agence d'évaluation de la recherche
et de l'enseignement supérieur

Section des unités de recherche

Criteria for the evaluation of research institutions:

The AERES standards

Criteria for the evaluation of research institutions:The AERES standards
Version of 21 february 2013

Contents

Summary

The document below presents the AERES evaluation criteria standards with, for each of the six chosen criteria, the assessment field covered for the criterion, observable facts and quality indicators.

Introduction

The law has tasked AERES with a mission to evaluate activities conducted by higher education and research institutions[1]. The evaluation method chosen by the Agency is based on self-evaluation by the institution which presents its results and projects followed by an external, independent, collective and transparent review by experts drawn from the same communities as the assessed groups. This leads to a written report to which are appended observations by the research institution following its reading of the report and a set of grades which has changed in form over past successive campaigns.

Whereas in 2011, AERES completed an initial evaluation cycle on almost three thousand research institutions – providing an overview of higher education and research in France - its scientific representatives, in partnership with members of its council, decided to proceed with an appraisal of applied evaluation practices, based on the analysis of feedback gathered from chairs of expert committees, directors of assessed laboratories and their parent organisations. A further purpose of this appraisal has been to compare the AERES evaluation method with others used worldwide, especially in other European countries, with a view to facilitating analysis of partnerships between French research institutions and their European counterparts.

This appraisal has helped develop AERES evaluation and grading practices, in view of the experience gained, users' observations and an abundant international literature on the subject. The document the Agency publishes today presents the findings of this work aimed at clarifying the principles and method that it will implement in its new version in the 2012-2013 evaluation campaign.

First and foremost, we should recall that evaluations conducted by AERES aim to be *constructive* and have three main objectives. Their first goal is to *allow assessed research institutions to identify ways in which their results and practices can be improved*. The report submitted by expert committees to each of these research institutions is designed to help each one take expedient, useful and beneficial initiatives in terms of scientific policy, internal organisation or medium- and long-term strategy in agreement with its parent organisations. Its aim is to *inform stakeholders outside the assessed research institution* that are in a position to take *management or funding decisions* affecting it. That is why it presents the detailed results of the review, taking into account the various criteria liable to interest decision-makers, in the context of their overall strategic vision, the resources available to them and the context in which they should take their decision. This can concern the very existence of the research institution but also its management or funding[2]. The last objective targeted by the evaluation report published by AERES on its website is to *contribute to informing everyone who would like to know the results of the evaluation but does not have a management or funding role*: thesis applicants, applicants for higher education recruitment examinations, future researchers, guest personnel, candidates whom the research institution wants to attract, etc. In this case, which covers external communications in the broad sense of the term, the results should be presented as simply, clearly and understandably as possible.

In view of these evaluation objectives, it is possible to identify all potential recipients of the AERES evaluation of research institutions. These recipients form three concentric circles.

The first consists of *the management and all staff of the assessed research institution*, as well as *experts having contributed to the evaluation*. All these recipients are directly concerned, on publication of the evaluation report, by the report itself, by the contributions made by each expert to its drafting, its appended grades, the observations of the assessed research institution and the publicity resulting from the final report. That is why AERES is attentive as to how these different documents are drafted: they should not only provide objective evaluations, based on proven facts, but should also show consideration and respect for their recipients.

[1] Art. L. 114-3-1-2.

[2] The Law specifies in particular that "the State takes into account the evaluation results produced by AERES [...] to determine financial commitments it makes with respect to institutions... "(Art. L. 311-2 of the French Research Code and art. L. 711-1 of the French Education Code).

The second circle of recipients consists of *people liable to take decisions relative to the assessed research institution*, whether public- or private-sector, and the decision covers the existence, the management, the resources of this research institution (financial in particular) or the validation of a partnership. These recipients often have to take many decisions rapidly and need clear and concise information allowing them to take the most appropriate decision to implement their strategy.

The third circle consists of a wide range of recipients. Some may require detailed information while others, as simple citizens or because they have public responsibilities, want to understand the state of research in a region or the achievements and results of a given research institution. They should have access to the results of the evaluation in the most concise form possible. This information is not an integral part of the appraisal process but is important to inspire confidence in the evaluation and to meet strong interest in the wider society.

The evaluation incurs the responsibility of the evaluator, in particular owing to its impact on the life and future of the assessed research institution. That is why AERES wanted to explain its evaluation methodology clearly and provide the assessed communities with general standards for use by all disciplinary fields. This led to a general revision of its criteria based on experience gained, adjustments that dialogue with evaluation stakeholders inspired and on methodological ideas brought into play in other European countries.

The evaluation method set out below has been chosen because it guarantees the clarity of the whole evaluation process and, in view of additional consultations conducted by the Agency before publicising it, it seemed to satisfy the dual requirement of being acceptable to all stakeholders and in line with their needs. Before its publication, this document was submitted to the management of a large number of research organisations and the CPU (Conference of University Presidents) and their comments were integrated into the report. At the end of each evaluation campaign, the Agency will request feedback that will allow assessed institutions to provide input on what they believe is useful to improve the ongoing discussion.

The following pages are therefore a presentation of the methodological principles defined by AERES then, for each evaluation criterion, a set of data used to characterise and assess the research institutions. In addition to these general documents, there are indications as to the evaluation of interdisciplinary institutions, the number of which is growing in the French research sector. There is also a complementary note on scientific production and quality in Human and Social Sciences, a field with a specific character, namely in terms of publications, requiring specifications that it seemed worth presenting in these standards. A glossary is appended to the end of this document: it specifies the meaning that AERES gives to a set of terms frequently used in the evaluation of research institutions.

I – Methodology

The methodology chosen by AERES to evaluate research institutions (research units, federal structures, clinical investigation centres, etc.) within the framework of missions assigned to them is based on a few fundamental principles:

- a collective qualitative peer evaluation,
- an evaluation which, using explicit criteria, takes into account the plurality of missions, the diversity of research and, when applicable, the complexity of its interdisciplinary dimension,
- an evaluation which, for each criterion used, is based on observable facts and assesses their value.

1. Collective peer evaluation

In terms of evaluation, international literature traditionally identifies two models[3]. Some countries have adopted the first, others the second, and sometimes those that adopted the first or second, after a few years, have switched from one to the other[4].

The first model, based on qualitative evaluation, involves appreciation of the assessed institution by researchers in the same field, the "peer review". They work individually, for example drafting a report in the preliminary phase of a review, or collectively in evaluation committees. In the latter case, these committees (whether ad hoc for a one-off review or whether they evaluate all research institutions in the same disciplinary group) take a collegial approach, taking into account the environment and nature of the assessed institution. Based on the confrontation of possibly contradictory viewpoints, their evaluation strives to find consensus.

The second, quantitative model focuses on the measurement of performance (metrics). For that, it produces reliable and general indicators that allow comparisons between different institutions, as long as the measurement is properly correlated with the subject of the assessment and the application field of these indicators is relevant[5]. In contrast with the qualitative evaluation, this other form of evaluation has the disadvantage of giving less weight to local contexts and disciplinary characteristics.

At first sight, these two models are clearly distinct: quantitative evaluation chooses to quantify, qualitative evaluation goes beyond simple quantification. It is important however to explain that qualitative evaluation does not exclude examination of quantified factors; these comprise only one element among other data collated for the assessment. The quantitative model, basing its judgement on quantification only, risks producing a summary approach to research, reducing the diversity of its objectives and practices. Although this model produces indicators that simplify decision-making, it tends to reduce evaluative judgement to a mechanism that puts excessive emphasis on gross figures to the detriment of a genuine analysis of their contextual meaning and value.

AERES would like to provide assessed institutions, from their standpoint, with tools to allow continuous improvement. It also aims to provide assessment instruments to funding and management bodies but does not claim to impose a model. On the contrary, it strives to promote quality in research in all its aspects and forms: it wishes to respect the diversity of scientific cultures and the practices they generate.

---

[3] The bibliography is considerable. We will focus on a particularly enlightening reference: Claire Donovan, "Future pathways for science policy and research assessment: metrics vs peer review, quality vs impact", *Science and Public Policy*, vol. 34 (8) October 2007. Although old, this document remains relevant in terms of the analysis of compared advantages and disadvantages of the two models (quantitative evaluation or metrics vs peer evaluation).

[4] Although it was the intention in Great Britain to move from the first model to the second in the transition from the Research Assessment Exercise (RAE) to the Research Excellence Framework (REF), it proved impossible to establish agreed metrics which commanded sufficient confidence for them to be used. Although evaluation panels will be allowed to use metrics if they wish to do so, these will only be in support of peer review judgments. As a consequence, the new REF remains an example of the first, qualitative, model notwithstanding the original intentions to move to the second

[5] According to a recent report by the French Academy of Science, the use of bibliometric indicators to quantify individuals' performance is not suitable for a large number of fields. See *Du bon usage de la bibliométrie pour l'évaluation individuelle des chercheurs*, Académie des sciences, January 2011.

That is why the Agency has chosen peer evaluation: independent, transparent evaluation, calling on ad hoc committees for each of the assessed institutions. These committees, which share a common reference base, are constituted according to missions, scientific areas and fields of application covered by the research institutions. The experts comprising them are chosen by scientific representatives sitting on the committees for their competence in relation to the characteristics of the subject to be assessed: its disciplinary scope, its research targets, its possible interdisciplinary dimension, etc. Their assessment work does not stop at accumulating characterisation information determined on the basis of a repository of quantifiable data: it requires the ability to judge, i.e. analyse observed facts and their discussion, conducted so as to hear all the views of the college of experts to produce a summary of their opinions, while complying with the ethical rules set out by AERES.

2. Diversity of research missions and evaluation criteria

In its concern to provide a broad enough range of information to assessed research institutions and their parent bodies, AERES has since 2008 based its evaluations on four criteria. In their most recent version, these criteria were (i) scientific quality and production, (ii) reputation and appeal, (iii) governance and life of the research entity, (iv) strategy and research perspectives for the next contract.

