

Department Evaluation

Protocol for research assessment in Informatics, Computer Science and IT Departments and Research Institutes

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INFORMATICS
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1. INTRODUCTION

Through its Department Evaluation service, Informatics Europe aims to contribute to the *assessment of research* quality in the fields of Informatics, Computer Science and IT (referred as Informatics throughout this document). The service is offered to Informatics Europe members and to all other Departments, Faculties, Schools and Research Institutes (referred as Institutions throughout this document) in Informatics, Computing, and so on in Europe and beyond. The service is also offered to departments in areas related to Informatics. The service is characterized by an exclusive, peer-review driven evaluation process based on the standards and experiences of Informatics Europe.

The evaluation service offers an unbiased and transparent way of assessing the research activities of a given institution and provides it with a thorough analysis that will contribute to the identification of *strengths, opportunities and aspects of its operations that could be improved*. Such activity is of strategic importance because too often this kind of assessment is delegated to external agencies, whose criteria fail to single out the special aspects of research and its products in our field.

In recent years Europe has seen increasing efforts to design methods, protocols and guidelines for the assessment of research quality, primarily at national level [1-4]. The EU report “Assessing Europe’s University-Based Research” [5] underlines the importance of the level at which the quality of research is assessed. Accordingly, it is fundamental to design *flexible and multidimensional processes* that can be adapted to diverse *research disciplines and institutions*. It should be noted that efforts to understand and improve the quality of research of European universities have clear encouragement, promotion and support by the European Commission [5].

The present *guidelines* are directed to both *institutions* under assessment and to *evaluation panels* (also called audit teams below). The guidelines describe the process and the main criteria of evaluation in detail. The purpose of this document is to provide an overview of the evaluation process and to improve the quality and consistency of the evaluations by offering transparent and consistent directions for its implementation.

Informatics Europe offers *different forms of evaluation*. One can opt for: (a) different “intensities” of evaluation, namely *classic* and *extended*, (b) quantitative (with grades) or qualitative (without grades, only recommendations) evaluation, (c) evaluation covering one department or multiple departments, even a whole faculty, and (d) evaluation of only research, or research combined with teaching (carried out together with EQANIE). An evaluation may (e) be carried out according to the rules of Informatics Europe or by taking also other evaluation criteria or restrictions into account, which may be defined by the faculty, the university, some further habits or rules, or following legal rules of a country. It is clear that the information material submitted before the audit team visit and also the report delivered by the audit team depend on the form of evaluation that is chosen.

This report is the second and *extended version* of the guideline report from 2012. The extension mainly deals with the different forms of evaluations sketched in the last paragraph.

The Department Evaluation initiative is supervised by the *Department Evaluation Committee* which includes Board Members of Informatics Europe as well as external renowned experts in the field.

2. OBJECTIVES OF THE EVALUATION

The Department Evaluation service of Informatics Europe is based on a systematic acquisition and assessment of information about the institution, and intends to provide an *output* that *contributes to better decisions* concerning policy and planning, strategic positioning, or research strategy development and management. The evaluation panel is committed to delivering *useful feedback* to impact decision making and strategic planning. The goal is to contribute to the identification of strengths and weaknesses and to provide advice on best ways to tackle the problems, difficulties and limitations. The evaluation outcome should effectively contribute to the elaboration of short and long-term strategies to improve the quality and impact of the research carried on in the institution.

The purpose of the present evaluation process is to contribute to the improvement of research quality, focusing on the central role played by the institution management. We believe that *quality is also a matter of the whole faculty*. Therefore, an evaluation should not only or solely be imposed from the outside but is also a means to stimulate internal quality improvement efforts.

3. EVALUATION PROCESS VARIANTS

The evaluation process is based on a systematic analysis of data collected and presented by the institution under assessment. There are *different variants* of the process. Correspondingly, the input (the self-evaluation report) and the result (the evaluation report) may manifest different dimensions.

3.1 Intensity

Classic Evaluation

The evaluation *model Classic* consists in the analysis of the documents provided by the institution and a one day site visit of the audit team (and additional travel time), which includes mostly meetings with the institution management and possibly a small selection of groups. The evaluation will be based on the self-evaluation report that includes the indicators selected for each of the evaluation criteria (described in Section 5 and Appendix 1) and on the visit of the panel. The aim is to evaluate the department as a whole and not the corresponding areas or groups individually. The panel typically consists of 3 peers and a person managing the process.

Extended Evaluation

In the evaluation model *Extended* the evaluation panel analyses the documents and visits the institution for an extended number of days, typically two plus travel time. Furthermore, the evaluation will go deeper, also including the performance of areas or groups. The panel consists of 5 peers and a process manager.

