions to address matters of common interests for mutual benefit. When implemented, synergies are anticipated with other areas of EU interests, such as disaster management, sustainable development and environmental protection. In context, the objectives for activities under this area of the Work Programme are:

a) To jointly respond to major global technological challenges by developing interoperable solutions and standards;

b) To jointly develop ICT solutions to major global societal challenges and

c) To improve scientific and technological cooperation for mutual benefit.

In order to achieve what is mentioned above, a first session was carried out having three presentations:

1. EU-LAC Joint Initiative for Research and Innovation (JIRI);

2. The ICT Working Group of the JIRI;

3. International Cooperation in ICT: Challenges and opportunities.

Intervention of Fabrizio Gentilli – Regione Lazio, Italy

These presentations had the objective to give context to the participants, in preparation for the afternoon dialogue session. The presenters were: Monique Bossi (APRE, ENLACE Coordinator), Hector Torres (Director of Protein LAB UTEM, FORESTA Chile and member of the ICT Working Group of the EU/LAC SOM initiative) and Fabrizio Gentilli (Regione Lazio, Italian expert in the ICT Committee Programme), respectively.

During this session, the expert researchers in ICT together with all the participants in the event, had the opportunity to inquire more about the possibilities of joint collaboration considering what has been done and the framework already existing. The methodology was questions and answers.

Afterwards, another introductory session was held, having the following content: The importance of Research Networks (Collen Wint-Smith, CKLN), Engaging the ICT Private Sector (Joaquim Cordeiro, AL –INVEST), Brokering ICT research around EU technology platforms (Katalin Gallyas, Open Cities project), The RISC Project: High Performance Computing in EU-

LAC perspective (Jimena Arango, Menon Network). These presentations were of utmost importance for the development of the Dialogue in the afternoon, considering this a extend description is be made.

THE IMPORTANCE OF RESEARCH NETWORKS - CKLN[3]

The objective of CKLN is to enhance global competitiveness of the Caribbean Region by upgrading and diversifying the skills and knowledge of human resources in the region through greater regional collaboration and connectivity. Caribnet is connected to other regional networks such as Geant In EU, Internet 2 in the US, Red Clara in Latina America.

Issues facing tertiary education in the Caribbean:

- Caribbean tertiary institutions cannot develop the critical mass needed to offer all the programmes that are needed to satisfy the skills and knowledge required by Caribbean
- Apart from UWI, almost all Caribbean colleges and universities are relatively small, offering a narrow range of programmes mostly at the Certificate, Diploma, Associate Degree and Bachelor degree levels

- There are only a few institutions offering programmes in the areas of critical need, especially in the sciences and technology,

- Despite majority of Caribbean countries having a British education system, many students/institutions lean more towards North America as they are closer and have more similarities etc.

In addition to these major challenges, individualism of universities, lack of institutional capacity building to take advantage of existing opportunities, strong diaspora of professors and researchers along with the Multilinguism/Multiculturalism (French and NL Caribbean, Cuba's isolation towards the Caribbean) sums up complexity to the region. The use of ICT to cover distances with the Caribbean (virtual mobility) – i.e. C@ribNET, RedCLARA and other

[3] Colleen Wint-Smith - CKLN (Caribbean Knowledge Learning Network)www.ckln.org

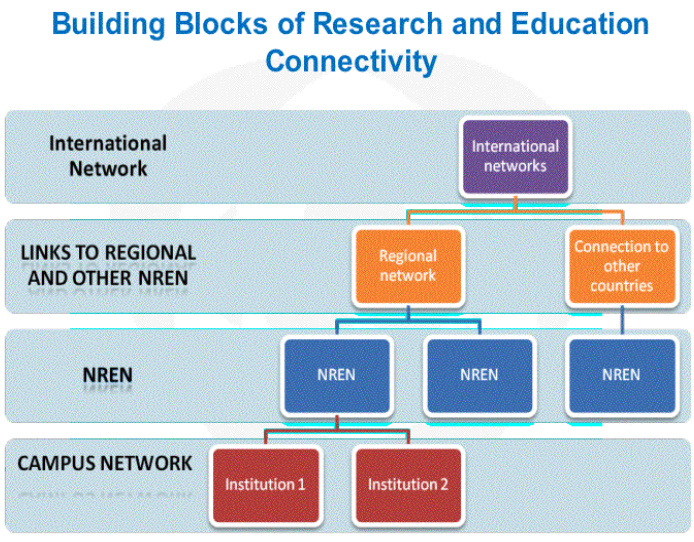
R&E Networks can help cover the capacity to work in networks (Europe could be a model for this)

Caribnet provides R&E network opportunities as more persons from the Caribbean can have access to tertiary teaching and learning plus new ways of collaboration such as: E-Learning, Virtual Mobility. Reduced cost related to overseas study/extended research and greater possibilities for research collaboration & partnerships (field work, testing, simulations, access to equipment, databases, resources, analysis, peer reviews, publication, mutual use of infrastructure etc). The initiative intends also to develop/Strengthen regional databases of researchers and research interests (Health, National and Regional Security, Cultural, Sports, Farming/Agriculture, Disaster and Emergency Management), thus creating the communities of interest and practice. To illustrate this, several research advances in Sickle Cell Disease, Agriculture, climate change, marine ecology, Cardiac surgery simulator have been made in the region.

The key Importance of National Research & Education Networks (NRENs)

NRENs are the entities that engage each other via the R&E Networks – primarily TLI's, libraries, public institutions and CARICOM agencies. In some countries R&E have separate networks. New categories of users are becoming accepted and are still being accepted, including commercial users.

Today, NRENs job is to serve organizations that do not belong to the research and education community. For many NRENs, cross sector partnership and collaboration usually requires good communication infrastructure between collaborating sectors. In this sense, there is an absence of NRENs in Caribbean and the existing ones have poor Institutional infrastructure lack useful



NRENs dynamics

contents.

However, Coming out of the recent Assembly of Caribbean NRENs (CKLN 3) was the need to actively support growth and development of NRENs as well as support and develop cadre of innovative researchers, build capacity and institutional force, promote research collaboration towards building and strengthening communities of interest and develop and share content (databases, etc.) over C@ribNET.

In terms of challenges, CKLN is pursuing aggressive NREN development, building Communities (Assembly of NRENs), fostering collaborative development and sharing of content and boosting resource mobilisation in order to guarantee sustainability.

Applications to which priority is given are:

- Environment for collaborative research
- A Regional Digital Library for Caribbean Tertiary institutions
- Shared Student Information system for Tertiary Sector
- Support for Virtual Classrooms for E-learning
- Open Educational Resources (OERs)
- Regional Tertiary Education Portal
- Commodity Internet Access
- Functional Cooperation
  - Climate Change
  - Disaster management
  - Crime and Security
- Telemedicine and remote diagnosis from anywhere

ENGAGING THE ICT PRIVATE SECTOR-AL INVEST IV PROGRAMME[4]

The AL Invest IV project aims at contributing to the social cohesion through the strengthening and internationalization of Latin American SMEs by means of the exchange of

[4] Sandra Rivera – Al Invest IV

innovation, know-how and economic relations with their European counterpart companies. The way to engage ICT actors to the private sector
The Al Invest programme focuses on delivering ICT and other products and services to SMEs through various channels (Intermidiary Organisations in LA and EU) as well as ICT related conferences both in the EU and around the EU and specialized networks for building capacity in partner institutions. The ICT related subjects although not exclusively are: are Open Source. SaaS. E-Health. Green IT. Automation. Systems management. Software management[5]

BROKERING ICT RESEARCHERS AROUND EU TECHNOLOGY PLATFORMS[6]

Despite access to the same technologies applied by these (private) innovators, governments have historically failed to tap into the expertise of the American people to help to solve our nation's biggest challenges. To tackle this absence 7 mechanisms of Open Innovation in Governments have been outlined:

- Crowd Sourcing
- Involving Citizens & Constituencies
- Open Data - Data becomes a platform for developers to create applications providing unexpected services
- Partnerships with leading innovators
- Experimenting in Urban Labs
- Prizes, Challenges & Competitions
- Standards and Best Practices

The use of urban labs for developing relevant applications to develop innovative products taking advantage of real life environments and involving citizens in design, proof of service and proof of business validation is the project's approach. Its objective is to bridge the cognitive distances between city administrations and innovative companies and to create an initial demand & provide a showcase for innovative solutions.

