Coordinating IST research and development across Europe: the CISTRANA outlook

Simon Lambert
CCLRC Rutherford Appleton Laboratory, UK

Summary

The CISTRANA project is concerned with coordinating research activities in information and communication technologies across Europe. The project can be seen as a kind of Current Research Information System, in that it comprises interacting components with behaviours, taking inputs and producing outputs. One of the project's activities is the development of a portal revealing the landscape of research in Europe. The portal is a CRIS in the more usual sense. The paper explores the motivations and models underlying the project and the portal, and gives illustrations of how they have been designed and are operating to achieve their goals.

1 Introduction

It is of course normally understood that a Current Research Information System will be a software system, typically designed to allow the browsing or searching of some kind of information base, perhaps a collection of distributed databases of projects or a central repository of institutional publications. Such an information system might have been designed with only a general goal in mind—to allow researchers and other interested parties to discover projects that are of relevance to them—or for a rather specific purpose—to precisely measure the output of a research institute. But if the word 'system' is understood more generally, it can also encompass other kinds of development and activity: for example, a project itself can be considered as a CRIS. In general, a system must be composed of multiple components that interact in certain ways. It must exhibit behaviours: that is, it must accept and respond to inputs and produce outputs. As an information system (not necessarily a software system), it will probably have users, those people who take and use its outputs (and may provide inputs).

CISTRANA is a project that is in itself a kind of Current Research Information System. One of its activities is the development of a portal that is also a CRIS, in the more usual understanding of the term. Portals are very well established in the networked world: a succinct characterisation is that portals offer 'a mechanism by which [organizations] can manage information in a cohesive and structured fashion. … they provide a single point of entry for employees, partners, and customers. … portals can be combined to form a portal network … Portals distinguish themselves from other software systems because they provide the ability to integrate disparate systems and leverage the functionality provided by those systems.' (Apache Software Foundation 2005).

The CISTRANA project is concerned with coordinating research activities in information and communication technologies across Europe. One of its goals is to develop a map of the national research landscape in the area of Information Society Technologies (IST). This metaphor of map-

ping a landscape is fruitful for conceiving the role and aims of the portal within CISTRANA. The portal should reveal the features of the landscape. Just as a map shows the existence of rivers, mountains and forests that lie outside the sight of its user, so a portal can make plain the features of the research landscape: the research programmes, projects, organizations, perhaps even individuals who are active in it. The portal should help to provide the 'big picture', and to avoid the trap of 'not seeing the wood for the trees'.

A general geographical map is an example of an information resource (perhaps it cannot be called a system) that is so evidently useful that it needs no explanation of its purpose. Other more specialized maps, such as land use or climate maps, are motivated by particular needs. There is a spectrum between mapping a landscape for a general view or for a specific purpose. If there is a specific purpose in mind, it follows that it must originate from some intended users, and be based on an analysis of their requirements.

The same spectrum can be found in CRISs. This is not to say that a system designed with a particular purpose in mind cannot be used in other ways. The website of *amazon.com* is intended to sell books (and now a wide range of other articles as well) but may be used for finding out whether a particular book is still obtainable and whether it is likely to be interesting. A portal designed to identify possible research collaborators might find itself being used to spot emerging hot topics and proposal opportunities. Nonetheless, there is a distinction between a CRIS that says to its users, 'Here is the landscape to inspect', and one that says 'Here is what should be done to change the landscape'. The CISTRANA project is of the latter kind, the portal of the former (see http://www.cistrana.org for the website of the project).

2 The CISTRANA project

What then is the motivation of the CISTRANA project? Why is the landscape of ICT research activities in need of changing, or at least monitoring? The fundamental idea is that of the European Research Area (ERA) which combines three concepts (European Commission 2005):

- the creation of an 'internal market' in research;
- a restructuring of the European research fabric;
- the development of a European research policy which not only addresses the funding of research activities, but also takes account of all relevant aspects of other EU and national policies.

