

The area of R&D information has been chosen as the first area of application of the SwissCast project due to the opportunity of a close cooperation with the Research Office of the University of Ticino (Servizio ricerca USI/SUPSI), thus having from the beginning, an interested partner that knows the specific application field very well; at the same time, a first inspection showed that R&D information is a domain well suited for the development of push services and where we find interesting developments in the field of electronic communication.

Thus, the SwissCast project and Servizio Ricerca developed an information service for the area of scientific research that fully integrates the SwissCast push into an informational platform on the WWW, which is specifically targeted to the informational needs of the Italian-speaking part of Switzerland (in the rest of this paper this service will be called RIS-ita).

In the first part of this chapter, we briefly discuss the development of electronic communication in the research area, and the few existing examples of push services already active in this domain.

The second part of the chapter presents the objectives and the structure of the research information service; while the structure and the functionalities of the push system have been presented in the previous chapters, we will focus here on the following issues:

- The specific problems of research information, namely finding relevant sources and classifying information;
- The solutions adopted to integrate the push service into a website which also gives general information about scientific research, so that the user can see the service as a unique information platform, despite the differences in the technical solutions that were adopted;
- The «customisation» of the service to the needs of research information for Italian-speaking people in Switzerland.

The research community was at the root of the development of the electronic communication and of the Internet; it was the widespread use of Internet services by the scientific community that first boosted the development of the Internet as a platform for electronic communication. Therefore, the scientific community, particularly in high schools and research facilities, is an ideal test-bed for electronic information services, because most of the internal communication and of the information exchange already develops via the Internet and, thus, researchers are used to this medium.

While it is not the objective of this report to present in depth the issue of electronic communication in the scientific community, we find it necessary to outline some basic developments which are central also for the emergence of push services. We see these developments as the combined results of structural changes in the research policy and in the shaping of scientific work and of technological innovation in the electronic networks.

8.1 | The development of Research Information Systems in Europe

While electronic communication was widely used by researchers for scientific cooperation – mostly via e-mail –, for the exchange of documents (via ftp protocol) and for internal discussion on specific research communities (using mailing lists and discussion forums), electronic research information systems – i.e., systems that deliver information on research activities via Internet – are a relatively late development.

This can be explained partly by the existence of very structured channels for scientific communication, mainly via scientific journals, which guarantee strict quality control on published information, partly by the difficult access to electronic information on databases, because their access was mostly possible only via telnet.

The situation changed dramatically at the beginning of the '90's; while at the second European Conference on Current Research Information Systems (CRIS) in 1993 the utility of research information systems was under discussion, and other information sources – personal contacts, congresses and scientific literature – scored far higher in the interest of researchers⁹, the next two Conferences (Milan 1995 and Luxembourg 1998) gave accounts of booming development of such services in Europe¹⁰.

The reasons for this development lie both in structural changes in the research policy and in technological innovations in the electronic communication¹¹.

1.

At the political level, most European states during the '80's found a strong need for a better planning and coordination of the research activities, due also to the widespread crisis of public finances and to economic and occupational problems in Europe; thus, a strong argument was made in direction of improving the effectiveness of scientific research, to avoid duplications and to foster the transfer of results to industrial innovation; the main political arguments in this direction can be found in the documents of the European Union (Guzzetti 1995) and, for Switzerland, in the publication of the Swiss Science Council and of the Federal Government (Conseil Fédéral 1994; Conseil Fédéral 1998).

The set-up of the European research programmes – the first framework programme started in 1984 – was a strong action in this direction: while these programmes account only for a small part of the public financing of research in Europe, the coordination effort and the great political visibility gives these programmes a central position in the research policy in Europe.

The set-up of the European programmes, with their focus on international cooperation in research, specific research themes of political and economic interest and the application to industrial innovation brought new needs in the field of research information and diffusion of the results, which could not be satisfied by the traditional communication channels used by the scientific community.

Thus in 1990, the European Commission created the Community Research and Development Information Service (CORDIS), a common platform for publishing all available information on the research activities financed by the EU. Since then CORDIS has developed a wide series of information

9 Maurits van der Graaf, Opening Speech to the Conference on Current Research Information in Europe. Amsterdam, December 1993; <http://www.fou.uib.no/cris/am93conf.htm>.

10 See the programme of the four CRIS Conferences held since 1991, so as the minutes of the last meetings of the partners of the network of European research information services (EUROCRIS) at: <http://www.fou.uib.no/cris/>.

11 The proceeding of the last CRIS conference, held in Luxembourg in March 1998, give a very broad account of the recent developments and of the major issues in the field of CRIS: <http://www.cordis.lu/cris98/>.

services, including databases on European research projects and results, a large website, including news and events services, a series of printed publications and, during 1998, a push service called CORDIS-Rapidus (see section **; Vounakis 1998); due to its strong links with the telematics research programme, CORDIS also contributed to the technical development and experimentation in this field and thus played a leading role in the development of RIS in Europe.

2.

At the technological level, the WWW brought a key development in improving the accessibility of research information services. Thanks to the use of web interfaces to on-line search most of the databases, all the content of research information services is now accessible to inexperienced users, who do not have specific technical knowledge and equipment (e.g., to handle telnet protocols); moreover, the combination of databases – for the storage of standard information – and static web pages for publishing standard information has strongly improved the information content of these services; moreover, web technology now allows a decentralised management of research information services, where parts of the service can be delegated to external units or where research teams can directly input the information in the central db. As a result of this evolution, many European countries have now well developed research information services¹²; in the framework of the ERGO project (European Research Gateways On-line), the European community is also trying to create a common interface that gives the possibility to enquire most national research information services at the same time, based on the CERIF format; ERGO is now available on-line on CORDIS with a limited choice of source databases (<http://www.cordis.lu/ergo/home.html>).

