

# Stimulating Innovation in the Frascati Living Lab through Supporting Business Incubation

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**Abstract:** This paper presents methodologies, tools and initial validation results on how the Frascati Living lab is supporting the regional business incubation process and stimulating innovation in the Frascati region. Action research is used as key methodological paradigm to create learning and evaluation environments. The technological platform enabling business incubation support relies on services and tools developed within the C@R and ECOSPACE Integrated Projects.

## 1. Introduction

This paper presents a case study on Living labs impact on innovation in the Frascati region. The Frascati area is unique in Lazio and even in Italy as the most populated technological and research area, also in terms of SMEs dedicated to innovative sectors. The area hosts many institutional centres, including the second University of Rome Tor Vergata, the technological centre of Banca d'Italia, Italian largest Nuclear Physics Laboratory INFN, the Italian technology centre for nuclear fusion ENEA, the site of the National Research Council (CNR), and ESRIN, the ESA (European Space Agency) Frascati establishment. In the nearby Tiburtina area are located the Italian aeronautics and space industry and the new technological district for aerospace and ICT, where BIC Lazio (Business Innovation Centre of Lazio) has the incubation establishment dedicated to space and ICT. Frascati has become an European City of Science, via the Frascati Scienza Association.

The Frascati Living Lab (FLL) experiments a dynamic dedicated collaborative platform to support the development in real life scenarios, experimentation and operations of:

- Innovative applications involving incubation processes for supporting the transfer of space technologies (including earth observation, navigations and telecommunications and their integration) to non-space sectors;
- More traditional applications in sectors such as environment, agriculture and tourism, to serve both the science and the industrial/service communities;
- eProfessional services to support the creation and operation of virtual professional communities as human centric organizations interacting with the networks of SME's, engaging the participation of individual knowledge workers and citizens for catalyzing the region innovation processes.

This paper discusses some of the methodologies, tools and initial validation results on how FLL is supporting the regional business incubation process and stimulating innovation in the Lazio region. For this purpose, two projects, ECOSPACE and C@R<sup>1</sup> are working together to design, develop and validate collaboration services and tools and to create a community of innovation. The main objective of the FLL, its technological platform, innovation activities and business support, is to stimulate business innovation and technology transfer and to enhance rural development in the Frascati region. Establishing a community of innovation offers new ways of collaboration to help new and existing companies to grow and enhance their business processes.

## 2. Methodology

Setting up the innovation community in FLL has benefited from the action research approach to participative research and innovation as pursued by Baskerville [1] and Wilson [2]. They have described action research as a collaborative activity among individuals working with others in teams or communities of practice searching for solutions to real problems. The approach allows practitioners to address problems and issues that are close to them, ones over which they can exhibit some influence and make change. Action research encourages us to study complex processes by introducing changes into these processes and observing the effects of these changes during the process and in a participative way. This makes it to a methodology which is highly suitable to the Living labs innovation environment. Action research operates through spiralling cycles consisting of activities ranging from problem diagnosis to joint learning, as illustrated in Figure 1.