To take better account of the diversity of research, their missions and production, the Agency extended its criteria to six, which will be implemented in the 2012-2013 evaluation campaign.

The six criteria chosen are as follows:

- Scientific production and quality,
- Academic reputation and appeal,
- Interactions with the social, economic and cultural environment,
- Organisation and life of the institution,
- Involvement in training through research,
- Strategy and research perspectives for the next contract.

AERES, through this modification, has included proposals made by managers of assessed research institutions and their evaluators in their feedback after previous evaluation campaigns. It has also taken into consideration methodological discussions held by several internal or external work groups and by other European agencies6. Finally, it has capitalised on the recommendations of the last report of the French parliamentary office for the evaluation of scientific and technical choices (OPECST[7]).

[6] In particular, it took into account conclusions drawn by scientific representatives in Human and Social Sciences who, in collaboration with experts outside the Agency, examined indicators specific to their field in a seminar bringing them together between September 2011 and January 2012. It also integrated discussions on the evaluation of clinical research and interdisciplinarity held by two other groups of scientific representatives and qualified personalities working on these themes at the Agency. Finally, it took on board the conclusions of the report by the EREFIN group on the evaluation of finalised research, like work developed in Great Britain on the theme of the *impact* of research within the framework of the transfer in 2014 from the *Research Assessment Exercise* of 2008 to the *Research Evaluation Framework (REF)*.

[7] *L'Innovation à l'épreuve des peurs et des risques*, Report by the OPECST, 2012. Recommandation IV: élargir les critères d'évaluation de la recherche.

Improvements were recommended in two fields. The first covers activities falling within the scope of *applied research* [8] or considered to be *research-related activities* – especially activities to support public policy. These were not sufficiently recognised and promoted by the Agency in its standards based on four criteria: the introduction of the "interaction with the social, economic and cultural" criterion, differing from the "academic reputation and appeal", criterion aims to integrate them fully into the assessed activities.

The second area is training through research which, in the four-criterion standards, was only one of many others in the "governance and life of the research institution" criterion. To give training its rightful place in missions assigned to research institutions, it seemed necessary, here again, to treat it as a criterion in its own right.

By adopting the new standards, AERES offers a clearer response to the requirements of the 2006 framework law for research which specifies that: *"Research personnel are tasked with a mission of national interest. This mission covers: a) the development of knowledge; b) its transfer and application in business and in all fields contributing to the progress of society; c) the circulation of scientific and technical information and culture throughout the population, particularly among the young; d) involvement in initial training and continuing education; e) research administration; f) scientific expertise*."

However, AERES takes into account the fact that research institutions are not designed to undertake all the activities covered by these evaluation criteria in a standardised way. These entities, according to their identity and nature of their research, fulfil the mission assigned to them in their own way[9]. That is why, to be as relevant as possible, the criteria used as reference by the expert committees tasked by the Agency may be tailored to each institution's own character.

3. Criteria, observable facts and quality indicators

The notion of *evaluation criterion* covers what is deemed to be relevant to assess the value of facts (activities, results, etc.) and what the review work of AERES should involve.

The evaluation criterion closely links factual data that may be observed by evaluators to back up their assessment (*observable facts*) and the value to be given to such data to elaborate the actual assessment (*quality indicators*). That is why AERES has chosen to specify each evaluation criterion, according to three successive stages:

- It is firstly important to specify the *evaluative intention*, which underpins the consistency of each criterion and the efficiency of its application: in this way, the *scope* of the criterion is defined to sum up the aspects that the evaluator needs to evaluate, in general terms for all types of research institutions and for all fields.
- It is then necessary to specify empirical data – activities and results – that ground the evaluation through concrete evidence. This factual data, sometimes called "descriptors" in the evaluation process, will be referred to as *observable facts*. These can group together different types of descriptors.
- Finally, to assess these facts, it is important to determine their value through indicators that allow a qualitative assessment. Although it is not very realistic to seek unanimity with respect to *quality indicators*, as part of a peer evaluation, these can be based on assessment elements on which a large proportion of members of a disciplinary group agree. As such, they establish a standard or at least a set of references on which a discussion, in the context of institutional support and advice, can take place within expert committees and within evaluated groups and their evaluators.

[8] The term 'applied' is a generic one and includes translational, technological or clinical research. These different terms will will be used as appropriate through the document.

[9] Below, in particular, you will find a note (p. 24) on scientific production and quality in Human and Social Sciences.

Although quantitative indicators do exist for some types of activities, outputs and results, they can only act as an aid in the peer evaluation practised by AERES. The quality of an activity, an output or a result cannot be reduced to quantitative elements as these themselves do not have a universal value that could be automatically deduced by simple calculation. Value or quality should be verified on the basis of observable facts, including quantitative data, through *analysis*, *discussion and interpretation work* taking into account the *objective* and *context of the evaluation*: with respect to this, it is important to be attentive to the history and identity of research institutions behind their missions, the resources and support available to them, the scientific and educational environment within which they deploy their activities, etc.

4. From evaluation to grading

The evaluation criteria chosen by AERES apply not only to research institutions but are also designed for use by the components of these institutions (internal teams, themes). The appropriate granularity of the evaluation should produce a mapping of the research institution that takes into account the reality of its scientific landscape.

The Agency, which has replaced the general grade given to research institutions with an overall assessment, has maintained the attribution of a grade for each evaluation criterion, considering it to be a useful management instrument for the various users of its evaluations, such as the evaluated groups themselves, managers of higher education institutions, elected representatives, ministerial heads and decision-makers in funding agencies

Each criterion is therefore graded not only in terms of the research institution but also, when structured into internal teams, in terms of those teams. When themes have a cross-cutting character and bring together personnel from several internal teams within one single research institution, they are not graded by AERES.

To ensure the standardisation and fairness of these grades, it is necessary to closely tie in the definition of the criteria and the *grading scale*: each grade should correspond to a level of quality that needs to be precisely defined.

II – Evaluation criteria standards

To compile its standards, AERES, in compliance with the aforementioned method, firstly wanted to specify the *field of evaluation* covered by the six criteria chosen. It then sought to identify and classify *observable facts* and *quality indicators* linked to each of these criteria.

These standards should not be considered as a rigid and closed evaluation grid and even less so as a norm that needs to be followed and satisfied term by term, without exception. To avoid any misunderstanding, it is important to note, on the contrary, that the observable facts and quality indicators listed here:

- are illustrative, without claiming to be exhaustive,
- do not need to satisfy all the items identified,
- do not include the adaptations needed to take into account the specific features of each discipline.

The diversity ofresearch institutions means that they will not fully and uniformly satisfy all the items selected: these should adapted according to the identity,missions and research focus of each of these organisations. This is precisely what gives its full meaning to peer evaluation: experts, who themselves belong to the disciplinary field of the research institutions they evaluate, know how to adapt this common language and give it the emphasis required for their field, to be recognised and understood by their community.

It has been made clear that these standards are designed to assist research institutions in drafting their self-evaluation document. They are also used to specify how activities or results can be characterised and presented prior to the qualitative peer evaluation. Henceforth an instrument common to all subjects is in place for the evaluation of research institutions.

AERES will, after an initial implementation stage, produce a revised statement of these standards taking into account the feedback that is received, and after consultation with the communities subject to the evaluations.

It is important to note that the lists presented below under each criterion is simply illustrative; they do not claim to be comprehensive. Observable facts are those that have been most frequently identified by the working groups within the Agency which , have contributed to the drafting of this document as well as by the institutional partners who were consulted prior to publication.

1. Criterion 1: Scientific production and quality

- Evaluation field covered by the criterion

This criterion, which covers the production of knowledge, assesses discoveries, results, issues and experimental facts leading to scientific achievements with respect to the discipline's standards and the research field. It also assesses the originality, quality and scope of research.

● Observable facts

The main observable facts for this criterion are:

- *publications*: books, chapters, publication of texts (and specially critical editions), translations, articles in peer-review journals, published papers in conference proceedings, etc.;
- *lectures and other unpublished oral communications*: oral papers to conferences without published proceedings, conference posters, invited lectures, sets of slides, etc.
- *other scientific reports specific to the field*: scientific or technical reports (e.g. excavation reports), exhibition catalogues, atlases, corpora, psychometric tests, demonstrations, software, prototypes, scientific audio-visual productions, research-based creative outputs, etc.;
- *the production of instruments, resources, methodology*: glossaries, databases, collections, cohorts, observatories, technological platforms, etc.
- …

● Quality indicators

Among quality indicators linked to these observable facts, the following may be assessed in particular:

- the originality and scope of research, the importance of the advance to the relevant field;
- theoretical and methodological breakthroughs, paradigm shifts, emergence of new problems or new proposed investigations;
- their impact in scientific terms within academia (citations, references, etc.);
- their international or national presence;
- the reputation and selectivity of the editorial vehicles chosen for their publication;
- …

2. Criterion 2: Academic reputation and appeal

● Evaluation field covered by the criterion

This criterion takes into account the institution's ability to get itself known in research communities, by acquiring a reputation and visibility. It also assesses its involvement in structuring research bodies on the regional, national and international level and its capacity to become a magnet in its field.