Thus, the development of CRIS at the European level is closely linked to the issue of information classification and indexing in the scientific field. While classification schemes for scientific literature are quite common, standardisation for information on research projects started in the '70, with the major objective of permitting data exchange between different research databases; this work brought to the definition of the Common European Format for Research Information (CERIF) by the European Community at the beginning of the '90's (Commission européenne 1991; see also Van Woensel 1998 for a good account of this development).

CERIF is now under revision to address the broadening of the information scope of CRIS in the direction of general information on research activities; at the same time, this revision will take into account the need to interface CRIS via the Internet and the parallel development of metadata standards for web pages (e.g., Dublin core; for a review of classification and metadata formats see Dempsey et al. 1997).

The European dimension also brought the issue of multilingual information retrieval and of automatic translation to the centre of CRIS development, a most important theme for the European Union due to the need to deliver the information in the main languages of the member states (see the Home-page of the Multilingual Information Society Programme of the EU for a review of activities in this field; <http://www2.echo.lu/mlis/en/home.html>).

8.2 WWW as the main publication support of research information

Despite these improvements in the architecture and technological support, most CRIS remain bound to a fairly traditional model of information systems, where the information is collected and formatted by a central editing team according to uniform standards and selection criteria; for this reason, the most important CRIS are issued from central institutions that administer and finance research programs – such as the European Union or the central research agencies of European countries –, which thanks to their institutional position have the channels to get relatively complete information on research (e.g., because they finance the projects).

Thus, CRIS tend to collect only information on research which is organised in research projects with third party financing, whereas the free academic research and the production of intermediate results – e.g., working papers – tends not to be included.

At the same time, almost all European universities do now have a website and many research departments use the WWW to make their research activities known, thus publishing research descriptions, resources, working papers, conference presentations, even if they have not been reviewed and officially published. A great deal of the information on research activities is now accessible via Internet, but doesn't match any quality or editorial standards, and is not formatted in a form that allows precise information retrieval (e.g., via keywords or metadata standards).

While search engines are used widely for specific queries – e.g., to find information on a scientist or on

a very specific research project via generic search engines like AltaVista – or to search a limited domain for a specific topic – e.g., on the electronic version of the research report of a University –, the quality of the retrieval is too low to give good results when searching a wide domain for a broad scientific theme.

In the framework of the European telematics programme, the DESIRE project (“Development of a European Service for Information on Research and Education”; <http://www.desire.org>) addressed this issue via the concept of “Subject gateways”.

Subject gateways are catalogues of Internet resources, which have been verified in respect to their informational quality and classified according to some pre-defined scheme; thus subject gateways are similar to traditional library catalogues, but instead of printed books they contain a list of Internet resources in various formats; thus, they fully exploit the potential of Internet as a common platform to access information, but rely on traditional methods (hand-made) for classification. Thus, subject gateways for research information are very similar to services like Yahoo, but use specific criteria and classification schemes for the research information field.

While search engines normally get all the resources in an Internet domain, subject gateways do have a precise selection procedure for information, according to the information scope of the gateway, the content of the resource and its quality; moreover, they deliver very precise information about their content and selection procedures, so that the user can guess what their information content is from the beginning.

An example of this model can be seen at the Social Science Information Gateway (SOSIG; <http://www.sosig.ac.uk/>), a website that offers a db of Internet resources in the field of social sciences. Besides the traditional search mask, also SOSIG offers the possibility of browsing through its subject catalogue; resources are classified using the Universal Decimal Classification of libraries. Moreover, a mask to submit new resources is added to the websites, while people interested to become regular correspondents to the service can apply for this.

While the subject gateways concept is appealing because of the good quality control and classification scheme, it is too time-consuming to ensure a complete coverage of Internet resources in this field.

A second, perhaps complementary approach is that of the automatic creation of web catalogues. This can be done using combined harvester tools, i.e. tools which combine a harvester, which searches a definite web domain for new information and collects it in a central db, with an indexing module which extracts relevant information from the collected data and automatically generates a catalogue (see <http://www.lub.lu.se/combine/> for an example).

While the quality of such databases can be expected to be lower, they can cover a larger scope of resources without delay due to procedure of human classification; examples of such indexes are the Nordic web Index (<http://nwi.lub.lu.se/cgi-bin/egwcgi/egwrtcl/nwihelp.tcl/lang=en?helpon=toppage>) or the European web Index (<http://www.desire.org/html/services/resourcediscovery/indexing/>) which is being developed in the DESIRE project. Also SOSIG offers a Link Harvester Index (http://www.sosig.ac.uk/help/what_is_harvester.html), as an alternative if the user doesn't find in the main db interesting records; in any case, the user is given clear information regarding the differences between the two resources.

8.3 The Swiss situation: fragmented information

While at a European level, great efforts are being made to improve access to research information, the Swiss situation is characterised by a very fragmented and incomplete approach to this issue. In fact, there is neither a central information system on research in Switzerland, nor a complete db of relevant research information.

