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Link and Evangelize the FI-PPP from Europe to the world for the benefit of FI research and innovation and to the European industry business

D2.1.1: Plan for engaging FI stakeholders (v1.0 – Public version)

Revision: v1.0

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Abstract	This deliverable presents the initial plan of FI-LINKS for engaging Future Internet stakeholders at international and European level.
Keywords	Engagement, International and European Stakeholders, Work Plan

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Disclaimer

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RE	Restricted to bodies determined by the Fi-Links project	
CO	Confidential to Fi-Links project and Commission Services	

[1] R: report, P: prototype, D: demonstrator, O: other

EXECUTIVE SUMMARY

FI-LINKS Deliverable 2.1.1 is the first version of the plan for engaging Future Internet stakeholders into roadmapping activities and "evangelization" and adoption of FIWARE, both at European regions and at international level.

The objectives of the engagement activities, that have been refined during the first few months of the FI-LINKS project, can be summarized as follow:

- The main objective of FI-LINKS with **highly developed countries** outside Europe is to **find the most efficient means to interact to the mutual advantage of both the EU/FIWARE and of the country**. In addition, FI-LINKS is also looking at **creating a common understanding and cross evaluate / validate our efforts in Future Internet** in general at worldwide level.
- The main objective of FI-LINKS towards **emerging economies** is to **encourage the set-up and deployment of FIWARE nodes and help mobilize the local ecosystem towards the adoption of the FIWARE technology** (e.g. through the set-up of FIWARE ecosystems including all relevant players such as public authorities, ICT clusters, accelerators, etc.).
- FI-LINKS is proposing an initiative to **set up "FIWARE Regions"**, under the form of a **"FIWARE Regions Programme"**. The main objective would be to **ensure the set-up and sustainability of a FIWARE ecosystem in selected European Regions through public and private investment at regional and local level beyond the current funding from the EC for the FI-PPP.** FIWARE Regions could then have more opportunities to access the regional funds available for innovation from the EU, including but not limited to Smart Specialisation Strategy related funds.

The main activities that are planned for FI-LINKS towards those objectives in the next few months are:

- With highly developed countries: identify the most relevant organisations and contact persons to liaise with, mostly via the experts involved in the FI-LINKS Advisory Board but also taking advantage of forthcoming meetings and workshops where representatives from international countries coordinate or participate (e.g. bilateral workshops); and keep discussing with them about the most efficient means of interacting with the objectives of either seeing FIWARE adopted in those countries or sharing best practices among communities.
- With Latin America: pursue contacts with Chile via the expert involved in the FI-LINKS Advisory Board and other LatAm representatives;
- With Africa: involve existing ecosystems moving around the ICT universities, particularly in Ivory Coast and Senegal. At policy level, establish contacts with the Ministry of Education and Ministry of Digital economy in those countries. Investigate opportunities in other African countries e.g. via the IST Africa 2015 conference.
- At European regions level: meet and then select the regions where there is interest to become "FIWARE Regions" and where the regional players have the ability to set-up a full FIWARE ecosystem. In addition, evangelization about FIWARE shall continue towards other European regions.

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ABBREVIATIONS

AB	(FI-LINKS Future Internet) Advisory Board
CAF	CONNECT Advisory Forum
Canarie	Canada's Advanced Research and Innovation Network
DAIR	Digital Accelerator for Innovation and Research (Canarie's Cloud Technology Programme)
DoW	Description of Work
EC	European Commission
EU	European Union
ETRI	Electronics and Telecommunications Research Institute of Korea
FI	Future Internet
FI-PPP	Future Internet Public-Private Partnership (of the European Union)
FP7	Framework Programme 7 of the European Union
KIAT	Korea Institute for Advancement of Technology
RoI	Return on Investment
SME	Small and Medium Enterprises
WP	Work Package

1 INTRODUCTION

The first objectives of the "Future Internet engagement" activities of the FI-LINKS project are twofold:

- Identify and start engaging the relevant stakeholders and players at European regional level and in countries beyond Europe with the aim to evaluate the establishment of the appropriate interaction with those regions and countries in terms of sustainable adoption of the FIWARE technology;
- Support the Future Internet roadmapping activities performed in Work Package 1 (WP1).

The FI-LINKS project has already successfully engaged a number of actions both at international level and at European regional level, making it possible to refine the objectives that had been described in the Description of Work (DoW). This document provides information on the revised plan for engaging the most relevant stakeholders.

Section 2 describes the revised objectives with respect to the original plan, which was included in the DoW, taking into account additional information and interactions that have happened in the first months of the FI-LINKS project.

Section 3 provides further details on the various stakeholders to be engaged.

Finally Section 4 shows the plan for engagement both at European regional and at international level, with a specific focus on the 1st year of the project i.e. until June 2015.

Note: this deliverable is released one month later than the date originally planned in the DoW. This was done voluntarily in order to take into account the latest information and outcomes from meetings that were held in the September-October time frame, making the plan more accurate.

2 MAIN OBJECTIVES OF THE FI ENGAGEMENT

2.1 Overall objectives of the FI engagement

The original objectives of the "FI engagement" were described in the FI-LINKS DoW as follow:

> *"The evangelization of FI-PPP to SMEs and web-entrepreneurs in Europe requires the endorsement and collaboration of different actors, going from the regional ecosystems, to the European and the international ones. These ecosystems will facilitate the exchange of knowledge and best practices between the FI-PPP and the extended FI community. To achieve its goals, FI-LINKS will establish a number of worldwide and local links around the FI-PPP to support the research and innovation around the Future Internet. Primary actors in the FI global picture will support FI-LINKS activities, a provide relations with relevant innovation and research activities in US, Japan, Canada, Latin America, as well as other countries if deemed relevant during the course of the project. Industries member of FI-LINKS consortium are FI-PPP leading actors and will support the engagement with EU enterprises.*
>
> *Regional actors will be involved through the Coalition for Action (CfA) ICT Regio initiative with the focus on FI-PPP. At the time of writing, the CfA includes contributions from 14 regions: Brittany (FR), Helsinki (FIN), Liguria (IT), Saarland (DE), Lombardia (IT), Valencian (SP), Trentino (IT), Euskadi (SP), Piedmont (IT), Catalunia (SP), PACA (FR), Baden-Wurttemberg (DE), Paris-IdF (FR) and Puglia (IT).*
>
> *Engagement will be crucial to support impact on communities through the identification potential adopters of FI-PPP technology. We already identified interest by Chile and Guatemala in that respect."*

During the first months of the FI-LINKS project, some adjustments were made to those original objectives. In particular, the following was taken into account:

- At international level, it was decided on the one hand to select first a few experts that could be part of the roadmapping activities of FI-LINKS WP1 within the "FI-LINKS Future Internet Advisory Board"; and on the other hand to concentrate on a few countries which would complement the internationalization activities already engaged by FIWARE, focusing primarily on Mexico and Brazil. More details are provided in section 2.2.
- At European regional level, it was agreed upon within the consortium and also with the EC to focus on a few selected regions that could become examples of deployment of FIWARE platform and set-up of a FIWARE ecosystem. We decided to call those regions "FIWARE Regions". More details are provided in section 2.3.

2.2 International engagement

The original objectives of the "FI engagement" at international level were described in the FI-LINKS DoW as follow:

> *FI-LINKS will engage the relevant stakeholders in the global context to foster a larger impact of FI-PPP. FI-LINKS will aim at engaging relevant players in US, Canada, Japan, Brazil, LatAm for roadmapping activities to bootstrap the community building actions foreseen in the project. In addition FI-LINKS will target inclusion of stakeholders from other potential adoption markets such as Latin America including especially Brazil and Mexico, in addition to Chile and Guatemala (as well as other countries if deemed relevant during the course of the project).*
>
> *The objectives include:*
> - *Identify and engage the relevant stakeholders and players in the third countries with a flexible approach to countries when deemed relevant during the course of the project.*
> - *Support the roadmapping activities performed in WP1.*
> - *Promote the wider adoption of the FI-PPP technology.*
> - *Support the adoption of the technology developed in the FI-PPP beyond Europe.*
> - *Import good practices from other FI players worldwide that could be beneficial to the FI-PPP and to*

European players.
- *Export European FI-PPP good practices into other countries for a mutual benefit.*

2.2.1 The "FIWARE Expansion Toolkit"

A preliminary "FIWARE Expansion Toolkit" has been defined in order to describe the rationale behind the internationalization of FIWARE.

