

ERAWATCH EVALUATION

Brussels, 29 July, 2008

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A team of five evaluators was appointed by DG-RTD on 31 March, 2008, to carry out an evaluation of ERAWATCH with the purpose of informing decision makers on possible options for its future development and, in particular, for the negotiations of the new contract with JRC-IPTS. The Evaluation Process, as described below, consisted in the analysis of documents, formal meetings with Commission representatives and relevant informal contacts.

The analytical part of the evaluation has been based on the extensive documentation provided, including transcripts of communications between the respective participants, formal meetings with DG-RTD, JRC-IPTS and less formal face-to-face contacts with DG-ENTR, DG-REGIO and a series of telephone and e-mail exchanges. Each of these sources of information and insight have been controlled by the Rapporteur and made available to the rest of the team. The technical part of the evaluation is based both on the findings and discussions of the meetings in Brussels on April 21st and 22nd and Seville May 26th and 27th, as well as on the evaluation of the documents and reports provided by the parties involved. A series of informal meetings and discussions were also held with relevant people, including the Brussels Technopolis Director, and the evaluators made a variety of contacts with users. The knowledge gained from all of these sources helped to shape the views and conclusions expressed in this Report.

This report contains the final results of the evaluation and addresses the key issues as requested by the Commission in the Terms of Reference. It consists of an Executive Summary, an Introduction, the Main Report (in five Sections) and the Conclusions with Recommendations for the future development of ERAWATCH and its relationship with TrendChart¹. A number of related issues were also brought to the attention of the evaluators during the evaluation period. These are not addressed separately but commented on where appropriate and to the extent that the evaluators saw fit to pursue these matters.

A CD containing some examples of web-based information services and a series of Annexes accompanies the Evaluation Report. Annex 1 contains key elements of the evaluation briefing and details of the tasks set for each of the evaluators. Annexes 2-5 present some of the useful information gleaned from the formal meetings with Commission Staff. Annexes 6 and 7 contain the ERAWATCH User Survey and a questionnaire sent by the evaluators to a small sample of users of the ERAWATCH web site, respectively.

The Evaluators would like to express unanimously their appreciation for the excellent spirit of cooperation on the part of all of the staff at DG-RTD, JRC-IPTS and DG-ENTR with whom they contacted. Especially outstanding were the efforts of Mr Larosse and Mr Boden in responding promptly to the requests for documents and comments on issues.

¹ Operated by DG-ENTR <http://www.proinno-europe.eu/trendchart>

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ADDITIONAL MATERIAL

A CD containing:

- Some examples of web-based information services.
- Annex 1 Evaluation briefing and the evaluators' tasks.
- Annex 2 Key points from the 1st Meeting with DG-RTD.
- Annex 3 Key points from the Meeting with JRC-IPTS.
- Annex 4 Key points from Meetings with other DGs.
- Annex 5 Key points from the 2nd Meeting with DG-RTD & JRC-IPTS.
- Annex 6 ERAWATCH User Survey.
- Annex 7 The Questionnaire used in the Evaluator's ad-hoc survey.

² ERAWATCH Network

EXECUTIVE SUMMARY

ERAWATCH was conceived to provide knowledge and a better understanding of national research systems and of the environment in which they operate. The main beneficiaries of this service would be the Commission officials that prepare briefings and those involved in European research policy making. This original concept continues to be valid, the evaluators have concluded that ERAWATCH has not yet made an effective contribution to the process of evidence based policy making and its outputs have only been used to a limited extent, both within the Commission and by policy makers in the Member States.

ERAWATCH continues to be “work in progress”, many of the initial shortfalls have now been overcome, much useful information has been gathered and valuable analysis carried out and the intense efforts of the JRC-IPTS to continue to improve its operation are to be commended. However, both the level of use within the EC, and of user satisfaction among policy makers outside of the Commission Services, could still be significantly improved.

This evaluation report endeavours to explore how the project could become more effective and successful (within the limitations imposed by the legal, administrative and financial boundaries) by focusing primarily on the key needs of the Commission services while also addressing those of research policy makers in the Member States.

This report explores two principal avenues:

1. how ERAWATCH could become more effective in satisfying the specific demands for analysis of research policy-mixes in Member States and the development of the ERA-dimension as well as the requirements of evidence based policy making;
2. how to optimise the use of modern information technology to create a user friendly interface via a website that could present, in a transparent and seamless manner, the contents of both the ERAWATCH and Trend-Chart databases.

The report addresses the former under the headings of:

- the Information Inventory and the EWN (Section 1);
- the Intelligence Service (Section 2);
- the cooperation between ERAWATCH and TrendChart (Section 4);
- the ERA dimension in ERAWATCH (Section 5);

and the latter under Section 3, “the Website”.

Five of the principal recommendations are:

1. A more active involvement of Member and Associated States should be sought in the Inventory part of ERAWATCH.
2. The objectives of the Intelligence Service should be aligned with the new EU policy objectives and it may be more appropriate to refer to this part of the project by the term "ERAWATCH Analysis".
3. A modern user-friendly web site should be implemented in such a way that it provides a transparent, flexible and well thought out integration of the information and analysis available from both TrendChart and ERAWATCH, which could in the future also bring together other ERA related policy information services.
4. Continue to develop the cooperation between, and where appropriate achieve integration of, related EC information services - including those under the responsibility of different Directorates General.
5. ERAWATCH's specifications should be carefully re-addressed and its activities streamlined with the objective of achieving a cost effective information and knowledge management system that is capable of monitoring and supporting the development of ERA in the Member States, as well as becoming a very valuable tool for strategic analysis by the Commission and other policy makers.

Clearly the right balances will have to be struck between very clearly specified and agreed objectives, specifications, indicators of usefulness and benchmarks, and the effective monitoring of the level of the use of, and satisfaction with, the products available via the ERAWATCH website. At the same time a reasonable level of flexibility in the working relationships between DG-RTD and JRC-IPTS and the EWN will have to be maintained.

The technical analysis component of the evaluation sets out in considerable detail how the web-based user interface should be overhauled and modernized in implementation of the recommendations presented. This has to be done through a process of migration, in such a way as to preserve the operability of the web service during its transformation.

INTRODUCTION

ERAWATCH was initially set up to help meet the need for a system capable of providing up-to-date, well informed and targeted information on Member States in the field of RTD policies, funding and structures. After consulting with selected external experts, DG-RTD and the JRC-IPTS entered into a partnership whereby each paid a proportion of the costs involved in setting up and operating ERAWATCH. A targeted workshop was held (ERAWATCH Vision workshop, June 2007), which explored a variety of scenarios for both its medium and long-term development.

The initial agreement was for 2 years and specified a Framework Contract with an external service provider who would organise a network of country correspondents. Initially the information inventory and the intelligence service have been considered as separate activities, which have both provided input to the documents available to both the Commission Services and to external users via the website. ERAWATCH has two production phases:

- March 2005-December 2006; developing the inventory, starting the intelligence service and launching the website.
- January 2007-December 2008; consolidating ERAWATCH services at national level and expanding them to cover the EU level and transnational progress on ERA.

It has been made clear to the evaluators that the current context is quite different from the starting point, especially in view of the fact that:

- The current negotiation of the proposed contract extension between DG-RTD and JRC-IPTS provides an opportunity to improve the cost effectiveness and value for money of the project, while adjusting the specification and focus of the objectives and deliverables according to the new priorities.
- The ERAWATCH products are expected to “grow” in usefulness while the overall project will “shrink” in some aspects of its extension.
- ERAWATCH is seen as providing a valuable platform on which targeted products (e.g. the proposed review of policy developments and governance trends in research intensive universities) can be cultivated and harvested.

Moreover, there is an evident good will on the part of the management and staff at both DGs -ENTR and RTD as well as at JRC-IPTS to work together closely in the development and operation of ERAWATCH in conjunction with other EC information services, such as TrendChart. This bodes very well for the project’s future and its increased usefulness to the users.

MAIN REPORT

Section 1

The evaluators were requested to assess the problems and efforts of establishing the *information inventory*, including the functioning of the ERAWATCH Network [EWN] as an information-gathering infrastructure.

The declared objective of ERAWATCH was to, “collect data on national and regional³ research structures, organisations and policy developments. It will organise and structure descriptive information on existing national and regional research activities and will develop analyses and reporting activities on policies, their trends and the impacts of factors influencing them.”⁴

The ERAWATCH project has gone through a “learning curve” experience in the process of establishing the information inventory. ERAWATCH collects data on national research profiles, organisations, programmes and documents⁵. It organises and structures the information within its Research Inventory service and it develops further analysis and reporting activities on policies, trends and the factors influencing them within its Intelligence service.