[5] For more information please visit **http://gc21.giz.de/alinvest4**

[6] Esteve Almirall – ESADE Business school, Katalyn Gallyas-Economic Affairs City of Amsterdam

Two examples applied in Europe:

Open cities[7]
Open Innovation for future internet enabled services in smart cities. Its objective is to validate Open Innovation methodologies for Public Services (Crowdsourcing, Open Data, Urban Labs) and to promote Future Internet Services for cities (Fiber to the Home, Sensor Networks) through an open data platform and to promote working with contests/challenges with the citizens.

Commons 4 EU[8]
There is currently a big contradiction between the possibilities cities can offer with their own resources for innovation and what actually cities want and therefore a need to create tools which would be needed in future cities.
Commons 4EU is aiming for an unforeseen variety of chances co-innovation can be possible with citizens creating distinguished city services such as Bottom up Broadband Networks – Muni Wifi – Experiment with pilots on Super Wifi and integration of Sensors in Wifi networks. The cities involved in the replication pilots are Helsinki, Berlin, Manchester, Amsterdam, Paris, Rome and Barcelona.

RISC PROJECT[9]

The RISC project aims at Deepening strategic R&D cooperation between Europe and Latin America in the field of High Performance Computing (HPC) by building a multinational and multi-stakeholder community through capacity building, awareness building, networking and training events.

The themes that the project will tackle are: HPC and Supercomputing - driver for Innovation (Innovation and HPC, etc), Computational Biology (Advanced Modeling of the Genome, Genome Sequencing, Modeling of Epidemics, etc), Oil Exploration Advanced Modeling

[7] More Information in http://opencities.net/

[8] More information on http://commonsforeurope.net/

[9] Jimena Arango M- Menon Network (beneficiary of the ENALCE project)

(Advanced Computational Methods and Techniques for Oil Exploration, etc), Natural Disasters Modeling and Simulation (Hurricane a Catastrophe Modelling, Air Pollution Modelling, etc), HPC and Supercomputing as a platform for research in the industry and academia. Caribbean and Central American Researchers can participate in research networks through the researchers and partner universities in Latin America. Special emphasis is made for collaborative research between industry and academia on innovative models involving energy consumption in relation to the power needs of supercalculation and modelling.

The expected products of the project are twofold. In the one hand, policy oriented documentation such as Green Paper on High Performance Computing and Supercomputing Drivers and Needs in Latin America. On the other hand, a roadmap of High Performance Computing and Supercomputing strategy of R&D in Latin America. Research wise, the project will create strategic research clusters established and by establishing a fully functioning network focusing on activities to support and promote coordination of the HPC and Supercomputing research between Europe and Latin America.[10]

PRIORITY DIALOGUE WORKSHOP- IDENTIFYING RESEARCH LINES OF INTEREST

E-INFRASTRUCTURES

BACKGROUND

The e-Infrastructures activity, as a part of the Research Infrastructures programme,[11] part of the 'Capacities' specific programme, focuses on ICT-based infrastructures and services that cut across a broad range of user disciplines. It aims at empowering researchers with an easy

[10] For more information visit www.risc-project.eu

[11] Please see http://cordis.europa.eu/fp7/capacities/research-infrastructures_en.html

and controlled online access to facilities, resources and collaboration tools, bringing to them the power of ICT for computing, connectivity, storage and instrumentation. This allows for instant access to data and remote instruments, "in silico" experimentation, as well as the setup of virtual research communities (i.e. research collaborations formed across geographical, disciplinary and organisational boundaries). e-Infrastructures foster the emergence of e-Science, i.e. new working methods based on the shared use of ICT tools and resources across different disciplines and technology domains.

In 2012-2013, international cooperation in e-Infrastructures focuses on:

- ensuring global connectivity and interoperability,

- developing an open, virtualised and multi-domain test bed facility and expanding it globally

Further, The e-Infrastructures activity supports a number of interrelated topics designed to foster the emergence of new research environments in which 'virtual communities' of scientists and engineers are empowered to share and exploit the collective power of the European ecosystem of scientific and engineering facilities.

RESULTS OF THE DIALOGUE ON E-INFRASTRUCTURES

The Team was mainly focused on improving proactive and recovery actions/co-ordination of a disaster or an emergency (e.g. earthquake, hurricanes or other natural disasters)

Participating **experts**

George Tsakis (Rapporteur)	Digicel, Haiti
Albert Comellas	CIMA Research Foundation, Savona, Italy

Ludgardo Job	University of Netherlands Antilles UNA
Miguel Angel Cid	ConCentra- IT management, Dominican Republic
Juan Pablo Ligorría	Asociación Guatemalteca de Ingeniería Estructural y Sísmica – AGIES, Guatemala
Patricia Hernández Cañadas	Universidad Nacional Autónoma de Honduras UNAH
Luis R. Furlán	Universidad del Valle de Guatemala

During the workshop, all participants agreed that there is limited and fragmental co-operation between the regions or/and countries in the area of disaster management. It is a reality that very limited mutual programs related with the disaster recovery and prevention, have been implemented. Future co-operation in this area will definitely lead to advanced global solutions with the minimum cost. Also, solutions implemented in one region/country could be immediately operational in other regions/countries. The fact of isolated and overlapping efforts and projects across the countries and regions was highlighted by all participants. Better global co-ordination of efforts/projects is crucial to increase efficiency and minimize research and implementation cost.

In addition, it was commonly agreed across all participants, that there is a complete lack of preparation to manage natural disasters in the region of the Caribbean (each emergency situation is handled when it happens). As an example, it was discussed in detail, the reaction of the regions to the catastrophic earthquake of 2010 in Haiti, Port au Prince.

As presented by Mr Ludgardo Job (University of Netherlands Antilles UNA), businesses in the Caribbean and Central America are not interested on investing in Business Continuity plans. This is mainly caused by the fact that business continuity plans are extremely costly and don't create any immediate benefit to the businesses. All participants agreed that there is no state regulator's pressure to the businesses regarding the necessity of business continuity plans. The support of the EU is essential in this area due to the fact that the level of business

continuity readiness of the European business is extremely advanced in comparison with the Caribbean and Central America region.

As presented by George Tsakis (Digicel Haiti), no sufficient early detection mechanisms of national disasters exist in the region as commonly used in the EU. Currently, most of the countries in the region depend on external early detection mechanisms operational in other countries (e.g. in the US). The support of the EU in this area could be also essential.