Nowadays, resources available on the Internet include:

- the web-site of Switch, the Swiss Academic & Research Network, which holds a collection of links to the main research institution in Switzerland and a db of research teams, with links to their web pages (http://www.switch.ch/edu/research_index.html);
- the website of the Swiss Science National Foundation (<http://www.snf.unibe.ch>); being the major financing body for research in Switzerland, the SNSF holds important information on new research programmes; the db of the research projects funded by the SNSF holds about 3500 records, are the backbone of research activities in Switzerland (http://www.snf.unibe.ch/WWW_e/Projekt Datenbank_e/inhaltfr.html); however, for many projects information is limited to the title and the name of the people responsible;

- some Swiss universities do have good research reports, which contain standard information on the research teams and projects in the school, one example is of the Swiss federal institute for technology in Zürich ETHZ (<http://www.rereth.ethz.ch/>) and in Lausanne (http://research.epfl.ch/research/webdriver?Mival=IRS_nav_index&Milang_env=2); the research report of ETHZ uses Eurospider to perform advanced information retrieval;
- there are also some research information systems in specialised fields such as the PROCLIM information service on climate and climate change (<http://www.proclim.unibe.ch/HomePage.html>) and the SIDOS service (Service suisse d'information et d'archivage de données pour les sciences sociales) which collects information on social science projects (<http://www-sidos.unine.ch/>).

All these information sources are very diverse in their scope, objective and format; moreover, very scarce available information on research projects funded directly by the public agencies is (e.g., the Swiss national state). To improve this situation, the Swiss Federal Office for Education and Science is currently developing the project of a central research db for all the research funded by the public powers (ARAMIS –Administration Research Management Information System –project; see <http://www.admin.ch/bbw/d/forschnat/aramis.html>); a first version of the db, which will fully conform to European standards and will be interfaced with the ERGO project, should be available during 1999.

In this framework, deserves a special mention the Swiss network for information on international research programmes, which was created by the Swiss Federal Office for Education and Science (BBW) to promote the participation of Swiss researchers in the European programmes, since Switzerland is not fully integrated in these programmes. This network covers all Swiss universities through a local «Euroguichet» and two national contact points, responsible for providing more detailed information on specific programmes.

This network is interesting because it is the only example of a service that diffuses information on a Swiss level on research programmes without being part of the agency that finances them; this is particularly important because, in the present situation of scarce financing for research, agencies such as the SNSF do not have a strong motivation to improve information on funding opportunities. However the steady growth of the Swiss participation in European programmes in the last five years demonstrates however the usefulness of such information.

Moreover, the network has developed a very active policy of information in the past years, mostly through the ten Euroguichets, but also via printed bulletins (e.g., Euroscope-CH published by the BBW) and electronic communication (<http://www.admin.ch/bbw/d/forschint/auswahl.htm>) and it has enlarged its focus to almost all international research programmes (e.g., programmes like Intelligent Manufacturing Systems or COST or INTAS).

Swiss federal office for education and science	General coordination
National contact points for european research programmes	Specific information on each programme
Swiss National Science Foundation - International office	
Kontaktstelle für schweizerische Beteiligung internationalen Forschungsprojekten, Zürich	
Euroguichets in each Swiss university	Local contact points
Swisscore	Swiss contact point in Brussels

While researchers can rely on very advanced information systems in the research field, there are very few examples of push services in the R&D area; in this section we will present the two most interesting examples, i.e. the push service of CORDIS, the Information service of the EU, and the ELFI project, a service which delivers information on research funding opportunities in Germany developed at the University of Bochum.

In fact, the main instrument to automatically diffuse information to groups of users in the research field are mailing lists. Mailing lists are easy to install and to manage, mostly via very simple web interfaces, are robust, require very little intervention from technical personnel, and are readily available as off-the-shelf products.

As already emphasised, mailing lists are widely used, and their success has to be kept in mind when designing push service.

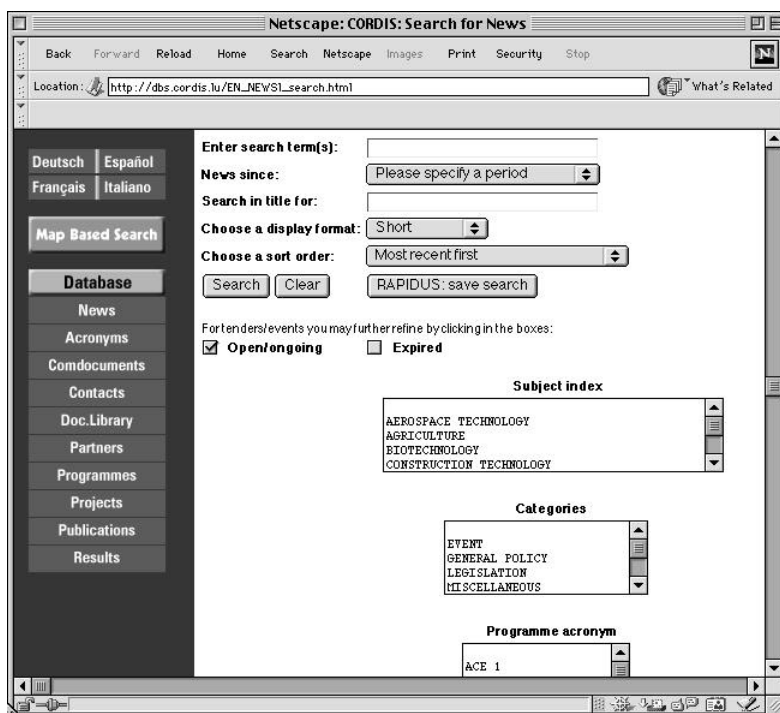
The mailing list well suit the information needs in the scientific community, because research information is specialised around specific research subjects and, thus, the information content is normally quite homogeneous and there is little scope to differentiate the message content between different subscribers.

However, as has been explained, researchers have a growing need for generic information about research programmes and funding opportunities, which cover a far broader scope than the specialised information in their research area; moreover, this information needs to be retrieved quickly, because most of the funding opportunities have fixed deadlines for proposals. This leads us to foresee a growing scope for the use of push services, mainly in the area of research funding and research policy.

