



The External Evaluation Report of a Doctoral Study Domain

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I. Introduction¹

In this chapter, the following shall be summarized:

- the context in which this external evaluation report was drafted (**the type of evaluation, the period of the evaluation visit, the composition of the Experts Committee** etc.);
- details about the doctoral school(s) of which the doctoral domain under review is part (number of doctoral advisors, number of students, institutional context, short history etc.);
- details about the doctoral study domain under review (number of students, institutional context, short history etc.).

Due to the restrictions of the pandemic crisis, the evaluation was mainly conducted online. Meetings were organized through the platform Zoom in Romanian but with a simultaneous translator service.

The Doctoral School of Electronics, Telecommunications and Information Technology (SD-ETIT) was established in 2012 and covers three main topics: (1) electronic devices and circuits, and reliability, (2) telecommunications and (3) applied electronics and information engineering. The third topic addresses the application of Artificial Intelligence techniques to electronic and telecommunication problems. SD- ETIT currently hosts 51 doctoral supervisors and 253 students, and 87 doctoral students graduated from the doctoral program in the last 5 years. This doctoral school covers the Electronic Engineering, Telecommunications and Information Technologies doctoral domain.

¹ Each time when applicable the information shall be presented gender-wise.



II. Methods used

This chapter will contain the methods and tools used in the external evaluation process, before and during the evaluation visit, including at least:

- The analysis of the internal evaluation report of the doctoral study domain under review and its Annexes;
- The analysis of documents made available by the IOSUD, in physical format, during the evaluation visit (if such documents have been requested);
- The analysis of documents, data and information available on the IOSUD/Doctoral School(s) website, in electronic format;
- Visiting the buildings included in the institution's property, comprising (indicative and non- exhaustive list, which shall be changed according to the context):
 - classrooms;
 - laboratories;
 - the institution's library;
 - research centers;
 - the Career Counselling and Guidance Center;
 - lecture halls for students;
 - the student residences;
 - the student cafeteria;
 - sports ground etc.;
- Meeting/discussions with doctoral students in the doctoral study domain under review;
- Meeting/Discussions with the graduates of the doctoral study domain under review;
- Meeting/Discussions with employers of the graduates in the doctoral study domain under review;
- Meeting/Discussions with the school officials of the Doctoral School(s) in which the doctoral study domain under review is operating;
- Meeting/Discussions with the doctoral advisors in the doctoral study domain under review;
- Meeting/discussions with the representatives of the various structures of the IOSUD/Doctoral School(s) in which the doctoral study domain under review is operating:
 - The Council of the Doctoral School, the University Senate, the Board of Directors, the Quality Assessment and Assurance Commission, the Quality Assurance Department, the Ethics Commission (including with the student representatives of these structures);
 - the Career Counselling and Guidance Center;
 - student organizations;
 - secretariats;
 - various departments/administrative offices (Social/Student residences- Cafeterias etc.);
- Application of questionnaires to doctoral students or academic staff in the doctoral study domain under review.

During the evaluation, the self- assessment report and provided annexes were



used as the main elements for the evaluation. This information was complemented with additional documentation, such as the presentations displayed during the online meetings and the physical visit to the educational and research infrastructure.

The online meetings proceeded as scheduled with the different stakeholders: representatives of the institution and of the Council for Academic Doctoral Studies (CSUD), responsible of doctoral domain and the team who drafted the internal evaluation report, doctoral coordinators, PhD students, members of the Ethics Commission, members of the Commission for Quality Evaluation and Assurance, the Directors and persons in charge of the research centers/laboratories, Doctoral Studies Council, employers of doctoral graduates and graduates. The meetings were moderated by the evaluation team, and attendants answered to the question raised by the members of the evaluation panel. In general, all the meeting were satisfactorily carried out and the discussion with attendants helped to clarify the different issues raised by the evaluation members.

III. Analysis of ARACIS's performance indicators

Domain A. INSTITUTIONAL CAPACITY

SD-ETTI has proven to adopt the institutional framework required by legal regulations to conduct the doctoral studies. The research infrastructure is adequate to support students and supervisors. During the last 5 years, the research production and visibility of the research staff evidence the required quality to support the training program and the research topics within the doctoral field.

Criterion A.1. The administrative, managerial institutional structures and the financial resources

From the institutional and managerial point of view SD-ETTI covered satisfactorily all the issues related to the adoption and implementation of specific regulations for doctorate schools and enough financial and logistics resources are allocated to carry out the doctoral studies' mission.

Standard A.1.1. The institution organizing doctoral studies (IOSUD) has implemented the effective functioning mechanisms provided for in the specific legislation on the organization of doctoral studies.

SD-ETTI has adequately implemented all the aspects included in the specific legislation of doctoral studies. Both indicators under the standard A.1.1. are fulfilled and there are evidence that confirm the application of specific regulations, being this information accessible to all students.