All participants agreed that "trouble-free" markets are in the interest of the EU. Due to the presence of significant EU businesses in the region, the prevention and/or the early recovery of disasters in the two regions is directly beneficial for the EU businesses. In addition, future potential EU investments could be generated in reduced-risk countries. Currently, the high risk of natural disasters in the region is a "show-stopper" for several EU businesses which would potentially expand their operation in the region of the Caribbean and Central America in case that risk is eliminated.

1. Main lines of research

Potential areas of mutual research and cooperation across the regions:

Theme	***Beneficiary (Caribbean, Central America, both?)***	***Leading Country (ies)***	***FP7 relevance or related calls***
The need for cooperation of CAC and EU on development and optimization of detection, warning and mitigation systems is essential	Caribbean and Central America	Guatemala, Haiti	Theme is relevant with the FP7 scope of developing an open, virtualised and multi-domain test bed facility and expanding it globally

Global concept of emergency shelters distributed across all regions coordinating all proactive and post-disaster actions.	Caribbean and Central America	Haiti	Theme is relevant with the FP7 scope of developing an open, virtualised and multi-domain test bed facility and expanding it globally
Knowledge transfer in the area of business continuity plans (BCP). There is a lot of space for improvements in CAC and the support of EU is essential. If BCP become the mandatory way forward in CAC for business, EU ICT companies will potentially develop most of the projects	Caribbean	Antilles	Theme is relevant with the exchange of knowledge between the EU and the Caribbean
Use C@ribnet, RedCLARA and Geant research and education networks as primary vehicles for research activity, which may include: -Use of supercomputers, disaster simulations, etc -Use of networks for data sharing, videoconferencing for disaster recovery matters.	Caribbean and Central America	Jamaica	Theme is relevant with the FP7 scope of ensuring global connectivity and interoperability
Share of EU civil construction norms and regulations with the	Caribbean and Central America	Guatemala	Theme is relevant with the exchange of knowledge between the

CAC region.			EU and the Caribbean

Recommendations for future consideration

1. R&D core competencies in both regions

- Support on civil construction norms (building codes) for the construction of disaster-proof buildings
- Disaster prevention actions: Knowledge of Business Continuity Plans (BCP)
- Free movement of knowledge is required

2. Success stories of ICT cooperation in the international arena
-Early warning systems

3. Potential synergies with other initiatives and programs in the both regions
-Utilization of regional networks as primary vehicles for research activities

Conclusion

General conclusions from the e-infrastructure discussion group were the following:

The region (Central America and the Caribbean, CAC) is highly vulnerable to natural disasters. They have traumatic effects, socially, economically and politically. International and EU businesses are located in the region; EU investments in the region are indirectly affected by the results of natural disasters.

Prevention and reaction to natural disasters is not effectively organized yet and co-operation between regions is fragmental. There is a lot of space for improvement in the global co-ordination and co-operation of all relevant projects to avoid overlapping of efforts. Initiatives such as sharing norms and regulations regarding this matter could be shared by the EU with Central American countries, in order to transfer well tested models of disaster prevention activities

TECHNOLOGY ENHANCED LEARNING

BACKGROUND

European research on technology-enhanced learning investigates how information and communication technologies can be used to support learning and teaching, and competence development throughout life.

Education is a strong prerequisite for economic growth. Europe must support national efforts to help students to learn better, teachers to teach better, and school systems to become more effective. Customized learning systems can adapt to effective use in a wide variety of diverse contexts. This is key for a successful modernization of educational and training systems in Europe.

In this context, the EU acknowledges ICT as at 'the very core of the knowledge-based society', as enabler and stimulant for 'product, service and process innovation and creativity'. The technology-enhanced learning programme promotes the **adoption and use of information and communication technologies** (ICT) in teaching and learning initiatives. EU funding can drive the collaborative agenda, helping the definition and implementation of common approaches to technology-enhanced learning, sharing of resources and best practices and widespread deployment of solutions that are fit for purpose. It is expected that once projects are initiated, they will begin to exact impact in the several environments within 5 – 10 years.

The technology-enhanced learning objective will be supported under the ICT work programme 2013 that will be launched by European Commission in July 2012.

RESULTS OF THE DIALGUE ON TECHNOLOGY ENHANCED LEARNING

Rapporteur: Daniel Burgos, International University of La Rioja-UNIR

The workshop was very much focused on practical aspects about Technology Enhanced Learning to be implemented and considered in CAC countries, and in collaboration with Europe. With this premise, a number of experts made quick presentations about their concerns, suggestions, and obstacles to overcome, which was followed-up by an intense discussion, along with a number of specific conclusions.

Participating **experts**

Daniel Burgos (Rapporteur)	International University of La Rioja-UNIR
Alexandra Martínez	ECCI, Universidad de Costa Rica
Fabio Nascimbeni	Menon Network, Belgium
Francisco J. Mata	Universidad Nacional de Costa Rica
Ivan Armuelles Voinov	CITIC, University of Panama
Jean-Marie Raymond Noel	State University of Haiti
Philippe Hunel	Université des Antilles et de la Guyane
Rocael Hernández Rizzardini	Universidad Galileo, Guatemala

The moderator started with an overall presentation (Pros and cons of Technology-enhanced Learning in Europe. The need for a different model in CA & the Caribbean) and a set of **ground questions**:

- Do ICT infrastructure of the various Caribbean & Central America countries allow the development on elearning?

- Is there a digitization of patrimony transmission of traditional knowledge?
- What are the major obstacles to the development and the widespread of e-learning in our countries?
- What public or private initiatives have been taken in your countries to improve the quality of education? Do these initiatives consider the ICT component?
- How people in the CAC countries envisage e-learning?

In addition, specifically about the workshop attendees two key questions were asked:

- What can we do to implement eLearning and to improve its quality in CCA?
- What can we do to foster the cross-connections between CCA, and Europe, leading to actual implementations?

These questions, in addition to the speakers' presentations, encouraged a pro-active discussion, with a number of selected outcomes, distributed by category. Haiti and Antilles were very positive about overcoming technology obstacles. Guatemala focused on international cooperation with Europe. Costa Rica stressed the need for international collaboration for research and tutoring, meaning foreign professors.

Technology enhanced learning working group -expert session

Relevance of policy makers and infrastructure

Policy makers are Regional Governments, National Ministries, lobby groups, et cetera. They are responsible for general policies on Education and ICT, as well as for providing the required technological infrastructure that facilitates the right implementation:

- The involvement of policy

makers is a way to override the lack of ICT infrastructure
- To keep eLearning on top of the EU agenda, we might combine it with other top priorities (i.e. eHealth, Living labs, infrastructure, disaster management, etc)
- Policy could come from what companies need, so that learning can be developed based on actual requirements

Obstacles

To this workgroup, barriers for eLearning CAC countries are multi-faceted: not only technical development is required, but also a clear understanding between actual needs and educational programmes provided is missing. In addition, there is a lack of real evaluation of the eLearning efficiency:

- A technical obstacle is to make good content, pedagogical design, system management, which is highly cost-effective. Lifecycle is time and cost demanding (even worse with school teachers)
- People don´t believe in effectiveness of eLearning, maybe because the lack of a solid evaluation against traditional (e.g. face to face) teaching
- There is no real knowledge if eLearning works and their actual reach (e.g. data collection and interpretation)
- There is a mismatch between the needs from enterprises and competences provided by academic programmes. How related is academic certification/accreditation with the ones from Industry?