One particular goal is the improved coordination of national research activities and policies, which account for most of the research carried out and financed in Europe.

It is clear that national boundaries raise barriers to the achievement of the European Research Area. The diversity of languages is one difficulty, but there are others, including lack of awareness of research activities in different countries, lack of communication between policy makers, and lack of dissemination of best practice.

The European Commission is pursuing a number of initiatives to foment the European Research Area (for example, ERA-NET projects (European Commission 2006)), and one of these is the CISTRANA project. The project has three interconnected objectives:

- to develop a map of the national research landscape in the area of IST;

- to pinpoint research topic areas and strategic themes where cooperation is essential;
- to establish sustainable mechanisms including common methodologies and procedures to set up transnational coordination initiatives between several Member and Associated States.

Figure 1 shows the structure of the project. The boxes (which correspond to work packages) are the components of which the CISTRANA 'system' is built. They take inputs, have behaviours and generate outputs. Some of these outputs feed into other components of the system, while others are for the external 'users' of the CISTRANA project.

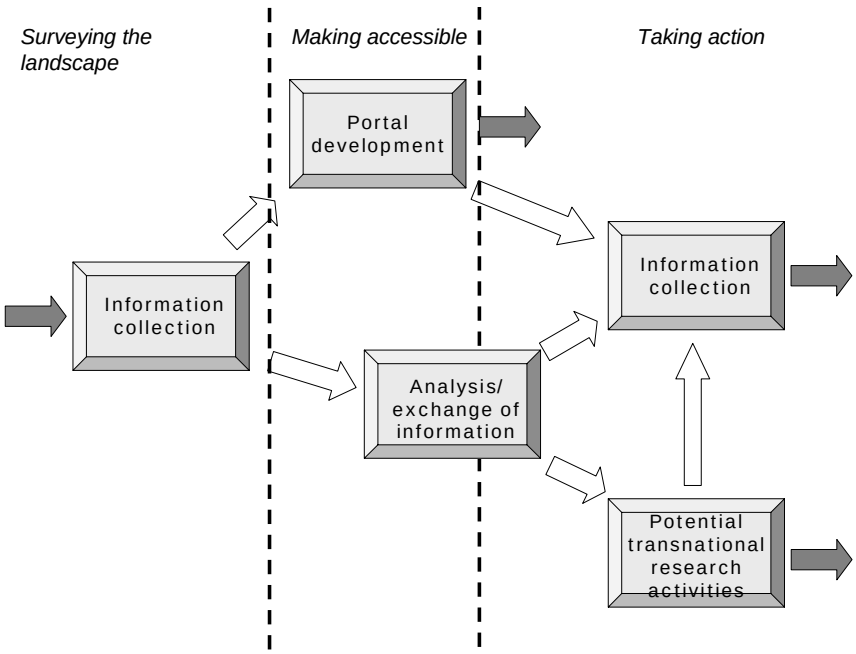


Figure 1: The structure of the CISTRANA project

The figure also shows that the project's work proceeds in three phases: surveying the landscape, making it accessible, and (in parallel) acting on it. This paper follows the same sequence.

3 Surveying the landscape

The first question to be asked in preparing to survey the landscape of IST research in Europe is what is considered to be in scope. This is partly a matter of granularity, but also of the underlying process model that is assumed. There are many thousands of individual researchers who make up part of the landscape; likewise there is a vast accumulated historical record of PhD and Masters theses; but perhaps these are too fine-grained to offer much insight. Bearing in mind that the over-

all goal of CISTRANA is the coordination of national activities with each other and at European level, a basic cycle has been assumed that is appropriate both for its granularity and because it represents a fundamental process model. This cycle is shown in Figure 2.