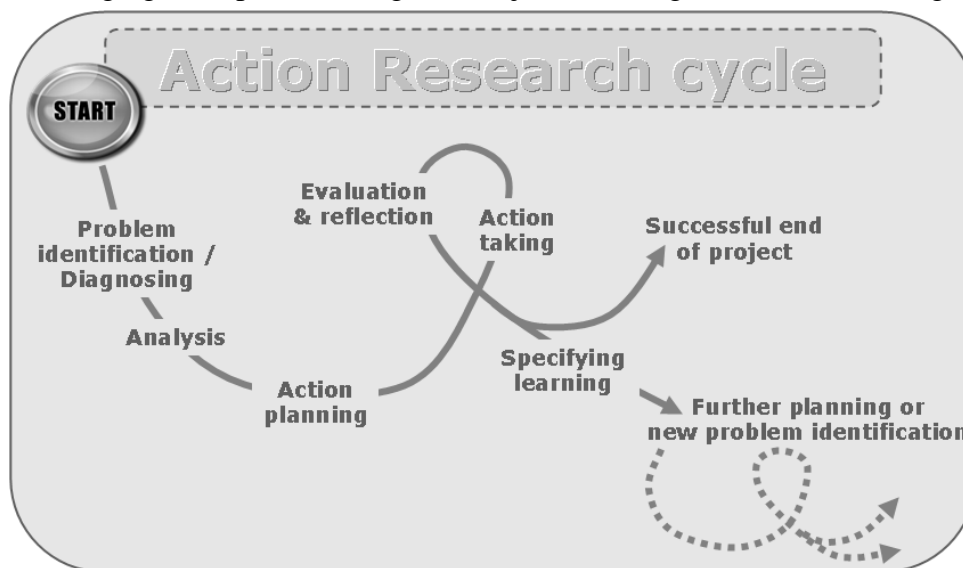


Figure 1: The Action Research Cycle.

In the Frascati Living Lab setting, key elements of this approach are being used to set up an experimentation environment and infrastructure in order to facilitate user co-creation and user involvement and enable continuous learning in cycles of development and evaluation. Such environment provides a service and data platform, but also a community-building framework, allowing the user-driven creation and validation of business incubation scenarios. Concrete starting point has been to develop a business incubation scenario that originated from the local and regional stakeholder needs and was drawn up in collaboration with end users, policy stakeholders and researchers. Elements of the scenario include the access to an incubation support portal, the search and involvement of external experts, the support of partnering and team building, the start up of joint product development and the building of business communities.

In the process of elaborating and implementing the scenario, a collection of collaboration services, providing tailored functionalities, was developed and integrated into the storyline. Among the many examples we mention portal management, shared workspace services, group blogging, visualisation of social networks, team building support, and presence awareness. Several other services are currently in the pipeline, such as discussing a document in a videoconference after uploading and notifying. The scenario approach was found to strongly enrich the action research approach and provided a good basis to start the cycles of technical and social design, and to attract the interest of regional stakeholders of FLL. The action research approach envisages also training and feedback sessions, already included in the developed experimentation environment.

### **3. Collaborative Platform Description**

The technical platform enabling business incubation support and Living Labs experimentation relies on services and tools developed within the C@R and ECOSPACE projects (Figure 2). Examples are the services related to the ECOSPACE collaborative workspace platform such as shared workspaces, knowledge sharing, presence awareness and team building and the services and tools related to portal management, ideas marketplace, web services access, and applications enabling the use of geographical information which are more central for the C@R project.

This synergy is being built on mutual sharing of data and services and is growing to a mature stage where FLL acts as a pilot Living Lab for experimentation, validation, deployment, user rollout purposes [3]. Due to such close collaboration amongst different projects and because of Living Lab's nature itself, the technology platform that supports the Frascati Living Lab can be defined as collaborative, shared, distributed and user centric:

- (1) The term 'collaborative' refers to already developed and available services as well as services in the implementation phase that are all in all mostly developed on a collaborative way. That means they are built by merging the efforts and the results coming from different partners and stakeholders. In some cases the joint contributions are data or sub-services orchestrated to build a more general and complex service; in other cases such contributions are knowledge- and expertise-based providing services an added value hardly found as "generic" services available in the world wide web.
- (2) The adjective 'shared' is used to define the FLL web portal due to its web-based nature. The platform can easily be accessed by a lot of devices, even mobile ones. The platform has advanced mechanisms to recognize the actual device used to access the portal and the consequent applications and adapts latter to better fit and view on the device itself. Such adaptation includes pages re-formatting, layout changes, text and images resizing or avoiding as to enhance readability and saving battery power at the same time.
- (3) The FLL platform is 'distributed' among its partners since data and applications reside on different servers, provided by project's contributors. This characteristic enhances services' reliability and highlights the collaborative nature of the platform itself.
- (4) Finally the platform can be defined as 'user centric' mostly because of two reasons. First of all users are the effective target of Living Lab. They use services developed explicitly for them, under precise requests and evaluated by them. That is what the overall platform is made up of services asked by users and it follows a user-driven development approach. Secondly, many FLL's applications are customized in different ways upon each single user, both on an automated way, depending on usual used device, typical invoked application and on "human chosen" way, depending on personal preferences about colours, font size, bookmarks, etc.