The *visit* will typically include:

- Meeting with Rector or President
- Meeting with Department Head
- Meeting with representatives of cooperating departments (if any)

- Meeting with faculty
- Meeting with PhD candidates and postdocs
- Presentations by research groups or clusters of groups and discussion
 - List of members, subjects
 - Presentation of top subjects
 - Vision for the next 5 years
- Visit to labs and facilities

3.2 Grades and/ or Recommendations

Some departments might be interested only in the *recommendations* of the audit team. They are used for internal improvements. In other cases the department leader, the dean, or even the university rector or president is interested to get the evaluation result as *grades* of a linear scale. We offer both types of evaluation forms depending on the wish of the institution.

3.3 Combined Evaluations

There might be different departments which want to be evaluated, especially if their fields are overlapping or close to each other. But for reasons of efficiency (manpower and/or costs) or for being able to compare and relate the results, it is wanted to do the *evaluations at the same time*. In that case we offer a combined evaluation, where the audit teams might be different, or might have an overlap. In the same way, there might also be a comprehensive evaluation of a large faculty.

3.4 Integrating the Evaluation of Study Programs

A department might be interested to evaluate its *research* and also its *teaching quality*. For this case we have installed a cooperation with the European Quality Assurance Network for Informatics Programmes (EQANIE). EQANIE is responsible for the evaluation of the teaching quality.

Experienced peers can make research evaluations and also study program evaluations. So, a combined evaluation is on one hand more *economic*. On the other hand it might also give *valuable* recommendations which are possible if both fields are evaluated at the same time.

The evaluation of the teaching quality may address different parameters of teaching as it is done with research in order to make improvements or determining grades, or it might determine whether the institution fulfils a certain threshold quality, as it is the case with an accreditation [6]. The combination of research and teaching evaluation is more attractive if both evaluations share the same ideas, approach, similar methods, or have similar goals.

3.5 Regarding Local Specifics and Variations

According to faculty, university, or state *regulations* it might be necessary to include *further aspects* into the evaluation process. For example, in some countries evaluations are demanded by law in determined intervals and a specific form is given for these evaluations.

Our evaluation procedure is flexible in order to adapt to those situations. The *criteria* defined below therefore might be *extended* or even partially *replaced* by similar ones.

The structure of the *self-report* and the *evaluation report* is extended or changed accordingly.

3.6 General Aspects

In all models of above the evaluation panel and the management of the institution will agree on the *program* for the visit. The panel receives all relevant *material* (the self-evaluation report and the visiting program) prior to the site visit). The dates for receiving the documentation will be explicitly defined in the initial *agreement* (see below). The panel chair may request, possibly after consulting with the other members, additional information from the institution. The evaluation panel may meet in a closed session prior to the site visit. In that closed session, the team decides on their working procedure for the visit and for writing the report.

The *self-evaluation* gives the opportunity to the members of the institution to *present* their own assessment of the matters to be evaluated, to *reflect* and inspire further quality development. The site *visit* is an opportunity for those under evaluation to meet the panel of experts and elaborate on the description and assessments contained in the self-evaluation report. Furthermore, the content of the self-evaluation report can be validated and supplemented.

4. EVALUATION PROCESS STAGES

The whole evaluation *process* will typically be *organized* in the following *stages*:

Stage 1: Agreement and information exchange between the Department Evaluation secretariat and the institution under assessment that should provide some preliminary information such as: mission and objectives, research areas and programs, composition of the research unit to be evaluated: total number of employees in each job category (including PhD candidates). A letter from the institution, stating the reasons for the evaluation and mentioning specific points where the feedback of the evaluation panel is particularly desired, should accompany the documentation. At this stage the model and the specifics of the evaluation process are defined according to the different options given in section 3.

Stage 2: Determination of the audit team of experts. The evaluation panel and its chair will be nominated by the Department Evaluation Committee. The team will include international experts that have a solid experience in the areas of research covered by the institution under assessment, possibly including experts outside the strict realm of Informatics. The panel will also include members with previous experience in academic management. Before starting the evaluation the appointed panel will be presented to the institution. The institution can ask for changes in the panel only if compelling reasons for conflict of interests are presented. Otherwise the decision of the Committee will stand.

Stage 3: Definition of a detailed calendar scheduling the site visit, deadline for the self-evaluation report, deadline for preliminary data analyses and deadline for clarifications on the report (if necessary).

Stage 4: Determination of the site visit program of the evaluation panel. The panel and the management of the institution will agree on the program for the visit.

Stage 5: Preparation of the evaluation report by the evaluation panel.

Stage 6: Follow up. The institution will receive the evaluation report and outcome of the evaluation. The panel of experts has the professional responsibility for the conclusions of the report, its assessments and any recommendations. The report will contain recommendations that may effectively contribute to the elaboration of short and long-term strategies to improve the quality and impact of the research carried on in the institution. The decision to make the report public will be ultimately reserved to the institution. However, in case of publication, Informatics Europe requires the report to be entirely published and not only particular excerpted sections.