The objective of this toolkit is to make sure that we ask ourselves the relevant questions before starting to engage actions towards international cooperation, and to provide means of reflections towards the activities that are planned to be held.

The preliminary toolkit is described below. It will be refined along the course of the FI-LINKS project. It shall be considered as an "internal toolkit" for the use of FI-LINKS and other FI-PPP projects engaged in the internationalization of FIWARE e.g. FI-CORE and XIFI.

Preliminary "expansion toolkit": reflections on FIWARE internationalization/expansion

1. Why international expansion beyond Europe is needed?

    1.1 ICT developments are global by nature –boundaries don't last much and only make things more complex
    1.2 Ultimately we seek to create a world-wide de facto standard
    1.3 By contrast, adoption implies engagement by an ecosystem, and ecosystems are local and don't always happen when and where we want them to
    1.4 If we want to succeed, we need to devote effort to act as catalysers
    1.5 The right actors - such as academic and research reputed names - can push towards standardization – there is a deep intellectual rationale behind FI-PPP and raising awareness can bring enthusiasts & evangelists on board
    1.6 Within industry and other key players, such as municipalities, awareness can create a real market pull
    1.7 Upon adoption, international companies from other countries can contribute to the richness of the platform and ecosystem, and thus creating an additional market push
    1.8 Try and add up all of the above to create a snowball effect
    1.9 Focus first on international markets were EU industry is already present, which could be described as more "natural markets"
    1.10 It is not without trade-offs: dilution of effort, danger of message distortion or overpromising by third parties, not being able to provide enough throughput to deal with the new context, and in the case of failing to engage, creating a bad reputation to the initiative
    1.11 In Summary: SWOT chart

2. Where should we address our efforts towards internationalization?

    2.1 Technological situation – striking the right balance between advanced economy with possibilities to make strategic ICT investments, and thus profit from FI-PPP, while still not having and over exploited ICT sector
    2.2 Economic prospects – in the very same regard as the above
    2.3 Support from local administration and geopolitical stability – leveraging our effort on the local administration, e. g. existing support to entrepreneurship
    2.4 Academic and research involvement – availability of a sound and developed research and university tissue as part of the ecosystem
    2.5 All of the above criteria should converge also in the form of a solid possibilities for clustering innovation ecosystems around ICT
    2.6 Ecosystems will bring EU companies, already working in FI-PPP, possibilities to take part in the new local opportunities
    2.7 Geographies within industry focus and reach – leverage on efforts already ongoing by the companies investing in FI-PPP – this is the case for Telefónica in Latin America, for Orange in Africa, etc.
    2.8 Geographies with the right size and connections to "export" the model, acting as a local hub for FI-PPP expansion - Magnifying effect – for example, we expect activities in Mexico, Brazil and Chile to inspire additional Latin America countries to join.

2.2.2 Objectives with respect to countries where "interaction" is foreseen

In a first stage, in line with the objectives described above, it was decided to focus on selecting a few high-level international experts who could be involved in the FI-LINKS roadmapping activities. Those experts were selected from the countries where "interaction" is foreseen, as opposed to "adoption" of FIWARE technology. The reason for this choice is that such countries are supposedly advanced in their Future Internet activities and may immediately contribute to the various roadmaps that are envisaged in WP1. The countries that were selected, out of the many potential experts listed at the time of the proposal and later by the FI-LINKS partners and their contact points in those countries, are the **US, Canada, Japan and Korea**.

The main objective of FI-LINKS with those countries is to **find the most efficient means to interact to the mutual advantage of both the EU/FIWARE and of the country**. In addition, FI-LINKS is also looking at creating a **common understanding and cross evaluate / validate our efforts in Future Internet** in general at worldwide level.

Preliminary discussions with e.g. Canada and Japan indeed confirmed, as was already described in the FI-LINKS DoW, that the FIWARE technology cannot just be "sold" or a FIWARE node set up in those countries, which have their own advanced technology and hence are reluctant to "just adopt" European technology. Therefore EU experts should discuss on an equal footing with the other countries, at technical, business, industrial and political level, for such an interaction to happen in conditions that will be acceptable to both sides – eventually leading to a probable mutual exchange of technology.

This objective is perfectly in line with the recommendations from the CAF (CONNECT Advisory Forum) which states the following: *"the CAF advices DG CONNECT to […] pursue and further develop the international dimension of ICT in Horizon 2020 along the lines of the current work program by […] partnering with countries that are recognized as major technological players for the next generation of products and services especially in areas such as networks and communications."* ([1] page 28).

2.2.3 Objectives with respect to countries where "adoption" is foreseen

Although the engagement phase was considered as being the next priority, it was also agreed upon to immediately start contacts with a number of relevant projects and initiatives focusing on countries with which interaction or adoption could be considered.

Given that Mexico and Brazil are already progressing with the local set-up of FIWARE ecosystems, FI-LINKS is focusing on the next countries in the list.

These include other **Latin American countries and in particular Chile**, where some preliminary discussions revealed that opportunities could arise sooner than other countries (besides Mexico and Brazil as already mentioned). In addition, there is strong interest from industry (Orange) toward **Africa**.

The main objective of FI-LINKS towards those countries is to **encourage the set-up and deployment of FIWARE nodes and help mobilize the local ecosystem towards the adoption of the FIWARE technology** (e.g. through the set-up of FIWARE ecosystems including all relevant players such as public authorities, ICT clusters, accelerators, etc.).

This has already successfully started in Mexico and is currently being attempted with Brazil. Such an approach could also work in other Latin American countries as well as in Africa, provided that there is sufficient interest from European industry on the one hand, and sufficient ecosystems willing to adopt the technology on the other hand, along with political willingness to make it happen.

This objective is perfectly in line with the recommendations from the CAF (CONNECT Advisory Forum) which states the following: *"the CAF advices DG CONNECT to […] pursue and further develop the international dimension of ICT in Horizon 2020 along the lines of the current work program by […]*

exploring the opportunities for mutually beneficial joint arrangements with emerging economies which offer opportunities to promote the adoption of European technological platforms (e.g. Future Internet FI-WARE) and develop new markets" ([1] page 28).

2.2.3.1 Rationale for FIWARE adoption in Chile

As already stated, Latin America has been already a "target" for FIWARE adoption, with Mexico and Brazil at the forefront. Other Latin American countries may be engaged in the near future (see more details in section 4.1.2).

In addition, the recent developments in Chile provide for a favorable context. Chile is the most developed country in Latin America. It is an advanced economy in transition to the first world, which brings opportunities to make strategic ICT investments, both in terms of adoption of technology as much as its economic possibilities.

This situation is recognized by the local administration, which is encouraging R&D centers establishment in the country. Chile's geopolitical stability guarantees to some extent that efforts are sustainable and consistent in time, and also guarantees that initiatives supporting several layers of the economical tissue will receive sustained backup (e. g. actions promoting entrepreneurship)

There is an established academic and research community, looking forward to be involved in transnational initiatives to maximize their impact, which integrates seamlessly in the ecosystem tissue, completing sound ICT innovation clusters.

All of the above make Chile the most "European country" in Latin America, likely to become the "FIWARE's spearhead" for expansion into Latin America.

2.2.3.2 Rationale for FIWARE adoption in Africa (Ivory Coast, Senegal)

The Orange Group operates in several African countries and is interested to set up such a platform as FIWARE in order to help local developers to create innovative applications thanks to FIWARE enablers provided in IAAS/PAAS mode in particular.

Orange already experimented with a platform called "Emerginov" in Senegal and Ivory Coast. An overview of this platform can be found in Appendix B.1.