● Observable facts

The facts to be taken into account in this criterion include:

- participation in national and international collaborative research projects;
- the existence of collaborations with other laboratories;
- participation in national and international networks, European cooperation bodies, (JPI-Joint Programming Initiative, COST-European Cooperation in Science and Technology, etc.), federated organisations (e.g. Maisons des sciences de l'homme), scientific societies, scientific programming communities (preparation of invitations to tender, infrastructure organisation, etc.) ;
- participation in the "Investissements d'avenir" programme: Idex, Labex, Equipex certification.
- organisation of national and international symposia;
- researchers, doctoral and postdoctoral students at the institution;
- prizes and distinctions awarded to members of the institution, invitations to scientific events;
- management of collections, series listed at scientific publishers; participation in editorial committees, scientific committees of symposia or conventions, scientific review bodies;
- …

● Quality indicators

Among quality indicators linked to these observable facts, the following may be assessed in particular:

– responsibility for the direction of, and the level of scientific involvement in, international and national projects;

– lead partner in networks, excellence networks (e.g. REX), communities, project-promoting associations, infrastructure or centres of scientific or technical interest, at the international, national or regional level;

– the high standard of foreign researchers and postdoctoral students recruited by the institution;

– responsibilities taken in international academic bodies;

– the reputation of prizes and distinctions awarded to members of the institution;

– the scientific quality of the peer-review journals and collections to which members of the institution contribute in an editorial role, their referencing and reputation;

– the selectivity and importance of scientific issues discussed at international events in which members of the institution participate or which they organise;

– the level and reputation of journals to which members of the institution contribute;

– …

3. Criterion 3: Interactions with the social, economic and cultural environment

● Evaluation field covered by the criterion

This criterion is used to assess the different activities and achievements whereby research contributes to the innovation process and impacts on the economy, society or culture. The necessary length of time and complexity of conditions for the success of this process call for the evaluation of the research institution's partnerships with different stakeholders as well as the different forms of interaction between researchers and their environment.

● Observable facts

The facts to be taken into consideration in this criterion cover activities directed at stakeholders who do not belong to the research world. They depend on the nature and purpose of activities developed by research institutions which would not all be involved to the same degree in their delivery. There are three types of facts.

– *Outputs directed at various non-academic stakeholders*, underpinned by by research work, for example:

- articles in professional or technical journals, summary works aimed at professionals;
- study and review reports targeting public or private decision-makers; contribution to standards, guidelines (in the case of clinical protocols for example or public consultations on the restoration and enhancement of the archaeological heritage);
- software, conceptual tools and models for decision-making;
- patents and licences and, as appropriate to the field, pilots or prototypes, processes, methods and know-how, clinical studies, registered trademarks;
- documents in different formats and events (e.g. science fairs) contributing to the dissemination of scientific culture, continuing education and public debate;
- …

– *Commitment to partnerships* and all other elements highlighting *the interest and commitment of non-academic partners,* as well as *visibility* of the research institution in the socio-economic or cultural field, such as:
  - introduction of technological transfer support structures; involvement in interface structures (Carnot institutes, clusters, combined technology units and networks, innovation clusters, citizens' associations, etc.);
  - collaboration with cultural institutions (museums, libraries, academies, theatres and opera houses, etc.); participation in cultural events, heritage programmes;
  - management and availability of its own documentary collections to the public (specialised libraries, archives, digital resources);
  - contracts obtained with non-academic partners (research, publishing contracts, availability of expertise or resources, jointly-funded theses, etc.) and joint responses to invitations to tender;
  - participation in the organisational structure of partners(scientific committee, steering committee, etc.), professionals received in the research institution;
  - organisation of conferences, debates, fairs, exhibitions, seminars or training cycles for professionals or social groups (patient, consumer, environment-protection associations, etc.);
  - the appointment of members of the research institution to national or international review panels (health agencies, international organisations, etc.).
  - …

– *Possible indicators of the impact* of research and partnership collaborations, such as:
  - the creation of companies, contribution to the creation, maintenance or development of employment in an economic sector or branch;
  - innovations (new products, techniques and processes, etc.);
  - effects on public health, the environment, territorial development, legislation, public debate, etc.;
  - creation of structures or new professional organisations;
  - national, European or international regulations underpinned by results or contributions from the research institutions; reviews to assess the potential impact of technological innovations;
  - …

● Quality indicators

The evaluation could take into account the following factors, in the context of existing knowledge in the field at the national and international:

– the originality of methods and products transferred (e.g. contribution to disruptive innovations);

– their relationship to the most recent scientific knowledge;

– the quality and success of dissemination (choice of medium, outcome for methods and products, impact on the intended target audience, connection with professional training, etc.);

– the existence of joint outputs with non-academic partners (jointly-authored articles, co-invented patents, etc.);

– indicators on the use of transferred knowledge and technical objects;

– the choice of partners: strategic leader in the field, innovative value-creating start-up, etc.;

– the quality and length of the partnership relationship;

– any influence of this relationship on the economic, social or cultural position of partners; influence on public policies;

– the impact of this relationship on the emergence of new problematics for the research institution or scientific community;

– the accreditation or certification of procedures aimed at public use (ISO standards);

– …

4. Criterion 4: Organisation and life of the institution

● Field of application of the evaluation criterion

This criterion should be used to assess the overall functioning of the institution. Among other things it covers the organisation of the scientific and material conditions of staff, the management and pooling of financial resources, the decision-making process, the existence of a scientific plan, the use of tools for monitoring progress and, generally speaking, everything that contributes to the smooth operation of the institution and the scientific momentum envisaged in its plan.

● Observable facts

The facts to be taken into account in this criterion include:

– the presence of objectives or a scientific strategy for the past period;

– organisation of the research institution into teams or themes;

– the existence of shared platforms or resources (e.g. documentary collections);

– scientific coordination and interactions between teams, themes and disciplines;

– the decision-making process and personnel involved; existence of a laboratory council, a functional organisational chart, rules of procedure, personnel AGMs, budget distribution.

– the role of engineers, technicians, administrative staff, temporary personnel (e.g. on fixed-term contracts) in the research system of the institution;

– internal and external communication;

– communication of a recruitment policy;

– the approach to environmental and health & safety issues and their articulation in research and training;

– …

● Quality indicators

Among quality indicators linked to these observable facts, the following may be assessed in particular:

– the achievement of strategic objectives or the ways in which of the strategy has been implemented for the past period;

– the extent to which the way the institution is structured follows a coherent scientific logic;

– accessibility of shared resources;

– the existence of cross-cutting scientific coordination structures, incentive for the emergence of teams, themes or innovative programmes;

– representativeness of personnel in steering committees, collegiality of decisions, frequency of meetings, relevance of budget distribution with respect to the research institution's scientific policy;

– sharing of technical departments;

– human resources strategy with respect to training and mobility;

– clarity of communication of the scientific policy and research programmes (regular updating of the website, quality of the newsletter, etc.);

– appropriate premises for the institution's scientific activities and the needs of its personnel;

– …

5. Criterion 5: Involvement in training through research

● Evaluation field covered by the criterion

This criterion analyses the institution's investment in training through research at Master and Doctorate level, in liaison with the educational bodies of those courses. It takes into consideration its involvement in the evolution of educational content. It analyses the care taken with the reception and support of Master's and doctoral students and assesses its appeal for them.

● Observable facts

The facts to be taken into account in this criterion include:

– presence of Master's degree trainees (M1 and M2) and doctoral students received in the research institution;

– theses examined;

– the existence of an induction and support policy for trainees and doctoral students (supervision rate, rate of funded doctorates, technical and financial support, scientific monitoring, thesis committees, etc.);

– publications, summary documents, educational digital tools and products;

– the design and coordination by the institution of certified training modules and courses; its contribution to the evolution of their educational content;

– seminars for doctoral schools or summer schools for young researchers designed and coordinated by the institution, alone or in partnership; doctoral student seminars;

– contribution to international training networks (ITN, Erasmus, etc.), co-supervision of theses with foreign universities or co-management with universities from other countries;

– involvement in steering committees for Master's and Doctorate training;

– …

● Quality indicators

Among quality indicators linked to these observable facts, the following may be assessed in particular:

– the effective support given to students and the quality of their supervision (duration of theses, drop-out rates, etc.);

– the quality of scientific outputs (articles, books, etc.) from completed theses;

– monitoring of doctoral students in liaison with doctoral schools and attention to the career opportunities for doctoral graduates;

– the existence of an internal discussion process to ensure that the most recent scientific progress are integrated in teaching;

– national or international certification of training (e.g. Erasmus mundus);

– relevance of dissemination media and vectors as well as the reputation (regional, national, international) of educational outputs;

– presence of researchers at doctoral seminars; level of doctoral student participation in the life of the research institution;

– the degree of involvement and responsibility in international training networks;

– researchers' involvement in setting up Master's training courses, in particular those coordinated or promoted by professors in the research institution or external personnel within the framework of their teaching duties;

– …

6. Criterion 6: Strategy and research perspectives for the next contract

● Evaluation criterion scope

This criterion should allow the assessment of the scientific quality of the research perspectives in the research institution's field and their relevance to the context in which the institution fulfils its mission. It assesses proposed changes. It evaluates the research institution's strategy to achieve its objectives.

● Observable facts

Two types of facts may be referred to:

– The existence of a *scientific policy* based, for example, on the following elements;
  - an understanding of the future evolution of the scientific field and good knowledge of others working in the field;
  - a specification of the potential contribution of the research project to the solving of problems identified by social,economic and cultural stakeholders;
  - objectives for results and for positioning in the national or international scientific field, adapted for the short and medium term;
  - partnership construction objectives with stakeholders in the socio-economic and cultural world; objectives in terms of innovation and impact;
  - cross-cutting programmes in the case of research institutions subdivided into internal teams;
  - objectives of training through research;
  - an analysis of the usable skills and resources available and able to be deployed;
  - …

– The existence of a *strategy* to achieve these objectives, articulated through precise actions, concerning the following aspects in particular;
  - partnerships in research and higher education;
  - partnerships with the socio-economic and cultural world;
  - the development of skills (training, mobility, recruitment, etc.);
  - the search for resources (funding, equipment, etc.);
  - the publication of results (publication strategy, knowledge and know-how transfer processes and media);
  - intellectual property policy;
  - …

● Quality indicators

Among quality indicators linked to these observable facts, the following may be assessed in particular:

– the originality of the research perspectives and any risk-taking;

– overall coherence of the research perspectives;

– for an entity with several components, the synergy of team projects, themes, focuses, etc.