2. Main lines of research

The Practical and relevant research line/s, which are sensitive to the needs of the target countries are listed as follows:

Theme	***Beneficiary (Caribbean, Central America, both?)***	***Leading Country (ies)***	***FP7 relevance or related calls***

M-learning is an interesting proposal. It´s more feasible than computer supply & energy to power it up	***CAC***	***Haiti***	Objective ICT-2013.8.2 Technology-enhanced learning Call: FP7-ICT-2013-11 Call: FP7-ICT-2013-11
Elearning as a way to get quality training for teachers, de-centralized from the excellence center	***Central America***	***Costa Rica***	Objective ICT-2013.1.6 Connected and Social Media Call: FP7-ICT-2013-10
Regional open campuses for research might be a solution to support teachers and researchers	***Central America***	***CAC***	Objective ICT-2013.10.3 International partnership building and support to dialogues – Horizontal International Cooperation Actions Call: FP7-ICT-2013-10 Objective ICT-2013.9.4 International cooperation on FET research
It´s appropriate to re-use and implement others' developments rather than starting our own tools	***All (CAC + Europe)***	***All***	Objective ICT-2013.8.2 Technology-enhanced learning Call: FP7-ICT-2013-10
e-Learning in Health	***Europe***	***All***	Objective ICT-2013.5.3 ICT for smart and

			personalised inclusion Call: FP7-ICT-2013-10

Conclusion

Insights about the overall situation of Technology Enhanced Learning in CAC and European countries are as follows:

- Sometimes means and ends are misunderstood. In this sense, ICT is not an end
- We don´t have a clear clue about what to improve through ICT. The tools are there, however the strategy and the objective are usually missing
- Elearning is more than compiling learning resources (e.g. Videos, PDF)
- Some traditional teachers are reluctant to new technologies in the learning processes, new generations are more receptive
- In Technology Enhanced Learning, the misunderstanding between the Technology and the Learning is often present. A combined approach is required of Technology & Learning experts

E-HEALTH

BACKGROUND

This challenge addresses advanced ICT research for sustainable high-quality healthcare, demographic ageing, social and economic inclusion, and the governance of our societies. The Challenge covers the following:

✓ Research that aims for disease management and also targets rehabilitation and treatment at the point of need with a focus on specific diseases.

✓ Research focused on more elaborate and reusable multi-scale models and a VPH information infrastructure of larger repositories. Preparatory actions will aim at a grand

challenge on a "Digital Patient", being the integration of patient-specific models for better prediction and treatment of diseases.

- ✓ Patient Guidance Services (PGS) to enable patients' active participation in care processes. A special emphasis will be given to semantic interoperability to enable integration of patient information from multiple sources and locations and to ubiquitous and secure access to these personal health records.
- ✓ Research on ICT for Ageing Well focused on developing service and social robotics and highly intelligent environments in support of the ageing population. This is complementary to the AAL programme (applied research, focused on smaller-scale projects with 2-3 years to the market). More.
- ✓ Research on ICT for smart and personalized inclusion addressing advanced solutions to improve social and economic inclusion by means of inclusive design, accessible, customizable and human-ICT interfaces (more), social computing and advanced solutions for learning and skills acquisition (more) as well as Brain-Neural Computer Interfaces (more).
- ✓ Research into ICT solutions for governance and policy modeling addressing ICT tools for trusted governance and policy impact analysis. This research should help deal with future scenarios involving even greater complexity and citizens' involvement, in particular addressing the needs of the younger generation.

The e-Health objective will be supported under the ICT workprogramme 2013, that will be launched by European Commission in July 2012.

RESULTS OF THE DIALOGUE ON E-HEALTH

Rapporteur: Stavroula Magklavera,

Participant experts

Stavroula Magklavera (Rapporteur)	CERTH – Center for Research and Technology Hellas, Greece

Roberta Annicchiarico	IRCCS Fondazione Sta Lucia, Italy
Darwin Muñoz	Universidad Ibero Americana, UNIBE Dominican Republic
Marco A. Munguía	Universidad Nacional de Ingeniería Managua, Nicaragua
Sébastien Régis on behalf of Jimmy Nagau (Computer Sciences)	Université des Antilles Guyane UAG, Guadeloupe
Lynwood Bell	The Technology Campus, Anguilla
Arturo Camacho	Universidad de Costa Rica UCR, Costa Rica
Miguel Vargas-Lombardo	Universidad de Panamá, Panamá
Mynor Gudiel	Unit coordinator to support research School of Graduate Studies, Faculty of Medicine, University of San Carlos de Guatemala

During the session were nine presentations from Caribbean, Central American and EU experts, which covered both existing capacities as well as topics of potential interest for cooperation between the EU and the region. EU experts presented best practices in the

sector and the potentiality of new collaborations based in the new call for proposals of the ICT for Health, Ageing and well-being.

Discussion and question and answers, included comments from European experts and a general discussion of the proposed topics, as well as some cross-cutting issues and institutional aspects potentially affecting future cooperation opportunities.

ICT working group – eHealth experts

It should be noted that Health (electronic or not) is not only a research priority but is a NECESSITY all around the world, especially for this part of the population that has limited access to healthcare services as reported in some of the countries.

Especially, ICT for Health and Ageing is a priority for all countries, rich and poor, diseases do not respect borders, 'Rich world' diseases (cancer, DM…) also affect developing countries and vice versa (Aids, TB…) and treatments and cures are universal.

Health and ageing research requires co-operation across the globe and is a priority for all countries, rich and poor. Diseases and their management do not respect borders. ICT solutions for healthcare are universal.

The session opened with the presentation of *Stavroula Maglavera (CERTH)* and set the scene of the discussion by presenting the European Commission developments in ICT for Health and Ageing that are very high on the EC agenda based on the demographics and the policy agenda. The concept for future developments such as the current ICT call for proposals that includes the following topics that might interest stakeholders from both regions to jointly

prepare proposals:

1. *ICT-2013.5.1 Personalised health, active ageing, and independent living*
    - Personalised Guidance Services for lifestyle management and disease prevention and co-morbidities and integrated care.
    - Personalised Services for Independent Living and Active Ageing
2. *ICT-2013.5.2 Virtual Physiological Human*
    - Clinical proof of concept of patient specific computer based models
    - Personal Health Forecasting
1. *ICT-2013.5.3 ICT for smart and personalised inclusion*
    - Accessible and intuitive solutions for personalised interfaces to smart environments and innovative services

In addition, the International dimension of ICT for Health and Ageing was explained. In parallel with the she explained why International cooperation is important and how EC is supporting it.

Arturo Camacho – U. Costa Rica

The proposed research theme is the personalized treatment and health care for cancer. The main issues in Costa Rica are: gastro - stomach cancer and lungs TB. Existing gaps are the algorithm needed for the selection of optimal treatments and the different algorithms needed for different types of cancer. There are available data-bases however it is needed to obtain a lot of data for cancer.

Two level cooperation are envisaged, the EU and regional. It is very difficult to involve CAC stakeholders in joint research at the moment. Contacts with European organizations exist (German organizations).

EU relevance:

The relevance of the proposed idea is linked with *Challenge 5*: ICT for Health, Ageing Well, Inclusion and Governance and specifically with objective *ICT-2013.5.1 Personalised health, active ageing, and independent living*, since it is in line with the development of Intelligent systems for the analysis of multi-parametric data and aims to create that will process and interpret physiological measurements, medical data and other lab test data. The expected impact will reduce the hospitalisation rate and improve disease management.