The inventory is considered to be the core of the information service and constitutes a unique source of policy intelligence. Although the construction of the inventory has benefited from the experience of TrendChart, it was felt that its mode of operation, which was/is focussed on the production of yearly country reports, was inappropriate for the objectives of ERAWATCH. Therefore the ERAWATCH 'country profile' in fact started as an online publication. IPTS also expected mainly 'text' results, distributed via

³ The use of the expression “regional” is of course open to more than one use or interpretation e.g. the regions within a country, a region consisting of cross border neighbouring provinces of a set of neighbouring countries and a cluster of countries.

⁴ Final Report on the ERAWATCH Base-load Inventory, February 2005

⁵ The “regional” dimension has largely been overlooked during this initial period of ERAWATCH and this evaluation report will also address briefly the extent to which the evaluators recommend its inclusion in the future.

the web, and input for analytical work. As a result the EWN correspondents (considering themselves 'writers' and not 'collectors') perceived the data collection as a periodic exercise in preparation of their editing of the country profile, rather than regularly updating the country information as policies, structures and funding programmes changed/evolved. This has led to many users concluding that the information available via the ERAWATCH website fails to reflect the current state of affairs at a given moment of consultation.

Therefore, although ERAWATCH has succeeded to establish a base of primary information allowing an overall view of the national research and scientific landscape in each MS (and in some third countries) and the information provided is extensive and descriptive, it is also arbitrary and very often ad hoc. Moreover, it seems that parts of this information have a limited relevance for policy decisions and/or analysis and are very weakly connected to specific intelligence objectives. The use of templates has contributed to certain degree of uniformity in EWN efforts to collect information, however information would need a tight quality control in order to become a reliable starting point for further action. There is evidence that, as a result of other priorities, the templates for research programmes, organisations and documents were not developed as fully as would have been appropriate. The initial poor specification of the content, as well as the limited knowledge of some of the correspondents on the essential factual issues to be reported (considered less important compared to broader analysis), resulted in a situation where their information value was inhomogeneous. However both the EWN and the IPTS have succeeded in achieving a considerable improvement in these areas.

At present ERAWATCH has a relatively low reputation among the members of CREST as to the degree to which the information it provides is up-to-date and useful for evidenced based policy making. In some cases the criticism addresses the belated upload of information on new developments in the research policy of the respective countries.⁶ This is a factor that has discouraged users from using ERAWATCH. The need to over-

⁶ This view is based on the responses of CREST members to the invitation to comment on the ERAWATCH website in the course of two rounds of surveys conducted on behalf of the evaluation by one of the evaluators.

come this negative perception should be effectively addressed by both the EWN and the IPTS.

Another difficulty has been that the degree of comparability was initially rather poor. IPTS has endeavoured to improve this by introducing 'editing guidelines', however, even now the degree of accurateness necessary to perform information management for extracting targeted information across countries has not been achieved.

A lot of energy was devoted to setting-up an extranet to establish contacts/information flows between IPTS and the EWN. IPTS controls every bit of information before it is transferred to CORDIS. This has three obvious effects; a valuable accumulation of knowledge by the IPTS staff running the "country desks"⁷, which should in turn ensure more accurate information content but also a delay in the process of getting new information onto the website.

Research programmes form the core of the inventory, which is now part of a common database with TrendChart. Although a lot of effort was dedicated to the process of setting-up this common database, the presentation of this template information on the website is not user friendly. Search functions are not well supported by the categorisation of the information. It lacks an analytical and a policy framework, as well as an information management framework.

An effort was made to introduce a 'thematic' dimension for searching programmes (this is important for a sectoral approach to research policy) and at present, although the superficial observer is impressed by the amount of information, the critical observer is disappointed by its limited use for addressing precise questions. Clearly this is something that should change substantially and the current focus on the ERA priorities could provide an appropriate context and motivation. As the policy scope and policy questions become more precise, these can be translated into clearer requirements for monitoring and analysis in the next contract.

⁷ Formal and informal personal contacts and information exchange between them and their counterparts at DG-RTD should continue to be encouraged.

The comparability of information reveals weaknesses; national differences with regard to policies and the scientific/research landscape may difficult direct comparisons, as well as the different approaches and the reporting styles of EWN country correspondents. So although from an ex-post perspective, the ERAWATCH inventory accomplished to a large extent the tasks assigned to it by the original concept, a 'questionnaire' approach, on selective issues as a complementary input, might contribute to the collection of accurate and comparable information.

It is understandable that information products of ERAWATCH have been developed in the first phase as descriptions of purely national systems and now in the second phase as products for ERA development. This should not, however, exclude in the future development the regional⁸ and global contexts of the operation of national systems.

The Evaluation Committee suggests **a more active involvement of Member States and associated states in the inventory part of ERAWATCH**. In order to counteract the criticism of poor accuracy of the information provided about the different countries and of the fact that the information is not sufficiently up-to-date, a more direct link between the ERAWATCH country correspondents and the respective ministries should be established. The members of CREST could be asked to identify a national focal point that would function as regular communicator between national authorities and the country correspondent⁹. Thus the accuracy of factual information could be improved, the time lag between new initiatives and their appearance on the web-site could be reduced, and through an annual quality check organised by the national focal point, the information would be more reliable than at present.

The possibility of adopting a similar approach to relevant “regional” trends could also be adopted, especially to those aimed at opening funding programmes to “external” or cross-border participation in the furtherance of ERA goals.

⁸ As already noted the regional context can refer to either the regions within a country or a region consisting of cross border neighbouring provinces of a set of neighbouring countries. In the context of the future development of ERAWATCH each of these uses or contexts has its own peculiar relevance therefore DG-RTD, as the principal consumers of the outputs of the project, should specify exactly which contexts and within them which specific trends and policy measures it wishes to have addressed although it would be appropriate to do this in consultation with DG-REGIO.

⁹ This would have to be carried out within an agreed time frame so as to ensure a reasonably quick turn round of material.

The overall conclusion of the evaluators is that the ERAWATCH inventory has not, so far, made a significant contribution to evidence based policy making.

In view of its evolution and the future expectations being placed on it, a series of fundamental questions for the organisation of the inventory have to be addressed:

1. Is the EWN capable of organising information collection as a 'survey'?
2. What does it need to set-up an organisation of data-collection and updating that is guided by web-publishing of 'information bits' relating to precise policy (or analytical) questions?
3. How can MS play a bigger role in providing, and quality controlling, the factual information?
4. What is the value-added of the IPTS country desks in the process of editing information for the web?
5. How should information management and web-editing be integrated?
6. What will be the impact of different scenarios of cooperation with DG ENTR/TrendChart on the inventory?
7. How could a “locked-in” situation with the existing external service providers be avoided in the next contractual periods?

As far as the sub-national regions are concerned, it is unlikely that resources will become available to produce a detailed inventory. Therefore three steps are proposed:

- 1. Specify carefully the requirements for, and use of, a broader picture of basic trends in research at the regional level.**
- 2. Discuss with DG-REGIO what use would be made of which information and whether they could contribute directly or indirectly to its aggregation.**
(Do they have a database that could be tapped by an EWN country correspondent or an IPTS country desk officer?)
- 3. Ensure that the new website specification includes a provision for the uploading of research policy or ERA related documents by officials in the national and regional authorities.**

Section 2

The evaluators were requested to assess the results of the *intelligence service*.

The focus of ERAWATCH concentrates on policy decisions during recent years. This favours an appraisal of current policy initiatives, supporting common policy areas (e.g. Lisbon goals & ERA); however those that were already established in Member States that are equally relevant should also be analysed.

It should be added that the effort of IPTS to apply the same basic methodology in the presentation of country reports, although it did not eliminate all of the initial weaknesses, offers a valuable improvement.

However, one can still notice significant differentiations with regard to intelligence analysis. To give some examples:

- *“Country reports”*: Some of these reports are going into extended details on institutional and organisational issues without any other element, while the reports for other countries have followed a more synthetic and less detailed approach.
- *“Specialisation reports”*: Quite interesting reports but with very unequal quality, content and form of presentation.

The “ERAWATCH Guidelines for the Country Reports 2008”¹⁰ is by far the most thoroughly developed document for analytic intelligence work produced so far by the project. It has been designed for the drafting of the “ERAWATCH country reports 2008”, on the basis of the experience of the six country reports already available and it includes the lessons learned from that test phase through feedback by DG RTD, its Lisbon expert group and external peer review. The remaining 21 country reports are in the drafting process.