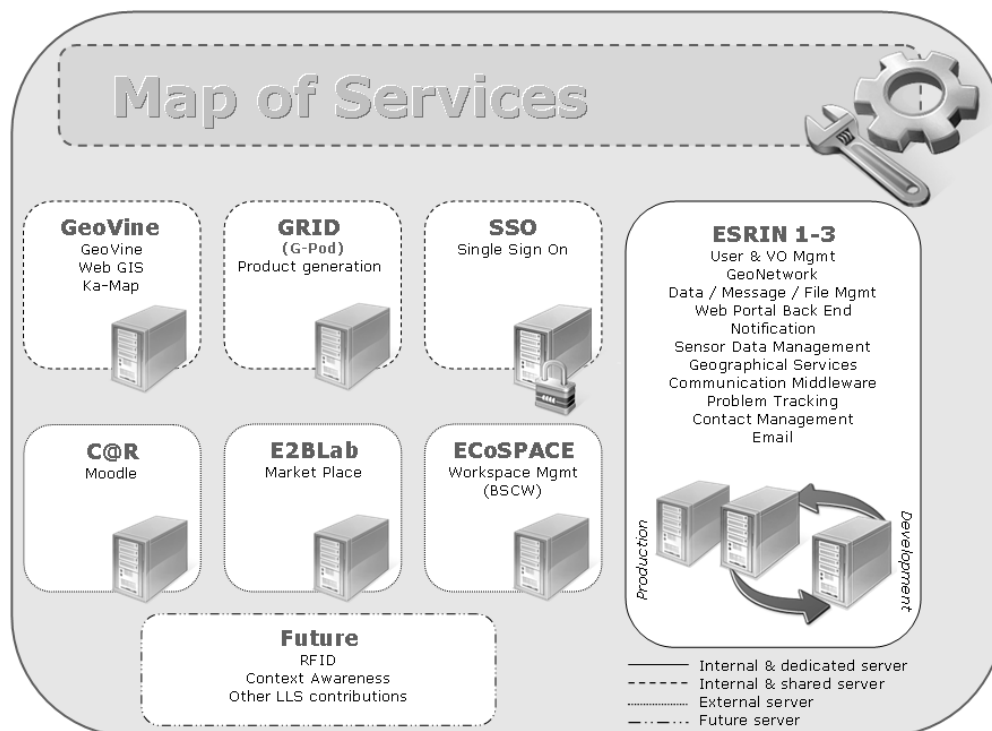


Figure 2: Map of Services in the Frascati Living Lab.

#### 4. Developments

The actual development of the platform results in a huge set of services and data that can be distinguished on actual providers' basis and grouped on purposes / target communities' basis. Analyzing the development aspect of the FLL's platform, it appears that the services and data providers are much more numerous than the projects listed before. The FLL platform, services and data are accessible through a web portal at <http://www.frascatilivinglab.eu/>. Different actors, projects and stakeholders can be identified providing contribution and, practically speaking, building the platform itself.

The initial starting point of the FLL's platform comes from a former ESA-funded project finished 2006, called The Voice<sup>ii</sup>. The purpose of this project was to build a collaborative platform providing services devoted to agricultural bodies, farmers, virtual organizations. A selection of services and data, adequately adapted and updated, constituted the initial basis of the platform. As already mentioned, the ECOSPACE project contributed to the FLL's platform, providing the BSCW workspace environment and other tools (described below) expressively devoted to collaborative works, sharing data and ideas that constitutes the core value of incubated companies and SMEs. Obviously, it must be mentioned the C@R project, in terms of services and data developed on Frascati site and contributions coming from its project's partners. Last but not least, several partners and stakeholders in FLL, such as E2Blab, provide services and data.