Stage 7: A formal letter written and signed by the Department Evaluation Committee of Informatics Europe will be provided to the institution evaluated. This formal letter will be provided after the institution presents a short report describing which decisions were made taking into consideration the panel's recommendations and advices. Again, the decision to make the letter public will be ultimately reserved to the institution. However, in case of publication, Informatics Europe requires the letter to be entirely published and not only particular excerpted sections.

Different forms of evaluation as indicated in section 3 imply *extensions and variations*. For example stages 2, 3 and 4 have to be extended in case of further local requirements for the evaluation, see 3.5. The preparation of the report (Stage 5) might contain further aspects to be reflected on in additional chapters. The formal letter (Stage 7) may contain further statements.

All reports and *documents* involved in the process are considered strictly *confidential* and shall not be disclosed unless explicitly mentioned otherwise.

5. EVALUATION CRITERIA

5.1. Evaluation Purposes

The (general) assessment takes place at two levels of the research organization, i.e. the level of the institute (or faculty or research school) and the level of research groups or programs, and considers *three vital tasks* of research organizations: producing results for the academic community, producing results that are relevant for society, and educating and training the next generation of researchers. In this context the evaluation process proposed by the present initiative holds close resemblance with the system proposed for research assessment in the Netherlands (SEP 2009-2015, see [2]), some of the criteria described in the next sections were also adopted in the SEP protocol.

In the evaluation proposed the term "*research*" is not limited to *research results*: aspects like research management, research policy, research facilities, PhD-training, and the valorization and societal relevance of research are considered integral parts of the quality of the work of an institute and its programs.

The selection of *indicators* for the assessment can significantly *vary* according to the *objectives of the evaluation*. Research quality assessment is most often undertaken to, inter alia, improve research performance and quality, allocate resources, drive research mission differentiation or promote innovation and community engagement [5]. No single set of indicators can meet all these requirements or provide all solutions. The assessment proposed by the Department Evaluation initiative of Informatics Europe aims to provide to the institution an evaluation

output that will contribute to better decision-making concerning policy and planning, strategic positioning, research strategy development and management. The assessment method is composed of a combination of quantitative and qualitative indicators, i.e. using indicator-based data with peer review (documentation analysis and site visits).

As pointed out previously [5] there are several *advantages* to this *approach*:

- Indicators provide peer experts with condensed, systematic, verified and ‘objective’ information on the research performance of the institution.
- The results provided by indicators are never self-evident but must be evaluated and interpreted in the context of the discipline, national circumstances, the university, etc. This can only be done by experts.
- Indicators aid good judgment by supporting or challenging peer assumptions, thereby making the assessment process more transparent.
- Indicators can provide additional, objective information on research performance from a global perspective.

Another important aspect of the process is the *inclusion of self-assessment*. Preparing the documentation that reflects on performance enables the research to be placed within the context of the distinctive research mission and strategy, and encourages consideration of achievements and disappointments. Self-evaluation benefits from involving researchers in the process and encourages them to become involved in helping define “excellence” and setting the strategy for improvement. In this way, it reinforces *internal quality processes*.

5.2. Criteria and indicators

As general guidelines for both institutions and evaluation panels, the *main evaluation criteria* used in the process are described in this section, including indicators and relevant aspects of their evaluation.

Criterion 1 - Quality and scientific relevance of the research

Reflects the level and relevance of the research conducted by the researchers of the institution compared to accepted (recognized) international standards in the field of Informatics

The analysis of research productivity, quality, impact and relevance is the core of any evaluation program. Numerous parameters and indicators have been designed along the years to measure these aspects. Although citation indexes and impact factor schemes are widely accepted and can be useful objective indicators when applied carefully, it is also of utmost importance to include qualitative analyses when evaluating this criterion. Aspects like: originality of the ideas and the research approach (including technological characteristics); significance of the contribution to the field; coherence of the research program should also be taken into consideration. The existence of productivity goals, publication strategy, rewards and sanctions may also work as indicators of scientific quality.

The indicators to evaluate this criterion, that will be provided by the institution in the self-evaluation report (see Appendix 1) include: list of publications, publications in prestigious peer-reviewed venues (journals, conferences and workshops); distinguished articles (e.g., award-winning, selected for inclusion in special issues) in top venues (journals, conferences) relevant to the discipline, high-impact articles, and influential books.