9.1 CORDIS Rapidus

Two years ago CORDIS has set up a push service named CORDIS-Rapidus, which enables users to receive, by e-mail, news on research matching a given profile defined by them.

First of all, a user has to compile a personal profile. The service's subscription is free, because it's paid from the EC organisation. Content is organised by topics (for instance, telecommunications, food, commerce, ...); users can subscribe to one or more topics of content. Also, within each topic area, a user can optionally define one or more keywords, in order to restrict content delivering only to information that match the keywords (for instance within "telecommunications" topic area, we can restrict content defining keywords like "push", "webcasting" or "internet"). If user doesn't specify any keyword, whole content regarding the topic will be delivered.



With a daily schedule, service match each user profile with new content available on the db. When new data are found, the result of the search is delivered by an e-mail containing the text of each news. Sometimes, if the text of a news is too long, e-mail contains a links to a web page where the information can be found.

This service can be characterised as follows:

Technology used: service is implemented coupling an information retrieval system with a mail service delivery tool. No commercial push tool seems to be used.

Target user: exclusively the research's world. The kind of data delivered, simple plain-text, shows that this service is tuned to a professional target of recipients.

Benefits: simple receiver program: almost every one who uses Internet is able to read e-mails.

No need to distribute and to install another software on users' computers.

No intrusive to user.

Open system: every computer's platform has an e-mail reader program.

Possibility for the user to specify a set of keywords in order to restrict content in each topic area.

Drawbacks: users can receive an e-mail message too long, if user don't set an appropriate set of keywords or systems receives a lot of data that match the user's profile.

The system searches for new data only once a day.

This is a reasonable solution for the kind of content published and for the user's target of service. But this could be a high restriction in other contexts.

A wrong set of keywords may obscure relevant data (for instance, if in telecommunication area users set the keywords "push", and "broadcast", they'll never receive a single piece of news where appears only the term "webcast", even if it is the same meaning).

Market's strategy: service is paid from the EC, and is supplied for free. The service is supplied to be a professional network framework among researcher.

Each message can contain many relevant pieces of information, or only one, or — if too much long to be send by an e-mail message — links to websites where relevant information can be found.

CORDIS-Rapidus works only on the content of R&D databases of CORDIS; this has the advantage that all the information to be pushed is already classified and, in fact, the user has to define profiles according to the same classification criteria; thus, information can be retrieved very efficiently and there is no risk for the user of getting information that doesn't correspond to a set profile. On the other side, this push system is completely limited to the CORDIS db and cannot be extended to other information sources without a very expensive classification work.

9.2 | The ELFI project

ELFI (<http://www.elfi.ruhr-uni-bochum.de>) is a project to set up an information brokering system in the field of research funding which was realised between october 1996 and september 1998 by the Ruhr University Bochum and by the GMD – Forschungszentrum für Informationstechnik GmbH.

The ELFI service is built on the following components:

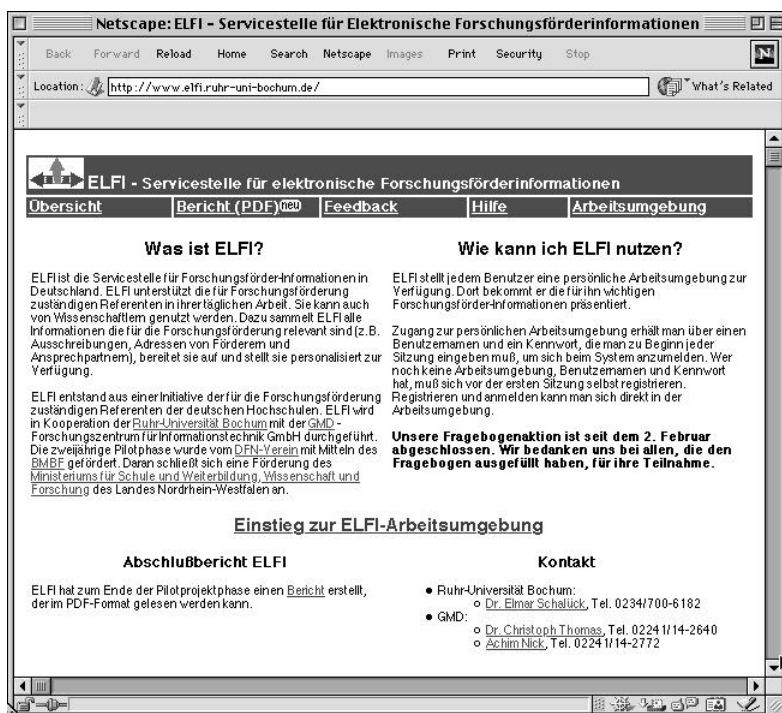
- A gatherer module, which searches regularly the websites and the databases which provide information on research funding opportunities for new documents; these are copied to the ELFI server. For documents in paper form a scanner module is used to retrieve the information, a proceeding which is necessary mainly for small institutions, which do not have a website.
- A master tool, i.e. an interface where the information editor can look at the new documents, if it is the case compare it with already existing information and, finally, classify and abstract it;
- An user interface, where users can subscribe to the service, define their user profile and look for existing and new information.

Information scope of the service are all the funding instruments for research in germany, including also the international and the european programmes (through an interface module with CORDIS). The information is classified using the scheme of the Deutsche Fördergesellschaft (DFG), a strictly hierarchical scheme with as first-level divisions the main scientific disciplines (e.g., human sciences); a list of transversal subjects is added to handle issues which are interdisciplinary (e.g., environmental research). Moreover, the information is classified and can be retrieved according to the funding institution, to the type of funding (e.g., programm call or research grant), to the region and to the deadlines for request.