The aforementioned services are mainly devoted to three target users' communities: incubated companies, eProfessionals and farmers. BSCW (Basic Support for Cooperative Work), the main collaborative tool, is a professional and powerful tool that includes all aspects related to "collaboration" and "shared workspace" concepts. It permits business workflow management, creation of documents, appointments, contacts, tasks, notes and lot more, in a shared way. All BSCW functionalities and data are fully available through a typical Web browser, make even easier and more effective the "shared workspace" concept and suitable for online collaboration in distributed teams (Figure 3). The integration with

portal management and GIS related services provides much scope for further collaboration and collaborative workspace innovation in the near future.

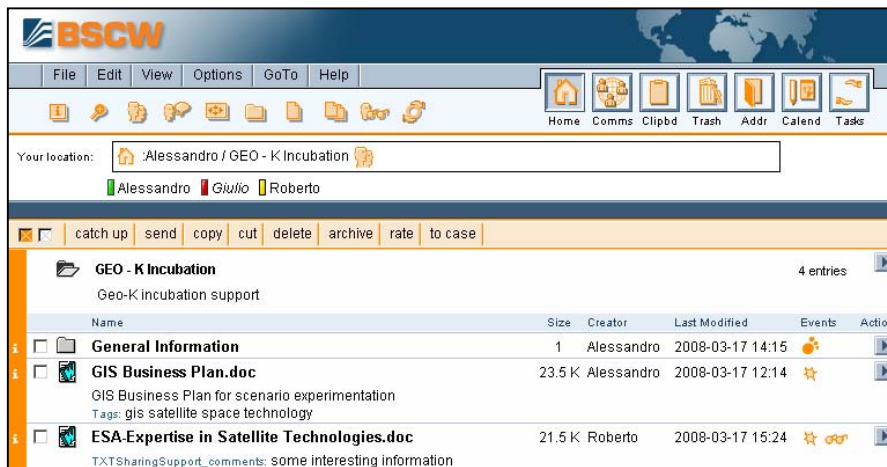


Figure 3: BSCW Sample Folder

Beside the standard BSCW features, like hierarchical data organization in shared workspaces, self-organized membership administration, document management, version management, group awareness: event notification, history and daily notification service, calendar, polls and search functions some special collaboration features developed in the ECOSPACE project are introduced.

One example is *BSCW Document tagging* (Figure 4). For documents stored hierarchically in a big repository tagging becomes more and more important to find and view the documents in a different context. In particular in collaborative environment it is import. Members, who work on a special topic, normally store their documents in a special sub tree of the document hierarchy, which is in this case their current context. If now all documents in the repository will be tagged, the members easily can find documents of other sub groups, which are related to their work. On adding, replacing or revising of a document tags can be added or changed. Further on tags are also allowed on folders and blog entries. They can be changed with the BSCW action Change attributes. In a folder listing tags are shown in the description area of a document and linked with a tag search. It searches for objects in the current workspace, which have set the same tag and displayed them as BSCW search result. This gives a new view for documents located in different folders.