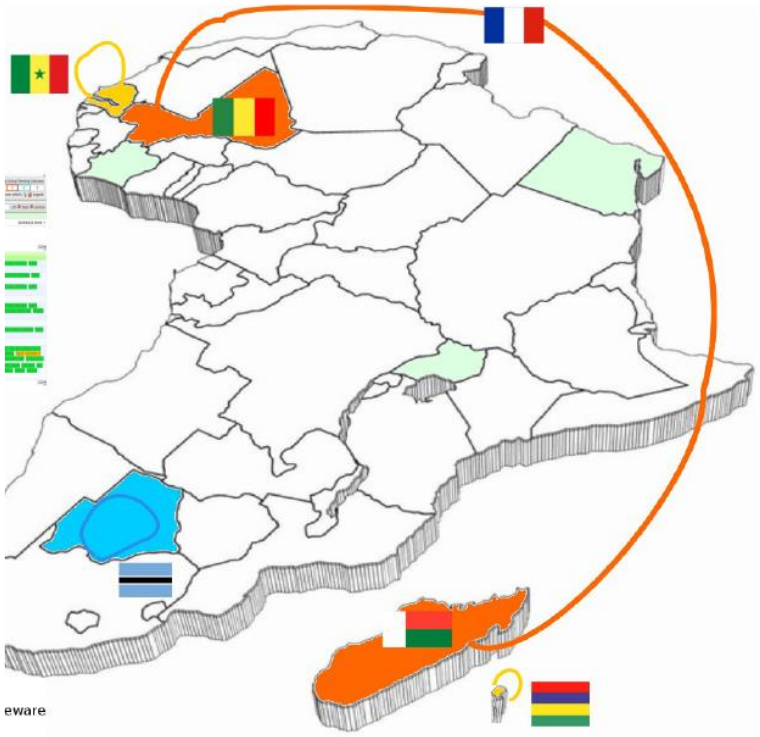
Emerginov has already helped set up several African communities:

- Emerginov Cameroon - G.E.Kouamou (LIRIMA)
- Emerginov Côte d'Ivoire - F.Youzan (Africaworkers)
- Emerginov Mali - I.Fadiga (Yɛlɛman)
- Emerginov Senegal - C.Tidiane Diop (Sonatel) & L.Ahouansou (MobileSenegal, SenMobile)
- Emerginov Togo - E.Alomatsi (WɔɛLab) & E.Amemassovor (WɔɛLab)

Orange has already installed the Emerginov platform as an open source solution. It is usable by anyone, and the existing ecosystem in sub-Saharan countries (Benin, Cameroon, Mali, Ivory Coast, Senegal, Togo) already exists.

Platforms are already installed in Senegal, in Ivory Coast, in Mauritius and in Botswana and gateways have also been installed in Mali and Madagascar.

Today, more than 400 developers are registered, more than 100 micro applications have been developed, more than 10 hackathons gave been organised.



Emerginov has been and is used to support several projects in Africa

Research projects

Projects, with partners

Widget quiz (2012)
(Unicef, Senegal)

Voices (2011)
(Web Foundation, TNO, SahelCo,.. EU project) / Mali, Senegal)

Content project Niger (2012)
(AFD, Orange foundation/ Niger)

Widget birth declaration (2011)
(NGO Santé&Action, Health minister/Senegal)

Market place (2012)
(Ilab Cairo/Egypt)

Basic Wolof voice recognition (2011)
(ESMT/Senegal)

Webradio API(2012)
(University of Botswana)

Medicines management (2012)
(Pharmacie Humanitaire, Senegal)

E-education IFADEM (2012)
(AUF, AFD/Madagascar)

Hackathlon (2012)
(LIRIMA/Cameroon)

Geolocation (2012)
(UCAD/Senegal)

Service creativity sessions (2012)
(Orange Botswana, University of Botswana)

Codecamp orange Expo 2010 &2011
(MT, Mauritius Universities)

Orange Money web API
(University of Technology of Mauritius)

Commonwealth Telecommunication organizations event (2012)
(MT, Universities of Mauritiues)

Low-cost USSD enabler (2011)
(University of Technology of Mauritius)

Figure 1: Emerginov in Africa

The FIWARE platform has similar objectives and proposes additional enablers that could complement the existing Emerginov platform. There is a strong opportunity to reuse the communities already involved in Emerginov initiative and also to extend this to other African countries.

Although adoption of FIWARE may be possible as such in some cases, adaptation to the local market may be required to better fit African needs. Here again the recommendations from CAF are relevant and shall apply: *"the CAF advices DG CONNECT to […] pursue and further develop the international dimension of ICT in Horizon 2020 along the lines of the current work program by […] giving also consideration to developing countries (Africa, ASEAN) which constitute the markets of the future but also offer unsuspected opportunities to redefine the use of ICT in a context of frugal resources, hence driving innovation"* ([1] page 28). In this sense, Africa could also lead to renewed innovation for FIWARE.

In 2015, the Commission will open a specific call ICT39 to fund projects with African countries. This could prove to be an opportunity to support the establishment of FIWARE ecosystem by offering FIWARE platform to the projects that will be selected in this call, as a concrete case of cooperation between the EU and Africa.

In conclusion, Africa faces rapid urbanisation and as its population continues to grow unabated, more and more people are moving to cities every single day. As urban development continues, cities need to become 'smart cities'. To handle large-scale urbanisation, city officials are under pressure to find new ways to manage complexity, increase efficiency and improve the quality of life for the many citizens living in formal and informal settlements.

According to the output of the conference "SMART Technologies for municipal sustainability" organised by Santander, FMDV and UN in July 2014, a platform dedicated to the smart technologies solutions that allow a better access and management of local financial resources has been created[2]. It seems that Abidjan and Dakar should be candidate for smart cities initiatives.

African countries already have developers' ecosystems well educated to develop application on PASS/IAAS platforms thanks to Emerginov initiative.

There is a strong opportunity to extend the existing ecosystem with FIWARE in order to help Africans to develop new innovative applications answering their needs.

The international engagement activities of FI-LINKS are a means to study the opportunity for European companies such as Orange and others to operate an innovative cloud platform and ecosystem in sub-Saharan African countries.

Having Orange already well established relations with Ivory Coast (Abidjan) and Senegal (Dakar), we will first target these two countries. More information can be found in Appendix B.2 and B.3. Other countries could be targeted later.

2.3 European engagement

The original objectives of the "FI engagement" were described in the FI-LINKS DoW as follow:

> *FI-LINKS will engage the relevant stakeholders in EU regional context to foster a larger impact of FI-PPP. In Europe, FI-LINKS will purse the engagement of the national ICT clusters and other relevant actors who could mobilise developer communities and smart solutions adopters in each country, via the regions included in the Coalition for Action, and other relevant stakeholders identified in FI–LINKS as potential supporters of the FI-PPP.*

As already stated in section 2.1, it was agreed upon within the consortium and also with the EC to focus on a few selected regions that could become examples of set-up and deployment of FIWARE.

[2] Cf. http://www.uclg.org/fr/node/22461.

FI-LINKS is proposing an initiative to **set up "FIWARE Regions"**, under the form of a **"FIWARE Regions Programme"**. The main objective would be to **ensure the set-up and sustainability of a FIWARE ecosystem in selected European Regions through public and private investment at regional and local level** beyond the current funding from the EC for the FI-PPP. FIWARE Regions could then have more opportunities to access the regional funds available for innovation from the EU, including but not limited to Smart Specialisation Strategy related funds.

The "FIWARE Regions Programme" complements other FIWARE related initiatives:

- The initiative of the I3H project to set up a network of 15 "Internet Innovation Hubs" (I3H)[3] is looking primarily at mobilizing local communities to "speed up the transformation of FIWARE results to services and applications addressing the needs of European citizens, companies and society", while FI-LINKS will be focusing on making sure that there are means to ensure the sustainability of FIWARE at regional level once the FI-PPP is over, i.e. beyond the EC funding.
- The Future Internet Forum (FIF) of the Member States has been involved since the inception of the FI-PPP in order to promote the adoption of FIWARE at national level. We were recently informed that there are national programmes that were launched in line with such an objective[4]. FI-LINKS is focusing on European regions –and whenever relevant will involve the national authorities as well.

In FI-LINKS we will develop a strategy following three different steps and distinguishing three kinds of regions:

1. Regions that are not aware of FIWARE and the programme or have just some knowledge about the existence of the programme: our intention will be to create a higher awareness and evangelise the FIWARE word there.
2. Regions with basic FIWARE knowledge or with some experiences, but where FIWARE is still not reality (no active promotion, no FIWARE adoption…): we will stimulate and support them to adopt FIWARE for their innovation strategy, and to do active promotion.
3. Regions where FIWARE is a reality (active in promotion, with a FIWARE node, thinking in what to do with FIWARE in their region…): we will support the alignment between local innovation and the programme, so as to maximise the use and deployment of FIWARE in such regions.