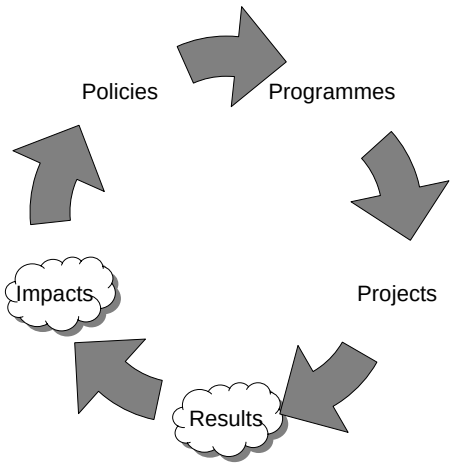


Figure 2: The basic process cycle

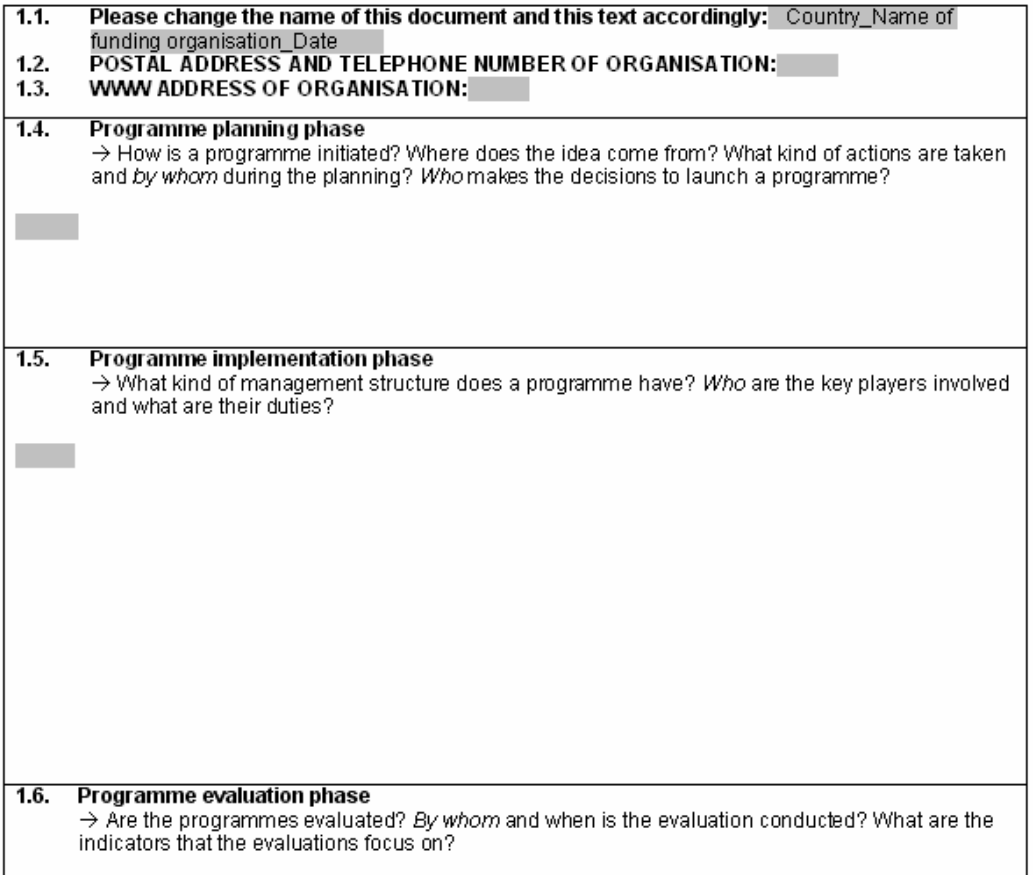
Policies, formulated by national (or possibly regional) governments lead to the setting up of programmes. A programme is defined as public funding given to companies, public research institutes, universities, etc. through calls or similar procedures to be used for research and technological development in the field of information and communications technology (ICT). Programmes in turn generate projects which are the entities in which the research and development is performed. The work done in the projects produces results that have some impact. Consideration of this impact influences the development of future policies. There are of course variations on this cycle. Some countries might opt not to have programmes, but to stimulate research in other ways. Nonetheless such variations may be analysed and compared with the cyclic model.