Sebastien Regis- UAG

Two ideas presented:

- Project 1 –Use of neural networks for the detection of problems and the monitoring patients of sickle cell disease (sickle cell disease develops the risk of having cerebrovascular diseases difficult to detect)

  The existing monitoring questionnaires to find out cases are long, tedious, boring and difficult to adapt (questionnaires are too EU focused and does not integrate Caribbean nuances). To use games to provide behavior estimation. The challenge is to build an updated database for behavioral estimations for psychologists of the region.

- Project 2- Image analysis for the recognition of Caribbean plants

  Intoxication and poisoning from plants can be difficult to manage since it requires an expert knowing all the properties of plants and always available and the pharmacopeia of Caribbean (and Central America) is not developed and recognized as European one.

  Images analysis for the recognition of Caribbean plants is based on the analysis of photos of plants and comparison with a data base of samples (one of the partner is TRAMIL, **Tra**ditional **M**edicine for the **Isl**ands) provides a list of possible names of

plants - takes some minutes to give answer.

EU relevance:

The proposed idea 1 of monitoring patients with sickle cell disease that is mainly developed in the region, is relevant with the *Challenge 5*: ICT for Health, Ageing Well, Inclusion and Governance and specifically with objective *ICT-2013.5.1 Personalized health, active ageing, and independent living.* The proposed idea N1 is mainly relevant with the programme of Health Innovation of FP7.

Darwin Munoz- UNIBE

The following six lines of research in ICT for health are of interest of the organization: (1) Tele cardiology, (2) Tele gynecology and obstetrics, (3) *Electronic medical records*, (4) *HIS (Hospital Information System), (5) RISC (Radiology Information System)*, (6) *EDIS (Emergency Department Information system).*

Two projects ideas based on existing technology aiming to improve health care in the country are foreseen:

- Tele cardiology
- Tele gynecology and obstetrics

Issues of the region related to the above projects are the mortality rates of children and mothers in rural area that is very high. The priority on the National agenda in the country to go rural and make tests on local people having a rapid telediagnosis.

EU relevance:

The relevance of the proposed idea is linked with *Challenge 5*: ICT for Health, Ageing Well, Inclusion and Governance and specifically with objective *ICT-2013.5.1 Personalized health, active ageing, and independent living.*

Roberta Annicchiarico – IRCCS Fondazione

The use of ICT technology in elderly people is key research priority in EU because of the digital divide between disabled people and the rest of the population. The EU is pushing to use technology to support disability in the elderly.

Examples of projects:

- SHARE-it - Supported human autonomy for recovery and enhancement of cognitive and motor abilities (www.ist-shareit.eu). It aims to develop next generation assistive systems that empower persons with disabilities and aging citizens to play a full role in society, to increase their autonomy and to fulfill their potential. It developed the i-Walker that is (1) Walking assistant, (2) Evaluates the residual strength, (3) Compensate between different strengths, (4) Personalized level of assistance and help, (4) Security system (5) Communication with care-giver.
- SOCIABLE - Motivating platform for elderly networking, mental reinforcement and social interaction FP7 (http://www.sociable-project.eu/)

ICT has a new call for proposals that local stakeholders might be interest in participating.

Discussion and remarks – Some of the countries are behind in technological platforms and connectivity. Life expectancy is low for children and elderly due to malnutrition in indigenous and rural areas as opposed to people in the city. Rural population is still very high. Given this, such project may not be relevant for the time being. Nevertheless is necessary to take action from now.

EU relevance:

The presented projects and best practices are in relevance with the FP7 Challenge 5: ICT for Health, Ageing Well, Inclusion and Governance and specifically: Personal Health Systems (PHS for remote management of diseases, treatment and rehabilitation), Patient Guidance

Services (PGS for personalized management of health status) and ICT for Ageing and wellbeing (Service and social robotic systems for «Aging well»).

Marco Mungia UNI – Nicaragua

The research project idea presented was "Haemodialysis Vascular Access Patency in End-Stage Renal Disease Patients". Hemodialysis vascular access patency in end-stage renal disease patients and the proposed PHS will consist of (1) Wearable, portable or implantable devices (Data Acquisition), (2) Intelligent processing of acquired information (New insights about individual's health status), (3) Active feedback based on such new insights (Assisting in diagnosis, treatments, etc.). The idea is relevant to the ICT Objective 5.1 – Personal Health Systems.

Specific issues in the region presented such as

- More than 2,800 men have died from kidney failure in Central America each year from 2005-2009. An increase of fivefold in Nicaragua and El Salvador.
- In developing countries, CKD generally occurs at a younger age. In Guatemala, 40% of patients receiving RRT are under 40.
- In the province of Guanacaste, Costa Rica, the regional hospital had to start a home dialysis program because it was overwhelmed with so many CKD patients.

The challenge is to create signal processing technologies to extract relevant clinical data.

EU relevance:

The relevance of the proposed idea is linked with *Challenge 5*: ICT for Health, Ageing Well, Inclusion and Governance and specifically with objective *ICT-2013.5.1 Personalized health, active ageing, and independent living*, since it is proposed PHS will consist of (1) Wearable, portable or implantable devices (Data Acquisition), (2) Intelligent processing of acquired information (New insights about individual's health status), (3) Active feedback based on

such new insights (Assisting in diagnosis, treatments, etc.). The idea is relevant to the ICT Objective 5.1 – Personal Health Systems.

Miguel Vargas – U Tecnológica de Panamá

Technological University of Panama has developed a research and innovation in ICT (CIDITIC) that brings together researchers with doctoral degrees Panamanians. From here you create REDISAE. Currently, they are developing a model of ICT for palliative care in terminally ill patients, for this we have a medical and technical team working on developing a web portal environment and mobile Health. The main interests in collaboration with EU are listed below:

- Medical Informatics, telemedicine systems development, cyber medicine, telemedicine in rural areas
- ICT propose models, development and implementation for both rural and urban areas to benefit the Panamanian population.
- Decision Support Systems in Medicine
- Data model and data base with support in the context medical.
- E-learning in health

EU relevance:

The proposed ideas of e-learning in health and the introduction of decision support systems in health are totally relevant with EU research priorities in ICT for health. Previous best practices examples of FP7 and FP6 projects could be followed and should be contacted for cooperation, since previous developments might be useful.

Lynn bell

There is an effort to push research and innovation activity on the Caribbean. There is added value to make the EU interested in working with in CAC region.

The possible competitive advantage: Using small countries as petri dish to make practical studies and apply projects see if they work. Making sampling easier than high-populated countries.

EU relevance:

Cooperation with Europe will facilitate the research in ICT for health in the Caribbean region.

Mynor Guidiel – Byron Mazariegos Universidad de San Carlos, Guatemala

Delivery of health is fragmented in Guatemala, since only the 65% of the population have access to healthcare services (electronic or not). This has to be considered as an issue and ICT for Health and eLearning learning can help enhance the coverage. However it was pointed out that there is a complete and utter lack of understanding of the benefits and advantages of ICTs in regards to health. There is no way to calculate the real cost of implementation of an electronic health system as well as clarifying the skepticism of health professionals and the general population and finally, to *d*etermine the optimal requirements for an electronic health system.

Ideas for joint research projects include:

- Epidemiologic vigilance of international health standards and codes.
- Conditions of efficiency and effectiveness of the electronic health system.
- Generation of software and electronic interactive applications.
- Human resources in ICTs and health.
- Strategies to ensure coverage and access to e-health.
- The culture with relation to ICTs and health.
- Health investigation methods through the internet.