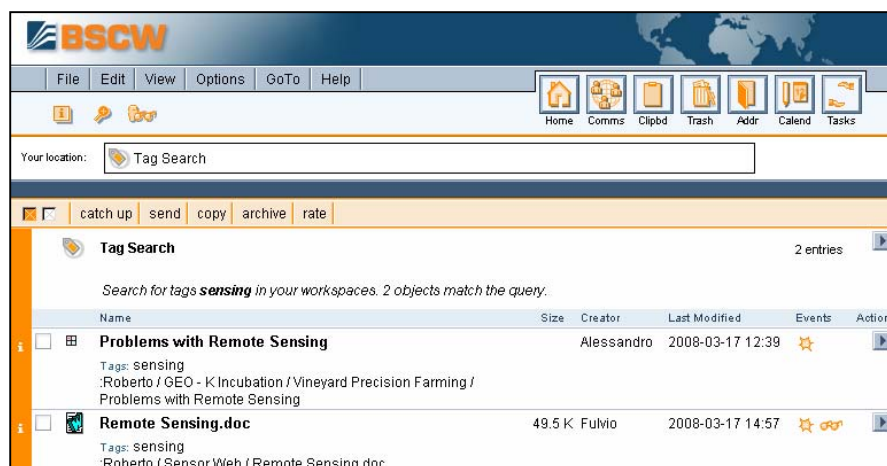


Figure 4: BSCW Tag Search

Another example is *BSCW Blogs* (Figure 5). The publicity of the web 2.0 is deeply linked with the success of blogs. Blogs enable authors to publish articles to a wide audience

without the need to share a direct connection between author and recipient. The communication is mainly based on the usage of RSS to receive the articles of a special author or an author-group. This XML-based message-protocol enables the user to stay informed about recent updates of a blog. The simplicity of use, like the passive notification service or the simple subscription-mechanism, permits a dynamic and user-driven information portfolio which incorporates a high rate of information-sources.

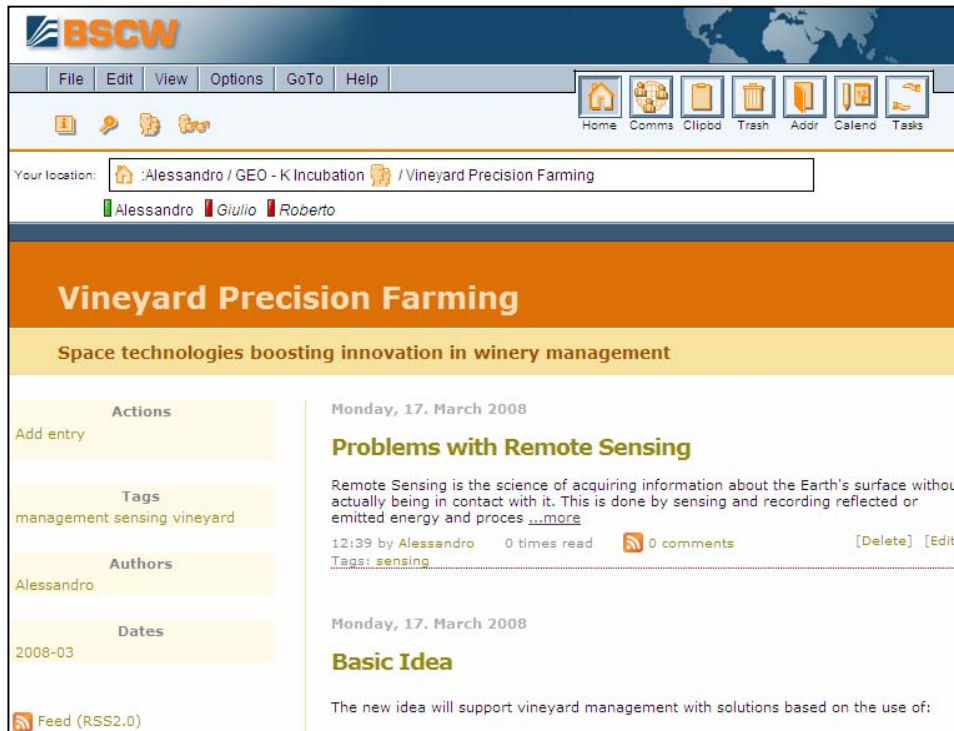


Figure 5: BSCW Blog

The BSCW-Blog supports the personal distribution of information via a flexible communication channel. The BSCW-Blog-Functionality enables every workspace-user to create an own blog, with a custom topic and limited accessibility of other users. As a recipient of blogs, each user can comment on any article, with respect to the access-rights. Based on RSS as an information-transport infrastructure, the user is enabled to produce and consume a highly personalized information-portfolio in his or her shared workspace.