Results and impacts are not so easily surveyed as policies, programmes and projects. Certainly it is possible to measure output of academic papers or patents, and to point to exemplars in which specific research results have been applied in practice and are yielding quantifiable benefits. Nonetheless compared with policies, programmes and projects, they are harder to make concrete.

Thus the CISTRANA project has taken as its task in surveying the landscape the acquisition of information about national policies, programmes and projects. This is justified by the fact that these three are the influential elements of the cycle; results and impacts are the consequences. It is policies, programmes and projects that may be directly controlled. With respect to projects, the issue of granularity becomes important: to what extent is it desirable to be able to view all ICT research projects in a country to understand the landscape?

In order to acquire the information, so-called National Support Organisations were identified in each of the 33 countries represented in the CISTRANA Steering Committee. Carefully-structured questionnaires were sent to each one, and a very good response was received. Information was

collected on more than 120 programmes. The questionnaires were designed to shed light on the mechanisms of steps in the cycle of Figure 2. Figure 3 shows an extract for the questionnaire on programme procedures.



1.1.	**Please change the name of this document and this text accordingly:** Country_Name of funding organisation_Date
1.2.	**POSTAL ADDRESS AND TELEPHONE NUMBER OF ORGANISATION:**
1.3.	**WWW ADDRESS OF ORGANISATION:**
1.4.	**Programme planning phase** → How is a programme initiated? Where does the idea come from? What kind of actions are taken and *by whom* during the planning? *Who* makes the decisions to launch a programme?
1.5.	**Programme implementation phase** → What kind of management structure does a programme have? *Who* are the key players involved and what are their duties?
1.6.	**Programme evaluation phase** → Are the programmes evaluated? *By whom* and when is the evaluation conducted? What are the indicators that the evaluations focus on?

Figure 3: An extract from the questionnaire on programme procedures

4 The IST Research Portal

The CISTRANA portal, known as the IST Research Portal, is the chief mechanism by which the landscape uncovered by the CISTRANA project is made available to the world at large. Unlike the mechanisms operated by the project itself to reach specific target groups with high leverage, the portal may be accessed by anyone with a Web browser. It is not just created as a work of charity, however; the need for such a portal was identified in a study conducted for the European Commission in 2002–03 (European Commission 2003) which found that ‘only limited, incom-

plete and inconsistent information on national research activities is available, making identification of common and complementary activities virtually impossible', and recommended the development of a portal to overcome this barrier.

The portal must face a very particular design problem. It is intended for the use of different groups with interests in the coordination of national ICT research across Europe, including policy makers, programme managers, university researchers, people in industry, even journalists. This segmentation of the potential users might suggest that a pre-requisite is a thorough analysis of their particular and differentiated needs, and the development of functionality to meet those needs. In fact, the very diversity of the target groups makes this difficult; however, alternative models of benefits realization might be appropriate, allowing for emergent change in behaviours (see for example (Work 2001).

The general aim of the portal is therefore to present information in ways that are novel, interesting and cannot be readily obtained elsewhere. This can be achieved by gathering together information that would otherwise be scattered (as has conveniently been done in the CISTRANA project's survey of national policies and programmes) or by showing views that allow new insights or comparisons (for example, tabular displays of basic facts about national programmes).

The CISTRANA portal can thus be contrasted with other European-level endeavours that might appear similar:

- The ERGO pilot project (http://www.cordis.lu/ergo/home.html) contains European research and development project information but does not include information on projects funded by national governments/ministries.
- The CORDIS web pages on national R&D information (http://www.cordis.lu/national_service/en/) aim to keep users informed of important developments related to the European Research Area so provide general policy level information.
- IST World (http://www.ist-world.org) concentrates on actors in the research scene: organisations, individuals and projects.