At the technical level, ELFI is built upon an object-oriented database for the information, using Java as programming language for the different functionalities; the interfaces are built with a client – server architecture, using a Java applet to the user side. In respect with the architecture used in the Swisscast push service, this technical solution allows the programming of more complex functionalities (i.e., to define profiles with many interest areas); to the other side it is quite demanding on the technical level, which can be severe limitation at

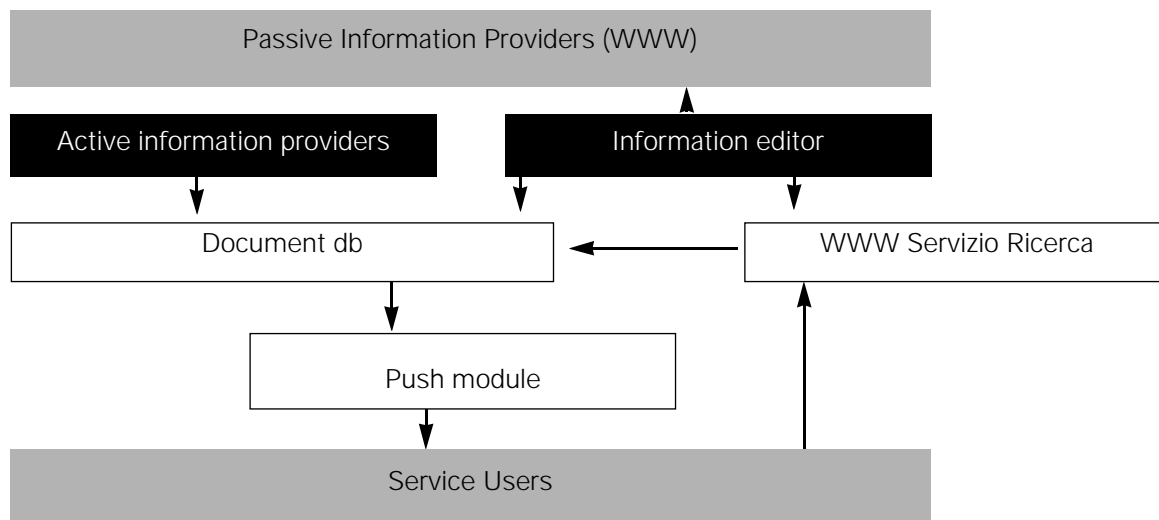
the user side. Also experience shows that the complex functionalities of the user interfaces cannot be exploited by the average ELFI user without a tutorial from the project team.

The project phase of ELFI has been ended in 1998, while the service has already more as 1000 subscribers in Germany; the project responsables will try to continue ELFI activity as an independent information service in the research area, which should be financed by the german unversities and research institutions.



In this section we outline the main features of the research information service developed by the SwissCast project (RIS-ita). The objective of the service is to deliver actual information on research programmes, with particular reference to funding opportunities, to Italian-speaking people in Switzerland; a second objective is to inform about research activities developed in the Italian-speaking part of Switzerland.

10.1 | General architecture



As a general structure, the service is built as a research information service, based partly on a document db and partly on a conventional (static) website, coupled with a push module to inform users on new entries in the db (see the figure). With respect to the system presented in chapter 6, the main difference is that the document db is integrated with a website that contains general information about research programmes and references to external websites.

Thus the information content of the service is divided into two different parts:

- The information inserted into the document db, in a standard form, which will be pushed to SEUs;
- The information contained in the html pages of the website of Servizio ricerca (<http://www.ti-edu.ch/servizi/ricerca/>), which can be accessed directly via Internet; these web pages give also access to the information contained in the document db via standard query interfaces.

The following table explains the main differences between the two parts.

Feature	WWW	Document db
Information content	General information on research programmes & activities	Actual information, in particular on funding opportunities
Information format	Static html pages	Records in a db; output as dynamic html pages
Information structure & classification	Free	Fixed item structure as db fields
Indexing	Dublin core metadata on each page	Full classification with a fixed keywords scheme
Input	By the information editor as html pages	By the information editor or by the active information providers via standard forms
Output	http (fixed links)	http, dynamic, via standard forms (queries)
Push	No	Yes

10.2 Main service features

We can describe the main features of RIS-ita as follows.

10.2.1 Target publicum

The target publicum are researchers and other persons interested in research activities – e.g., politicians; private companies; mass-media – in the Italian-speaking part of Switzerland – Canton Ticino and some small parts of Grisons – and, more in general, native speakers of Italian but living in the rest of the country.

This area is particularly interesting for research information because the Università della Svizzera Italiana was opened in 1996 and the High School of Applied Arts (Fachhochschule) of Ticino in 1997; thus, despite the previous presence of some research institutes, Ticino can be seen as a new developing area in Switzerland for High School and Research activities, then an ideal test-bed for a new information service.

While Italian is one of the three official languages of the Swiss Confederation, it has till today played a very marginal role in scientific communication. This is reflected also in electronic information: the most important web-sites in the domain of research policy and funding have either no information in Italian (e.g., the website of the Swiss National Foundation) or very little information in this language (e.g., the website of the Swiss Federal Office for Education and Science); also printed publications in this domain are mostly in French and German.

Thus, there is considerable scope for a research information service in Italian.

10.2.2 Information editor

The role of the information editor is taken by the head of the Research Office USI/SUPSI (“Servizio ricerca”) Dr. Benedetto Lepori. The Servizio ricerca was created at beginning of 1997 and it is officially charged by the Swiss Federal Office for Education and Science to diffuse information about international research programs in the Italian-speaking part of Switzerland.