Criterion 2 - Academic Reputation

Defines how research and researchers of the institution are recognized and valued in the scientific community

National and international leadership, influence, recognition and reputation are tightly related to research quality, relevance and impact in the field and frequently reflect successful strategy and research policies. The indicators of this criterion, provided by the self-evaluation report (see Appendix 1), include: invited keynote addresses at national/international conferences; chairmanship (and program chair) at national/international conferences; won prestigious national/international grants, awards and prizes (e.g. Turing Award, honorary doctorate, Fulbright Grant, etc); editorial and refereeing for prestigious national/international journals; invited PhD courses given; fellowship with prestigious associations (e.g. ACM, IEEE, etc); executive board positions in national/international scientific or academic organizations; career perspectives of PhDs; communication to general public media (interviews, articles, etc).

Criterion 3 - Doctoral training

Quality and relevance of PhD (or equivalent) program, doctoral completion and production

Training the next generation of researchers is one of the vital tasks of an academic institution. The quality of the doctoral program is tightly connected to the quality of the research in a given department. To evaluate this criterion both quantitative and qualitative aspects should be taken into consideration. Supervision, organizational embedment and structure of the PhD program in the research organization and research activities, objectives, success rate, availability of educational resources should be considered together with more quantitative indicators provided by the self-evaluation report (see Appendix 1, Table 2) such as number of doctoral completions per year; publications per thesis defended; participation in teaching activities and undergraduate or graduate students supervision.

Criterion 4 - Research Infrastructure

The environment the institution provides for conducting research, including basic facilities and human resources

This criterion considers the research environment as a predictor of research capability and success. Infrastructure encloses both physical facilities (laboratories, lecture rooms, library and digital access) and human resources supporting the research activities (technical and administrative staff).

The indicators for this criterion, provided in the self-evaluation report, include: administrative staff and technical staff; condition, space and distribution of laboratories and offices; infrastructure budget and investment; proportion of research active academics.

Criterion 5 - External funding and resources

Level of funding attracted by researchers from external sources and presence of funding policies

This criterion measures the capacity of attracting funding and grants from national and international competitive and peer reviewed programs, as well as the overall level of financial means available to support research. Research income is a useful parameter for measuring the scale of the research enterprise and its capacity to secure additional income through competitive grants and research contracts. Competitive grants and funding are valuable indicators of past research performance and scholarly impact and can also be used to predict future performance. Funding from end-user sources (industry, governments and communities) is a good indicator of performance and contribution to innovation and/or society and economy.

The indicators to evaluate this criterion, that will be provided by the institution in the self-evaluation report (see Appendix 1, Table 3) include: granted EU projects; projects funded by national/international science foundations or governments; projects funded by Industry.

Criterion 6 – International Orientation

International relations, presence of foreign researchers and students

The conduct of research is by definition an international undertaking. Nearly all fields of research are characterized by an intensive international exchange of ideas and people. Therefore, the performance and development of the research of a given institution is tightly connected to its level of internationalization.

The indicators to evaluate this criterion, that will be provided by the institution in the self-evaluation report (see Appendix 1, Table 4) include: incoming/outgoing visiting professors; proportion of foreign degree-seeking students; proportion of foreign PhD candidates; incoming/outgoing Erasmus students; programs for dual and joint degrees; faculty members educated abroad; courses taught in English; international master programs.

Criterion 7 - Diversity

Inclusion and distribution of different identity groups (age, culture, ethnicity, gender) in the various research levels

This criterion considers the efforts and policies to tackle diversity and in particular gender balance, which is one of the great challenges faced by the field of Informatics. The indicators of this criterion, provided by the self-evaluation report (see Appendix 1, Table 5), include: diversity within research groups, female percentage by level (from PhD candidates to full professors); minorities integration; age distribution at the faculty level; presence of recruiting policies to improve diversity and career perspective to young researchers.

Criterion 8 - Interdisciplinarity

Presence of efforts to connect and integrate different disciplines in the research program

Interdisciplinary thinking is rapidly becoming an integral feature of research as a result of four powerful ‘drivers’: the inherent complexity of nature and society, the desire to explore problems and questions that are not confined to a single discipline, the need to solve societal problems, and the power of new technologies. Complex ‘grand challenges’ can be much more efficiently tackled by interdisciplinary, collaborative solutions and interlocking innovation systems. In general, successful research programs include in different levels efforts to develop and promote interdisciplinarity.

The indicators of this criterion, provided by the self-evaluation report (see Appendix 1, Table 6) include: projects and publications in collaboration with researchers of other fields; presence of interdisciplinary study programs.

Criterion 9 - Innovation, technology transfer and social benefit

Impact and contribution of the institution’s scientific, technologic and human output to society and economy

The purpose of assessing the impact is to gauge the contribution that university-based research makes to society and economy. This may take the form of evidence for policymaking, social improvements or the translation of research into cost-effective, practical, policy- and technology-based interventions that improve people’s lives. In some instances, this may involve assessing the value, purpose of the research.