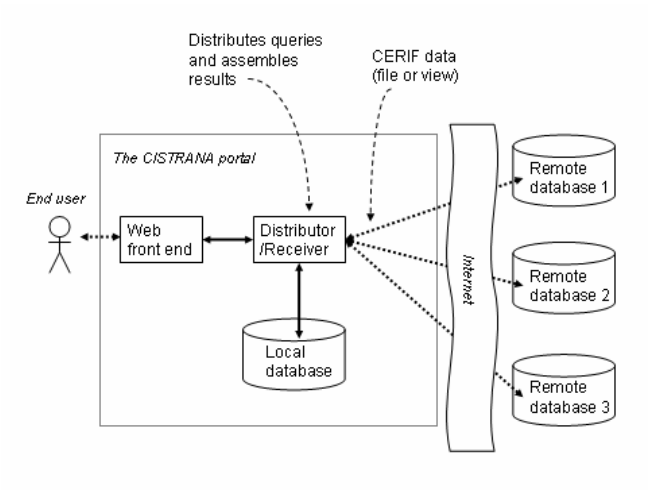


Figure 4: Schematic design of the CISTRANA portal

The portal has been designed to allow access to remote databases of content and to store data locally. The choice depends on the nature of the data: how much and how frequently updated. Information gathered specially for the CISTRANA project will be stored locally, whereas the classic example of remote data access is national project databases. The unifying factor is the CERIF standard (euroCRIS 2005) for representing research information. Figure 4 shows a schematic illustration of the design of the portal, while Figure 5 and Figure 6 are screen shots of the current version.

Figure 5: One of the portal's search interfaces

There are some general issues that merit discussion because of their importance to any such endeavour. The first is the organization of the collected materials. Part of what makes a portal interesting and 'sticky' to its users is the richness of content and the linking of content both to other content and to external resources (for example, the home page of a ministry). Having a database implementing the contents of the portal means that new views on information can be created even when they are not explicitly represented. For example, each programme is associated with a funding institute. Information about funding institutes was not requested as part of the questionnaires, but a view on all funding institutes responsible for programmes can be easily created and offered to the user.

Second, the strategy for bringing knowledge into the system is essential for keeping it current and interesting to its users. Several approaches have been adopted. An update interface for programme information is provided so that National Support Organisations can edit data directly. The existence of an interface does not mean it will be used, so the project is exploring ways of obtaining continuing cooperation as part of the goal of long-term sustainability of the portal. The hope is to set up a cycle in which the success of the portal encourages data providers to cooperate, in turn driving more visitors to the site. There may be a need for a boot-strapping mechanism in which

the project subcontracts initial data update to establish a momentum. This is an example of interaction between the CISTRANA project and the portal—the project is providing a context in which the portal may thrive.

New methods of enterprises, work, and training organisation 05/10/2005 more...	General Secretariat of Research and Technology/Ministry of Development	2005-2006	4.9 M€ Ministry of Finance/Structural Funds/ERDF	2.1 M€ Private sector/Public Sector
Natural Environment and Sustainable Development 05/10/2005 more...	General Secretariat of Research and Technology/Ministry of Development	2005-2007	24.84 M€ Ministry of Finance/Structural Funds/ERDF	11.16 M€ Private sector/Public Sector
FAR 05/10/2005 more...	MIUR	2005-2007	81 M€ MIUR (calls 2004-05)	34.6 M€ Funded Organizations (calls 2004-05)
GLANCE 11/08/2005 more...	Netherlands Organisation for Scientific Research (NWO)	2005-2010	4 M€ NWO	
VIEW 05/10/2005 more...	Netherlands Organisation for Scientific Research (NWO)	2005-2010	4.5 M€ NWO	
The Technology Programme	Department of Trade and Industry	2005-2008	450 M€ DTI	

Figure 6: Comparative display of national programme information in the portal

5 Capitalising on the findings: a CRIS process

The CISTRANA project must be capable of making an impact. The project is itself a kind of current research information system, with mechanisms for transforming inputs to outputs, and these outputs are what create the impact. There are two basic varieties of mechanism through which outputs can be produced:

- internal ratiocination about the input information obtained by the project, and dissemination of the conclusions to appropriate audiences;
- engagement of actors within the scope of the project itself (the participation of the Steering Committee and National Support Organisations in the survey is an example).