The first selected regions include some regions that were particularly active during the first phase of the "Coalition for Action ICT Regio initiative", i.e. **Brittany (France), Helsinki (Finland), Lombardy (Italy), and Catalonia (Spain)**. Experts from those Regions were invited to join the FI-LINKS FI Advisory Board.

In addition, other regions are being targeted, using the following criteria:

- Regions which have declared ICT as one of the main subject for Smart Specialization Strategy.
- Regions which have been identified as European ICT Pole of Excellence (EIPE).
- Regions which are already involved in FI-PPP:
  - FIWARE Lab node deployed. Those regions include nodes being set up within FIWARE/FI-CORE and infrastructures from (or associated with[5]) the XIFI Project.

[3] Cf. "Open Call Announcement" section at http://www.fi-ppp.eu/i3h/.

[4] "Two Member States have launched national ICT initiatives which make reference to the Future Internet – Public-Private Partnership (FI-PPP) results or to FIWARE: (1) Germany: "Smart Service Welt" (Smart Service World), a programme with a 50 million Euro budget. (2) Austria: "IKT der Zukunft" (ICT of the Future), this is the 3rd call of this programme and it has a budget of 8.75 million Euro. […] Although there is no mandatory use of FIWARE foreseen in these initiatives, it is a significant step forward to see these first Member State initiatives that explicitly mention the use of FI-PPP results or FIWARE. It is encouraging and we expect them to soon be followed by others." Posted by Ragnar Bergstrom (EC) in FIWARE Basecamp on 22 October 2014.

[5] Some infrastructures which are not formally part of the XIFI Project are asking to be part of the "FIWARE Lab Federation of Infrastructures" and may eventually become "FIWARE nodes".

  - Large phase 2 experiments. Those regions host large trial to experiment FIWARE technology through a FI-PPP Trial.
  - Accelerator. Those regions host a partner involved in the FIWARE acceleration programme.
- Regions that have an active ICT cluster able to reach and activate a strong SME ecosystem.
- Regions which are at the top of the ICT in Europe (cf. Appendix A.5 "ICT Regio Ranking") with their ICT ecosystem and also usually involves strong ICT Clusters.

At this stage contacts have been initiated with Brittany, PACA and Paris Ile de France in France[6], Berlin and Baden-Wurttemberg in Germany, the Basque Country in Spain, as well as Poland, Ireland, and Czech Republic. For the three latter countries, discussions are happening in order to decide whether a national or regional approach is the most efficient means to set up a "FIWARE Region".

[6] A common meeting with FI-CORE and I3H also happened with the Picardie Region in France.

3 IDENTIFICATION OF THE FI COMMUNITIES & ECOSYSTEMS

The partners from the FI-LINKS Project had already established at the time of the DoW a list of potential experts and organisations that could be contacted at European and international level. Those lists were refined and complemented with additional experts and organisations (cf. Appendices A.1, A.2 and A.3). A first analysis of the most prominent European ICT Regions was also performed, in line with the criteria to select the first potential "FIWARE Regions" already described in section 2.3 (cf. Appendix A.5 ICT Regio Ranking).

3.1 FI-LINKS Future Internet Advisory Board

The FI-LINKS project has set up a "FI-LINKS Future Internet Advisory Board". The role of the Advisory Board members is to participate in the FI-LINKS Future Internet roadmapping activities, and to ensure promotion and mutual know-how transfer to/from specific European regions and 3rd countries not directly involved in the FI-LINKS consortium, of the FI-PPP initiatives and related Future Internet innovation activities worldwide.

The Advisory Board groups selected European regions representatives and prominent experts from 3rd countries not included in the consortium of FI-LINKS. It is supervised by the Advisory Board Manager.

The first objectives of the Advisory Board have been defined as follow:

- Support the Future Internet roadmapping activities performed in Work Package 1 (WP1);
- Identify and start engaging the relevant stakeholders and players at European regional level and in third countries with the eventual objective of establishing the appropriate interaction with those regions and countries in terms of Future Internet cooperation (and potential adoption of the FIWARE technology in those countries when relevant and/or of technologies from those countries into Europe).

In this respect it was decided to hire first experts coming from countries where Future Internet activities are already advanced so that the experts could actively contribute to the roadmapping activities, as already stated in section 2.1. The following international experts have been selected (in alphabetical order):

- **Heeyoung Jung from ETRI, Korea**. Dr. Jung was selected further to contacts with KIAT and ETRI as the most relevant person to be involved. Dr. Heeyoung JUNG joined ETRI in 1991 and is currently responsible for ID based networking section. He has been the leader of a couple of Future Internet Architecture projects funded by Korean government, such as IdNet and MOFI. He is currently participating in an EU FP7 project, SmartFIRE, as the representative of ETRI. As collaboration activities with EU, he has also participated in a couple of EU research project proposals (FP7 ORION, Horizon 2020 SODIUM) with many EU organizations.
- **Alberto Leon-Garcia from University of Toronto, Canada**. Dr. Leon-Garcia participated in a couple of years ago in a FIRE Board meeting and was also recommended by the CTO of Canarie to represent Canada in the FI-LINKS Advisory Board. Alberto Leo-Garcia is a professor in Electrical and Computer Engineering at the University of Toronto and holds a Canada Research Chair in Autonomic Service Architecture. His research interest is in adaptive resource management using virtualization and service-oriented approaches in very large-scale systems of various types: application platforms, for future connected vehicles, in smart grids, management and control algorithms.
- **Glenn Ricart from U.S. Ignite, USA**. Glenn Ricart was already approached by FI-LINKS at the time of the proposal drafting as he is one of the most distinguished experts in the field. Glenn is the founder and CTO of U.S. Ignite. Glenn Ricart brings forty years of innovation in computer networking and related fields to US Ignite. His is an Internet pioneer who implemented the first Inter-net interconnection point (the FIX in College Park, Maryland) and was recognized for this achievement by being inducted into the Internet Hall of Fame in August 2013.

- **Nozomu Nishinaga from NICT, Japan**. Nozomu Nishinaga was already approached by FI-LINKS at the time of the proposal drafting as he is one of the most prominent expert in the field and is also a good connoisseur of EU-Japan cooperation. Nozomu Nishinaga received his B.S. and M.S. in Electronics Engineering, and his Ph. D in Information Engineering from Nagoya University, Japan. From 1999 to the present, he has been a researcher with National Institute of Information and Communications Technology (formerly, Communications Research Laboratory). Since April 2011, He is director of New Generation Network Laboratory, Network Research Headquarters. His current research interests include future internet architecture and wireless communications. He is a member of IEICE.

In addition, it was decided to involve experts from selected European regions who were most active in the "Coalition for Action". Those experts are:

- **Giacomo Piccini,** regional development agency and cluster coordination, Lombardy Region Delegation to the EU (Italy).
- **Sergi Marcen Lopez,** ICT-Mobile Industry Development Manager and head of international affairs & projects, Generalitat de Catalunya (Spain).
- **Sylvie Monfort,** Project Manager IT, Networks and Media, Bretagne Développement et Innovation (France).
- **Taina Tukiainen,** Responsible for digitalization in the regional innovation ecosystems, Aalto University (Finland).

Finally, as explained in section 2.2, an expert from Chile was also invited to start reflections on the potential set up of a FIWARE node in this country:

- **Daniel Contesse from UDD, Chile**. Daniel had already been identified at the time of drafting the proposal as the most relevant expert to engage with Chile. Daniel Contesse is an Industrial Engineer, Vice President for Innovation and Development at Universidad del Desarrollo, Chile. He holds a Master of Science in Management from Stanford University and a Master of Science in Industrial Engineering from the Georgia Institute of Technology. He is a professor of "System Optimization" at the School of Engineering of the same university. His business career has been related to the development of business and entrepreneurship as a founding partner of an investment fund from which he is the chairman and as President of the UDD accelerator.

3.2 Relevant international stakeholders and players

Besides the experts involved in the Advisory Board, a number of other organisations and related individuals have been identified as contact points, in line with the objectives highlighted in section 2.2.