Therefore the evaluators believe that these Guidelines, and the first country reports drafted, are a major step forward in the intelligence service of ERAWATCH. They move the work of ERAWATCH from encyclopaedic fact collection to a more dynamic

¹⁰ ERAWATCH strategic intelligence service, 26 March 2008.

analytic work. The guidelines are a well thought-out and not too complex steering document for a diversity of analysts in the member countries. In this context, two points for its further development could be mentioned:

On the basis of six country reports drafted so far, it is sometimes difficult to see what is the evidence on which the strengths and weaknesses of the research system are identified. **The situation could be enhanced by adding to the ERA-WATCH strategic intelligence service a comprehensive account (links) of system/governance and institutional/policy evaluations in the member countries and in the Commission.**

One way in which ERAWATCH could contribute to evidence based R+D policy making in the Member States would be by offering deeper insights into the processes involved in formulating RDI policies. **This could perhaps be addressed in the form of case studies on why and how particular policy mixes were adopted and what the expectations behind them were.**

The explicit purpose of the guidelines is to move from *structures* to *processes* and this is conducive to a (more) dynamic perspective. They aim at creating a chain from description of challenges, through analysis, to assessment. The first phase of the analysis is system analysis (the structure of a Research System and its strengths and weaknesses) and the second phase is policy analysis (key recent policy developments and new policies).

The analyses focuses on key processes relevant to system performance in four policy-related domains of research systems:

- Resource mobilisation;
- Knowledge demand;
- Knowledge production;
- Knowledge circulation.

The analysis of strengths and weaknesses of research systems is based on the identification of challenges (the system has a strength if it is addressing a challenge, a weakness, if it is not able to do this). The impact analysis is related to policy changes in the four domains (ex-ante impact evaluation).

The selection of governance issues to be addressed by ERAWATCH should take into consideration the call by the Competitiveness Council Meeting in Brussels (29-30 May, 2008), which noted that an, "Improved governance of ERA should ... involve all Member states and associated countries including regional authorities, as well as stakeholders such as universities and research organisations, civil society and business which should be actively engaged in ERA governance". **Therefore a series of key questions should be addressed in defining to which extent the Intelligence Service should monitor and analyse the actions of public actors and stakeholders.** For example:

- How is this active engagement encouraged (measures, incentives) and organized?
- How are foresight exercises being used to improve active interactions between actors?
- Are there any domestic/international evaluations of research/innovation systems from the point of view of governance (efficiency, effectiveness, participation etc.)?

The quality of the Intelligence Service is also dependent on the presence of a user-friendly website, the relevance of the information and the opportunity provided to all user groups involved (Commission, national policy makers, analysts) to produce quality analyses based on the base-load inventory.

The evaluators have reached the conclusion that, in fact, the intelligence work was only partly based on the baseload inventory, and that information gathering was not necessarily related to specific analytical tasks. It appears that the two functions of ERAWATCH have been relatively disconnected and not mutually supportive. Although it is not possible to adjust the information content of the baseload inventory to the changing needs of analysis, a more flexible and targeted approach with regard to the information to be collected by ERAWATCH is recommended. The evaluators also note that, although the differentiation between the baseload inventory and the intelligence service may have been appropriate initially, it is likely that in the next stage of ERAWATCH this distinction may become increasingly arbitrary as the information gathered should be for the purpose of targeted analysis.

The evaluators consider that **the following issues should be determined before establishing the future criteria under which the intelligence service should be specified and executed.**

The first, and perhaps most basic issue, is the issue of “Which determines which”: Are the intelligence products to be developed on the basis of the contents of the information in the base load inventory, or should the inputs to the latter be governed by the demands for the former? In principle, ERAWATCH can be seen as a tool to monitor and analyse the extent to which national RTD policies contribute to the achievement of EU goals. If this view is adopted as the overriding principle, then its implementation will have to be carefully specified and agreed with all of the key participants.

Another issue is whether or not the “intelligence service” should be only static (e.g. recording the policies adopted), or dynamic (e.g. it could be complemented with an analysis of the results of prospective and foresight exercises carried out by the MS and other countries).

The needs (including those related to policy analysis) of the main pre-defined user groups (DG-RTD, CREST/OMC & MS policy makers) should determine the choice of the intelligence products.

A constructive development would be a more active role over the next 18-24 months by DG-RTD in the interface with EWN. After this transition phase a new management arrangement could be considered (either with or without a greater cooperation/integration between ERAWATCH and TrendChart). Such a role would also facilitate the development of knowledge management, going beyond the current data collection and intelligence service. Although considerable time has been dedicated during the evaluation process to the issue of greater cooperation/integration between ERAWATCH and TrendChart, the Evaluators recommend that efforts to increase the cooperation and, where appropriate, integration between ERAWATCH and other DG-RTD information gathering and analysis activities should continue. The issue of improved knowledge management within DG-RTD and between the Commission Services (in this case JRC-IPTS, DG-RTD & DG-ENTR specifically) could be initially addressed by developing the level of personal contacts and information exchange between those staff handling

similar knowledge contexts (i.e. a Member or Associated State). For example, IPTS staff on ERAWATCH country desks and the RTD staff preparing the Key Figures Report for the same countries.

It may be appropriate to rename the ERAWATCH Intelligence Service as the ERAWATCH Analysis Service as this describes more clearly what it does and avoids the negative connotations of current use by Governments of the expression “Intelligence Service”. The following **recommendations** are made and a set of **options** presented for its development.

Recommendations:

- a) *Set clearer ERA based priorities so as to achieve selective, quality and in-depth analysis of topics such as:*
 - *RTD policy-mixes in Member States;*
 - *the ERA-dimension;*
 - *policy impacts at the institutional level;*
 - *emerging issues and trends.*
- b) *Improve the knowledge management without losing flexibility.*
- c) *Achieve a mutual reinforcement between the information gathering and analysis.*
- d) *Improve the diffusion and marketing of ERAWATCH to user groups (both within the Commission Services and in the MS) by:*
 - *increasing its visibility;*
 - *improving the value of its support to analysis;*
 - *monitor its real use and level of user satisfaction;*
 - *establishing two-way links between the ERAWATCH website and related sources (such as the relevant national and regional websites).*

Options:

- e) *Adoption of thematic approaches;*
- f) *Clustering of countries;*
- g) *Complementing static analysis with dynamic analysis.*

ERAWATCH should monitor the evolution of policies that are developed with the purpose of evaluating the socio-economic impacts of the RTD policies and report on the results of such impact evaluations as these become available. Impacts refer in the present guidelines to ex-ante evaluation of expected impacts of policy changes. The evaluators note the intention to include ex-post assessments in the country reports and these should include an analysis of the research system after the changes.

So as to strengthen and develop the links between the baseload inventory and the intelligence products, it is important to specify the demand for analysis of the policy mixes of the national research systems and their governances that contribute to the development of ERA. In this one of the key points is, “How are issues of socio-economic impact considered when dealing with the governance issues?” The governance issue is addressed in the guidelines with the following questions:

- How does the country pattern match with the current governance structure (at the national level)?
- Are there domains which require particular consideration or, have remaining weaknesses rather to do with co-ordination and coherence problems across domains? (Domains are defined as internal issue clusters of research systems).

It is evident that the strengths and weaknesses of governance at various levels and between them are not sufficiently covered in the analytic work. It should be remembered that governance issues are even more pertinent if efficient and effective policy mixes are on the agenda. Unless governance issues are solved, even a significant increase in RTD funding and of human resources, cannot achieve the desired effects. Actually **improved governance can help to deliver more financial and human resources, therefore governance issues should be analysed at all relevant levels.**

ERAWATCH users	Inventory	Intelligence
Policy-makers in Member States and associated states (e.g. CREST, research ministers) and RDI consultants	Country profiles along existing categories	Analytical country reports; OMC; ERA initiatives of the partnership; Evolution of Member States' R&D policy mixes; Transnational dimension of national R&D policies; Integration of EU and Member States' policies towards the ERA; R&D specialisation; Key indicators.
European Commission	Country profiles along existing categories; More DG-related profiles (e.g. internationalisation)	Analytical country reports; ERA initiatives of the partnership; Specific areas of interest for the DG's (e.g. universities); Key indicators.
ERA performers (research community)	No specific services	"social networks" (e.g. clusters of regions, networks of universities).

Table setting out examples of uses of ERAWATCH products by different User Groups.

Section 3

The evaluators were requested to examine the design and use of the *website*.

1. Introduction

The written report of the evaluators is accompanied by a CD that presents a series of proposals on the way in which both the website and the supporting database technology could be developed. However, for the sake of clarity, some comments on the analysis and recommendations are included in the written report.

The implementation of software for a “monitoring and analysis solution” in the above mentioned sense requires a precise specification of the user tasks. For the specification of an information system it is not sufficient to claim tasks such as “Cross National policy learning and intelligence” as they only remain on the “political” level. From the technical point of view, the result is an ill-defined problem.