The IE is a specialist in research information, he knows and can evaluate the quality of information sources to be accessed, so as of the active information providers that are allowed to input new data into the service. Moreover, he has a very broad knowledge of the research panorama in the Svizzera Italiana and, in general, in Switzerland. Due to his experience in this field, he could suggest many practical solutions to the pro-

blem of classifying and organising research information and to define the scope of the service.

Finally, due to his position of co-ordinator of the research in the Svizzera Italiana, Dr. Lepori has very good contact with researchers and thus he can motivate to the use of the new service; moreover, full integration can be assured with other research information activities in the Svizzera Italiana.

10.2.3 Information scope & content

The focus of the service is to deliver fresh information on research programmes and, in particular, on new funding opportunities for scientific research.

The table gives a basic classification of the information; the rationale is to make a clear separation between news and fresh information on one side – which need to be pushed – and general information on research programmes, on the other side, that can be at best viewed by accessing the website. Moreover, this integration is useful because new users can at first get a glance on the general structure of a research programme, before reading the new announcements (e.g. of a specific call for project).

Information category	Support	Push	Comments
General information about research programmes at national and international level	WWW	No	This information has to be prepared at the beginning of each Programme, but normally it doesn't change during or afterwards the implementation phase. Thus this information can be at best published on static web pages on the web part of the service. However, reference to new items in this section can be given through the news section of the service.
General information about research projects and activities	WWW	No	This is the main content of most of the Research information systems (e.g., CORDIS databases on European research projects and results). This information domain is already well developed and there is no need for creating a new service in this area. Thus, the website contains fairly complete reference to these sources.
Information about research projects and activities in Ticino	Document db & WWW	Yes	This is a special focus of RIS-ita, because there is no other service in Switzerland that can offer a review of this information. This information is nowadays present in the websites of the Università della Svizzera Italiana and of other research Institutes in Ticino. To handle this information, we will give the possibility to each research institute to insert into the document db their information (i.e., in the news and events section). General information is also given in the website under the specific section about research in the Svizzera Italiana.
News on research programmes and funding opportunities	Document db	Yes	This is the main focus of RIS-ita; this part of the information is also the main reason for setting up a push service.

While the information in the static part of the website can be formatted in a very flexible manner, the items in the document db follow a fixed structure and have a unique classification scheme; this is necessary in order to produce html output and for the functioning of the push service.

The table gives the list of the information fields in the document db for research (they are defined in Italian); for the technical details on the db refer to chapter 6.

Field	Content	Value
Title	Title of the item	Free text
URL	URL of the WWW page which contains additional information on the item	URL By default the home of the information provider
Abstract	Short abstract	Free text
Type	Type of information	<ul style="list-style-type: none"> • notizia; • messa a concorso; • borsa di ricerca; • manifestazione.
Subject	Scientific subject code of the information	Scientific index codes of CORDIS
Loc	Geographical area of the information	<ul style="list-style-type: none"> • Svizzera Italiana; • Svizzera; • Unione Europea; • Programmi internazionali.
Date	Input date of the item	Date
Expiration date	End date of the item	<ul style="list-style-type: none"> • notizia: date + 6 months; • messa a concorso: expiration date; • borsa di ricerca: expiration date; • manifestazione: event date.
Source	Information source	<ul style="list-style-type: none"> • for information input by the AIPs = provider; • for the information input by the IE = original source of information
Luogo	For events only: place of the event For other information type this field is void	Free text
Lingua	Language of the original information (referred web page)	Fixed list
Provider	Information provider	Fixed list

Following remarks to this table are needed:

- the two fields “type” and “loc” have been defined on the basis of the practical experience as a workable solution for information classifying; they are very specific for this service (however, the type field is much similar to the classification used by CORDIS);
- for the subject classification, we have taken the list of Subject Index Codes used by CORDIS, because this list is well adapted to the needs of information on research programmes and all information provided by the European Union follows this scheme; moreover, standard translations of SIC exist in most European languages.

The list of the codes and their definition can be found at <http://www.cordis.lu/en/src/sicen.htm>.

- as a general rule, all information in the db will be input in Italian, but reference could be given to documents in other languages.

Using the terminology previously introduced in chapter *, the information sources are divided in **passive providers** and **active providers**. As we can recall, passive providers produce relevant information, which have to be selected and inserted into the document db by the IE; AIPs insert on themselves new information into the document db.

Passive providers

The passive providers are in principle all the sources in the research field which give relevant information

for the task of the service. Thus, it is the responsibility of the IE to select the most relevant sources, to search them periodically for new information and to input this information into the document db.

Given the service nature, passive providers will be mostly agencies and programmes which finance scientific research, either in Switzerland or on the European and international level. The following table gives a list of the major information providers.

Information provider	Description & type of information	Main information channels
CORDIS	Research information service of the European Union; almost complete information on the European research programmes (including calls, programmes' description, projects' description).	1. WWW 2. CORDIS-Rapidus
Swiss National Science Foundation	Information on the research programmes funded by SNSF; a db of research projects is provided, but is far from being complete.	1. WWW (news are published with some delay) 2. Newsletter (Agenda FN); 3. Printed information; 4. Direct contact.
Swiss network on international research programmes	All the information on the European programmes and the opportunities for Swiss participation; information also on other international research programmes (Eureka; IMS...).	1. e-mail; 2. Direct contact; 3. Newsletters 4. WWW.

The IE receives new information through the following channels:

- The websites of the information providers.
- Mailing lists and the existing push systems in this area (e.g., CORDIS-Rapidus);
- Personal e-mails from partners (e.g., in the Swiss information network for international programmes);
- Printed media (mostly newsletters);
- Direct contact with researchers and research officers, during meetings or by phone.