– the credibility of the strategy and, in the case of complex research perspectives, the quality of their formulation in their following aspects;
  - disciplinary range;
  - awareness of objectives and viewpoints of non-academic partners;
  - effective articulation of basic and applied research;

– the richness and the openness of academic and non-academic partnerships;

– ability strategically to adaptat and reorientate in response to changes in the environment; ability to make human resources evolve according to strategic objectives;

– the quality of self-evaluation (e.g. *SWOT* analysis);

– …

III – Evaluation of multi-, inter- and transdisciplinarity

When the managers of interdisciplinary research institutions are interviewed — as they were by the working group of scientific representatives and qualified persons set up to examine the issue for AERES — a clear conclusion emerges: interdisciplinary research is today a handicap as much as it is an asset for these institutions. It is an asset because interdisciplinarity, by grasping new subjects through an original approach, involves epistemological risk-taking by opening up to new approaches of existing ways of thinking, which can result in the design of new analytical tools and positive forms of enhancement. But it may also be a handicap insofar as interdisciplinary research struggles to gain recognition in an academic context where disciplinary organisational and evaluation methods continue to dominate. In view of this situation, AERES has conducted work on the evaluation methodology for interdisciplinarity and on appropriate criteria to fairly assess this type of research. Here are the results:

1. Evaluating interactions between disciplines

Whereas the knowledge economy makes increasing demands from research with respect to concrete benefits in terms of development and innovation, interdisciplinarity is considered to be a powerful source of enrichment and scientific renewal whose cognitive dynamism facilitates mutual integration of disciplines, pushes back the frontiers of knowledge and promotes the emergence of new applications.

Although the potential of interdisciplinary research is generally acknowledged by researchers and decision-makers, this scientific approach to original study topics using innovative methods is difficult to evaluate using the logic and methods applied to disciplinary research. To produce results, interdisciplinarity, among other specificities, needs to be established in the longer term: not only does it cover topics that are, by definition, complex but it also requires mutual acculturation of partners, joint learning of concepts and methods.

AERES has set itself the objective of reporting fairly on the specific nature of interdisciplinary research. But the momentums developed at the frontiers of each discipline are very diverse. They generate interactions between teams and people, epistemological transfers, modifications of institutional structures and cultural changes. The difficulty in evaluating them definitely lies in cognitive factors, but also in social and managerial factors that need to be properly weighed up: these are linked in particular to the diversity of structuring methods applied to interdisciplinary research and the organisational configurations it induces.[10].

In its generic use, the term *interdisciplinarity* broadly covers various forms of integration of knowledge linked to disciplines, specialisms, technologies and various research fronts. That is why, prior to any evaluative approach, AERES has looked at ways to distinguish different modes of interaction between disciplines that do not have the same degree of integration. Literature dedicated to this issue agrees that it is important to distinguish multidisciplinarity, interdisciplinarity and transdisciplinarity[11]:

[10] The question of linked disciplines, for example, arises for multi-, inter- or transdisciplinary units. This question will be examined by AERES in the interdisciplinarity work group.

[11] The same type of definitions will be found in Stokols et al. (2003), reference cited in C. S. Wagner, J. D. Roessner, K. Bobb, J. Thompson Klein, K. W. Boyack, J. Keyton, I. Rafols, K. Borner (2011), « Approaches to understanding and measuring interdisciplinary scientific research (IDR): A review of the literature ». *Journal of Informetrics*. See also, European Science Foundation, Member Organisation Forum (2011), *European Peer Review Guide. Integrating policies and practices into coherent procedures* http://www.esf.org/activities/mo-fora/peer-review.html.

- *Multidisciplinarity* is a juxtaposition of disciplinary perspectives that broadens the field of knowledge by increasing the amount of data, tools and methods available. The disciplinary components, in this case, maintain their identity: one particular discipline, which generally steers the others, uses a methodology and the tools of one or more other disciplines to address a question or make inroads in a research project that is specific to its disciplinary field.
- *Interdisciplinarity* is the cooperation of several disciplines in common projects. These projects open up research prospects for each discipline which are mostly no longer restricted to conventional applications. Collaborative working brings together data, methods, tools, theories or concepts from different disciplines and the role of the disciplinary components goes beyond mere juxtaposition. Indicators of this integration include, in particular:
  - combinations of models or representations that unify otherwise disparate approaches;
  - a genuine collaboration rather than a mere exchange of services, with coordinated investment of resources and cooperative-style organisation;
  - the creation of a common language by hybridisation, leading to a revision of initial hypotheses, broader understanding of the stated problem, the opening of new prospects and the development of new knowledge.
- *Transdisciplinarity* is a scientific approach that goes beyond disciplinary viewpoints by offering an overall approach to a question. It shows an additional degree of integration in comparison with interdisciplinarity which partner disciplines achieve when repeated practice leads to the definition of new paradigms and the creation of a community that shares them, thus allowing for the gradual emergence of a new discipline[12]. This was the case, a while ago, with systems biology, synthetic biology, artificial intelligence and human ecology.

These distinctions are *operational aspects*: by explaining the different levels of interaction between disciplines and providing references to track trends, they clarify the evaluation of this type of research. Following on from this document, they will allow better identification, on the basis of criteria chosen by AERES in its general standards, of observable facts and quality indicators to characterise and assess multi-, inter- or transdisciplinary aspects of research institution activity.

The aim is not only to adapt expert review procedures to new approaches, while giving indications institutions under evaluation and their parent organisations. , but also to enable research to mature in line with the interface between disciplines which can provide such powerful levers to transform the general organisation of research.

2. Observable facts and the quality indicators associated with the different criteria

The evaluation criteria of multi-, inter- or transdisciplinary research institutions are no different from those applied in the evaluation of monodisciplinary institutions. However, to assess the multi-, inter- or transdisciplinary dimension of a research activity in all its aspects, it is necessary to identify specific observable facts for the various forms of interaction between disciplines and their corresponding quality indicators.

The level of multi-, inter- or transdisciplinary interaction between disciplines varies according to the research institution (and, in some cases, its internal teams) and according to the different research actions within the same institution It is therefore necessary to define evaluation terms adapted to these different levels which may be characterised using two indicators of multi-, inter- or transdisciplinarity: the *type of interaction* and *proximity* between interacting disciplines.

[12] We note that the term "transdisciplinarity" was recently also used to describe a new means of knowledge production based on collaborations with organisations outside the research sector and which integrates scientific knowledge and stakeholder (professionals, decision-makers, etc.) knowledge. This means of knowledge production could be called *trans-sectorality*.

Within the framework of the pilot phase of interdisciplinary evaluation at AERES, four types of interaction have been provisionally identified:

- to promote their research, researchers in a "pilot" discipline apply methods or use tools taken from another discipline.
- researchers belonging to two different disciplines (at least) have a common research object; each group works on its own questions and shares information on its results with researchers in the other group. This type of cooperation is often interlinked within the framework of research driven by a project.
- researchers belonging to two different disciplines (at least) have come up with a common question to address and the research findings depend on progress made on that question in each of the disciplines.
- researchers have demonstrable experience in the aforementioned type of interdisciplinary projects. They are involved in one or more interdisciplinary networks and contribute to the coordination of a new research community.

In addition to this distinction between types of interaction, the proximity between disciplines should be indicated. This measurement of proximity will take into account *epistemological factors*: proximity of frames of mind, paradigms and concepts, type of data, observation and measurement instruments used by these disciplines. It will also assess *the degree of interaction between disciplines* in a corpus of scientific literature (publications in particular), given their content (words, citations, etc.), media or the authors' experience in the discipline. This assessment may benefit in the long-term from the contribution of scientometric methods. It remains to be seen which ones will prove useful in characterising multi-, inter or transdisciplinary research institutions.

The analysis of these methods is currently being considered by a working group at AERES. Pending this group's conclusions, expert committees will be able to evaluate types of interaction and proximity between disciplines by referring to the AERES nomenclature (which quite closely follows that of the European Research Council/ERC[13]). They may thus differentiate the following cases:

- partner disciplines are linked to the same disciplinary group (e.g. SHS 5: "Literature, language, art, philosophy, history of ideas");
- partner disciplines fall within two different disciplinary groups (e.g. ST 2: "Physics" and ST 4: "Chemistry"), but within the same field (e.g. ST: "Science and technology" which is different from SVE fields: "Life and Environmental Sciences" and SHS: "Human and Social Sciences");
- partner disciplines fall within two different fields.

● Criterion 1: Scientific production and quality

Observable facts

In the case of multi-, inter- or transdisciplinary productions, it is possible, for example, to observe the following facts:

- the publication of articles with multi-, inter- or transdisciplinarity confirmed by the co-authors (publishing in their different disciplines of origin), by major references to work in another discipline than that of the supporting review, by the editorial line of the review or by any other relevant characteristic;
- the publication of chapters of works whose editorial objective explicitly targets multi-, inter- or transdisciplinarity (e.g. directors of publications are themselves from different disciplines and explicitly set a multi-, inter- or transdiciplinary objective for the work);
- the publication of articles in multi-, inter- or transdisciplinary journals[14];
- the oral presentation of papers at conferences whose founding approach is that of multi-, inter- or transdisciplinarity.
- other outputs with a demonstrated multi-, inter- or transdisciplinary position (authors, target of users from different disciplines, etc.);
- …

[13] The use of bibliometric measurements means checking consistency between the different disciplinary nomenclatures (ERC, WoS, etc.)

[14] The list of these journals will be drawn up by AERES, in consultation with the various stakeholders and regularly updated.

Quality indicators

Among the quality indicators linked to these observable facts, the following may be assessed in particular:

– the proportion of multi-, inter- or transdisciplinary outputs in the research institution's overall outputs; the *type of interaction* and *proximity* between disciplines in these multi-, inter- or transdisciplinary outputs.