EU relevance:

Cooperation with Europe and stakeholders from the EU and transfer of knowledge and best practice examples will facilitate the research in ICT for health in Guatemala that finally aims to create better conditions and access to health care services in the country. Development of policies in the delivery of healthcare according to the EU models. (I will leave this as it is but maybe APRE will want to summarize this part. Ya veremos)

3. Main lines of research

Based on the above presentations and the discussion, ***ideas proposed for joint research*** are listed as follows:

Theme	***Beneficiary (Caribbean, Central America, both?)***	***Leading Country (ies)***	***FP7 relevance or related calls***
Tele cardiology and Tele gynecology and obstetrics	*Caribbean*	*Dominican Republic*	The relevance of the proposed idea is linked with *Challenge 5*: ICT for Health, Ageing Well, Inclusion and Governance and specifically with objective *ICT-2013.5.1 Personalised health, active ageing, and independent living*
Cancer personalised treatment through the development of algorithms for the selection of optimal treatments	*Central America*	*Costa Rica*	The relevance of the proposed idea is linked with *Challenge 5*: ICT for Health, Ageing Well, Inclusion and Governance and specifically with objective *ICT-2013.5.1 Personalised health, active ageing, and independent living*

Hemodialysis vascular access patency in end-stage renal disease patients	*Central America*	*Nicaragua*	The relevance of the proposed idea is linked with *Challenge 5*: ICT for Health, Ageing Well, Inclusion and Governance and specifically with objective *ICT-2013.5.1 Personalised health, active ageing, and independent living*.
Decision Support Systems in Medicine	*Central America*	*Panama*	The proposed idea of the introduction of decision support systems in health is relevant with EU research priorities in ICT for health. Previous best practices examples of FP7 and FP6 projects could be followed and should be contacted for cooperation, since previous developments might be useful.
e-Learning in Health	*Central America*	*Panama*	The proposed idea of e-learning in health is relevant with EU research priorities in ICT for health. Previous best practices examples of FP7 and FP6 projects could be followed and should be contacted for cooperation, since previous developments might be useful.
Use of ICT tools for the detection of problems and the monitoring of patients having sickle cell disease	*Caribbean*	*French West Indies*	The proposed idea 1 of monitoring patients with sickle cell disease that is mainly developed in the region, is relevant with the *Challenge 5*: ICT for Health, Ageing Well, Inclusion and Governance and specifically with objective *ICT-2013.5.1*

			Personalised health, active ageing, and independent living.
Image analysis for the recognition of Caribbean plants	*Caribbean*	*French West Indies*	The proposed idea N1 is mainly relevant with the programme of Health Innovation of FP7 and is an idea that can be further explored.
Epidemiologic vigilance of international health standards and code	*Central America*	*Guatemala*	Cooperation with Europe and stakeholders from the EU and transfer of knowledge and best practice examples will facilitate the research in ICT for health in Guatemala that finally aims to create better conditions and access to health care services in the country.
Strategies to ensure coverage and access to e-health	*Central America*	*Guatemala*	Cooperation with Europe and stakeholders from the EU and transfer of knowledge and best practice examples will facilitate the research in ICT for health in Guatemala that finally aims to create better conditions and access to health care services in the country.

Conclusion

Future steps in bi-regional cooperation, recommendations:

- Strategic thinking and integration of research ideas to the national plans in the different countries is needed. In addition, Policy makers should be involved in the discussion, since coordinated actions needed for future activities

- Capacity building, including institutional and technical/financial aspects is needed and should be further explored.
- Human resources are an important aspect for international cooperation. Researcher's mobility is an option that could be used. Marie Curie Actions of the European Commission is another opportunity for research mobility around the world that should be further explored.
- As discussed, interregional collaboration is also needed, since cluster activities of the region might have better changes and at the moment are not yet in place.
- As discussed, some of the local stakeholders they have existing collaborations with European Universities and Institutes. It will be good to built on those existing collaborations and to extend to the development of research projects.
- European Commission research programmes in the sector for ICT for Health are running for several years and results are already available. It is suggested that regional stakeholders should investigate what exists and how to build upon these results.
- European Commission programme FP7 Health Research Theme is an option for health research and could be taken into account.
- ICT for Health (call 10) could be the first opportunity for cooperation that might include local stakeholders.
- Local partners are suggested to use the different NCP resources in order to be able to enhance the collaboration and access to knowledge and knowledge transfer.

LIVING LABS AND ICT INNOVATION MODELS

BACKGROUND

Living Labs are open innovation ecosystems in real-life settings in which user-driven innovation is fully integrated in the co-creative process of new services, products and societal infrastructures. The Living Labs model includes end-user participation from an early stage of the creative process of technology development. As a result, evaluating aspects

such as social and economic implications of new technologies has become more accurate. So the needs of users are better listened to and fulfilled.

The Living Labs model benefits citizens, industry and research

- Living Labs empower citizens, as end-users, to influence the development of innovative services & products that eventually could benefit the whole society.
- Living Labs allow industry to develop, validate and integrate new ideas, to partner with other companies and to increase their chances of success during product and/or service launches.
- Living Labs facilitate the integration of technological innovation in society and increase return on investments in ICT research.

There is a large number of Living Labs in Europe with a variety of different characteristics. The European Network of Living Labs ENoLL[12] has now more than 100 members in 2008. Some focus on a particular technology such as mobile communications or RFIDs (Radio Frequency Identification), others focus on a particular industrial sector, again others focus on groups of services to local citizens, just to mention some of these characteristics.

RESULTS OF THE DIALOGUE ON LIVING LABS AND ICT INNOVATIN MODELS

Rapporteur: Esteve Almirall,

Participant experts

Esteve Almirall (Rapporteur)	ESADE Business School, Spain

[12] See http://www.openlivinglabs.eu/

Agustín Gómez Meléndez.	Universidad de Costa Rica UCR
Julio Martínez	Instituto Superior Politécnico José Antonio Echeverría CUJAE, Cuba
Jorge Armin Mazariegos	Universidad de San Carlos USAC, Guatemala
Vilma Altet Casas	Centro Internacional de la Habana CIH, Cuba
Marcelo Jenkins	Universidad de Costa Rica UCR

1. Generalities of the session

The session aimed to provide an overview of the different practices around Living Labs in the world with a special interest in Central America and Caribbean areas.

Experts of the region together with an European representative of the ENoLL (European Network of Living Labs), presented and extensively discussed the state of Living Labs activities around the world both in terms of a methodology and in terms of the organizations that promote it.

From this discussion it clearly surfaced the diversity of interest underlying Living Labs, ranging from the development of new products and services in Europe and Asia, to social cohesion and development in Central America. Also the different characteristics of the organizations that are promoting these activities and the opportunities for cross-fertilization that this diversity provides. Part of the discussion was also devoted on how to take advantage of these opportunities.

2. Specific interventions – relevance to the EU

The session was structured in two parts, the first part was aimed at providing an overview of the state of the art of Living Labs around the world, and particularly showcasing the particularities of the Caribbean and Central American regions with their specific needs.

The second part of the workshop was devoted to discuss the different approaches and the opportunities of collaboration that this diversity provides, together with the difficulties that this presents due to the diversity of interests and motivations in each region.