At the moment, websites provide most of the relevant information (included all documents that need to be downloaded), the other sources being used mainly as pointers to have notice on the news and getting the web reference; personal contacts are mostly used to check information and to get more precise details; printed and direct information is also useful because in some cases new information is published on websites only with a certain delay.

When the gatherer module will be operational, it will be possible to search systematically the websites of funding agencies and international research programmes for new information and thus to give also information on very specific programmes and funding opportunities.

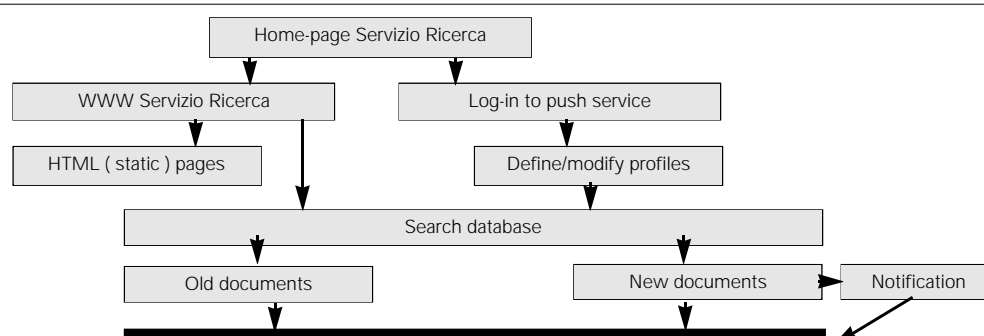
Active providers

Given the scope of the service, active providers will be only institutions in the Svizzera Italiana that do research activities and that are interested in diffusing their information through the service:

- Faculties and Institutes of the Università della Svizzera Italiana;
- Departments and Research Institutes of the Scuola Universitaria Professionale della Svizzera Italiana;
- Other research institutes in the Svizzera Italiana (see the list at: <http://www.ti-edu.ch/catalogo/>).

AIPs will be bound to the service with a cooperation agreement that defines their rights and duties, to ensure a regular input of information and to avoid bad use of the service (e.g., to insert too much information or information that doesn't match the scope of the service).

10.3 Information output to the users



While in the previous section we have described the informational content of the service and its sources, it is here presented the information output that users accessing to the service will receive.

10.3.1 Access to the service

Basically users access the service through the home page of Servizio ricerca (<http://www.ti-edu.ch/servizi/ricerca>); from here, they can choose either to access directly the web pages, either to define their own user profiles in the push service. In the first case, they will look at all existing documents in the information service, either on the static part or in the document db.

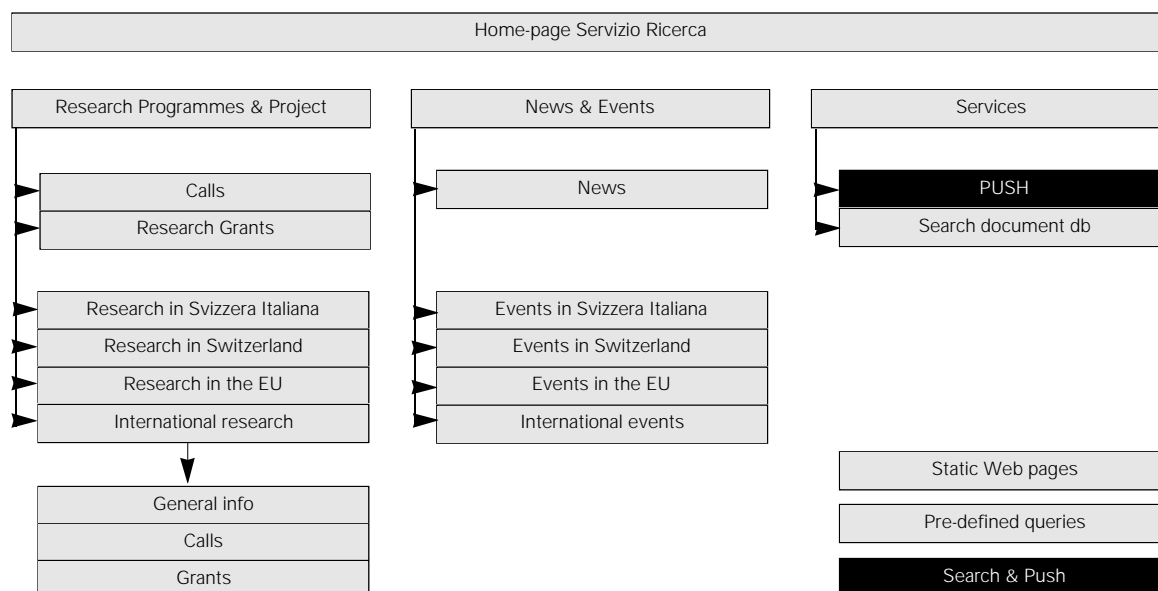
In the second case, they will get all new documents inserted in the document db (pushed via their personal home-pages and via e-mail notification); moreover, they have the possibility of searching separately the db for old documents matching their profiles.

10.3.2 Integration within the web structure

In the planning of the service much care was devoted in ensuring the structure of the website to be consistent with the data structure in the document db, so that from the user-side the service could be perceived as a single reality.

As it can be seen in the figure, the information content of the document db is fully integrated into the website of Servizio Ricerca by a series of pre-defined queries, that make use of the two fields “type” and “loc” of the db; in particular, the latter field has been introduced in the db in order to match the structure of the web-site.

These queries extract from the db all items corresponding to the query content; for example the query “Manifestazioni nella Svizzera Italiana” will give back all items in the db which correspond to events (field type=manifestazione) in the Svizzera Italiana (field loc = SI) and which will happen after the current date (expiration date>current date); the result is shown in the form of a list ordered by date, with links to each retrieved item.