– the novelty for the institution of these multi-, inter or transdisciplinary outputs, the originality in the scientific community;

– the impact of these outputs on disciplinary outputs (e.g. the use of new methodology taken from another discipline);

– the coherence of the whole output: disciplinary and multi-, inter- or transdisciplinary;

– …

● Criterion 2: Academic influence and appeal

Observable facts

In the case of a multi-, inter- or transdisciplinary institution, it is possible to observe the following facts for example:

– the success of calls for projects where multi-, inter- or transdisciplinarity is a prerequisite;

– the demonstrated multi-, inter- or transdisciplinarity of networks in which the institution participates;

– the seminal character of the multi-, inter- or transdisciplinarity in scientific collaborations with other institutions;

– the multi-, inter- or transdisciplinary policy of scientific or editorial committees in which the institutions' researchers participate;

– the visibility in several disciplinary communities of conferences to which members of the institution are invited, proximity between these disciplines;

– reception through mobility programmes and other means of senior researchers or postdoctoral students, targeted recruitment, motivated by multi-, inter- or transdisciplinary projects;

– …

Quality indicators

Among the quality indicators linked to these observable facts, the following may be assessed in particular:

– the driving role of the multi-, inter- or transdisciplinarity in the projects of the institution or the networks to which it belongs;

– international recognition of these networks;

– the reputation of researchers received or recruited as part of the multi, inter- or transdisciplinary momentum;

– the quality of partnerships that nurture the multi-, inter- or transdisciplinarity of the institution (are they productive? are they reinforced, upgraded over time?);

– …

● Criterion 3: Interactions with the social, economic and cultural environment

Observable facts

The needs articulated by some users of research often necessitate scientific projects that call on several disciplines. A strategy for appliedresearch can therefore have an impact on the scientific collaborations and partnerships forged by the institution. All observable facts identified in the general standards under this third criterion may therefore be supported by a multi-, inter- or transdisciplinary approach. In this case, for instance, it is possible to observe:

– dissemination or communication activities (exhibitions, stands at cultural events, etc.) where the institution is involved through its multi-, inter- or transdisciplinarity;

– assessment reports calling on and integrating multi-, inter- or transdisciplinary knowledge;

– business start-ups through the institution's multi-, inter or transdisciplinary experience;

– aspects of local and regional public policy based on the institution's multi-, inter- or transdisciplinary research;

– …

Quality indicators

Among the quality indicators linked to these observable facts, the following may be assessed in particular:

– the leading role played in setting up an economic, social or cultural policy as as a consequence of multi-, inter- or transdisciplinarity;

– the expert role of members of the research institution in the region's innovation cluster(s) or in business networks allowing the setting up of trans-sectoral policies;

– a national or international expert role in the use of knowledge in pre-normative or normative applications, etc.;

– …

● Criterion 4: Organisation and life of the institution

Observable facts

As the integration process between disciplines is both cognitive and organisational, special attention will be paid, in the case of multi-, inter- or transdisciplinary institutions, to the existence of a strategic plan, its implementation, monitoring tools and remedial procedures to reduce gaps between objectives and achievement.

The other observable facts include:

– the multi-, inter- or transdisciplinary dimension of the strategic plan for the past period;

– scientific coordination within the institution allowing joint teaching of mindsets, paradigms, methods of related disciplines in the multi-, inter- or transdisciplinary project;

– the time and space dedicated to multi-, inter- or transdisciplinary interactions;

– the allocation of resources to multi-, inter- or transdisciplinarity;

– multi-, inter or transdisciplinary job descriptions, which the institution asks its parent organisations. to earmark;

– …

Quality indicators

Among the quality indicators linked to these observable facts, the following may be assessed in particular:

– the ability to defend a multi-, inter- or transdisciplinary policy before parent organisations. ;

– the way the institution exploits a context favourable to multi-, inter- or transdisciplinarity; the effectiveness of the steps it takes to adapt to an unfavourable context;

– adaptation, within the framework of project management, to collaborations between different scientific cultures;

– the degree of appropriation of the multi-, inter- or transdisciplinary approach by the institution's young researchers;

– risk-taking, responsibility taken by researchers in the construction of multi-, inter- or transdisciplinary projects;

– …

● Criterion 5: Involvement in training through research

Observable facts

In the case of a multi-, inter- or transdisciplinary institution, it is possible to observe the following facts for example:

– multi-, inter or transdisciplinary theses (co-)supervised by the institution's researchers; linked theses combining two doctoral students from different disciplines on the same project;

– multi-, inter- and or transdisciplinary seminars and summer schools;

– involvement of the institution in multi-, inter- or transdisciplinary modules or courses;

– the emergence, linked to multi-, inter- or transdisciplinary research, of new training offers integrating this dimension;

– …

Quality indicators

Among the quality indicators linked to these observable facts, the following may be assessed in particular:

– the type of interaction and proximity between disciplines involved in multi-, inter- or transdisciplinary theses;

– common supervision, its coherence (the existence, for instance, of work sessions and presentations where two disciplinary components are involved);

– the recognition of theses by two disciplines;

– the type of interaction and proximity between disciplines in training, seminars and doctoral schools in which the institution is involved;

– the evolution of training modules and courses from multi- to interdisciplinarity and even to transdisciplinarity;

– the integration of doctoral graduates in teams, programmes, enterprises, etc. where their multi-, inter- or transdisciplinary training was decisive;

– …

● Criterion 6: Strategy and research perspectives for the next contract

Observable facts

In the case of a multi-, inter- or transdisciplinary institution, it is possible to observe the following facts for example:

– The existence of a multi-, inter- or transdisciplinary scientific policy to meet the following objectives for example:

- pushing back the frontiers of a scientific discipline by opening it up to the approaches and methods of another discipline;
- detecting the possible input from one discipline to another by identifying the appropriate level in the scientific approach (method of observation or acquisition of data, method of representation of knowledge and modelling, formulation of new hypotheses, transfer of paradigms, etc.);
- assessing the appropriateness of calling on several disciplines to examine a complex question that social,economic and cultural stakeholders wish to have addressed;
- creating multi-, inter or transdisciplinary training to enrich the science or build a profile of skills essential for society;
- …

– The existence of a strategy to achieve these objectives.

Quality indicators

Among the quality indicators linked to these observable facts, the following may be assessed in particular:

– As far as scientific policy is concerned:

- the relevance of approaches to parent organisations, scientific communities, social,economic and cultural stakeholders to obtain the necessary support;
- the depth of interactions between disciplines to make multidisciplinarity evolve into interdisciplinarity or even towards the emergence of a new discipline;
- the ability to achieve support from disciplinary components for multi-, trans- or interdisciplinary research perspectives;
- …

– As far as strategy is concerned:

- the ability to share resources (human, financial, material) with a structuring effect on multi-, inter- or transdisciplinary research;
- the ability to define expected outputs (assembly of existing knowledge, production of new applications, production of new knowledge, etc.) and their mode of dissemination;
- the ability to call on high-level competencies in each partner discipline of multi-, inter- or transdisciplinary research;
- the ability to mobilise relevant external competencies to achieve multi-, inter- or transdisciplinary research;
- …

IV – Note on scientific ouputs and quality in the human and social sciences

Human and social sciences encompass disciplines with significantly different practices that call for evaluation methods which are adapted to these differences. Some of these disciplines, for example, place books at the top of the publications list, while others favour articles published in peer-reviewed journals and even work that is presented in international congresses. As world-renowned means of scientific exchange, congresses, symposia and conferences in reality assume forms, an importance and subsequent effects in terms of publication and reputation of these publications, which bring about considerable differences between disciplines. An abstract, merely a piece of writing for a general readership for some, is considered to be a top-ranking publication in some branches of law. In some cases English is the means of communication and, to quite a significant extent, the language of evaluation; in others, other languages are the recognised vehicle of research. The greatly contrasting use from one discipline to another of bibliometrics and different review rankings – and even simple bibliographic overviews – gives an idea of these differences. AERES has certainly endeavoured to tackle these in conscientiously carrying out its evaluations – without seeking to remove them completely.

Although the methodology chosen by AERES pays careful attention to these specific features, it does not create as many special cases as there are disciplinary singularities or disciplinary groups with a specific identity, such as the humanities or the cultural domains. Furthermore, it does not define a field that would stand completely apart with no measure in common with the others, as this would give human and social sciences an exceptional status in the evaluation field. Indeed, the singularities are far from being limited to this field alone. Research in mathematics also takes distinctive forms and responds to distinctive uses if it is compared to research conducted in engineering sciences. The divisions and the complementarity between applied research and basic research is relevant to molecular and clinical research just as much as it is to economics and management. The problems posed by disciplinary specificity is something that goes well beyond the major disciplinary fields: the longer the list of differences, the longer the list of similarities and the question of the commensurability of disciplines once again raises its head. Many traits that appear to be specific to the practices of some are also present in the others when it comes to evaluation.

This is why AERES has decided to draw up *fairly flexible and adaptable multidisciplinary standards* so that they are both common and specific since they combine broad generality with characteristics that make sense discipline by discipline. Accordingly, these standards take account of the specific character of human and social sciences in the field of the evaluation. This attention to their specific features is expressed in two complementary ways. On the one hand, in keeping with the principles of qualitative evaluation, determination of the disciplinary characteristics is entrusted to expert committees, the “peers” who, by definition, belong to the same scientific communities as the assessed institutions. On the other hand, specifications tailored to human and social sciences have been introduced in the evaluation criteria standards on the basis of discussions between the Agency’s scientific delegates and external experts, held during a weekly seminar from September 2011 to January 2012. The practical consequence of this approach is that the result is not *other* standards but joint standards incorporating the perspectives of human and social sciences on the same footing as the others that can adapt accordingly when necessary.

We will not, therefore, define new versions of the six evaluation criteria intended for human and social sciences alone: there would be no point in doing this as it goes against the purpose for which the AERES evaluation criteria standards were designed. Admittedly, it is not a matter of ironing out certain difficulties: the interactions of research with the non-academic environment, covered by criterion 3, are, for example, a subject of variable interest to human and social sciences. In reality, the work of all disciplines in the field, at close examination, is of interest to social groups and economic or cultural stakeholders. Very often, without distorting the nature and focus of the research specific to these disciplines, the difficulty merely involves revealing the reality – often overlooked or downplayed – of their impact on the economy, society and cultural life. This is why the standards for criterion 3 (*cf.* p. 12) – contain specifications bringing the observable facts and quality indicators into line with the uses of human and social sciences.