How can this be fixed? In the first place it must become clear what the *use* of the system is, who the *users* are, what their profile is, what the *knowledge base* is and where/how it is stored. Moreover, what are the *actions* the users carry out to perform analysis and monitoring tasks? A description of possible usage scenarios can be done by means of *use cases*. From the use cases a *specification* of the needed technology has to be derived. Both the use cases and the specification are documents upon which a selection of technology can be based in a later step. The modelling of the use cases should focus on the tasks the ERAWATCH users have to perform.

Another aspect is the *information logistics*, i.e., how many information-processing units are needed and how can they be embedded by means of a lean and efficient *information architecture*?

2. Users, General Objective, and Tasks

The *target users* to be addressed in the first place are staff of the DGs of the Commission as well as staff of the governments of the MS. On top of that the following list of users is considered relevant:

- Officials in non-research government;

- Other specialists in complementary chambers of commerce, technology parks;
- Persons participating in programme and budget planning;
- Funding agencies;
- R&D managers and professionals.

The general objective of the ERAWATCH service should be to allow the users to monitor and analyse ERA by means of an:

- information inventory service;
- intelligence service.

As the ERAWATCH website is the technical interface of the service, the task of the technical evaluation is to find out to what extent the ERA-WATCH website supports the users in performing their tasks. The *user tasks* as described in the ERAWATCH programme are the following:

- Broad positioning and analysis work;
- Cross National policy learning and intelligence;
- Comparison and benchmarking;
- Practical policy development and implementation activities.

3. The ERAWATCH Website

For the current implementation of the ERAWATCH website and search technology there exists a knowledge base that stores approximately 1800 documents in a CORDIS database. The EWN country correspondents deliver the content. The documents can be accessed using the CORDIS full-text retrieval engine.

As far as the evaluators have been able to ascertain, real users were not sufficiently involved in the planning and design of the ERAWATCH technology. Thus, the evaluators have not found evidence as to what information the users need to accomplish their tasks and how it should be presented to them. The given approach follows a traditional paradigm where an “expert produces documents” that the user is offered for consumption.

The reversal of this situation could make a considerable contribution to improving the impact of ERAWATCH on the process of developing RTD policies.

Technically the ERA-WATCH website is located at cordis.europa.eu/erawatch. The user may access documents using a CORDIS search interface. He may either type strings in the full-text search interface to retrieve documents, or make use of the advanced search function. The advanced search function allows filtering on the retrieved document sets by country and document type (research programmes, research inventory, policy documents, organisation and information source), or by a combination of both.

Moreover, the website offers an individualised access. After login the user is able to define an information profile. This functionality has not been tested.

4. Evaluation of the User Questionnaire

A survey of users was carried out for IPTS by CORDIS (~ 200 participants). The results and analysis of the CORDIS survey, as presented to the Evaluators, were considered to be useful but in need of further analysis.¹¹ The Evaluators decided to design and carry out an ad-hoc survey specifically addressing the requirements that the ERAWATCH service should meet from the point of view of some users working in national governments. The results outlined below are based on 13 filled-in questionnaires out of a total of 25 distributed.¹²

1. The ERAWATCH website is considered an important tool to have. The most prominent criticisms relate to its content ranging from quantitative (“not enough”, “specific data missing”) to qualitative (e.g., reliability and timeliness) aspects.
2. The technical aspects are concerned with information access through browsing the website itself and the search technology. The website itself is perceived as being old-fashioned but easy-to-use, whereas the search technology was hardly used (only 4 out of 13 have used it).

¹¹ See Annex 6.

¹² The questionnaire is attached as Annex 7.

3. Concerning the future of the ERAWATCH website, users would like to extend the content by indicators, differentiation of the data categories and also additional material, such as news that relate to the topics. Concerning the future technology, the users wish to see an improvement of the design.

The findings of the IPTS user survey need to be taken into account. The value of the evaluators' questionnaire is to get a complementary, independent impression, of the user opinion. Thus, the questionnaire was an ad-hoc means for the evaluators to find out evidence. This is also reflected by the fact that the above comments are based on only 13 users. To find out more reliable evidence the sample should be extended and the questionnaire needs to be redesigned. In their study IPTS could, e.g., find out more on technical aspects. For instance they considered the improvement of the search technology as important, whereas in our study hardly anyone expressed usage of the search system.

5. Assessment of the ERAWATCH Website

Although the standardisation effort by means of "template-documents" is a sensible way of making corresponding data comparable, these efforts focussed mainly on an intellectual consumption of the documents and not on the facilitation of machine usage. This is illustrated by a simple example:

Budget Value of the German Research Programme concerning clusters is "600.000.000", whereas the Budget Value of the French Research Programme is "750 million".

A human user would read over the inconsistency in the data formats. The machine does not.

Other examples for data inconsistencies are the keywords assigned to some of the document types. They also seem to have been freely chosen by the EWN correspondent (or perhaps someone else?). Thus, there is no *controlled vocabulary* used throughout the document base to index or specify the data.

The inconsistencies and absence of controlled vocabulary make the structure of the documents (as it is at present) useless for machine consumption. It is difficult for a ma-

chine to go beyond plain keyword search. As outlined above, the only dimensions exploited so far, both for search and navigation, are the “country” dimension and the type of document dimension. Thus, the ERAWATCH search technology remains quite rigid.

Apart from the mentioned inconsistencies, the full-text index is quite slow and offers an outdated, very “early nineties” interface to the users. The main characteristic of such a system is the rationale driven by a “fill in a form” search. The disadvantages of the system are:

- a) It is complicated to use because the user is burdened with complicated data selection activities.
- b) It only offers full-text search because controlled vocabulary is missing.
- c) Many search efforts lead to no results, because for the combination of data typed in the system there are no results.
- d) The search system does not guide the user intelligently through the information space by providing possible options on how to dive into the data.
- e) The search technology is a pure “pull-system” and not a “push-system”. The latter would be pro-active, that is, provide the user with new information matching his profile of interest.
- f) As the templates are not designed for machine usage the comparison of data is relatively difficult, because the corresponding text passages cannot be matched. They need to be printed and then manually compared. Thus, comparison is not really technically supported.
- g) Aggregations over the data are impossible. It would, e.g., be helpful if the budgets of research organisations could be summed up and thus be comparable over different countries at a glance.

As the system is a pure search system the approach favours “reading pre-digested documents” rather than recompilation of data and in this way gaining new insights by means of aggregation and comparison.

TrendChart offers the user an interest-profile-based personalised push service whereby new information that matches the user profile is sent to the person.

Technically the document base of the TrendChart system is very similar. It also makes use of standardised “Template” documents. However, in analogy to the ERAWATCH website, it is not clear to what extent the structure can be used for intelligent search and comparison. Apart from the personalised core documents (policy measures) TrendChart also offers:

- General News;
- Latest News from TrendChart countries;
- Latest forum contributions;
- Country report workflow;
- Latest uploaded documents;
- Online-editing (e.g. place a new report);
- Who’s who.

It is thus more designed to be a communication system including forum, messaging system, newsletter, as well as other facilities. Such facilities are particularly important for an integrated knowledge management system that not only delivers information to the users but also brings policy makers and experts together. Another important feature is that TrendChart offers (distributed) editing and export functionality (MS-Excel and MS-Word) to the users. Thus, potentially documents can be directly input by the users and exported for further usage.

The search technology is the same outdated approach as the one employed by ERAWATCH (the contractor is the same, IntraSoft). However, the interface is much more appealing. Generally, the impression of the evaluators is that IntraSoft as the contractor has not provided an excellent service. This impression was mentioned in discussions with staff of DG-RTD, IPTS as well as DG-ENTR. To achieve successful results in software engineering projects both the contractor and the client should be cooperating closely as partners with a common objective. This requires a responsive attitude on the part of the contractor that appears to be lacking on the part of IntraSoft.

Moreover, the contractor should see himself as a consultant offering **state of the art technology** to the client. The core of the system, however – the search engine – fails in many cases to retrieve sufficient results in acceptable time (e.g. as compared to Google)

although the document base is not large in terms of size for a search engine. It is highly questionable how such a system would scale up if the document base was populated with significantly more documents. On top of that, as mentioned before, the user interface is quite outdated and burdens the user unnecessarily, instead of intelligently guiding him. Thus, **the technology currently implemented for the ERAWATCH website cannot be considered state-of the-art.** Consequently, the evaluators strongly recommend that **both the service towards the client and the technology must be significantly improved.**

6. Future approach and the requirements for a new ERAWATCH Website

a) Identify the target user groups.