The indicators of this criterion, provided by the self-evaluation report (see Appendix 1) include: spin-off companies and jobs created by them; projects funded by industry; patents granted; commercialization of research generated IP; contribution to standardization committees; participation in exhibitions and fairs; cooperation with local organizations for life-long education; employability of PhD graduates, and career perspectives of Masters and PhDs in industry.

There might be *further criteria* and corresponding indicators and aspects, for example to measure the influence on industry (e.g measured by leading positions of former outgoing Masters or PhDs). The variations and extensions of section 3 can enforce variations or extensions of the above criteria. For example, the rules imposed by a university might demand for a comparison of the own department with those of the country which have to be verified by the evaluation panel.

6. EVALUATION OUTCOME

6.1. Recommendations

The typical and in our view most important outcome of the evaluation procedure is an *evaluation report* containing a list of *recommendations* along the line of the criteria as given in the last subsection.

These recommendations might e.g. be devoted to *internal* quality aspects of different groups or group clusters of the department. They might also indicate how a department can improve its role and importance within the faculty, school, or whole *university*. The recommendations might even give indications to improve the visibility of the department at the national or, more generally, the international level.

The length of the evaluation report differs for the different forms of evaluations, as given in section 3. It is clear that the report of an extended evaluation is longer than that of a classic evaluation. In general, we are not aiming for long reports. Instead we are aiming at short, valuable, and semantical reports avoiding bureaucracy and unnecessary redundancy.

6.2. Grades

As already mentioned, it is up to the institution whether it wants the evaluation to come up with grades. If they are given, this is done according to levels described in the following.

Taking into consideration all parameters analyzed the institution will be evaluated on a five point scale: excellent, very good, good, satisfactory, unsatisfactory. For reference, the five levels are briefly described below. This scale will serve as general guide for the final evaluation report which will nevertheless elaborate and describe in details all aspects of the evaluation outcome, with suggestions and recommendations, when required.

Excellent (A)

Research conducted in the institution excels and levels up with the worldwide leaders in the field. Researchers are doing internationally cutting edge research and the outcome has an important and substantial impact in the field.

Very good (B)

Research conducted in the institution is internationally competitive and brings a significant contribution to the field. Researchers are doing nationally leading research.

Good (C)

Research conducted in the institution is nationally competitive and makes a valuable contribution internationally. Research is considered internationally visible.

Satisfactory (D)

Research conducted in the institution is solid and contributes to the field, but is not very exciting. Research is nationally (but not internationally) visible.

Unsatisfactory (E)

Research conducted in the institution is neither solid nor exciting, lacking novelty and creativity. Notable flaws can be observed in the scientific and technical approach. Research is not highly regarded both at national or international levels.

6.3. Further Report Parts

The evaluation report might contain specific sections in case of a specific evaluation process according to the options specified in section 3.

A collective report will be provided in case of a combined evaluation of different departments. Nevertheless it is aimed at having a separate part for each department evaluation report.

In the case of an integrated evaluation of research and teaching, a combined report is provided. The teaching evaluation part is the responsibility of EQANIE.

6.4. Report on Implications

In all cases, recommendations and suggestions for improvement are made by the evaluation panel. The evaluated institution should provide a short report informing which decisions were made in line with the evaluation panel advices. This report is to the attention of the evaluation panel and treated as strictly confidential

7. REFERENCES

1. Research Evaluation Guidelines of the Danish Agency for Science, Technology and Innovation. Danish Agency for Science, Technology and Innovation. Denmark, 2008. At: <http://en.fi.dk/research/research-evaluation>.
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4. Research Assessment Exercise (RAE 2008). HEFCE, SFC, HEFCW and DEL. United Kingdom, 2008. At: <http://www.rae.ac.uk/>
5. Assessing Europe's University-Based Research - Expert Group on Assessment of University-Based Research. European Commission. Directorate-General for Research, Directorate C - European Research Area: Knowledge-Based Economy, Unit C.4 - Universities and Researchers. Belgium, 2010.
6. EURO-INF Framework Standards and Accreditation Criteria for Informatics Degree Programmes, European Quality Assurance Network for Informatics Education (EQANIE), June 2011

APPENDIX 1

Guidelines: Self-evaluation report

The *self-evaluation report* constitutes the basis for the assessment and will be thoroughly analyzed by the evaluation panel. It includes a SWOT-analysis and full set of qualitative and quantitative information concerning the input and output of the institution usually during 5 years prior to the evaluation.

The report should give a *concise picture* of the institution's (and research groups') work, ambitions, output and resources. It should include a *SWOT-analysis* and be comprised of necessary information and reflective analysis.

Below some *guidelines* for the *elaboration* of this *report* are provided. The content should cover the elements of assessment as described in Section 5, providing facts and information, as well as a reflection about the research activities and quality. For simplicity, reports for different research groups should be combined according to the subject matter of their research areas.