It is important to remind ourselves of this key point: research institutions, owing to their diversity, will not completely and uniformly satisfy all the items selected: these should be tailored according to the identity of these entities, their missions and the subject of their research. This is precisely what gives its full meaning to peer evaluation: experts, who themselves belong to the disciplinary field(s) of the research institutions they evaluate, know how to adapt this common language and give it the emphasis required for their field, to be recognised and understood by their community.

Another subject that is acknowledged to be difficult with regard to human and social sciences – even if its extension is much broader in reality – is the relative weight of the types of publication and other scientific outputs according to discipline, hence the difficulty of making a uniform assessment of these subjects in the scientific production and quality criterion (criterion 1). The most commonly cited example to back up this observation is the insufficiency of scientometric tools for a significant proportion of disciplines in the field. In order to integrate the variety of publication forms and other scientific outputs in human and social sciences as well as the relative diversity of languages used for research in this field, AERES has therefore considered it worthwhile to offer certain clarifications with respect to the observable facts and quality indicators relating to this criterion. These further specifications are presented in the following pages.

1. Scientific outputs and quality in human and social sciences: observable facts

Scientific outputs gives overwhelming precedence to books in many disciplinary sectors of human and social sciences, particularly the humanities. These disciplinary sectors are also hampered by the low presence of the journals in which they publish in relevant bibliometric databases.

This is why the evaluation of scientific outputs and quality in human and social sciences requires special attention to be paid to the preliminary characterisation of scientific books and journals. AERES's proposals are given below.

● The characterisation of journals

The characterisation of journals, which supports the elements of the standards provided for the first criterion (see above, p. 10), is intended to facilitate evaluation and self-evaluation still in the perspective of collective qualitative evaluation by expert committees. They are the most competent to assess the scientific production and quality of research institutions.

It is therefore a question of characterising journals without claiming to pass judgement on the quality of the articles that use this mode of dissemination. Not all of the characterisation elements listed below are necessarily pertinent to the same degree for all the disciplines of human and social sciences; they must therefore be assessed in light of the specific features specific to each of these disciplines.

Characterisation elements of journals in human and social sciences

To characterise a journal, the following data can be collected:

Identification:
- Title
- ISNN
- IeSSN
- Website address
- Disciplinary field(s)
- Name of publication manager
- Institutional support (university, organisation, scientific society, public authority, etc.)

Dissemination:
- Dissemination start date (age of journal)
- Publisher
- Distributor
- Print run per issue (average over 5 years)
- Number of copies sold per issue (average over 5 years)
- Publication language(s) (French/other language, monolingual/multilingual)
- Publication at regular intervals (yes/no)
- Number of issues per year
- Type of publication (paper and/or online)
- Access method for online publications (open access, access for a fee, embargo for x years)
- Abstract (none, in French, in English, in another language, multilingual)
- Indexation by key words (none, in French, in English, in another language, multilingual)

Selection of articles:
- Publication of selection criteria (yes/no)
- Open calls for contributions (for thematic issues)
- Peer evaluation of the texts proposed (none, single blind, double blind, single non-anonymous, double non-anonymous)
- Selection by the editor of special issue (yes/no)
- Articles refused (yes/no)
- Average volume of articles published (in number of signs)

Scientific quality:
- Scientific advisory board (yes/no)
- Editorial board (yes/no)
- Peer-review committee (yes/no)
- Scientific reference system: notes, bibliography, etc. (yes/no)
- Type of articles selected (thematic review, meta-analyses, articles reporting original research, theoretical or critical discussions, viewpoints, debates or controversy, empirical research, etc.)

Editorial policy:
- Identifiable editorial line (yes/no)
- Diversity of published authors (outside laboratory or institution, etc.)
- Multidisciplinarity (yes/no)
- Cultural domains (yes/no)
- Foreign language authors translated in the journal

Reputation
- International (yes/no)
- Indexation in international lists of journals (yes/no)
- Award-winning articles (yes/no)

● The characterisation of scientific publications

On the basis of other observable facts, it is possible to distinguish diverse categories of scientific publications in human and social sciences, without restrictive claim and subject to uses specific to disciplines:

Elements for the characterisation of scientific books in human and social sciences

Three main elements can be distinguished.

The first is the type of authorship. This makes a distinction between:

- publications containing a single, uniform text, by a single author;
- publications containing a single, uniform text by several authors;
- collective publications bringing together essays, studies and chapters by different authors, organised by one or more academic editor(s)
- collective publications bringing together essays, studies and chapters by different authors with no identifiable academci editor.

The second element concerns the type of approach with regard to its subject. This makes a distinction between:

- publications presenting original research findings on a question or topic for a restricted, specialist readership;
- publications based on philological research: editions of texts (and, notably, critical editions) as well as translations of texts
- publications synthesising other scientific work to present current knowledge on a research topic or question. Such *syntheses*, which are often written to inform a broader readership rather than the researcher community, are not the same as *publications for a general readership*, which exploit previous research findings (one's own or those of other researchers) in that the summary they give assumes a scientific appreciation and further original research.

The third element concerns the presence, in such publications, of a clear critical system (notes and bibliographic references) and consultation tools (index of names, works, thematic index and glossary).

2. Scientific outputs and quality in human and social sciences: quality indicators

AERES provides its expert committees with two types of instruments to assess scientific production and quality in human and social sciences: lists of journals and a definition of the conditions for accessing the research publication category for conference proceedings and collective publications.

● List of journals

The increase in periodicals at international level illustrates not only the growth in the world's community of researchers, but also a profound change in the way in which research findings are published – such as the development of multidisciplinary approaches, which is leading to countless human and social science researchers publishing their findings in journals devoted to other disciplines than their own.

The experts conducting collective evaluations of research institutions can no longer hope to be familiar with all of the journals in which these institutions have published some of their outputs. Having observed the inadequacy of the available lists and databases, AERES has decided to draw up its own lists of journaqls for each discipline or field and, when permitted by the consultations conducted by the scientific delegates with those bodies representing the researchers of these disciplines or fields (Comité national de recherche scientifique, Conseil national des universités , learned societies, etc.), to produce a classification for giving experts indications on the editorial quality, level of requirement and national or international visibility of these periodicals.

Accordingly, in 2008 committees coordinated by the Agency's scientific delegates were set up bringing together representatives of the CoNRS and CNU departments, French and foreign qualified members per discipline or field. Several of these committees drew up lists of journals by defining a scientific sphere, without classification. Others, corresponding to disciplines in which the international bibliometric databases are for the most part accepted by the scientific community, put forward an initial ranking.

All of the review lists drawn up in this way have been made publicly available on AERES' website. They have been updated annually to reflect the level of internationalisation, organisation and practices in each discipline or field. The committees have taken account of the claims made by some journals that were not initially selected. They have responded to the requests of some journals created after the list for their discipline or field was drawn up. Lastly, they have endeavoured to list and include solely online journals too.

However, following diverse feedback that highlighted the difference in methods and criteria used to compile the lists of journals in human and social sciences amongst other points, AERES has undertaken a systematic revision of these lists that should improve their coherence and their representativeness. The principles which determined this revision are given below.

It is important, however, to remember this fundamental point: the lists of journals drawn up by AERES and updated annually are not a substitute for the assessment of the quality of scientific outputs carried out by experts.

Principles for revising the lists of journals in human and social sciences

The lists of journals in human and social sciences have been revised by AERES on the basis of the following principles:

- the quality of these publications is assessed *according to the characterisation elements* given in this document (see above, p. 26);
- the updating committees revise the lists that have already been compiled by ensuring the relevance of their selection and, where applicable, their classification, on the basis of these characterisation elements;
- journals that do not feature in AERES' lists but would like to be included must attach to their request [listerevuesSHS@aeres-evaluation.fr] a presentation of the characterisation standards and a few copies of their publication;
- committees focusing solely on the definition of a scientific domain may organise this by defining *a typology of journals*;
- if a decision is made by the *ad-hoc* committee to rank journals, this shall be done according to *the same scale* (three tiers indicated by the letters: A, B, C), irrespective of the discipline (or field);
- this classification shall be drawn up according to *the proportion* and *quality* of responses of the journals under considration with respect to the elements set out in the characterisation standard.

● Conference proceedings and collective works

With regard to conference proceedings and, more generally, collective works in the field of human and social sciences, AERES distinguishes what constitutes a genuine work of scientific publication – which should be taken into account in the evaluation of research works – from the simple bringing together of communications.

The scientific publication of conference proceedings and collective works

Of the works bringing together texts from presentations given at symposia, congresses, seminars or conferences, those giving rise to a work of scientific publication characterised as follows shall be deemed research works:

- a clear, rationalised critical system (notes and bibliographic references) for the entire work; the presence of consultation tools (index of names, works, thematic index and glossary);
- an in-depth disciplinary or interdisciplinary development, identifiable in the general presentation; the appropriateness of the publication's structure in this regard; the selection of contributions according to their relevance to the subject; the work carried out on each of them to ensure scientific quality.

This work of scientific publication is also the minimum condition for considering the other works bringing together texts by different authors such as research works.

V – Glossary

The definitions given in this glossary apply solely to the context of the evaluation of research institutions, and relate to the reference documents drawn up by AERES in this field. They do not intend to be exhaustive in any way – rather, they aim to provide a guide to reading these documents.

Asterisks indicate terms that have separate entries in this glossary.

Academic

The adjective *academic*, particularly applied to the *appeal and *reputation of *research institutions, describes a context for scientific activity which is structured around higher education institutions and research organisations. By contrast, a context that does not involve this form of structuring is termed *non-academic*. Accordingly, partnerships between a research institution and a company or a regional authority, for example, can be qualified as *non-academic*, even if they contain a research dimension.

Appeal

Appeal (in effect, ability to attract) can be defined as a *research institution's ability to promote its activities before an *academic or non-academic community. It therefore depends on this institute's ability to become a magnet in its field.