A first step towards the identification of the user needs has been done by the IPTS analysis survey and by the analysis of the evaluators presented above. For the success of the project the integration of “named” users (representing the user groups) in the project development is of great importance. Selected users should participate in the project development team concerned with the ERAWATCH re-launch. Users on the team will provide helpful information for a user-driven implementation of the system, and thus, increase acceptance and decrease misguided development. Users are important for the definition of the use case and for testing already during the prototype phase. It is probable that different packages on the web site could target different user groups and it may be possible to incorporate the use of “wiki” techniques to facilitate this (e.g. for the work related to universities).

b) Define the use cases.

Sketch concrete usage scenarios based on the user analysis. Use cases should include the description of user tasks and the actions by which they manipulate data. The use cases should make heavy use of examples to illustrate in a representative way the desired information system.

As a consequence of the discussion above, the tasks defined in point 6 a) above need to become more concrete, broken down on a more detailed level so as to derive actionable strategies.

Another important aspect in this context is the “size” of the problem to be solved. How can the given problem be tailored into smaller ones, e.g., meet the needs of a specific

target group of potential users such as the analyst experts of the Commission, instead of going beyond this scope. If this were the chosen target group, then the first step would be to find out what their needs are and in this way start from the beginning.

(c) Identify the information sources.

Once the users and their information needs are recognised the information sources must be identified. Up to now the content base is mainly produced by a system of correspondents. Provided the quality assurance mechanisms are properly applied, intellectual feed and maintenance of the content base by experts is certainly an important aspect for securing accurate information. An expert-driven approach has of course a price to be paid. On the one side there are the monetary costs for the experts, on the other side there remains the question of whether or not the information coverage is sufficient.

(d) Issues that have to be addressed include:

- What are the data?
- What could a new ERAWATCH System for Analysis and Monitoring look like?
- What should a combination of ERAWATCH and TrendChart look like?
- Is a combination of correspondents and automatic approaches possible?
- Is it possible to simplify the information acquisition by means of distributed collection of the data? How, in this case can the quality be ensured?
- What might be a migration strategy?

From the point of view of information technology development **the following requirements** need to be met by a future ERAWATCH analysis and monitoring system:

e) Development of a functional specification

The customer (e.g. commission directorates) should provide a functional specification of the desired system. The functional specification includes a written description of all data sources, functions and requirements the ERAWATCH analysis and monitoring system should meet. It should include the description of the overall *information architecture* as well as the specification of the *information logistics chain*. The functional description should be made by an expert in cooperation with the customer. The specification should be the document agreed by both the customer and the contractor.

f) Migration Concept

An important aspect is to take into account the efforts that have been made so far. The development of the new ERAWATCH analysis and monitoring system should exploit those efforts as much as possible, e.g., evaluating the effort of restructuring, tagging, or generally improving the given document base, the established network of correspondents etc.

g) Interface Design

An important objective of the interface design should be a homogeneous, easy to use interface and an intuitive as well as supportive search function.

7. Possible Information Access Scenario

The accompanying CD presents a series of screens that represent a possible usage scenario for the ERAWATCH search engine. The scenario presumes both the data underlying the current implementation of the ERAWATCH inventory and intelligence service. Based on that assumption and on available, state of the art search technologies, the scenario extrapolates a “Google”-like easy-to-use search interface that meets the following criteria:

(a) One input line for querying!

Professionals are very much used to Google like easy to use query interfaces. Thus, “keep the interface simple” is one of the most important design principles.

(b) Thematic search engine and guided navigation → no zero hit results!

Complex search interfaces hinder users in performing search tasks. The system should provide its service to the users by offering her/him information that fits the selection made so far. Given a certain information dialogue, what are the options for further navigation?

(c) Fast information access and structured presentation of information!

By navigating and browsing, rather than querying the knowledge base, the user gets fast access to the information she/he needs. At the same time the retrieved information should be presented in a structured way.

(d) Information aggregation and comparability

The knowledge base designed for monitoring and comparison of information concerning the ERA comparability should be supported by the information access system. To this purpose, quantitative information (e.g., key research indicators, country indicators) might be aggregated. For instance the total budget of the research organisations of a country could be computed as the sum of the individual budgets. Quantitative as well as qualitative information objects may be compared, e.g., by means of computed, interactive charts or by listing text passages pertaining to the same information category.

8 Other options for future development of the web-based service

The expected use of a web site determines the philosophy behind its design. For example: Depending on the resources available, ERAWATCH could provide a service that allows "social networks" consisting of different groups of research performers (e.g. clusters of regions, industrial sectors, networks of universities) to upload strategic documents and information that is relevant to themselves, but even more so to other research performers in ERA. There are some arguments in favour of implementing such a new tool on the web-site:

- Social networks have pre-defined profiles that clearly state their composition, their objectives and the use of the information provided. They are bottom-up in the sense of allowing all actors of the same community (e.g. regions) to participate in the network, but they are top-down in the definition of their scope.
- This service would be independent of the ERAWATCH Network of country correspondents. The limited resources of country correspondents should be focused –on the analytical country reports and on updating the information provided in the inventory.
- The "social network" approach would complement the expert-driven approach of ERAWATCH. A web-site of this kind requires a high level of expertise both with regard to the collection of data and to the quality assurance of information. The more and more open, rapidly changing, and globally networking field of knowledge creation cannot be fully understood and translated into an evidence-based web-site by an exclusive group of experts with a monopoly on information provision and scattered over different countries.

- This new tool offers the advantage of starting with one or two pilot actions in fields where the Commission detects the most vital interest from the research community.
- For users from the research community, this complementary tool will potentially reduce the effort of searching for specific information on the web-site, since the "social network" approach will clearly lead to well-furnished fora that provide information certified by the members of the network. Topics that are not covered by a "social network" would need to be searched through alternative web-sites outside ERAWATCH.
- The development of the ERAWATCH interface with its user community in the form of "a social network" is not necessarily the optimum choice, but it is a concept that should be examined and an appropriate level of adoption/adaptation incorporated during the forthcoming transition phase, covered by the 18 month contract starting in 2009.

The end goal should be to develop a project that has incorporated the most advantageous and practical features of the different approaches available with the most reliable, user friendly and modern technology.

9 Final Comment

In harmony with accepted business practice where the "purchasing agent" of an organisation is a specialist in the field of the materials and services to be purchased, **at least one person with an up-to-date and highly developed ICT knowledge should be incorporated into the IPTS ERAWATCH team as early in the new contract period as possible.** This person should have the relentless goal of pursuing the implementation of the objectives and technical standards proposed in this part of the evaluation. Their pro-active management of the contract with the external ICT provider may go a long way to turning round the current view held by most users of the web-based provision of ERA-WATCH products. They should also propose technical improvements to IPTS and RTD that could be incorporated in future stages of the project.

Section 4

The evaluators were requested to assess the *cooperation between ERAWATCH and TrendChart*

From the meetings that the evaluators have held with staff at both DG-RTD and DG-ENTR, they have concluded that there is currently a good level of cooperation and a will to continue to progress in coordinating the development of both the ERAWATCH and TrendChart projects and products and such a coordination can be quite fruitful for both projects. In view of the success of the current joint efforts to facilitate access to information about research and innovation policies by means of the joint inventory, that brings together national information and documentation on research and innovation policies, measures and programmes collected and presented by ERAWATCH and INNO-Policy TrendChart,¹³ the Evaluators **recommend that the middle levels of Commission management continue to support and facilitate this process** as the medium-term goal.

At the same time, the evaluators recognize that a further integration will require that:

1. **The administrative/legal aspects of how different Directorates General can contract external services be addressed in a timely and effective fashion.**
2. **The differences in the policy perspectives among the different projects are recognised.**
3. **There is an overriding need to ensure continuity in the services provided by well-planned and managed development and migration strategies.**

These objectives should be addressed by means of agreements among all of the relevant Commission Officials with their full participation in, and commitment to, the process. The evaluators recognise that such an integration of services would provide a more comprehensive picture of policy making in ERA and related contexts where although

¹³ The European Inventory of Research and Innovation Policy Measures
<http://cordis.europa.eu/erawatch/index.cfm?fuseaction=about.collaboration>

research and innovation form two distinct policy objectives, they finally constitute parts of the same value chain.

The evaluators have also considered the opinions expressed by members of CREST in regard to the relationship between the two services during the two rounds of survey conducted among them. TrendChart is now integrated into the Pro Inno Europe – web-site and although only a few of the comments received refer to this new setting, some reference is made to the fact that all EU web-sites face similar challenges as to keeping their content up-to-date.¹⁴ As far as the TrendChart chapter within Pro Inno Europe is concerned, CREST delegates generally appreciate this product as being useful (good classification of all types of programmes according to their objectives). On the other hand, the density of strategic information about countries varies very much from one country to the next. In many categories no documents are available in this field. In principle, the content of ERAWATCH and TrendChart are considered to be complementary.