The organisations and individuals identified as potential contact points for engaging with their countries are listed in Appendix A.2. Those people may be contacted by FI-LINKS when this sounds relevant during the course of the project.

When it comes to interacting with the countries mentioned in section 2.2.2 and 2.2.3, the engagement will be done mostly with the experts from the Advisory Board. In Canada, Canarie/DAIR remains also a relevant contact organization. For Africa, and in particular for Ivory Coast and Senegal, the first contact people would be G.E.Kouamou (LIRIMA) at Emerginov Cameroon, and F.Youzan (Africaworkers) at Emerginov Côte d'Ivoire.

In addition, the following projects and initiatives have been identified as good source of interaction towards our objectives at international level:

- **Latin America**: the **CONECTA2020** project (http://www.conecta2020.eu/) is an INCO project trying to strengthen interaction between Europe and LatAm via Technology Platforms. FI-LINKS is planning to interact with this project as they have the ability to mobilize ICT ecosystems potentially interested in FIWARE in many Latin American countries (Mexico, Costa, Rica, Peru, Uruguay, Colombia, Brazil...).

- **Japan:** The Japan-EU Partnership in Innovation, Science and Technology (JEUPISTE) project is engaged in several activities to reinforce Europe-Japan cooperation in different areas of interest through support to policy dialogues, deployment of bilateral information services, organisation of networking events focusing on specific technologies and/or societal challenges, operation of help desk services and contribution to the development of human resources for collaborative projects. FI-LINKS was invited to their first innovation workshop, named "Smart Communities in a broader term[7]. Throughout the event was remarked how relevant such international cooperation is in order to find similarities, and to establish a common strategy with 2020 as objective.

  FI-LINKS also attended the EU-Japan Symposium organized in Brussels on 16-17 October 2014[8]. Several examples were presented of EU and JP social CT pilots that demonstrated complementary technologies, approaches and application domains in social ICT pilots. From EU side, the Future Internet PPP was highlighted, in particular the FIWARE platform which is offering so-called generic and specific enablers (open source software components and tools) to developers and users for developing and validating dedicated ICT applications in a range of social domains. Examples of the usage of big data and benefits for smart cities were presented, as well as the use of the platform for e-health applications. Another presentation highlighted the use of the FIWARE platform to create an innovation ecosystem called FIWARE Lab bringing together developers and users in city environments in Amsterdam, The Netherlands.

  From the Japanese side, emphasis was on several platforms that were developed to make use of Big Data and address societal challenges in areas such as health and assisted living (e.g. a Life Management Platform developed by NEC) and mobility management services based on interactive visualisation of data and moving objects e.g. passenger flows. Also, it was presented how phased array radar systems are used for Big Data applications in monitoring extreme weather hazards for the use of disaster protection. Another presentation highlighted the Social Open Big Data platform for creating open smart cities (SODA) and real-time city management, which addressed several issues in sensor systems and context-based real-time participatory sensing as well as in big data analytics and the integration of cyber-physical systems.
  Based on this, it can be concluded that both EU and JP recognize the role of ICT role for resolving social issues and the need for further developing platforms and conducting experimental research and pilots. There is a clear joint interest in application domains such as smart cities, mobility and transport, the use of Big Data, the potential of ICT for supporting social life, health and assisted living, energy efficiency, weather observation and disaster protection. The presentations from both sides highlighted joint interest in platform developments and open big data for social applications: the EU presented the FIWARE service Platform and FIWARE Lab as innovation environment, whereas Japan promoted the "Wireless Sensor Platform", "Life Management Platform", and "Open Big Data platform". One of the possibilities would be to identify similar software components examples that were mentioned were “event analysis” and “profiling service”).

  The final discussion identified several concrete areas of future collaboration:

  - Mutual use and exploitation of platforms: EU: FIWARE service platform, Japan: Sensor platform / big data platform etc.
  - Explore collaboration in open (big) data platforms for smart cities, including the development and integration of sensor systems and cyber-physical systems.

[7] http://www.jeupiste.eu/events/jeupiste-IWS-No1.

[8] http://www.ict-fire.eu/events/past-events/5th-eu-japan-symposium-in-ict-research-and-innovation.html

- Explore collaboration in particular social challenges. For example in Mobility management: comparison of transportation services, applying database and visualisation techniques to sensor systems, but also driver behaviours comparison, and investigating the role of cultural differences.

It was agreed to set up a joint working group to investigate complementarities among platforms, e.g. FIWARE, wireless sensors, and social big data. It was recommended to identify shared societal challenges and the use of platforms, for example starting an exchange on ICT for health (FI-STAR and Life Management Platform) and on Smart City applications.

- **Africa**: there are several INCO support actions targeting at least partially Africa, that could be of interest to FI-LINKS and FIWARE expansion:
  - **MOSAIC** (http://www.mosaic-med.eu/index.php/en/) has the objective to setup Technology platforms in several Mediterranean countries.
  - **Med-Dialogue** (http://www.med-dialogue.eu/) is identifying the Strategic ICT Priorities and is developing ICT policy recommendation for ICT Research and Innovation for the Mediterranean Partner Countries,
  - **ClusMed** (http://clusmed.eu/) is mapping the National ICT Regulations in 5 Mediterranean Countries (Algeria, Egypt, Lebanon, Morocco, Tunisia) and benchmarking them with European countries status, experiences and best practices,
  - **IST-Africa** (http://www.ist-africa.org/home/) is an INCO project organising Participatory Training Workshops in Partner Countries focused on Living Labs (supporting Research, Innovation and Entrepreneurship) and opportunities for International Research Cooperation including Horizon 2020.

No contact has been taken yet with those projects as they are not targeting the countries defined as priorities at this stage by FI-LINKS.

3.3 Relevant European regions stakeholders and players

Besides the regions already stated in section 2.3, some contacts have also been established with representatives from other regions.

The following table summarizes the organisations and the contact persons:

Region	Country	Contact	email	Organisation
Restricted information due to privacy policy				

Table 1: European regions organizations and contacts

In addition, the following projects and initiatives have been identified as good source of interaction towards our objectives at regional level:

- eDIGIREGION (http://www.edigiregion.eu) is essentially focused on implementing the ICT Research aspects of The European Digital Agenda in the regions through collaboration between triple helix stakeholders (gov. research and industry). They will be developing Joint Action Plans based on each region's smart specialisations in the ICT area. The project started in April and will run for 3 years, funded under the Regions of Knowledge programme in FP7. FI-LINKS is planning to interact with this project as they are looking at several European regions in relation with S3.
- The European Cluster Observatory

(http://www.clusterobservatory.eu) is financed under the Competitiveness and Innovation Framework programme (CIP) which aims to encourage the competitiveness of European enterprises. The work is contracted by Enterprise and Industry Directorate-General of the European Commission to VDE/VDI-IT GmbH and is supported by well-known partners like Technopolis Group, the Center for Strategy and Competitiveness of the Stockholm School of Economics, Orkestra, Inno TSD and the communication agency TIPIK. The main purpose of the project is to share best practices between clusters in order to promote innovation. FI-LINKS is planning to interact with this project in order to identify contact persons in the most relevant European ICT Clusters, and possibly to promote FIWARE to Clusters and regions not yet identified as potential "FIWARE Regions".

Contacts have already been initiated with both projects. It looks like there could be some good interaction in particular with eDIGIREGION which shares some of the objectives of FI-LINKS.

4 PROPOSED WORK PLANS FOR THE ENGAGEMENT ACTIVITIES AT EUROPEAN AND INTERNATIONAL LEVEL

4.1 Proposed work plan – International

4.1.1 FIWARE Expansion Toolkit

A preliminary "FIWARE Expansion Toolkit" has been defined and suggests the possible action plan as follows. As already stated in section 2.1.1 the objective of this toolkit is to make sure that we ask ourselves the relevant questions before starting to engage actions towards international cooperation, and to provide means of reflections towards the activities that are planned to be held. It will be refined along the course of the FI-LINKS project. It shall be considered as an "internal toolkit" for the use of FI-LINKS and other FI-PPP projects engaged in the internationalization of FIWARE e.g. FI-CORE and XIFI.