SUGGESTED DETAILED CONTENT OF THE SELF-EVALUATION REPORT

The following *structure* is regarded to be a *proposal* for the self-evaluation report. As indicated above, there are different possible versions of the research evaluation, giving variations and extensions of the usual process. For example, if there is a regulated process given by the faculty, university, or by law regulations of the country, the evaluation process must be adapted in order to deal with those regulations. So, the following description is a suggestion for the "normal case" which can be followed or not.

However, we expect that *information* according to the following description is contained in the self-evaluation report in a *complete* and also *readable* form. In case of a variation or extension additional information has to be provided.

Section 1 – Introduction

This section gives a *survey* of the department's situation also indicating the *specifics*. It should include the institution's mission, vision, objectives and description of the research areas and programs. It should also include the reasons and goals for the present evaluation. The department should highlight specific points where the review and feedback by the evaluation panel is particularly desired, submitting specific questions if necessary. It is important to notice that this section should include information at the level of research areas and not at the level of single research groups.

Section 2 – Department Composition

With the support of Table 1, this section *is an overview of the department structure*. It should describe the total number of employees in each job category (including faculty, researchers, postdocs, PhD candidates, technical and administrative staff) at institutional and research group level.

Section 3 - Research quality and impact (see section 5, criterion 1)

This section should contain a detailed description of *key indicators for research*, per research group/subgroup:

- 3-5 most significant results/highlights relevant to the discipline
- 3-5 key publications (most cited papers, distinguished papers)
- Number of articles published in top venues for the research area/discipline
- 3-5 most important books or chapters of books

Section 4 - Academic reputation (see section 5, criterion 2)

This section should describe the most important signs of *recognition of the research staff* including: prestigious prizes, awards and grants; invited keynote addresses and chairmanships at national/international conferences; editorships for national/international journals; fellowships with prestigious associations; executive board positions at national/international scientific or academic organizations; communication to general public media (interviews, articles, etc).

Section 5 - Research productivity and impact

This section should provide *quantitative data* about the *research* performed in the institution for the previous 3 to 5 years including:

- List of referred publications (papers in prestigious peer-reviewed journals, conferences, workshops; books; book chapters).
- List of submitted/approved patents
- List of commercialized (or widely used open source) software/hardware
- List of eventual further publications.

Section 6 - PhD Training (see section 5, criterion 3)

This section should describe concisely the *PhD program* of the department (organizational embedment and structure of the program in the research organization and research activities, objectives, success rate, career data, availability of educational resources) and be complemented by the indicators provided in Table 2.

Section 7 - Research Infrastructure (see section 5, criterion 4)

In this section a concise description of the *state* of the *physical facilities* (labs, offices, common areas, computer equipment, library and digital access to journals and magazines) available to the research staff and students should be provided. The number of administrative and technical staff per research group and faculty member should also be included.

Section 8 - Earning capacity (see section 5, criterion 5)

This section, supported by the data provided in Table 3, should include a description of *projects* and *programs funded* by competitive funds (public and private, national/international).

Section 9 – Internationalization, diversity, and interdisciplinarity (see section 5, criterion 6, 7 and 8)

This section, supported by the data provided in Tables 4, 5 and 6, should describe the efforts and policies designed to increase the *human diversity* in the department and efforts considering *internationalization* and *interdisciplinarity*. On the criterion diversity, beyond Table 5 on gender indicators, the self-evaluation report should also include information on the age distribution at the faculty level and the existence of any other relevant diversity improvement efforts (regarding age, culture or ethnicity).

Section 10 - Societal relevance, impact and valorization (see section 5, criterion 9)

This section should describe the *societal* and *economic relevance* of the department, as spin-off companies and jobs created by them; patents granted and commercialization of generated IP and artefacts; contribution to standardization committees; participation in exhibitions and fairs; cooperation with local organizations for life-long education.

Section 11 - SWOT Analysis (see below)

- Procedure and outcomes of the SWOT-analysis
- Conclusions regarding strategy and activities based on the SWOT-analysis

Section 12 - Future developments

Strategy/Vision for the *future* of the department based on the SWOT analysis (strategic planning; investments and collaboration; research topics planned for the near future and their perspectives; flexibility and anticipation of expected changes).

SWOT ANALYSIS

The self-evaluation report should include a self-analysis of the institution's strengths and weaknesses and give a perspective for the future. This can be done through an analysis of the internal **Strengths** and **Weaknesses** and the **Opportunities** and **Threats** in the environment, called a **SWOT**-analysis. This analysis should be conducted at the level of the institution. The evaluation panel may decide together with the institution that the analysis is also to be conducted regarding each program or cluster of groups.