However, both information systems have also been characterised as “flat” in the sense that they lack deeper insights into the processes involved in formulating the current RDI policies of the countries covered. This could be addressed by means of case studies on how and why particular policy mixes were adopted and what the expectations behind them were. This could be especially useful for those who have to lead, or play key roles, in policy making.

The evaluators are pleased to note that it may be possible to achieve a user friendly, transparent, flexible and intelligent integration of information by means of a **modern indexing and accessing system**. However, the evaluators stress that it is vital that a level playing field is developed by means of transparent and two-way communication with the external community so that a **“locked-in” service provision by only one set of external organisations** (for information gathering, preparation of analysis and provision of ICT services) can be avoided.

¹⁴ To give one example, the "Who is who" section of "Pro Inno Europe" is seriously outdated and includes people who have never even been part of the innovation scene in the respective country.

Section 5

The evaluators were requested to provide views on how to include the *ERA dimension in ERAWATCH*.

In response to the question raised in the ERA-Green Paper, "70% of respondents expressed the desire to see EU-level databases and initiatives developed". (Follow-up of the ERA Green Paper, RTD-C1 D(2007), 29 November 2007, page 11). The strong demand for more evidence-based policy-making supports the intention already expressed by the Commission in the ERA-Green Paper to "support the development of data collection, analysis, monitoring and evaluation in order to strengthen the evidence base for the development of the European Research Area and to be able to measure the progress towards its realisation." (ERA-Green Paper, page 23). In a footnote attached to this statement, the Commission explicitly mentions ERAWATCH.

A CORDIS survey of ERAWATCH users conducted in early 2008 also indicates a certain demand from research performers to be provided with specific types of information on ERAWATCH. Out of 200 responses to the survey, only 17% come from ministries, the rest of the replies are divided between higher education, other public organisations, private non-profit organisations or private enterprises. Not surprisingly, almost 70% of all respondents say that their main reason for consulting ERAWATCH is to find specific information. However, the Evaluation Committee recommends that the Commission **do not consider the wider R&D community a core user-group of ERAWATCH**. There are several reasons for this:

- The financial resources available for the next period should be concentrated on meeting clearly identified needs of the target user groups and in monitoring the resulting use level and satisfaction. There is no point in dedicating a major effort to meet possible needs of the wider R&D community that have not been properly researched; neither as to exactly what information and in which formats, nor what would be its value added end use. Initiating such a major marketing strategy at this stage of ERAWATCH's development does not appear to be a viable option.

- Some informal discussions with staff who are asked by their superiors in government ministries (at a regional or national level) to prepare RDI policy briefings, indicate that if they want information on past or current policies of other authorities they contract an external consultant to prepare this for them, rather than trying to gather and analyse all the relevant information themselves. This response on their part may be motivated by both time constraints (an imposed deadline by which the document must be ready) and the feeling that the political priorities of their context differ from those that led other authorities, or funding agencies, to adopt or modify their policies. Therefore it is possible that outside the Commission Services themselves, **currently the main group of direct users** of the publicly available products of ERAWATCH on its website are the **community of RDI consultants** (e.g. the members of the EWN), rather than MS policy makers.

ERAWATCH should support the development of ERA in the MS and associated states by **providing analyses in the following areas:**

- (a) Research policy-mixes in Member States (e.g. funding instruments, articulation between research - education - innovation, evaluation, governance, public investment to attract private investment in RTD, role of research intensive regions [trends], reform of public organisations, industry - university links, research-driven clusters of excellence and the evolution of internationalisation and its effects on national and European research systems). This will require some re-drafting of the templates and the adoption of clear specifications of the level of detail.
- (b) ERA-dimension: Integration of EU and Member States' policies towards the ERA (e.g. at the national level; governance to embed ERA, monitoring of actions) and also the development of cross-border links (transnational dimension of national R&D policies; emerging open research system).
- (c) Institutional level: Impacts on public research organisations and monitoring of changes in selected European universities (e.g. in their governance, funding, recruitment and autonomy).
- (d) Emerging issues that are identified as being of high priority.

Therefore, the evaluators recommend that **ERAWATCH should be more focused in the future**. Clearly the right balances will have to be struck between very clearly specified and agreed objectives, specifications, indicators of usefulness and benchmarks, with a reasonable level of flexibility in the working relationships between DG-RTD and JRC-IPTS and the EWN. Apart from the inventory that provides more general country-specific information, **the analysis part of ERA-WATCH would need to be strengthened in order to become an effective information system**.

The primary objective of ERAWATCH should continue to be that of satisfying the needs of the Commission services. It should also offer valuable inputs to the processes of evidenced based policy making by the governments of the Member and Associated States. It should fulfil both objectives in such a way as to reverse the current situation where it appears that neither of the two groups has been satisfied with the service provided so far.

As a follow-up to the ERA-Green Paper discussion, the Commission proposed a partnership with the Member states to develop ERA further in five key areas, namely

- European Researchers' Partnership;
- Legal framework for European Research Infrastructures;
- Intellectual property management by public research organisations;
- Joint programming in research;
- International science and technology cooperation.

The country-related analyses should be complemented by horizontal analyses in the five areas of the ERA partnership. In turn this will complement the statistical analysis.

In addition, a debate on the future vision and governance of ERA started in CREST last February and was continued at the Council "Competitiveness" in May 2008, when a first set of conclusions was drawn up that will also affect the role of ERAWATCH.

In the context of the Open Method of Coordination, CREST provides the framework for an annual cycle of sub-groups dedicated to specific areas in which mutual learning is

considered particularly relevant. Currently, ERAWATCH is already involved in the work of some of these CREST sub-groups.

When putting the different pieces together - the partnership for the five ERA initiatives by the Commission, combined with the on-going OMC work within the framework of CREST and the above-mentioned Council conclusions on ERA governance – it is clear that **ERAWATCH has the potential to provide valuable analysis for the Commission, the Member and Associated States.**

The Guidelines for country reports 2008 deal with the governance issues, but the strengths and weaknesses of governance on various levels and between them are not covered adequately. These issues will be much more pertinent when new ERA policies are designed and implemented. This is clearly expressed in the decisions of the meetings of Ministers for Competitiveness (Research) during the Slovenian Presidency (Ljubljana Process). The accepted governance principles imply a much stronger effort, which will not be successful unless much more specific analysis of governance issues is included.

Another aspect of ERA development is its relationship with the Globalization processes that have increasingly deep impacts on European national research systems. These impacts can be seen both in more developed and less developed MS.

Some of the more developed national research systems (e.g. Ireland, Finland and UK) have strategically utilized global processes, either to achieve a new position in the global division of labour (Ireland and Finland), or to regain the position lost at a certain point of time (UK). A strategic policy mix, in which the role of RTD policy has been seen to be very important, has achieved this. These countries have developed (or are developing) an essentially global approach to RTD policies. It can mean, e.g. research and innovation centers in Europe, Japan, China, India and the US, a versatile mixture of program cooperation with these and many other countries as well as inward and outward investment strategies for RTD. In these countries the global cooperation and the

European cooperation can be seen as complementary approaches for developing national research systems.

In less developed MS a crucial issue is, How to develop basic capacities to utilize the opportunities of globalization? For example, How to develop capacities to attract foreign experts to, or foreign investment in, RTD?

The renewed regional RTD cooperation in Europe is a response to both global and European processes. An example of this is a new type of Nordic cooperation (that also includes the non-EU member countries Norway and Iceland) that pools resources (e.g. for common Centres of Excellence), but also finances cooperation in the formation of a common knowledge base for research and innovation policies. A deeper cooperation can be seen also on the Iberian Peninsula and between Eastern and Central European countries.

It is understandable that information products of ERAWATCH have been developed in the first phase as descriptions of purely national systems and now in the second phase as products for ERA development. This should **not exclude in the next stage of its development the global contexts** of the operation of national research systems.

Some of the questions that should be addressed are:

- Are the demands of internationalisation considered in the official S&T policy programmes and guidelines?
- Which are the most central instruments to enhance internationalisation of the national research system?
- What is the role of European cooperation/interactions and what is the role of other/global considerations?
- Have any indicator systems been developed for internationalisation and thus defined internationalisation policy priorities and how to measure progress there?

The global context, together with the development of ERA, the necessary prioritisation and proliferation in the policies and institutions at different levels, the versatile interac-

tions of RDT policies with other policy domains and changes of governance, can only be dealt with on the basis of a theoretically better and methodologically more sound foresight of STI. Therefore, **it is advisable that ERAWATCH should also record the outcomes of foresight processes being carried out at European, national and regional levels.**

Because modern research is intrinsically an international activity itself, it is necessary to consider the internationalization of national RS, including ERA. The internationalisation (in the active sense) of research and innovation, as well as of the national RS as a whole, is a necessity for many reasons:

- 1) limited national intellectual and financial resources;
- 2) cooperation as an instrument to enhance quality;
- 3) co-acting in the globalisation of S&T is beneficial;
- 4) the seriousness of global problems where RTD can make a major contribution.