FIWARE preliminary expansion toolkit: plan for international deployment

1. How should we plan the International deployment?

    1.1 Acting as a catalyser: shape the ecosystem and let it stand on its own
    1.2 Once the local ecosystem is up and running, there will be room for engaging more actors from European and external geographical locations for added thrust.
    1.3 Different types of stakeholder require different approaches. More specifically, the implication of local authorities should be planned first given its deep imbrication with the research, academic, industrial tissues of the countries.
    1.4 The early implication of local authorities can maximise the media impact and foster the attraction of the other players.

2. What are the execution efforts, costs and trade-offs?

    2.1 European implication:
        2.1.1 Industry
        2.1.2 SMEs
        2.1.3 Research / Academy
        2.1.4 European Commission

    2.2 Local implication:
        2.2.1 Public Authorities
        2.2.2 SMEs, Start-ups, entrepreneurs
        2.2.3 Local Academy and Research

3. What KPIs & metrics can we use to check whether the success level is in line with our ambitions?

    3.1 Evaluation of prospects for a Go / No-Go
    3.2 Determining RoI
    3.3 Success & opt-out thresholds
    3.4 Feedback, analysis and learning along the experience

4. Conclusion notes

    4.1 Expansion will happen naturally with or without FI-LINKS as a consequence of a global market and will be a sign of a successful programme
    4.2 We believe the opposite is also true, if properly promoted, the expansion can help the programme be more successful
    4.3 We expect feedback to this document from the commission, but furthermore, we expect the commission to allow us and encourage us to work in the lines here defined

4.1.2 Next steps for international engagement

The first activities of the FI-LINKS Advisory Board will be dedicated to roadmapping activities with a meeting planned on 12 November. The international experts will be asked however to attend the FUSECO Forum FI-PPP International Workshop on 13 November and will be requested to report on their first thoughts about FIWARE potential adoption in their country / potential interaction with their country. A second stage of their contracts focusing more on such adoption or interaction is planned for the first half of 2015 and will be detailed early 2015, based on the outcomes of the 1st stage contract which has started and will last until end of 2014.

The main activities that will be held in the coming months at international level are therefore as follow:

- For US, Canada, Japan and Korea: identify the most relevant organisations and contact persons to liaise with, mostly via the experts involved in the FI-LINKS Advisory Board but also taking advantage of forthcoming meetings and workshops where representatives from such countries coordinate or participate (as was already done with the EU-Japan Symposium for Japan and JEUPISTE workshop); and keep discussing with them about the most efficient means of interacting with the objectives of either seeing FIWARE adopted in those countries or sharing best practices among communities.
- For Latin America: pursue contacts with Chile via the expert involved in the FI-LINKS Advisory Board and the people from LatAm Technology Platforms whom we will meet via the CONECTA2020 project;
- For Africa: Emerginov has been partly funded by the European Commission in the FP7 work program, the VOICE project also funded by the European Commission has developed a set of services based on Emerginov platform and there is a good opportunity to set up and deploy the FIWARE platform in a similar manner as was done with Emerginov. To do so, there is a need to involve existing ecosystems moving around the ICT universities. At policy level, there is a need to establish contacts with the Ministry of Education and Ministry of Digital economy in countries that we are willing to target. As far as Orange is also operating in Ivory Coast and Senegal, we can propose to establish contact with these ecosystems. In addition, IST Africa 2015 conference is organised in Lilongwe, Malawi and there is a specific event: the 5th Living Labs Working Group Meeting which could help at identifying other African countries interested to join.

4.2 Proposed work plan – European regions

The European regions experts involved in the FI-LINKS Advisory Board have already been requested to update the "Coalition for Action" document for the section related to their regions. This will be discussed at the meeting planned on 12 November in Berlin. They have also been asked to attend the FUSECO Forum FI-PPP International Workshop on 13 November and will be requested to report on their first thoughts about FIWARE potential adoption in their region.

FI-LINKS is currently organizing meetings with the relevant regional representatives listed in section 3.3 i.e. regional authorities (including but not limited to people involved in S3), ICT Clusters, existing FIWARE Lab nodes, in order to discuss about the opportunity for the region to become a "FIWARE Region" and check willingness from the players to be involved together in such a programme. The objective of FI-LINKS is to bring regional (and/or local and/or national) public authorities around the table also with other potential sponsors/investors - e.g. clusters able to mobilize ICT/SME ecosystems - and then see how much interest there is and if there is how FI-LINKS can support the process for setting up a FIWARE ecosystem. Interactions with projects and initiatives such as eDIGIREGION may help for some regions.

In addition to FI-LINKS regional experts and meetings already planned with three French regions, there are a number of potential regions that we should investigate.

The idea is to define a methodology with a small number of regions and then to extend to all relevant European regions where we have identified an adequate/relevant ecosystem.

The draft methodology that we want to share and to enhance with the first regions is based on the following

steps:

1- Identify the key regional policy and business people and check their interest of setting up a sustainable FIWARE platform with potential regional funding's.

2- Qualify the ecosystem in terms of SMEs in the ICT domain and academics using clusters

3- Identify the structure/organisation able to host and to operate the FIWARE platform

4- Define the business model of such a service including the cost of the implementation and also the cost of the exploitation and maintenance (including hot line)

5- Propose an opportunity document and share it with the parties

6- Get the engagement/commitment and the signature of parties.

General note related to section 4: FI-LINKS deliverable D4.2 "Dissemination and promotion plan" is presenting and defining concrete actions and dedicated tools which are consistent with the activities proposed in this document D2.1.1. Activities foreseen in WP4 (Dissemination and promotion) such as specific events, targeted workshops, strategic conferences, promotion and advertisement will enable to promote our objectives and to reach and engage relevant stakeholders and players.

REFERENCES

[1] **H2020 ICT R&D&I beyond 2015**. Position paper reflecting the advice provided by the CONNECT Advisory Forum on the orientations for ICT research and innovation in the Horizon2020 for the programming cycle starting in 2016. *CONNECT Advisory Forum.* http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?action=display&doc_id=7050 (document), http://ec.europa.eu/digital-agenda/en/connect-advisory-forum (CAF).

APPENDIX A

Appendix A.1 FI-LINKS Advisory Board – List of invited experts

Name	Country	Organization	Email	Position / Comments
Restricted information due to privacy policy				

Table 2: FI-LINKS Advisory Board – List of invited experts

Appendix A.2 List of International Experts

Name	Country	Organization	Email	Engagement	
				Adopting FI-WARE	Potential cooperation
Restricted information due to privacy policy					

Table 3: List of International Experts

Appendix A.3 List of European Experts

Name	Country	Organization	Email	Engagement	
				Adopting FI-WARE	Potential cooperation
Restricted information due to privacy policy					

Table 4: List of European Experts

Appendix A.4 European Clusters-Associations

Name	Description	Sector	Country	Region	Contact name
Restricted information due to privacy policy					

Table 5: European Clusters-Associations

Appendix A.5 ICT Regio Ranking

Country	Region	ICT Cluster	RIS3	EIPE	FI-PPP	Total	Contact
Restricted information due to privacy policy							

Table 6: ICT Regio Ranking

APPENDIX B

Appendix B.1 Overview of the Orange "Emerginov" solution deployed in Africa

The Emerginov solution (http://www.emerginov.org) consists in a PHP toolkit to quickly develop mobile micro services. A micro service is a simple mobile service bridging mobile users to the richness of the Internet. The Emerginov solution is not an application shop but can be considered as an operator back end API shop. It concentrates in one place the web hosting, the database storage, the Telecom access API (e.g. SMS) and the media server. The developers can create Telco-web services over the top of the local operators by coding few lines of PHP. Originally Emerginov had been designed to help developers in emerging countries. The idea was to provide an all-in-one toolkit to develop vocal kiosk, web and SMS based services.

The Emerginov project was born in Orange laboratories in 2010. The decision to open the code was taken in 2012. Emerginov integrates a code repository system (SVN) but it is not a simple forge. In fact, it is possible to automatically deploy the services from the repository on a server. Through a self-care portal, a developer would be able to ask for resources. Once validated by the local administrator, the environment is automatically created and all the required credentials are provided to the developer. A VoIP system including a media server is also integrated so it is possible to test quickly the vocal services from VoIP clients.

The architecture has been designed to provide the opportunity to connect the VoIP core system to external gateways. Emerginov allows the creation of

- web services
- vocal kiosks
- SMS-based services
- mash-up services

Emerginov is not a mobile application shop solution. It provides back-end resources (Web Hosting, Database), vocal services and Telecom bearers through APIs.