Applied (research)

So-called *applied* research is research focusing on scientific and technological questions associated with socio-economic issues pertaining to specific sectors (such as energy, the environment, information, health or agriculture). Its aim is not only to increase our knowledge but also to produce findings and innovations applicable to the sector in question and likely to have an impact on how society functions. (It is therefore broad in its meanings, captured by the French term 'finalisé' of which 'recherche appliquée' is just one part.)

So-called *applied* research is research which, through the practical implementation of knowledge (setting it apart from basic research, which focuses mainly on the production of new knowledge), utilises scientific and technological breakthroughs to make progress in a given sector of activity.

Appraisal

We call *appraisal* the *results and, in general, all of the activities and *scientific outputs of a research institution during a period under contract. The appraisal is particularly based on the objectives and *strategy that the institution had developed in its previous *scientific plan.

Bibliometrics

Study by counts and statistics of a *research institution's scientific publications (media, authors, citations, institutional affiliations, etc.) for the principally quantitative purposes of description and analysis.

Characterisation

The *characterisation* elements of a *research institution's activities and operation are provided by *observable facts (*descriptors), which enable the evaluation to be based on factual data.

Clinical investigation centre (CIC)

Clinical investigation centres are infrastructures built for the purpose of developing *clinical research projects such as new treatment tests or investigations intended to gain a clearer understanding of a disease. CICs are supervised by both the French Ministry in charge of Health and INSERM.

Clinical (research)

Clinical research (from the Latin clinice meaning medicine that is practiced at the sickbed) is research that is directed at experimenting with new treatments or new techniques.

Component

We refer to *components* when we talk about the way in which *research units are put together. A *team, a *theme, a department and a focus are all types of components.

Context

The term *context*, when used in a restricted sense, identifies the diverse aspects of the situation (both past and present) and environment of a research institution being evaluated. In this regard, the context must be viewed as a parameter determining qualitative evaluation. The history, identity and missions of a *research institution, its scientific and educational environment, its regional situation, social, economic and cultural environment in particular all fall under the notion of context.

Descriptor

The term *descriptor* is sometimes used to refer to scientific results and activities allowing the evaluation to be based on evidence – in other words, on factual data. With regard to a scientific evaluation activity, we therefore call *descriptor* the function of an *observable fact.

Disciplinary group

Group of *disciplines for structuring the *scientific domains.

Discipline

Institutionalised scientific domain of specialisation. In the evaluation of *research institutions conducted by AERES, disciplines are divided into *disciplinary groups (or disciplinary fields) within each *scientific domain.

Domain (scientific, disciplinary)

AERES lists three scientific domains that shape the evaluation of research institutions. These are organised into disciplinary fields. Scientific domain *Sciences and technologies (ST)*: disciplinary fields: *Mathematics; Physics; Earth and space sciences; Chemistry; Engineering sciences; Information and communication sciences and technologies*. Scientific domain *Life and environmental sciences (SVE)*: disciplinary field *Biology/Health* (sub-fields: molecular biology, structural biology, biochemistry; genetics, genomics, bio-informatics, systems biology; cell biology, animal development biology; physiology, physiopathology, endocrinology; neurosciences; immunology, infectious diseases; clinical research, public health); disciplinary field *Ecology/Environment* (sub-fields: cell biology, plant development biology; evolution, ecology, environmental biology; life sciences and technologies, biotechnology). Scientific domain *Human and social sciences (SHS)*: disciplinary field *Markets and organisations* (sub-fields: economics, finance/management); disciplinary field *Norms, institutions and social behaviour* (sub-fields: law; political science; anthropology and ethnology; sociology, demography; information and communication sciences); disciplinary field *Space, environment and societies* (sub-fields: geography; town planning and land development, architecture); disciplinary field *Human mind, language, education* (sub-fields: linguistics; psychology; educational sciences; sport and exercise sciences and techniques); disciplinary field *Languages, texts, arts and cultures* (sub-fields: languages/ancient and French literature, comparative literature; foreign languages and literature, regional languages, cultures and civilisations; arts; philosophy, religious sciences, theology); disciplinary field *Ancient and modern worlds* (sub-fields: history; history of art; archaeology).

Environment (social, economic, cultural)

The social, economic and cultural environment constitutes a fundamental piece of data for evaluating *research institutions as it enables the interactions of a collective research organisation with society – taken in its non-*academic dimension – to be assessed. These interactions depend on the nature and purpose of activities developed by institutions. The main types of facts relating to these interactions are in particular: outputs for non-academic stakeholders such as regional authorities or enterprises (e.g. study reports, patents, licences, publications in professional journals, etc.), the institution's involvement in partnerships (with cultural institutions, industrial groups, international organisations, etc.), the impact of the institution's activities on an economic and social context, etc.

Evaluation [see Evaluation criterion]

Evaluation criterion

Term identifying what is considered pertinent when assessing the value of observable scientific facts in a *research institution's activity. AERES' review work is based on six evaluation criteria: 1. *Scientific production and quality; 2. *Academic reputation and appeal; 3. Interactions with the social, economic and cultural *environment; 4. Organisation and life of the institution; 5. Involvement in *training through research; 6. *Strategy and research perspectives for the next contract.

Evaluation field

We call the *evaluation field (field of evaluation)* the scope of a *criterion, namely the diverse aspects that the evaluator has to assess, in general terms for all types of *research institutions and for all fields. Accordingly, the evaluation field of the *scientific outputs and quality criterion, for example, is characterised by the assessment of breakthroughs, findings, problems, experimental factors leading to scientific achievements, and by the originality, quality and reach of the research.

Evaluative intention

Term denoting the application points of the *evaluation criteria implemented. Evaluative intention is defined by the specification of the *evaluation field covered by each criterion, and by that of the *observable facts and *quality indicators relating thereto.

Executive summary

This term applies to a brief description of a research institution's activities and objectives, allowing its field and profile to be defined concisely.

Expert

The term *expert* refers to a *peer (a researcher with a recognised level of scientific competence in a disciplinary field) entrusted with a scientific evaluation mission. Experts evaluating research institutions work in *committees. They are chosen for their competencies, deemed appropriate for the properties of the subject being reviewed: its disciplinary scope, its research purposes, its possible interdisciplinary dimension and so on.

Expert committee

In order to evaluate *research institutions, *experts work in committees made up of *peers chosen for their scientific competencies according to the disciplinary scope of the institution being evaluated, its research purposes, its possible interdisciplinary dimensions and so on. The work of expert committees involves collectively evaluating the institution's scientific application, finding out about the scientific context in which this institution works *in situ* and producing an evaluation report on its activities (*appraisal and research perspectives).

Exploitation

This term has two different meanings, which can sometimes lead to confusion when discussing evaluation. The first is a common, broad meaning in the sense of "showing to advantage", which applies to an undefined series of items. The second is more specialised, referring to a series of activities and initiatives that are likely to increase the *reputation and *appeal of the research and its impact on the social, economic and cultural environment.

Factual data [see Observable fact]

Federated organisation

Type of *research institution grouping together – around shared scientific topics – units that can belong to several organisations or higher education institutions. Federated organisations are often multidisciplinary (e.g. Maisons des Sciences de l'Homme). They play a part in identifying dominant scientific centres and make pooling of facilities and personnel possible. At the CNRS, *federated research organisations* are firstly federated research institutes (IFRC) that bring together specific CNRS institutions in one place, and secondly research federations (FR), which group together institutions reporting to the CNRS (or other organisations and institutions) that are working on joint research subjects. Institutions taking part in federated organisations maintain their own individuality.

Focus [see Component]

Governance

Originally from the French word which emerged around the 13th century, meaning "government", "jurisdiction" or "power", particularly to refer to the reach of a territory placed under the jurisdiction of a bailiff, i.e. a governor tasked with running this territory, this term then entered the English language initially to denote the way in which feudal power was organised. At the turn of the 21st century, with the development of the notion of globalisation, the word now refers to an organisation and administration process of human societies that is supposedly respectful of diversities and rooted in sharing and the community of interests. In the economic and political spheres, the term *governance* identifies a flexible system for managing collective structures (states, companies, international organisations, etc.). Swiftly entering our everyday vocabulary, the word has undergone significant semantic extension and has particularly been used in the field of scientific evaluation where it seeks to identify a method for directing and managing a research institution. Largely incongruous with this field of activities – where its meaning is still ambiguous – it has been replaced by the term **management* in AERES' standards.

Grading scale

Qualitative assessment grid forming a judgement on the *performance levels of a *research institution. AERES's grading scale comprises four levels: A+, A, B, C. It applies to each of the six *evaluation criteria adopted by the Agency.

Impact

The term *impact* is frequently encountered in the vocabulary of evaluation. Whatever the scope attributed to it (scientific, socio-economic or cultural impact for example), it should be understood as an effect (positive or negative) of a *research institution's activities on a given aspect of its *context.

Indicator

An indicator is based on factual data obtained during a comparative evaluation. In the field of research evaluation, indicators are most often thought of as sets of *observable facts serving as *descriptors applied to scientific *results or activities. In this regard, they are generally used to obtain a research institution's performance *metric and preferentially form part of the *quantitative model of scientific evaluation as robust, standardized tools, correlated with conventional criteria.

Innovation

Broadly speaking, innovation is a creative process of scientific or technological transformation that either partially changes what has been known to date or makes a clear break from this knowledge. This transformation leads to a new concept that may concern a theoretical framework, methodology, process, technique, product and so on. Innovation often brings about a change in people's behaviour and is associated with values linked to performance, improvement or simplification of an activity or set of activities. In the industrial field, the term *innovation* more specifically denotes the use of transformations undertaken on a process, technique or product. In this sense, innovation is often associated with the notion of efficiency (e.g. a competitive advantage arising from this transformation process).