The ERAWATCH Guidelines for the Country Reports 2008 deal with internationalisation in some issues, such as, the attractiveness of the RS for foreign researchers, brain drain and profiting from access to international knowledge. At the end of the analysis of every domain the “Summary of the role of the ERA dimension” is focused and at the end of the guidelines the “Perspective of the Lisbon agenda” is mentioned. In the six country reports these issues are considered in a variety of ways and to differing levels of detail. In the Commission draft table on possible “Key ERA indicators in view of 2010” the internationalisation dimension is much more prominent. It is more prominent from the point of view of both ERA and other aspects of international cooperation.

All these new policy objectives de facto impose criteria and selection procedures for the topics to be analyzed, and are supposed to lead to more practical and useful results for the main user groups. Equally, the monitoring of many of these activities will make necessary the collection and reporting of vast amounts of information, a significant part of which has to be provided by governments. Hence, a proper division of labour regarding the collection of information on the present areas, and on these new areas, has to be de-

signed, in order to avoid overlaps and major gaps. However internationalisation, as a strong trend in S&T and as a forceful instrument for RDT policies, will continue to increase and have substantially more impacts. Therefore it is important that internationalisation policies and their impacts on the national research systems be analysed in a deeper and more comprehensive way. At the same time the development of the analysis and measurement of interaction of MS and ERA with the rest of world is crucial.

The possibility that ERAWATCH could provide a service that allows "**social networks**" consisting of different groups of research performers (e.g. clusters of regions, industrial sectors, networks of universities) to upload strategic documents and information that are relevant to themselves, but even more so to other research performers in ERA, should be considered.

CONCLUSIONS

The evaluators believe that the original concept of a system capable of gathering and analysing the information that is needed by Commission officials, who have to prepare briefings, or draft policy documents, continues to be a valid one and that a good job has been done in many respects and an excellent basis exists for a productive future. However, the evaluators have also noted that the way in which the system has been set up and managed has not been optimum, but at the same time recognize that the bureaucratic context in which it has had to take place has in itself induced a series of limitations and complications.

The evaluators have not seen convincing evidence that ERAWATCH has so far made an effective contribution to evidenced based R+D policy making in the Member States, nor that the policy makers in these governments make regular or extended use of the information and analysis available via the web-site. One of the reasons for this, as communicated to the evaluators by policy makers, is that its products could be described as “flat”. ERAWATCH does not offer deeper insights into the processes involved in formulating the current RDI policies of the countries covered (which perhaps could have been addressed in the form of case studies on why and how particular policy mixes were adopted and what the expectations behind them were). This could have been especially useful for those who have to lead, or play key roles in, policy making. Therefore it is vital to address the issue of how to enhance the role and the usefulness of ERAWATCH as a policy tool and the evaluators believe that the successful implementation of the recommendations set out in this report could make a significant contribution to its achieving a higher level of usage and recognition in the Member and Associated States.

Something that could help the different partners involved would be the establishment and adoption of an agreed and clearly defined “picture”. This “picture” then needs to be cut into jig-saw sized pieces, which would correspond to each of the individual activities and reports of the project. Any activities or reports that are not pieces of the overall jig-saw have no place in the project. This approach could assist in streamlining the activities and thereby increase the project’s cost effectiveness. As a result it may be possible to reduce the overall budget without a loss in quality.

At the same time this has to be balanced with the right level of flexibility when DG-RTD has important ad-hoc demands for specific tasks or analysis. This would entail:

- flexibility on the part of DG-RTD in not requesting elements that do not fit the overall agreed “picture”,
- flexibility and responsiveness by JRC-IPTS and the EWN in both the tendering and delivery parts of the process and any quality control procedures or value-added analysis.

This will have to be accompanied by both improved top-down communication, so that the EWN receives timely advanced warning of topics and also reaches out to the proposed contact persons in ministries, funding agencies etc, to provide bottom up communication of trends and ERA relevant intentions to JRC-IPTS & DG-RTD.

The use of the common knowledge management metaphor of a “tree” in the current process of discussions and negotiations between DG-RTD and IPTS, and in turn with the external service providers, could help all involved to acquire a greater appreciation of their own roles and those of each of the others. This would involve exploring how the different components of a tree correspond to the roles of each of the participants in the project and how these relate to, and rely on, each of the others. It may be possible to extend the application of this metaphor to the collaboration between DGs-ENTR & RTD in the overall service provision to both those inside the Commission and the external stakeholders.

The evaluators believe that the web based delivery mechanism needs technical upgrading to address its weaknesses, improve its qualities and user friendliness, as well as meet the demand of the main user groups for new services in the next period. The combination of this and the addressing of the following management aspects of ERAWATCH, should enhance both its effectiveness and its perceived usefulness to the targeted user groups:

- harmonizing the targets of the different parts of ERAWATCH so as to focus on the key objectives established between JRC-IPTS and DG-RTD;
- continuing to develop the relations between JRC-IPTS, DG-RTD and other DG's;

- improving the lines of communication with policy makers in the MS and other countries;
- continuing to develop the relations with the EWN;
- evaluating the appropriate level of communication and relations with third parties (non-EU, non-official stakeholders).

Other aspects that should be examined include:

- The need for enhanced quality management of the subsystems so as to improve the specification of the “usability” of the products and the development and monitoring of indicators as to the extent to which they satisfy the intended use.
- The active development by DG-RTD of the necessary administrative frameworks that could facilitate its future direct management of the projects’ sub-contracts.
- The improved knowledge management between the IPTS staff and those at RTD preparing reports on actions that are related to the development of ERA.

In view of the foregoing, there are clear advantages in concentrating efforts on meeting as efficiently as possible the demands of identified users within the Commission and, as a secondary activity, making value added products easily available on a modern and user friendly website. The existence, and value within the framework of the ERA development, of the ERAWATCH website should be brought to the attention of the wider target community more effectively and its perceived value carefully monitored. This could be done in collaboration with CREST and similar bodies.

In the following section, the Conclusions address each of the five specific ERAWATCH issues requested in the terms of reference.

1. The ERAWATCH baseload inventory

Information gathering on RTD policies was one of the core objectives of ERAWATCH. Quantity, quality and type of information, as well as the related procedures, have been evaluated in terms of both their usefulness as well as within the framework of the future

objectives of national and EU RTD policies. Strengths and weaknesses have been analysed and this report has addressed topics such as:

- The accuracy, comparability, appropriateness and relevance of the information collected.
- The limited use of ERAWATCH and low reputation among non-EU users, especially government officials.
- The implications of the organization of information gathering through a network of correspondents and of the organizational relations between EWN and the IPTS.
- The interaction between DG RTD and IPTS in defining objectives on the intelligence work based on ERAWATCH should continue.
- The need to have a better selection approach (a kind of filtering) on the information gathering in the aim to streamline ERAWATCH by making it less 'encyclopaedic', more novel and more operative, and to define areas of analysis which could better serve the needs of the users.
- Links between ERAWATCH and other intelligence sources could enhance the usefulness of ERAWATCH intelligence without significant additional cost. Such links can connect ERAWATCH with other Community documents, indicators, statistical data and/or data sources and can increase its usefulness to the users.

2. The ERAWATCH Intelligence service

The value added role of IPTS has been particularly focused on this part of the project and the key elements of the evaluation are:

- a) The evaluators have reached the conclusion that the intelligence work was only partly based on the baseload inventory and that information gathering was not necessarily related to specific intelligence tasks. They also note that, although the differentiation between the baseload inventory and the intelligence service may have been appropriate initially, it is likely that in the next stage of ERAWATCH this distinction may become increasingly arbitrary as the processes of gathering and analysing information become more closely coordinated. It may be appropriate to rename the ERAWATCH Intelligence Service as ERAWATCH Analysis.

- b) Specific projects, such as the R&D specialization, other relevant thematic approaches, the ERA aspects and the related issues on the structures and the dynamics of research systems of the MS' resource mobilization, are signs of a differentiation and qualitative improvement of value added ERAWATCH services. However, many of these reports exhibit very unequal quality, content and forms of presentation; which are not solely due to objective national differences.
- c) The evaluators consider that the following questions should be addressed before establishing the future criteria under which the intelligence or analysis service should be specified and executed.
- The first, and perhaps most basic question, is the issue of "Which determines which": Are the products to be developed on the basis of the contents of the information in the base load inventory, or should the specifications of the inputs to the latter be governed by the demands for the former?
 - A second issue is whether or not the intelligence or analysis service should be only "static", or also "dynamic".
 - A third question is that the needs of the main pre-defined user groups should determine the selection and specification of ERAWATCH's products while retaining a reasonable level of flexibility in the working relationships between DG-RTD and JRC-IPTS and the EWN.
- d) The following issues should condition future actions:
- The priorities for ERAWATCH products;
 - The need for selective, high quality and in depth analysis of R+D policies and the balance between information gathering and analysis;
 - The need to achieve effective diffusion and promotion mechanisms of ERAWATCH to user groups, both within the Commission Services and in the MS (visibility and support to analysis);
 - The need to improve the focus on thematic approaches;
 - Whether or not to include information about the results of prospective and foresight analyses carried out by the MS and other countries.