A further example is *BSCW Workspace-Awareness*. To extend the asynchronous shared workspace system BSCW by a synchronous component the online status of the members in a workspace. The online BSCW status is calculated by:

- Available - online in BSCW in the last 5 minutes
- Recently active - online in BSCW in the last 60 minutes
- Inactive - online in BSCW in the last 120 minutes
- Unavailable

BSCW shows these states of members of the current workspace as a kind of toolbar below the navigation line. By clicking on a user name the contact page is shown.

A final example is *BSCW widgets* (Figure 6). In the Web 2.0 hype common dashboards like iGoogle<sup>iii</sup> or Netvibes<sup>iv</sup> become more and more popular. Here a user can configure its own web desktop with information widgets. To support this, BSCW provides some widgets with selected BSCW data which can be included on such desktops. Currently there are two type types of widgets: (1) Access widget - gives access to a selected BSCW object (like a folder or a document) and show the event icons, to inform the user about changes; (2) Presence widget - shows the presence toolbar of a workspace.

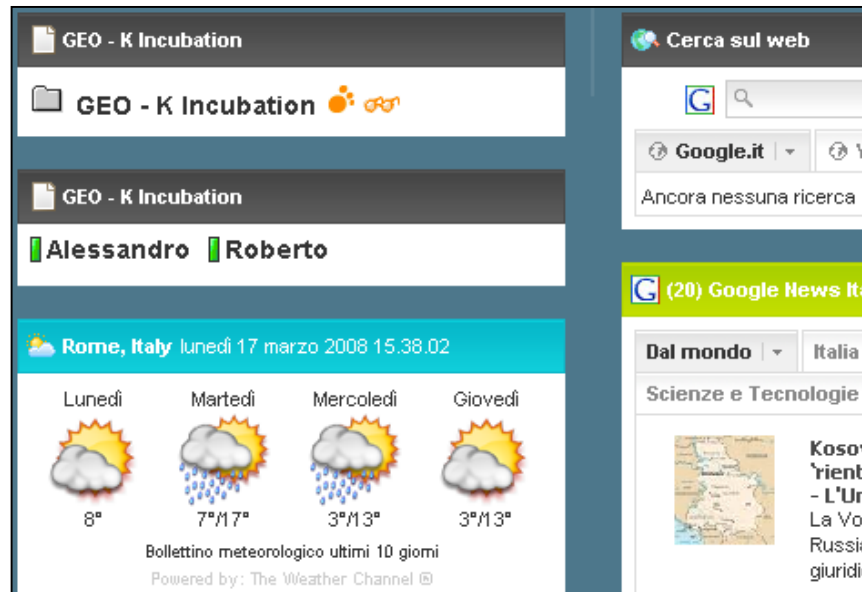


Figure 6: BSCW Widgets on Netvibes Desktop

## 5. Results and Business Benefits

Even though C@R and ECOSPACE are not yet completed, some interesting outcomes can be presented. Within those outcomes direct results and side-results can be distinguished.

Direct results regard some incubated companies that are currently participating to FLL, using its services and data and contributing to them at the same time. The Frascati innovation community is using the calendar, blog and other collaborative functionalities within BSCW to enhance the network and to increase their collaborative performance. On the other hand documents are not only exchanged but also edited via a versioning system, tagged and rated. In addition functionalities like the presence awareness is used by the people to establish new contacts and to widen their interaction. Final users are already involved in experimentation, evaluation and validation, through a cyclic approach that gathers their feedback and impressions, proceeding to elaborate them and resulting in updates of existing services and development of brand new functionalities. Recently a survey has been started in order to measure in a self-evaluation way the impact of the provided collaborative working environment. According to several indicators which are provided by the system to observe the interactions of the users, it has to be assumed that the impact can be highly rated. To summarize, the monitoring approach is two-folded: (1) self-evaluation via surveys and (2) automatic system measurements (e.g. daily activity reports, logs) together with indicators evaluation, face to face meetings, workshops and other techniques. Finally, as already mentioned before, FLL is acting as pilot innovation community Living Lab for the ECOSPACE project, playing the same role just described, that is giving feedback and enjoying both updated and new services.