Interdisciplinarity

The term *interdisciplinarity* seeks to identify the interaction and cooperation of several disciplines around common projects and subjects. For each discipline involved, the work carried out within an interdisciplinary context opens up research prospects that are not limited to their respective field of study. Such work makes use of data, methods, tools, theories and concepts from different disciplines in a synthesis in which the role of the disciplinary components goes beyond simple juxtaposition. Indicators of this integration include, in particular: combinations of models or representations that unify disparate approaches, a partnership collaboration and not a mere exchange of services, with coordinated investment of resources and cooperative-style organisation, the creation of a common language by hybridisation, leading to a revision of initial hypotheses, broader understanding of the stated problem, the opening of new prospects and the development of new knowledge.

Management

This term primarily applies to the management and running of a research institution by its manager(s). A research institution's method of management is evaluated under the criterion "Organisation and life of the institution". AERES has decided to substitute this term for **governance*.

Metrics

The term *metrics* is used in the context of a quantitative evaluation of a research institution's performance. The evaluation model developed from the notion of metrics aims to go further than a mere subjective approach and produce, to this end, numerical *indicators whose robustness and generality are supposed to guarantee reliability. The pertinence of metrics for evaluation is nevertheless subject to the scope of these indicators being precisely defined and their appropriateness for the subject of the evaluation.

Multidisciplinarity

Multidisciplinarity usually refers to a juxtaposition of disciplinary perspectives that broadens the field of knowledge by increasing the amount of data, tools and methods available. In the *multidisciplinary* perspective, the disciplinary scopes maintain their boundaries and their identity: accordingly, one particular discipline, which generally steers the others, uses a methodology and the tools of one or more other disciplines to address a question or make progress in a research project that is specific to its disciplinary field.

Observable fact

An observable fact is a factual piece of data (e.g. an activity or a *result) which allows the evaluator to base his or her judgement on evidence. Observable facts therefore act as *descriptors in the evaluation process. Data likely to be used to compile *indicators fall under the notion of observable facts in particular. For example, the main types of observable facts relating to the criterion *Scientific outputs and quality are: publications, lectures and other oral forms of communication without publication, the other scientific outputs specific to the field, the production of tools, resources, methodologies, etc.

Panel [see Disciplinary group]

Peer review [see Peers]

Peers

In the field of scientific evaluation, the term *peers* refers to researchers in the same field with the same recognised level of scientific expertise. *Peer review* denotes a *qualitative* assessment applied to personal research (e.g. in the case of an article submitted to an editorial committee) or collective research (e.g. in the case of a research institution's scientific outputs). Peer review relies on the comparison of viewpoints and aims to reach a consensus.

Performance

This term denotes an *institution's level of scientific activities, assessed on the basis of six *evaluation criteria defined by AERES. A research institution's performance may be subject to a *quantitative and *qualitative evaluation.

Proximity

The notion of proximity is used as a *characterisation element of interactions between disciplines. Proximity is measured by taking account of epistemological elements: proximity of frameworks of thinking, paradigms and concepts, types of data, observation and measurement tools they use. Proximity measurement also assesses the degree of interaction between disciplines in a corpus of scientific texts (such as guidance texts, project proposals or publications), by considering their content, media or the authors' experience in the discipline.

Qualitative

This adjective is applied to an evaluation model based on the consideration of quality *indicators. In contrast to quantitative evaluation, which relies on *metrics, qualitative evaluation goes beyond metrics alone, and particularly puts considerable weight on the contextualisation of evaluation data.

Quality indicator

A quality indicator is what enables an evaluator to clarify a qualitative assessment. For example, the main quality indicators relating to the criterion *Scientific outputs and quality are: the originality and scope of research, scale of progress in the field concerned; disruptive theories and methodologies, paradigm shifts, the emergence of new problems or proposed investigations; their impact in scientific terms on academia (citations, references, etc.); their openness to multidisciplinarity ; their openness to international engagement; the reputation and selectivity of editorial formats adopted for their publication, etc. In *peer evaluation, quality indicators are founded on assessment elements that are widely accepted by a scientific community. As such, they establish a standard or at least a set of references on which a discussion can be based within expert committees and within evaluated groups and their evaluators.

Quantitative

This adjective applies to an evaluation model that gives precedence to the performance *metrics of a research institution and endeavours to meet all of the conditions of an evaluation going further than mere subjective evaluation by evaluators and the evaluated. The quantitative model is based on a normative concept of evaluation that can induce a basic approach to the scientific activity by turning evaluative judgement into a mechanism that overvalues raw numbers to the detriment of a proper analysis of their contextual significance and value.

Reputation

Reputation is one of the criteria for evaluating *research institutions, closely correlated with the *appeal criterion. The two notions come together around the phenomenon of an institution's *scientific quality being recognised by an *academic or non-academic community. Reputation and appeal alike have a very positive *impact on this community, the former following a centripetal movement and the latter a centrifugal movement.

Research institution

Generic term referring to a collective research institution of variable format. *Federated organisations, *research units, *clinical investigation centres, unit *components such as *teams and *themes are research institutions.

Research unit

Collective research institution accredited by a research organisation or university – for example a Mixed Research Unit (UMR) or team not yet categorised as a research unit (EA) – organised around a scientific programme subject to a contract drawn up with the institution(s) to which this unit is affiliated. The types of personnel working in research units are researchers, professors, engineers and administrative staff. A research unit can be arranged into *teams, *themes, departments, focuses or even be made up of a single *component according to the nature of its research programme and workforce size.

Result

Type of *observable fact in *scientific production, brought about by the *strategy defined by a *research institution. This can be a discovery or any other significant breakthrough in the field of basic or *applied research. Results constitute the determining part of a research institution's *appraisal.

Risk-taking

Risk-taking within a scientific project can involve two different approaches. This approach may be negative if it takes account of the danger or threat that a planned action may pose to a structure (e.g. the uncertain feasibility of a research programme, which may indicate a mismatch between an institution's actual resources and its short- and medium-term strategy). But it may be positive if it takes account of the potential outcome for the institution of a planned action (e.g. a programme leading to scientific *innovations, likely to boost the institution's *appeal and *reputation, and enable it to develop partnerships).

Scientific outputs

*Evaluation criterion of a *research institution, closely correlated with *scientific quality. The main *observable facts relating to scientific outputs are publications, lectures and forms of communication, outputs specific to certain *disciplinary fields (excavation reports, corpuses, software, prototypes, etc.), tools, resources or methodological tools developed by an institution, etc.

Scientific quality

*Evaluation criterion of a *research institution, closely correlated with *scientific outputs. A *research institution's scientific quality is determined using *quality indicators: for example, the originality and reach of research, aptitude for paradigm shifts and emergence of new questions, the scientific impact of the institution's activities in academia, the reputation and selectivity of the editorial forms of publications, etc.

Self-evaluation

An approach to evaluations that involves a *research institution conducting an analysis of its past, present and future activities in a way that is likely to help it to operate effectively, develop and build a *reputation. Self-evaluation is the first stage in the AERES's process for the evaluation of *research institutions. With this in mind, the institution presents its *findings and research perspectives after consulting with its members, in an objective manner such that it takes account of both the strengths and weaknesses of its activities. On the basis of this self-evaluation, an independent, collective and transparent external evaluation is performed by experts belonging to the same scientific community as the evaluated institution. This leads to a written report to which the institution's observations after reading the report are appended.

Standards

Scoping document specifying AERES' methodological principles in the field of research institution evaluation, and defining the evaluation criteria for all scientific domains in particular.

Science, scientific

Although the term 'science' has a narrower meaning in English than it does in French, this document has used the term in its broader sense. Science is understood to embrace all academic disciplines and all fields of academic research-based knowledge, including the social sciences, arts and humanities.

Strategy

The term *strategy* is used in a general context to identify all of the means that a *research institution has implemented in its appraisal to meet its objectives and which, for the same reasons, it intends to implement by defining its research perspectives for the next contract. The strategy is a decisive part of a research institution's scientific policy.

SWOT

Acronym of the words *Strengths*, *Weaknesses*, *Opportunities* and *Threats*. We talk of the *SWOT* tool to denote an analysis used in the framework of an evaluative study of a situation, process, project, policy or strategy. This tool is also utilised by economic decision-makers insofar as it is meant to help them make the best decisions.

Team

Type of *component likely to structure a *research unit. Typical of units with large workforces, team structures foster cohesive scientific work on both research subjects and methodologies. Teams are given relative scientific independence within the research units to which they belong.

Technological (research)

Technological research is research directly linked to society – particularly the economic community and industry – with the aim of increasing knowledge by drawing on a variety of scientific disciplines to present new conceptual and systemic approaches, methods, processes, software, instruments, tools and more generally to create objects of all kinds.

Theme

Type of *component likely to structure a *research unit. Structuring by themes is beneficial to scientific work carried out on common research subjects but which are tackled according to methodologies that can be diverse. This organisational method is often used to foster a cross-cutting approach to a project that various internal teams are involved in and to respond to a call for tenders.

Training through research

A distinction needs to be drawn between *training in research*, which refers to training for students in the professions of research and higher education, and training *through research*. This means the theoretical, methodological and experimental training of students at Master and Doctorate level, irrespective of their professional specialisation. This training assumes involvement of a research institution's members in putting together courses and teaching content, in welcoming, supporting and supervising students and so on. Training through research also implies researchers giving thought, upstream, to the *appeal of the *research institution and the development of a *strategy that is likely to boost this appeal.

Transdisciplinarity

Transdisciplinarity is a scientific practice that goes beyond disciplinary viewpoints by offering a very wide-ranging approach to a question. It shows an additional degree of integration in comparison with interdisciplinarity which partner disciplines achieve when this repeated practice leads to the definition of new paradigms and the creation of a community that shares them, thus allowing the gradual emergence of a new discipline. We will use the term *trans-sectorality* to refer to a new means of producing knowledge based on collaboration with organisations outside of the research community and which integrates both scientific knowledge and knowledge of stakeholders (professionals, decision-makers, etc.).

Translational (research)

In the medical field, so-called translational research is research consisting of transferring the scientific innovations of basic research to *clinical research and of obtaining results in clinical practice from scientific hypotheses in basic research, to enable patients to be better treated as swiftly as possible.