Appendix B.2 The case of Senegal

Several academic entities such as the University of Technology of Mauritius, ESMT or UCAD in Dakar already contributed to the evolution of the Emerginov solution and constitute the seeds of the community.

Sonatel, one of the Orange Group Subsidiary, is operating in Senegal and has the objective to help young developers to make new businesses using Orange platform.
In 2013 and 2014, Sonatel has open the Emerginov platform which offers a few enablers such as SMS/MMS and clic2call and has organised several events (Hackathons) in order to push students and young developers as well as SMEs to develop innovative services.
These initiatives has been done in close relationship with the Senegal Minister in charge of education and digital economy which shows that there is a strong political interest to push such initiatives (more information in Appendix B.1 Senegal Case).

ICT in Senegal

Located 5h Europe, Senegal is a country of openness. Political stability, coupled with various structural reforms undertaken by public authorities has allowed Senegal to get a spot on the international ICT market in general and outsourcing in particular.
The Senegal is positioned as a leader in Africa in ICT. During 2006-2010, the country was able to gradually reduce the digital divide, thanks to a 100% digital network, good penetration of mobile phones (76.84% in December 2011 and 94.24% in December 2012), an extension of the territorial coverage of the various telecommunications networks and a steady decline in the entry ticket accompanied campaigns regular promotions of the various operators.
Phone operators have invested heavily in the sector. From the outset, Sonatel has launched an extensive program 1993-2010; TIGOP which began operations in 1999 invested 6.3 billion FCFA which CFAF 4.2 billion in infrastructure. In 2009, they amounted to FCFA 125 billion with the arrival of Expresso, a new operator (Please see Appendix B.1 Senegal Case for a more detailed analysis on the ICT in Senegal).

Forum de l'innovation : Sonatel trace le chemin du numérique pour les jeunes

vendredi 28 mars 2014

Avant-hier, 26 mars, la Société nationale de télécommunication (Sonatel), a procédé à l'organisation du forum de l'innovation sous la présence du ministre de la Communication et de l'Économie numérique, Cheikh Bamba Dièye. Ce forum, dénommé « Code camp Emerginov@Sonatel » a permis à la société de télécommunication de susciter l'esprit d'entreprenariat qui sommeille en chacun des universitaires.
La première édition du forum de l'innovation « Emerginov » s'est déroulée avant-hier, 26 mars à l'université Cheikh Anta Diop de Dakar(Ucad) 2. Ce forum a noté la présence la présence du ministre de la Communication et de l'économie numérique, Cheikh Bamba Dièye.
L'Emerginov est une plateforme multimédia régionale, ouverte et mutualisée, intégrant un portail vocal interactif. Elle vise, comme le rappelle son Directeur Alioune Ndiaye : « A tester des micro-services Telecom/web pour faire de la co-innovation avec l'ensemble des acteurs des technologies de l'information et de la communication (Tic), les universitaires et développeurs indépendants ».
Le ministre de la Communication et de l'économie maritime, Cheikh Bamba Dièye, a rappelé l'importance que lui et le Président de la République du Sénégal accordent à l'innovation et à la recherche surtout en matière de technologie. Parce que selon lui, « le numérique est un catalyseur de développement. » Il a affirmé qu'il était « en phase » avec le Chef de l'État car il a donné des instructions à tous ses directeurs généraux ainsi qu'à tous ses ministères afin qu'ils s'investissent œuvrent à l'impulsion du numérique ainsi qu'au développement de la recherche.
Le ministre a exhorté les jeunes universitaires ainsi que tous les jeunes, en général, de s'engager dans le numérique et surtout d'entreprendre. Cet avis est partagé avec le Directeur général de la Sonatel qui, avant le

ministre, avait lancé un appel aux jeunes universitaires et développeurs de projets. Pour Alioune Ndiaye, la société de télécommunication, avec cette plateforme Emerginov, « encourage les initiatives locales de création de services innovants et accompagne leurs porteurs dans la mise en œuvre et la pérennisation de leurs projets ».
Le représentant du ministre de l'Enseignement supérieur qui a assisté au forum a rappelé l'engagement de Mary Teuw Niane pour le développement du numérique. Selon lui, la distribution des ordinateurs à l'université, avec un apport de 50% de l'État est arrivé à 8000. Et l'État compte aller jusqu'à dix mille machines, d'ici peu. C'est dire, selon lui, « toute la détermination et l'engagement de l'État a vis-à-vis de la jeunesse et de la promotion du numérique. »
Le forum a été marqué aussi par le concours pour le meilleur projet. Ce concours opposait les universités Assane Seck de Ziguinchor, Alioune Diop de Bambey, l'université Cheikh Anta Diop de Dakar, celui de Thiès et l'École supérieure multimédia de télécommunication. Il a été remporté finalement par l'université thiessoise.
L'occasion a permis à l'opérateur de détecter des jeunes porteurs de projets qui, demain, pourront faire la fierté du Sénégal et même de l'Afrique, comme l'a rappelé Cheikh Bamba *Dièye : « facebook a été créé par des universitaires ; pourquoi alors ne pourrait-on pas* créer un projet de cet envergure, sinon même mieux ». Les ressources humaines existent au Sénégal, il reste à l'État et aux entreprises de les exploiter. *Ousmane Demba Kane*

ICT in Senegal

Telecommunications infrastructure of high-level: Senegal has an early bet on telecommunications infrastructure, with substantial investments made in terms of capacity and modernization investments. Senegal holds 1st place in West Africa in terms of growth penetration and quality of services (Source: International Telecommunication Union -UIT).

- 100% digital network broadband throughout the country offering a broad line (ADSL, Frame Relay, ISDN, VSAT etc.)
- International bandwidth available in 2010 is 4.2 Gb / s, will change with the arrival of the ACE cable (SONATEL ESPRESSO and are connected to this cable).
- Center satellite pointing to the satellite Intelsat 355.5 °
- Hub offering VSAT services pointing to the satellite Intelsat 328.5 °
- Digital telecommunications network with a 100% loop 3000 kilometers of optical fiber around the country
- IP national network and leased lines from 64 Kbps to 2 Mbps
- Generalization to 2.5 Gb systems on all connections since 2007
- Broadband in all departmental capitals (ADSL) since 2008
- 100% coverage of GSM and CDMA

Presence of three major telecom operators in the market:

- Sonatel subsidiary Orange
- TIGO, a subsidiary of International Milicom
- ESPRESSO-SUDATEL

Market share of the three telephone operators at 31 December 2012:

- Orange: 62.06%
- Expresso: 14.92%
- Tigo: 23.02%

Senegal is at the crossroads of intercontinental broadband networks:

- Atlantis 2: 20 Gbit / s, linking Portugal, Spain, Senegal, Cape Verde, Brazil and Argentina
- SAT-3 / WASC / SAFE: 120 Gbit / s, linking Europe, Africa and Asia
- Senegal is also connected to North America through the network TELEGLOBE Canada
- Sub-regional connectivity via cable with optical fibers (OPGW) 2.5G bit / s interconnecting Senegal, Mauritania and Mali and extended to Burkina Faso and Ivory Coast
- Optical fiber of 2.5 Gbit / s Kidira-Bamako extended to Burkina Faso and Ivory Coast
- Terrestrial optical fiber 622 Mbit / s Senegal-Gambia rescued by digital beam at 155 Mbits / s.

- Optical fiber 622 Mbits / s Senegal-Guinea Bissau rescued by digital beam to 34 Mbits / s extended to Guinea-Conakry

Sonatel provides investors with specialized high-speed Internet connections as well as international leased at very competitive rates bonds.
ESPRESSO through its connection to the ACE submarine cable jointly funded with Sonatel aims to increase the capacity and availability of Internet bandwidth in Senegal.
The Senegal draws its potential investment mainly to its geographical position and climate, political stability characterized by a multi-party democracy, multi union, its liberalization policy which favored the establishment on its soil many international programs, the quality of its telecommunications network, the development of the IP network and the presence of a dynamic and diversified private sector.
Well as ICT is not only a support for the emergence of a competitive industry, but also, and more, as the very foundation of a deliberately oriented service production orientation have the special "touch "all players in the economic life of our country.
Senegal has developed a policy of committed development based on ICT and teleservices which undoubtedly are the engines of the new economy is organized around networks of ICT as a challenge to all traditional hierarchies commanded the world works.