Side-results refer to agreements and collaborations amongst the main FLL's player, that is European Space Agency (ESA) and other institutions, public bodies and stakeholders, constituting associations, joining projects or participating to specific calls related to such topics. Amongst others, it must be mentioned the agreement between ESA and BIC Lazio (Business Incubator Centre). This agreement offers support during the elaboration and test phase of start-up companies that intend to apply technological solutions developed for space in non-space sectors. Other agreements were also reached with Italian public bodies (Provincia di Roma), private associations (Frascati DOC, Frascati Scienza) and other stakeholders such as universities and research centres. All this contributes to strengthening the Frascati innovation community, which is grounding the FLL.

## 6. Conclusions

The two projects ECOSPACE and C@R are working together according to the action research approach to support business incubation through enabling new ICT-based forms of collaboration. In fact, the Frascati Living Lab, and its connection to other Living Labs, can be characterized as an infrastructure establishing a “breeding ground” of new ideas and innovations (even linked to the regional innovation). Innovative forms of collaboration and partnership are emerging and leading to a range of new projects such as currently in winery management, earth observation and business incubation. In turn these forms of collaboration and partnerships enhance the capabilities for product and service innovations.

The Frascati Living Lab has started as an innovation community, using the portal and community workspace. It has linked up with other Italian Living Labs and with the European Network of Living Labs (ENoLL)<sup>v</sup>, to widen the potential community and scope of innovations. It has generated several specific innovation ideas that have been made concrete in projects that have attracted their own (sub-) communities, and again are pushing the wider Frascati community. These are promising signs of the power of networking and communities, which are central to the success of living labs as innovation environments.

The business ideas are co-created (not yet the applications, tools, services) with final users. A specific incubation support user community is building up to work with the tools and adapt them in a learning process. The success is largely dependent on the willingness of key stakeholders (organisations and people) to use the tools in daily practice. A concrete project (collaboration tools supporting project work) could be the starting point, rather than convincing organisations (generally using legacy tools) to use a new tool environment.

In this respect next steps emphasis on providing a more coherent infrastructure for the over-all breeding ground, integrating the portal, BSCW and other services and providing a more consistent and integrated interface to wider community of users.

Finally, the results achieved in terms of collaboration and open innovation within the incubation community has already been extrapolated to another domain, i.e. the precision farming community. Such approach is used by local farmers who are contributing to establish a common knowledge-base built upon their experiences and daily activities on field. Overall the FLL and its services is going in its next phase to become operational.

## References

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<sup>i</sup> ECOSPACE (eProfessionals Collaboration Space) and C@R (Collaboration at Rural) are Integrated Projects, funded by the European Commission under the 6th Framework Program, IST Priority. ECOSPACE website: <http://www.ip-ecospace.org/>, C@R website: <http://www.c-rural.eu/>

<sup>ii</sup> The Voice (THEmatic Vertical Organisations and Implementation of Collaborative Environments) study is funded by the European Space Agency. Official Project page: <http://www.esa-thevoice.org/>

<sup>iii</sup> <http://www.google.com/ig>

<sup>iv</sup> <http://www.netvibes.com>

<sup>v</sup> The European Network of Living Labs (ENoLL) was launched on 20th November 2006 under the Finnish Presidency, with 19 founding Living Labs (first wave). The Network currently has more than 50 members.