In fact a feedback cycle operates, in which the analysis informs discussions with the actors which give material for further analysis.

Returning to the cycle shown in Figure 2, the elements that can be adapted are policies, programmes and projects. CISTRANA is concerned with coordination, and therefore there are two ways in which these elements can be adapted to achieve impact:

- by spreading knowledge of how things are done differently in other countries;
- by creating structures and mechanisms that span several countries.

An example of internal ratiocination by the project is the analysis of the survey results. This has allowed generalizations to be made about the kinds of organizations involved in the strategic coordination, policy formulation and research funding of ICT, namely science councils, ministry level, financing and implementation agency, and basic research funding organizations. It has also allowed identification of promising technology areas for cooperation, based simply on the number of countries that identified these areas as national priorities: namely communications infrastructure, telecommunications, micro- and nanotechnology, software technologies, and optoelectronics.

The second variety of mechanism is exemplified by the holding of a series of workshops with themes of prime importance, and liaison with relevant European initiatives such as the ERA-NET projects and the COST programme. In the case of ERA-NETs, a concept for impact assessment has been developed by CISTRANA which will be performed by the individual projects and a consolidated impact assessment report will be produced. The impact assessment is built around the five phases defined by the European Commission, and aims to encourage the projects to define their goals with respect to each of these phases. The consolidated impact assessment report is expected to contribute important findings to the planning of future initiatives of this kind (e.g in the Seventh Framework Programme).

One of the important issues that the CISTRANA project faces is that the landscape is changing. Many countries are in a stage of transformation. In the course of 2004–05, France has founded the new National Research Agency (ANR), the Swedish and Norwegian RTD systems have undergone changes, Austria has received a new research promotion agency (FFG) as a merger of previously four separate agencies, and so on. This highlights the need for sustainable and responsive mechanisms in which stability is important: small changes to the inputs (the features of the landscape of IST research) produce small changes in outputs (recommendations etc.).

6 Conclusions

The CISTRANA project is now at its half way stage. The landscape of IST research in Europe has been surveyed and is being made accessible through the IST Research Portal, though there is still more to be done in terms of presenting a variety of data in interesting and novel ways. The project's mechanisms for making an impact in Europe are operating fully: the series of five workshops are now in progress and their results are already proving valuable for spreading good practice and influencing the way things are done in organizing European research in IST. The project is having to face issues of adaptability—reacting to the continual changes that occur in the landscape—and sustainability—ensuring that its mechanisms have some chance of life beyond the end of the funding period of the project.

7 References

Apache Software Foundation (2005): The Apache Portals Site. http://portals.apache.org.

euroCRIS (2005): CERIF Task Group pages. http://www.eurocris.org/en/taskgroups/cerif/.

European Commission (2003): *ERA Portal to National IST Research Information: Key Findings and Recommendations of the Feasibility Study*.

European Commission (2005): European Research Area. http://cordis.europa.eu.int/era/concept.htm.

European Commission (2006): ERA-NET Scheme. http://www.cordis.lu/coordination/era-net.htm.

Work, B. (2001): Learning to realize the benefits of IT. In: Remenyi, D., Brown, A. (Ed.): *Make or Break Issues in IT Management*. Oxford: Butterworth-Heinemann.

Contact information

Simon Lambert
Business & Information Technology Department
CCLRC Rutherford Appleton Laboratory
Chilton
Didcot
Oxfordshire OX11 0QX
UK

e-mail: S.C.Lambert@rl.ac.uk
http://www.cclrc.ac.uk/Person/S.C.Lambert;

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