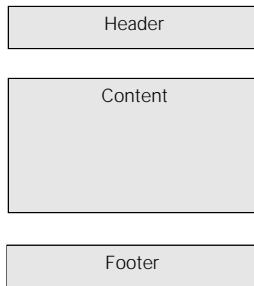


Given this structure, the user can access the documents in the document db as follows:

- from one of the pre-defined queries provided in the website of Servizio ricerca;
- from the general search mask;
- from the personal web page of the push service (new documents attributed to each profile).

The document output in html format takes into account the following points:

1. The output has to be slightly different for each information type (field “type”),because different information content is needed (e.g.,the location is given only for events); so, separate templates are to be provided for each of the four information types;
2. Users need to know at the first glance which type of information they got;
3. Users need a clear link to related information in the static part of the website, even if they get the document from the push service; e.g.,in a call for European programmes reference must be given to this section of the website.



Thus we have designed the following structure for the html output:

- The header gives the location of the document in the web structure, that can be reconstructed using the two fields “type”and “loc”,eg.A db entry with type = “messa a concorso” and loc = “EU”will be given the following pathway: /ricerca/Unione europea/messe a concorso/
- the content gives the informational content in the four different structures according to the “type”of information;
- the footer gives the address of the IE and the URL of the home-page, in case the output is printed; it is identical to the footer of the (static) pages in the website.

In the precedent section we presented the Research Information Service in the version that is operation since the beginning of may 1999.

However, this structure is the results of a series of developments that have happened since mid of 1997. The following table summarises the main milestones.

Date	Milestone
January 1997	Creation of the Servizio ricerca USI/SUPSI
October 1997	Start of the SwissCast project
January 1998	First version of the website of the Servizio ricerca online
March 1998	Start of the mailing list "news-ricerca"
April 1998	End of the Technology review in the SwissCast project; decision to develop the application in the research information field
June – September 1998	Complete remaking of the website of Servizio ricerca in view of the introduction of the push service
September 1998	First version of the push service installed (based on Eurospider search engine)
November-december 1998	First test phase of the push service
February-march 1999	Development of the Second version of the SwissCast push services & integration with the web of Servizio ricerca
Mai 1999	Start of the service

11.1 | Website of Servizio ricerca & mailing list

The website of Servizio ricerca was first put on-line in January 1998. The first version contained general information on research programmes and on the activities of Servizio ricerca.

On the basis of this experience, the website was completely re-designed in the summer 1998; the redesign involved the following main changes:

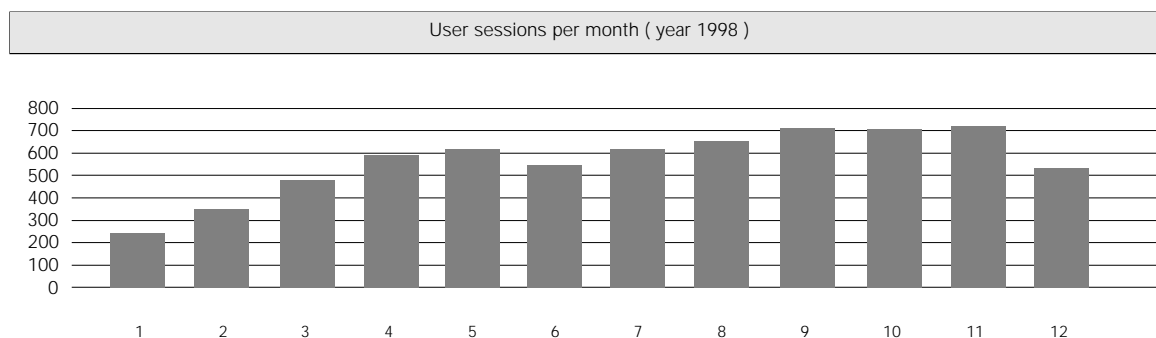
- A systematic definition of the architecture and of the content structure;
- The definition of formatting standards for the information;
- The design of a layout and graphics coherent with the information content;
- The introduction of metadata according to the Dublin Core standard and using the scientific index codes by CORDIS.

The redesign of the web-site can be seen as a first step in the direction of standardising and indexing the informational content and, thus, as a pre-requisite to the realisation of the service presented here.

At the same time, we introduced a mailing list for researchers in Ticino which is used to announce new information published on the web-site; the mailing list contributed strongly to promote access to the information hosted by the website.

The growth of the access to the website can be seen in the next graphics, that gives the number of user sessions per month during the year 1998. A more deep analysis of the user access will be prepared in the next months.

On the basis of this work, a first version of the push service, based on the Eurospider search engine, was installed in august 1998 and underwent a long phase of testing with a selected group of users; the results of this phase were of crucial importance for the development of RIS-ita and are shortly described in section 3.2.



RIS-ita has been set into operation for the general public at the beginning of may 1999.

The development and promotion of the Service will be in charge to the Servizio ricerca USI/SUPSI; the basis will be the wide network of contacts with researchers in the Svizzera Italiana, so as the electronic communication means already in use.

The strategy will be of a step by step development to enlarge progressively the information scope and the number of the users, starting with the existing nucleus of knowledge and users.

In particular, the following activities will be realised (for a detailed presentation make reference to the project plan for 1999/2000):

- Optimisation and development of the service in direction of a broader information coverage and to promote the service to the end-users;
- Assessment of the use of the service and of user satisfaction with it;
- Promotion of the service architecture in view of the realisation of a similar service in the Swiss context.

We plan a major evaluation at the end of 1999, with the publication of the main assessment report by the swisscast project in january 2000; these results will be the base for the final revision of the service in the spring 2000.