ICT universities in Senegal

Senegal universities educate more or less 30 000 students of which 1/3 are studying ICT and are able to develop applications. The biggest ones are :
1 Université Cheikh Anta Diop (Dakar)
2 Université Gaston Berger (Saint-Louis)
3 Université de Thiès (Thiès)
4 Université du Sahel (Dakar)
5 Université de Ziguinchor (Ziguinchor)
6 Université de Bambey (Bambey)
7 Université Dakar Bourguiba (Dakar)
More information is available on the IST Africa project web site : https://www.ist-africa.org/home/default.asp?page=doc-by-id&docid=5557

Appendix B.3 The Case of Ivory Coast

Ivory Coast Telecom (Orange Côte d'Ivoire) is one of the main telecom operator in Ivory Coast and has nearly 8 Millions customers.
Orange Côte d'Ivoire is already really active in the field of innovation and incubation of start up, it has already open the Orange Fab which is a 12 weeks accelerator program, welcoming start-ups in Paris, San Francisco, Tokyo, Warsaw, Israel and Ivory Coast in a co-working space in Orange offices.
Orange Fab offers mentoring from successful entrepreneurs, engineers and designers, with insights from Orange's experts and managers from around the world.
Any start-up company with an existing product or an advanced beta version can apply.
Orange has also organized an Emerginov hackathon in May 2014 with a number of developers and a winner (see Appendix B.2 Ivory Coast Case).

ICT in Ivory coast

During the last few years Ivory Coast has benefited from strong economic growth, with GDP having grown by 9.8% in 2012 before slowing to 8% in 2013 and an expected 8.2% for 2014.
Although it has two competing fixed network operators, the country's telecommunications sector is dominated by mobile telephony, with South Africa's MTN and France's Orange leading the market. The launch of three additional ore GSM networks between 2006 and 2008 – Moov (owned by Etisalat of the UAE until it was sold to Maroc Telecom in May 2014), KoZ (operated by the Lebanese Comium Group) and Oricel Green Network (backed by Libya's LAP Green) – has accelerated market growth and pushed mobile penetration well above the African average. Two additional operators have been licensed and are preparing to enter the market, but problems with frequency spectrum allocation have caused continuing delays. Some consolidation can be expected in this crowded market in the future. The Internet and broadband sectors have remained underdeveloped (Please see Appendix B.2 Ivory Coast Case for a more detailed analysis on the Internet and broadband sectors and the ICT in Ivory Coast in general).

Ivory Coast: Hackathon 2014, Orange Offre La Silicon-Valley A Falone Willy Kouadio

21 Mai, 2014 - 11:13

Abidjan le 20 mai 2014 © koaci.com – Falone Willy Kouadio est l'heureux gagnant du Hackathon 2014 Orange qui s'est déroulé samedi dernier à Yamoussoukro.
L'étudiant de l'ISCAE de l'INP- de Yamoussoukro remporte en lot principal, un voyage, tout frais payé, aux Etats Unis, précisément à Silicon-valley, la ville natale de Bill Gates où il pourra se frotter aux meilleurs hommes du monde informatique et technologique.
Notons que pour sa 2ème édition Hackathon, 35 candidats avaient été retenus et que le jury était présidé par Mme Wayoro Adjouka.
Ces derniers étaient réunis pour développer en 2 jours des applications pour les mobiles et les tablettes à télécharger sur Android, IOS ou autres système d'exploitation.
Avec l'heureux gagnant, les étudiants Coulibaly Evariste de l'ESI de l'INP-HB, Bechéluir Pascal également de l'ESI, Silué Noël Anderson de l'ESC de Bouaké, Dallet Djihoua Ignace de l'ESI et Doumbia Alexandre de l'ESI ont respectivement été déclarés 2ème, 3ème, 4ème, 5ème et 6ème lauréat de ce concours dont la 3ème édition débutera dans le courant de mars 2015 avec les inscriptions en ligne des candidats désireux de compétir.

Rappelons qu'avec cette initiative Orange Côte d'Ivoire tente de mettre en avant sa volonté de faire la promotion des jeunes talents pour le développement de nouveaux services.

ICT in Ivory Coast

The Internet and broadband sectors have remained underdeveloped. This is partly the legacy result of high international bandwidth costs caused by the incumbent having monopoly access to the only international fibre optic submarine cable serving the country. This was addressed in recent years, with the landing of a second cable in November 2011 and with up to three more cables expected to land in the near future. Significant reductions in retail pricing for some of the existing ADSL, WiMAX and EV-DO wireless broadband services can already be observed.
The biggest game changer, however, has been the introduction of 3G mobile services. Following years of delays, the first 3G licence was finally awarded in March 2012 and the first 3.5G mobile broadband service has been launched, offering up to 42Mb/s using HSPA+ technology. The extensive geographical reach of the mobile networks will now make the internet accessible to a much wider part of the population. With a national backbone network including more than 20,000km of fibre optic cable, Cote d'Ivoire is in a good position to translate these improvements in competition and infrastructure into a booming broadband market and digital economy.
Further changes are expected by the end of 2014 following the commercial launch of LTE services from Orange and VipNet, which will see a significant increase in mobile broadband availability.

Estimated market penetration rates in Cote d'Ivoire's telecoms sector – end-2014 (e)

Market	**Penetration rate**
- Mobile	88%
- Fixed	1%
- Internet	5%

(Source: BuddeComm based on various sources)

Market highlights:
Government announces intention for the merger between Orange CI and CI Telecom to be completed by the end of the year; MTN Ivory Coast planning to invest XOF120 billion to upgrade its network through to 2017; VipNet planning to launch a TD-LTE service by end-2014; Etisalat sells its Moov branded businesses in Benin, the Central African Republic, Gabon, the Ivory Coast, Niger and Togo to Maroc Telecom for $650 million; continuing high GDP growth sustaining telecom sector into 2014; competition in international bandwidth market leading to lower broadband prices; 3G licences finally awarded, first HSPA+ mobile broadband service launched; MTN commissions a second 336sqm data centre; WiMAX operator YooMee begins deploying an LTE network; government increases tax on telcos to 30%; SIM card registration ordered to be processed again following large scale fraud; report includes the regulator's market data for Q1 2014, telcos' operating data to Q2 2014, market developments into 2014.

ICT universities in Ivory Coast
The National University of Ivory Coast was founded as the Center for Higher Education at Abidjan in 1959 and became the University of Abidjan in 1964. Even in 1987 it was quite large with an enrollment of over 18,000 in 1987. Of this number, about 10,000 were Ivoirians and 3,200 were women. Still heavily dependent on French assistance, it included faculties of law, sciences, and letters and schools of agriculture, public works, administration, and fine arts. In 1996, the National University was split into three separate universities:

- the University of Cocody (Université de Cocody) in Abidjan
- the University of Abobo-Adjame (Université d'Abobo-Adjamé) also in Abidjan
- the University of Bouake (Université de Bouaké) in central Ivory Coast across three campuses

An unusual feature (for Sub-Saharan Africa) of Ivory Coast's higher education system is its international

character - a substantial number of Ivory Coast students study abroad, while a significant number of foreign students come to study at Ivory Coast universities
Other institutions of higher learning include.

- Canadian University (Université Canadienne des arts, des sciences et du management, formerly Pole Universitaire Canadien d'Afrique de l'Ouest)
- Institut National Polytechnique Félix Houphouët Boigny in Yamoussoukro

2007 Infodev report by Babacar Fall states that Cote d'Ivoire was the first African country to utilise internet applications, multimedia and distance learning in the education sector.
Institutions that offer training in ICT are:

- National Institute of Technical Education (INSET): Offers training in ICT and runs the School of Tertiary Technology (ETT)
- National Polytechnic Institute- Houphouet-Boigny (INP-HB): Runs several schools that feature ICT programmes
- African Institute for Economic and Social Development (INADES): Offers training in IBISCUS programmes to help libraries/resource centres use ICT
- National Academy of Extension and Telecommunications (ENSPT)
- National Higher Technical School (ENTS)
- Centre for Continued Training (CFC)