A constructive development would be a more active role over the next 18-24 months by DG-RTD in the interface with EWN.

3. The ERAWATCH website

Regarding the website the evaluators recognized a number of weaknesses, of which the following are particularly relevant:

- A number of shortcomings regarding the specification of the user tasks have been identified (what the use of the system is, who the users are, their profile, what the knowledge base is and where it is stored). Consequently, a specification of the needed technology has to be derived and some proposals have been articulated in the report.
- The information logistics and the information architecture require particular attention.
- Data inconsistencies and the absence of controlled vocabulary, which could facilitate search on the website, have to be corrected.
- The need to replace the search technology, which cannot be considered state-of-the-art

As a general conclusion, the evaluators have the opinion that the quality of a user-friendly website, the relevance of the information easily available and the opportunity provided to all user groups involved (Commission, national policy makers, analysts) to produce quality analyses based on the base-load inventory, have direct impacts on the overall quality of ERAWATCH and especially of the ERAWATCH intelligence service. In this regard DG-RTD and JRC-IPTS need to ensure that the external service providers fulfill their requirements for modern ICT in a satisfactory manner.

4. ERAWATCH and TrendChart

Although ERAWATCH and TrendChart are complementary to each other, there was no initial significant cooperation between the two services with the consequence that users could not benefit from a more friendly, transparent, flexible and intelligent integration of the information covered by the two systems.

At the same time, the evaluators recognize that a further integration will require:

- **The administrative/legal aspects of how different Directorates General can contract external services would have to be addressed in a timely and effective fashion.**

- **The differences in the policy perspectives among the different projects have to be considered.**
- **That the continuity in the services provided is ensured by well-planned and managed development and migration strategies.**

5. New policy dimensions and ERAWATCH

From what the evaluators have been able to assess, outside the Commission Services themselves, the **main group of direct users** of the publicly available products of ERAWATCH on its website are the community of European R+D consultants (e.g. the members of the EWN), rather than policy makers in the Member States.

The evaluators have noted that a number of projects have been initiated within the framework of ERAWATCH that increase the value-added of the intelligence service. In particular, both **the country and the R&D specialization reports are offering a more synthetic view of the research and technology landscape** in the MS as well as its characteristics in terms of R&D specialization and this fits well with the evaluators' recommendations to develop the overall analytical focus.

It is understandable that the information products of ERAWATCH that have been developed in the first phase have been descriptions of purely national systems. In the second phase these should be products for ERA development. This should not, however, exclude that in the next stage of its development a consideration of **the global contexts of the operation of national research systems**.

The new EU policy objectives will require intensive and systematic information from Member States. ERAWATCH seems to be the **most suitable tool available** for this exercise and this appears to be what people involved in the related procedures expect.

Governance issues will be much more pertinent when new ERA policies will be designed and implemented. The accepted governance principles in Ljubljana imply a

much stronger effort, which will not be successful unless much more specific analysis of governance issues is included.

When putting the different pieces together - the partnership for the five ERA initiatives by the Commission, combined with the on-going OMC work within the framework of CREST, and both of them put under the roof of the Council conclusions on ERA governance - ERAWATCH has the potential to become an effective analytical tool in the future, both for the Commission and for the Member and Associated States.

RECOMMENDATIONS

This summary of the Evaluators' recommendations is presented under five headings:

1. The information inventory (including EWN);
2. The intelligence service;
3. The design and use of the website;
4. The cooperation between ERAWATCH and TrendChart
5. The ERA Dimension in ERAWATCH

1. The scope of the information inventory (including EWN)

A more active involvement of Member and Associated States in the inventory part of ERAWATCH should be sought.

The processes of gathering and analysing information should become more closely co-ordinated and be mutually reinforcing.

The ERAWATCH reports should be of similar quality, content and forms of presentation.

The information gathering should be streamlined: less 'encyclopaedic', more novel and more operative.

The analysis needs of the main pre-defined user groups should determine the selection and specification of ERAWATCH's inventory.

2. The intelligence service;

It may be appropriate to rename the ERAWATCH Intelligence Service, "ERAWATCH Analysis". It is recommended to focus and develop it along the following lines:

- a) Set clearer ERA based priorities so as to achieve selective, quality and in depth analysis.*
- b) Improve the diffusion and marketing of ERAWATCH to the target user groups.*
- c) Complement the analysis of the research systems with case studies that offer greater insights into the processes involved in formulating RDI policies.*

- d) The “static” analysis should be complemented by “dynamic” analysis.*
- e) In the future development of ERAWATCH, the regional and global contexts of the operation of national Research Systems should also be addressed.*

The evaluators encourage DG-RTD to consider the usefulness of developing a more active role in the interface with EWN.

3. The design and use of the website

The Evaluators propose that the requirements for the new ERAWATCH Website should address the following five elements:

- Identify the target user groups;
- Define the use cases;
- Development of a functional specification;
- Migration Concept;
- Interface Design.

The future approach will have to involve a series of actions:

- (a) Identify the users.
- (b) Identify the information sources.
- (c) Issues that have to be addressed include:
 - What are the data?
 - What could a new ERAWATCH System for Analysis and Monitoring look like?
 - What should a combination of ERAWATCH and TrendChart look like?
 - Is a combination of correspondents and automatic approaches possible?
 - Is it possible to simplify the information acquisition by means of distributed collection of the data? How, in this case can the quality be ensured?
 - Define the appropriate migration strategy.

The end goal should be to develop a project that has incorporated the most advantageous and practical features of the different approaches available with the most reliable, user friendly and modern technology. At least one person with an up-to-date and highly developed ICT knowledge should be incorporated into the IPTS ERAWATCH team as early in the new contract period as possible with the specific responsibility of obtaining the necessary level of modern ICT from the external service providers.

4. The cooperation between ERAWATCH and TrendChart

The overall goal should be the development, over the next 5 years, of an extensive collaboration between the Services that have at the moment individual responsibilities for setting the objectives, providing the resources and managing different monitoring and analysis activities (including NETWATCH and IRMA). In order to achieve this:

- **The administrative/legal aspects of how different Directorates General can contract external services would have to be addressed in a timely and effective fashion.**
- **Continuity in the services provided should be ensured by well-planned and managed development and migration strategies.**

The evaluators strongly recommend that a reasonable effort be made in the short term to achieve a user friendly, transparent, flexible and intelligent integration of information by means of a **modern indexing and accessing system**. The achievement of longer-term goals will require the establishment of a road map covering the next 3-5 years, with specific objectives and deliverables.

5. The ERA dimension in ERAWATCH

The evaluators recommend that ERAWATCH should be **more focused** in the future on those issues directly related to the development of ERA.

ERAWATCH has the potential to provide in depth analysis of RDI policies and their contexts for the Commission and the Member States. The main target groups of ERAWATCH should continue to be the Commission services and it **should fulfil its potential to provide valuable analysis for the Commission as well as the Member and Associated States**. However the Evaluation Committee recommends that the Commission **does not consider the wider R&D community a core user-group of ERA-WATCH**.

The evaluators propose an integration of efforts within a clearly defined part of the overall “jig-saw puzzle” by reinforcing and focussing the information gathering, knowledge management, extraction, and analysis as well as diffusion activities. **The analysis part of ERA-WATCH should be strengthened in order to become an effective in-**

formation system that supports the development of ERA in the MS and associated states by providing analyses in the following areas:

- Evolution of Member States' R&D policy mixes;
- Transnational dimension of national R&D policies;
- Integration of EU and Member States' policies towards the ERA;
- Emerging issues that are identified as being of high priority.

The country-related analyses should be complemented by horizontal analyses in the five areas of the ERA partnership. In turn this will complement the statistical analysis.

ERAWATCH should also include information about:

- the published results of the STI Foresight processes at European, national and regional level;
- a more specific analysis of governance issues;
- the development of the global contexts of the operation of national research systems.

The evaluators encourage DG-RTD and JRC-IPTS to consider together the possibility that these efforts be complemented by the provision on the ERAWATCH website of a platform that allows "**social networks**" to be developed by and for the relevant research policy communities.