Esteve Almirall presented a showcase of Living Lab methodologies around the world together with best practices. Examples of Sweden (Lulea), Finland (Helsinki), Belgium (iLabo), Barcelona and Taiwan were showcased and discussed in depth, highlightening the specificities of each methodology and how and why it relates to the needs of a specific territory.

Living Labs working group - expert session

Esteve Almirall also presented a theoretical construction around Living Labs methodologies distilling their common aspects and showing their unique contribution respect to other methodologies.

Jorge Armin Mazzariegos discussed aspects of online reputation and online trust. Reputation was discussed as an antecedent of trust and a theoretical model of reputation deriving trust. Besides the

theoretical model, a discussion on the state of on-line trust in the Caribbean and Central American region was carried out deriving implications for Living Labs.

Agustin Gomez from University of Costa Rica, presented the reality of Living Labs in the region together with some examples of how Living Labs were used. A participatory methodology was developed there with the aim of fostering social cohesion in the region. Examples of how Living Labs were used for strengthening social cohesion were depicted. Particularly interesting was the use of Living Labs and participatory methodologies in rural and developing areas, which is particularly interesting for the region in terms of policy development.

Marcelo Jenkins from University of Costa Rica presented the state of Software Quality Assurance (SQA) in the region, and how the development of better practices in SQA could favorably impact Living Labs. In more general terms Living Labs for software development were extensively discussed, both in terms of specific Living Labs and how to produce software that could fit the needs of particular populations or communities.

Julio Martinez of Cuba also developed his presentation on these lines, touching the use of software as a lever for developing communities and producing software applications that were connected and could serve to cover the needs of the communities.

Vilma Altet also from Cuba presented the reality of the Biotech industry in the region, with highly skilled and knowledgeable professionals and weak innovation capacity. Living Labs were presented in this context as a way to close the gap between knowledge and innovation in the region.

Considering all the presentations, the main differences between Living Labs implementation in Europe, Asia and Central America were clearly showcased. Together with these differences, the opportunities underlying them were highlighted, particularly in aspects such as the importance of culture and the different targets of innovation among the areas, ranging from process/product innovation to social innovation.

These differences present an opportunity for cross-fertilization but also important implementations difficulties, because of the diversity of the underlying interests and targets

to accomplish. Finding common points that could benefit several areas is the main challenge for common research and innovation projects.

3. Main lines of research

Theme	***Beneficiary (Caribbean, Central America, both?)***	***Leading Country (ies)***	***FP7 relevance or related calls***
Living Lab Methodologies	both	European Countries	Any LL related call
Living Labs for social cohesion	both	Costa Rica	Any LL and Smart City related call
Living Lab oriented Software development	both	Cuba	Innovation related calls
Living Labs and online trust	Caribbean and Central America	Costa Rica	Software calls related to trust and online security
Living Lab Methodologies	both	European Countries	Cooperation calls

4. Conclusions

There are important differences on how Living Labs are understood and developed, not only between the different regions: Europe, Central America and Asia, but also among the different countries in each region. This certainly increases diversity providing important opportunities for cross-fertilization and innovation, but also makes more difficult to find commonalities and common objects on which to articulate projects and policy.

The definition of these projects and policies is therefore a central theme for cooperation and potentially a source for the enrichment of both areas. The recent experiences on innovation from the bottom of the pyramid comply in many aspects with the requisites to be qualified as Living Labs methodologies. These experiences have shown how innovation developed in third countries to fit specific needs can be translated to other contexts with success. Probably a similar process can be established in social innovation fostered by Living Labs that could be afterwards applied to similar problems in Europe and Asia.

Until now Living Labs have been nourished basically by the European experiences, the incorporation of other regions such as the Caribbean and Central America will certainly enrich the community and open its vision to new opportunities. Europe who has been leading the way in Living Labs research should also aim at providing and taking advantage of this.

GENERAL CONCLUSIONS

The workshops allowed fruitful knowledge exchange and the identification of common areas of interest of European, Central American and Caribbean ICT research groups. Common understandings of similar problems emerged, even if perspectives remain sometimes different. Cooperation at the CAC level is often fragmented due to lack of communication of actions and initiatives. A number of CAC-EU research connections exist (ex: between a research group from Costa Rica and one from Denmark in the eLearning field). Moreover, important areas of application of TICs solution existing in Europe emerged, as in the case of m-learning in Haiti. Research networks such as C@ribnet, RedCLARA and GEANT were highly encouraged. Merging forces and building up from existing initiatives will allow to leverage efforts and avoiding overlapping and double efforts.

Rapporteurs concluding remarks – Round Table "How to increase the engagement of CA and Caribbean partners in future ICT research"

Under this basis, panelists have shared good experiences such as the PhD exchange abroad fostered by Costa Rica's UCR. CSUCA has outlined the evaluation fostering of HE quality, identify problems, and facilitate discussion with policy makers, whereas CARICOM

has succeeded in finding a Caribbean education way to fit the region.

Researchers also shared a range of RDI aspects for future activities. UCR has spotted the need to better and closely work with industry, documenting research at the CAC level which complements CSUCA's need for confidence-building between university and industry. As for CARICOM, the issue resides on how to think in its own way in I.e., to question if it really matters to obtain a PhD to solve problems. Reaching Central America has also been a challenge for the institution. As for the EU, the challenges resided on finding the real added value of research for local development in the CAC region in order to create a competitive advantage as a region and towards the reciprocal interest of the EU. Finally, the fact of knowing the real needs of the region both from the academic, industrial and governmental level is increasingly important. If the CAC needs to develop PHDs then it is important to identify which critical areas shall be tackled.

One major remark underlining ICT initiatives is their lack of continuity and sustainability, especially in areas such as disaster management. To counterbalance this, EU-born innovation methodologies such as the Living Labs can be helpful as drivers for improving social cohesion within CAC countries. Involving CAC policy makers in research cooperation is critical, as they can push for cooperation policies: to this end, key actors from the CAC region such as CARICOM, CKLN, and CSUCA must be kept involved in the discussion

In general terms, the FP7-readiness of the CAC participants participating in the event is rather high, with good possibilities especially for pilot projects. Further, the idea of launching a FP7 Support Action on LAC Living Labs was put forward. As opposed to other thematic research areas, the ICT field has the advantage of permitting the participation of small research groups. In addition, ICT can be a way to facilitate knowledge flows among researchers. However, there is a strong consensus in articulating the different (EC and non-EC) funding schemes, to answer specific needs. According to the results of the Senior Official Meeting SoM[13], ICT can quickly help to overcome societal issues that in many cases exist.

[13] SoM

The policy dialogue process has never been so smooth despite the redundancies and thanks to the engagement of countries to participate on the dialogue. As a result, a working group was setup within this dialogue on "ICT for meeting societal needs" as one of the core results out of the SoM. This working group has the intention to develop a number of initiatives by the end of 2012. These are: a) An ICT observatory for social inclusion (based on ICT hubs for social inclusion); b) A LAC Network of Living Labs and c) a LAC network for intelligent transport and smart cities. To attain these mechanisms, **higher (and realistic) engagement from Central American and Caribbean countries in the EU-LAC dialogue is needed**, both at the level of research projects and of research policy dialogue by strengthening the local support structures, and possibly to connect them. On this line, ICT is more than a research field as it can facilitate knowledge sharing.