The SWOT-analysis is first and foremost an instrument for *reflection* on the *current position* and *future prospects* of the institution and its research programs. An important goal is therefore to benchmark the institution's position in the (inter)national scientific arena. The institution is requested to reflect on its own position in relation to its main external partners/competitors and compare its mission and main activities with these points of reference.

Below, some generic *guidelines* on how to prepare a SWOT-Analysis are provided.

In an Internal Appraisal:

Describe what can be identified as the main **Strengths** of your institution: skills, capabilities, delivery, performance, resources, etc. What advantages do the research groups in the institution have compared to other research groups in the national and/or international environment?

Describe what can be identified as the main **Weaknesses** of your institution. Which aspects of your work are considered as sub-standard compared to other research groups in the national and/or international environment or compared to other and more successful aspects in the department?

In an External Appraisal:

Describe the main **Opportunities** that face the organization.

Describe what can be identified as the main **Threats** that face the organization.

After identifying the Strengths, Weaknesses, Opportunities and Threats, it usually becomes clear what issues confront the organization. To define a strategy/vision for the future, and the areas that should be prioritized, finalize the SWOT-Analysis with the following confrontation questions:

	Strengths	Weaknesses
Opportunities	How can we use our strengths to take advantage of the opportunities?	How do we overcome our weaknesses that prevent us taking advantage of the opportunities?
Threats	How do we use our strengths to reduce the likelihood and impact of the threats?	How do we overcome the weaknesses that can make the threats a reality?

TABLES TO BE INCLUDED IN THE SELF-EVALUATION REPORT

Quantitative information as given in the following tables is *necessary* for being able to evaluate a department or faculty. There is a rule: The more open the department is in presenting and reflecting on its situation, the more valuable are the recommendations of the audit team.

The information may be given in the form as suggested below in the following tables *or in another form*. However, the information should be given in a complete and also readable form. The needed data are of course dependent on the variant of evaluation to be performed. Their requirements are discussed in a dialog between the audit team and the institution to be evaluated.

Table 1 – Research, technical and administrative staff at institutional and group level (total absolute numbers)

	Year 1:	Year 2:	Year 3:
Entire Institution <name institution>			
Full professors			
Associate professors			
Assistant professors			
Researchers (including postdocs)			
PhD candidates			
Total research staff			
Support and technical staff			
Administrative staff			
Visiting fellows			
Total staff			
Research Group 1 <name group and PI>			
Tenured staff			
Non-tenured staff			
PhD candidates			
Total research staff			
Support and technical staff			
Administrative staff			
Visiting fellows			
Total staff			
Research Group 2 <name group and PI>			
....			

**Footnotes can be used to introduce specifics as explanations about faculty organization and categories (in case different of the assistant > associate > full professor division and career path); tenure track system; presence of part time professors, people from Industry giving lectures, staff being partly in the department, etc.*

**In case the period of presentation is longer than 3 years, please add the data for the following years as further columns in the tables given here.*

Table 2 – Doctoral training indicators

	Year 1:	Year 2:	Year 3:
Entire Institution <name institution>			
N ⁰ new PhD candidates / Total N ⁰ of PhD candidates			
Doctoral thesis successfully completed			
Completed before 4 years			
Completed after 4 years			
Completed after 5 years			
Completed after 6 years			
Completed after 7 years			
N ⁰ publications per thesis defended			
N ⁰ PhD candidates with teaching responsibilities			
*Rate doctoral work : teaching responsibilities			
N ⁰ PhD candidates with supervision responsibilities			
*Rate doctoral work : supervision responsibilities			
Research Group 1 <name group and PI>			
N ⁰ new PhD candidates / Total N ⁰ of PhD candidates			
N ⁰ Doctoral thesis successfully completed			
Completed before 4 years			
Completed after 4 years			
Completed after 5 years			
Completed after 6 years			
Completed after 7 years			
N ⁰ publications per thesis defended			
N ⁰ PhD candidates with teaching responsibilities			
*Rate doctoral work : teaching responsibilities			
N ⁰ PhD candidates with supervision responsibilities			
*Rate doctoral work : supervision responsibilities			
Research Group 2 <name group and PI>			
...			

**Add footnotes to explain how much of the working time of a typical PhD candidate is dedicated to teaching and supervision compared to the time dedicated to his/her thesis (research work, learning, attending courses, seminars, conferences, etc), presence of part time PhD candidates. Please add additional explanatory information if necessary. Further information may be given, as the number of 2nd supervisions for PhDs.*

Table 3 – Funding at institutional and group level (in EUR)

	Year 1:	Year 2:	Year 3:
Entire Institution <name institution>			
Internal funding			
National research grants			
EU research grants			
Other international research grants			
Contract research/industry grants			
Other			
Total funding			
Expenditure			
Personnel costs*			
Other costs			
Total expenditure			
Research Groups			
Total Funding <name group 1 and PI>			
Total Funding<name group 2 and PI>			
...			
Total Expenditure <name group 1 and PI>			
Total Expenditure <name group 2 and PI>			
...			