In terms of solutions from the academic viewpoint, some ideas such as the support the creation of **regional PhD programmes on ICT**, engaging EU professors as tutors, fostering dual degrees, the use EU or LA professors to supervise PhDs in CAC and the collection of **information on the research communities in CAC**

RECOMMENDATIONS

A number of initiatives and ideas were put on the table to be developed *in the short term.* These were:

- ICT observatory for social inclusion (ICT hubs for social inclusion)
- LAC Network of Living Labs and LAC Network of ETPs
- LAC network for intelligent transport and smart cities.

However, in order to attain the latter, higher (and realistic) engagement from CAC countries is needed, both at the level of research projects and of research policy dialogue by strengthening the local support structures, and possibly to connect them. On this line, ICT is

more than a research field as it can facilitate knowledge sharing. The CAC scheme seems to be working, under some conditions.

One of the major remarks from CAC researchers has been their low participating rate, as universities typically focus on education for professionalization rather than pure research. Hence, there is a very low international visibility of researchers not only internationally but at the regional level. The need to construct data bases on these two regions has confirmed the key importance of Both ENLACE and EUCARINET online data bases for an efficient cooperation among researchers and networks of researchers.

Some **aspects where need for improvement exist** were mentioned, such as the need to better and closely work with industry, the importance of documenting research at the CAC level, the low level of cooperation between the Central American and the Caribbean region. From an FP7 viewpoint, the main challenge resides on demonstrating the added value of research groups from the CAC region and their "competitive advantage" towards the EU counterparts.

In terms of activities, bringing academic conferences in the region (PROFRES, ITCSE, CATE, SEPGLA[14]…) as well as organizing CAC virtual or physical events for researchers is also highly encouraged in order to foster research visibility in the area. Support research as a public good is of utmost importance. Also, participating in regional initiatives of cooperation other than FP7 such as the submission of projects to the "Connect the Americas" Summit held Panama in July can leverage the possibilities of obtaining funding not only sticking to EU programmes. In fact for the ongoing FP7 programmes it has been suggested to have a well-structured m**easurement of the impact of FP7 fund on the CAC countries** since its beginning. This can also gather important criteria for future calls and objectives

[14] http://www.iasted.org/conferences/home-774.html

http://www.sepgla.com/

Moreover, some ideas such as the participation of researchers through pilots or already existing experiences has been reckoned. Also, the need to look for the niches where researchers in CAC countries can be competitive such as environment, agriculture and cultural heritage. Furthermore, the relevance to foster collaboration between industry and academia (IPR support, joint research projects, internships in industry) or by integrating local SMEs to the process of innovation is encouraged. Connecting "niche sectors" in the region to reach a research critical mass by collecting research ideas in open science repositories has also been stated as a solution. In terms of solution from the academic point of view some ideas such as the support the creation of **regional PhD programmes on ICT**, engaging EU professors as tutors, fostering dual degrees, the use EU or LA professors to supervise PhDs in CAC, the collection of **information on the research communities in CAC.**

LIST OF ABBREVIATIONS

CAC	-	Central American and Caribbean region
CARICOM	-	Caribbean Community
CKLN	-	Caribbean Knowledge Learning Network
CSUCA	-	Central American University Higher Council
EU	-	European Union
EUCARINET	-	European Union – Caribbean Research and Innovation Networks
FP7	-	Framework Programme Seven
GIZ	-	German Agency for International Cooperation
ICT	-	Information and Communication Technologies

IPR	-	Intellectual Property Rights
LAC	-	Latin America and the Caribbean
R&D	-	Research and Development
RE	-	Renewable Energy
SMEs	-	Small and Medium size Enterprises
SoM	-	Senior Official Meeting
UWI	-	The University of the West Indies

ANNEX

AGENDA OF THE EVENT

"EUROPE, CARIBBEAN & CENTRAL AMERICA: PARTNERS IN ICT RESEARCH AND INNOVATION"

Visions, Innovations and Priorities Workshop
28th -29th of May, 2012
Hotel Camino Real Antigua,
7ma Calle Poniente 33B, La Antigua Guatemala

28th of May - Plenary Morning Session

09.00 09.30	Registration of the participants
09.30	**Welcome addresses** **Diassina Di Maggio,** *Director of APRE, Coordinator of EUCARINET & ENLACE* **Alfonso Fuentes Soria,** *General Secretary of CSUCA*
10.00	**Plenary session**
10.00	EU-LAC Joint Initiative for Research and Innovation (JIRI) **Paul Vossen,** *European Commission, DG-Research & Innovation, International Cooperation* *Q&A*
10.30	The ICT Working Group of the JIRI **Hector Torres,** *Director ProteinLab UTEM, Coordinator FORESTA Chile*
11.15	International Cooperation in ICT: challenges and opportunities **Fabrizio Gentili** , *Lazio Region, EU relations, Italian Expert in the ICT Committee Programme* *Q&A*
11.45	**Coffee Break**
12.15	How to increase cooperation in ICT • The importance of research networks **Colleen Wint-Smith,** *CKLN Caribbean Knowledge and Learning Network* • Engaging the ICT private sector **Joaquim Cordeiro,** *AL-INVEST* • Brokering ICT researchers around EU technology platforms **Katalin Gallyas,** *OPEN CITIES Economic Affairs City of Amsterdam* • The RISC project: High Performance Computing in a EU-LAC perspective **Jimena Arango M,** *MENON Network* Open debate
13.30	**Lunch**
14.30	Priorities Experts Dialogue Workshop – Identifying research lines of mutual interest • Technology-enhanced learning (e-learning) • e-infrastructure (sustainable development, disaster management) • Living Labs and ICT-based innovation models (including smart cities, transport, e-governments) • ICT for health
18.30	End of the afternoon session

Each of the 4 Parallel thematic workshops will include the presence of **8 experts** – 3 representing the Caribbean, 3 Central America, (incl. the rapporteur) and **2 EU experts** (also from the ENLACE and EUCARINET groups), **other stakeholders.**

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09.30 Welcome from the Host Organisations CSUCA

09.45 **Conclusions and recommendations from the Expert thematic dialogue workshops: Research lines of mutual interest for future cooperation actions**

- Technology-enhanced learning: **Daniel Burgos**, *International University of La Rioja (UNIR)*
- e-infrastructure, **Georgios Tsakis**, *Digicel*
- Living Labs and ICT-based innovation models, **Esteve Almirall** *ESADE Business School*
- ICT for health, **Stavroula Maglavera** - CERTH – *Center for Technology Hellas*

Q&A

10.45 **Round table: how to increase the engagement of CA and Caribbean partners in future ICT research: Moderator: Fabio Nascimbeni, MENON network**

- **Paul Vossen**, *European Commission - DG R&I*
- **Fabrizio Gentili**, *Lazio Region - Italy*
- **Marcelo Jenkins**, *UCR Universidad de Costa Rica*
- **Jennifer Britton**, *CARICOM Secretariat*
- **Francisco Alarcón**, *CSUCA - Consejo Superior de Universidades de Centro America*

12.30 **Conclusions:**

Fabio Nascimbeni, *MENON network*
Monique Bossi, *APRE Coordinator of Enlace project*

2nd DAY Afternoon Session: informal brokerage workshops moderated by EUCARINET and ENLACE partners on:

- Technology-enhanced learning (moderated by **F. Nascimbeni**, EUCARINET)
- e-infrastructure (moderated by **S. Hidalgo**, ENLACE)
- Living Labs and ICT-based innovation models (moderated by **E. Christofilopuoulos**, ENLACE)
- ICT for health (moderated by **J. Arango**, ENLACE)