**Please provide a footnote with the basic gross salary of a first year PhD candidate as reference. Add additional comments in case there are significant variations (only stipendium, or working contract with teaching responsibilities, etc, net/gross particularities). Classify the grants, if there are clear differences in the importance for research quality.*

Table 4 – Internationalization Indicators

	Year 1:	Year 2:	Year 3:
Entire Institution <name institution>			
Incoming visiting professors			
Outgoing visiting professors			
Faculty members educated abroad			
Proportion of foreign PhD candidates			
Programs for dual and joint degrees			
International master programs			
Incoming <i>Erasmus</i> candidates			
Outgoing <i>Erasmus</i> candidates			

Further indicators may be given.

Table 5 – Gender Diversity Indicators

	Year 1 :	Year 2:	Year 3:
Entire Institution <name institution>			
Percentage of female full professors			
Percentage of female associate professors			
Percentage of female assistant professors			
Percentage of female incoming visiting professors			
Percentage of female outgoing visiting professors			
Percentage of female researchers (including postdocs)			
Percentage of female PhD candidates			
Research Group 1 <name group and PI>			
Percentage of female researchers (including postdocs)			
Percentage of female PhD candidates			
Research Group 2 <name group and PI>			
...			

Further indicators may be given.

Table 6 – Interdisciplinarity Indicators

	Year 1:	Year 2:	Year 3:
Entire Institution <name institution>			
N ⁰ Projects in collaboration with researchers of other fields			
N ⁰ Publications in collaboration with researchers of other fields			
Research Group 1 <name group and PI>			
N ⁰ Projects in collaboration with researchers of other fields			
N ⁰ Publications in collaboration with researchers of other fields			
Research Group 2 <name group and PI>			
....			

Further indicators may be given.

APPENDIX 2

Guidelines: Final Evaluation Report

The panel of *experts* has the professional *responsibility* to write an evaluation report that is comprehensive and concise at the same time, as well responsibility for the conclusions of the report, its assessments and any recommendations. Essentially, the report will contain an assessment of the institution focusing on the criteria mentioned in Section 4 and further criteria, e.g. in the case of extensions corresponding to further requirements.

The research groups' review may be confined to one *review page per group* or a cluster of groups, possibly including the assessment by means of the five-point scale. It is important that the reasons for the given qualification are sufficiently explained in the text. Moreover, the report will contain recommendations that may effectively contribute to the elaboration of short and long-term strategies to improve the quality and impact of the research carried on in the institution.

The *final evaluation report* can have different forms due to the different versions discussed in section 3. As a proposal or recommendation the report should comprise the following *sections*:

Summary

Includes a short description of the purpose of the evaluation together with the most important conclusions, assessments and recommendations.

Introduction

- A brief description of the institution (and research groups), its vision, mission and objectives, and its research activities
- The documents used in the evaluation
- Concise credentials of the audit team

Assessment of the Institution

- A reflection on the research quality of the institution following the evaluation criteria (quality and scientific relevance of the research, academic reputation, quality of the PhD-training, financial and human resources and research infrastructure, organization and internal processes, management of the research program, leadership, national and international positioning and further ones agreed upon with the institution);
- A reflection on the originality of the research, academic significance, program coherence, publication strategy, prominence of the researchers;
- A reflection on the productivity (publications, output) and productivity policy;
- A reflection on the relevance (in research, in society, and with respect to valorization);
- A reflection on the internationalization, diversity and interdisciplinarity.

Recommendations to the Institution

For the aspects that were considered unsatisfactory or that present room for improvement the panel should give clear and effective recommendations. The goal is to provide advice on best ways to tackle the problems, difficulties and limitations and impact short and long-term decision-making and the management strategy.

Assessment of the Research Groups or Group Clusters

Similarly to the Institution Review it should contain reflections on the quality, originality productivity, relevance and impact of the research groups / group clusters evaluated.

Recommendations to the Research Groups or Group Clusters

For the aspects that were considered unsatisfactory or that present room for improvement the panel should give clear and effective recommendations. The goal is to provide advice on best ways to tackle the problems, difficulties and limitations to advance and improve research quality of the groups.

Note that extensive group / group cluster reviews and recommendation are only provided for evaluations conducts under the model Extended. In a big department/ faculty the detailed recommendations will be more on the level of research group clusters. Group reviews would need a special contract.

Annexes

The following must be attached as annexes:

- Institution-specific responses (if any)
- Brief CV s of the panel of experts
- Program of the visit to the institution.