Performance Indicator A.1.1.1. The existence of specific regulations and their application at the level of the Doctoral School of the respective university doctoral study domain:

(a) the internal regulations of the Doctoral School;



(b) the Methodology for conducting elections for the position of director of the Council of doctoral school (CSD), as well as elections by the students of their representative in CSD and the evidence of their conduct;

c) the Methodologies for organizing and conducting doctoral studies (for the admission of doctoral students, for the completion of doctoral studies);

d) the existence of mechanisms for recognizing the status of a Doctoral advisor and the equivalence of the doctoral degree obtained abroad;

e) functional management structures (Council of the doctoral school), giving as well proof of the regularity of meetings;

f) the contract for doctoral studies;

g) internal procedures for the analysis and approval of proposals regarding the training for doctoral study programs based on advanced academic studies.

SD-ETTI is constituted and operates according to the current legislation of the Romanian government. SD-ETTI is led by a Director and the Doctoral School Council (CSD). The structure, legislation and regulations are publicly available at the website of the Doctoral School (<https://www.sdetti.upb.ro/en>) both in Romanian and English, including the methodology for conducting elections, the organization of the doctoral studies, the PhD programme, the admission regulations and the habilitation procedure to obtain the status of PhD advisor. Additionally, the doctoral study contract is also available through the website under the section forms and templates (both in Romanian and English for foreign doctoral students). Finally, the frequency of CSD meetings at SD-ETTI is set to 3 meetings / years.

The analysis of the evidence provided shows that functioning mechanisms provided in the specific legislation have been adequately implemented. All the information is publicly available and the organization of the SD-ETTI is clear and efficient, so students can easily find all the required information.

As a recommendation, it is suggested to keep track of the CSD meetings using minutes of the meetings with a clear specification of date, attendants, agenda, decisions taken and questions raised by the attendants. They can be provided as evidence for future evaluations.

The indicator is fulfilled

Performance Indicator A.1.1.2. The doctoral school' Regulation includes mandatory criteria, procedures and standards binding on the aspects specified in Article 17, paragraph (5) of the Government Decision No. 681/2011 on the approval of the Code of Doctoral Studies with subsequent amendments and additions.

The website of the SD-ETTI specifically addresses the Code of Doctoral Studies regarding the issues of the acceptance of new doctoral supervisors and some other issues for PhD students such as the content of their training program, the procedures for changing their doctoral supervisor or interrupting their doctoral studies, their access to research resources. Likewise, students can access to anti-plagiarism through their supervisors.

The analysis of the documentation and the meetings with CSUD and PhD



students provide evidence that the doctoral school' Regulation covers all the aspects addressed by this indicator.

There are no specific recommendations.

The indicator is fulfilled

Standard A.1.2. The IOSUD has the logistical resources necessary to carry out the doctoral studies' mission.

The logistical resources are adequate to keep record and analyze the evolution of doctoral students. Information is easily accessible and facilitates the guidance of students. Accessibility to anti- plagiarism is also guaranteed.

Performance Indicator A.1.2.1. The existence and effectiveness of an appropriate IT system to keep track of doctoral students and their academic background.

The SD-ETTI keeps record of the doctoral students' progress through their internal IT system.

Using their personal account, students can upload their results and papers (<http://studenti.pub.ro/>).

During the meetings with CSUD it was evidenced how their internal IT system works. There are no specific recommendations.

The indicator is fulfilled

Performance Indicator A.1.2.2. The existence and use of an appropriate software program and evidence of its use to verify the percentage of similarity in all doctoral theses.

The SD-ETTI use the Turnitin program to avoid plagiarism. The meetings with the members of the Ethics Commission and PhD students confirmed the availability of Turnitin, so that both advisors and students can freely use it.

There are no specific recommendations.

The indicator is fulfilled

Standard A.1.3. The IOSUD makes sure that financial resources are used optimally, and the revenues obtained from doctoral studies are supplemented through additional funding besides governmental funding.

Financial resources are optimally used. It is worth mentioning the high number of research projects headed by PhD advisor that contribute to generate additional funding for students and increase the expertise of the advisors in their respective fields.

Performance Indicator A.1.3.1. Existence of at least one research or institutional / human resources development grant under implementation at the time of submission of the internal evaluation file, per doctoral study domain under evaluation, or



existence of at least 2 research or institutional development / human resources grant for the doctoral study domain, obtained by doctoral thesis advisors operating in the evaluated domain within the past 5 years. The grants address relevant themes for the respective domain and, as a rule, are engaging doctoral students.

The SD-ETTI is involved in 10 strategic projects for institutional and human resources development and 71 national and international research projects. The meetings with PhD students revealed that many of them have participated in such projects. They provide additional funding and help to engage students.

There are no specific recommendations.

The indicator is fulfilled

Performance Indicator *A.1.3.2. The percentage of doctoral students active at the time of the evaluation, who for at least six months receive additional funding sources besides government funding, through scholarships awarded by individual persons or by legal entities, or who are financially supported through research or institutional / human resources development grants is not less than 20%.

On average, 39% of PhD students have access to additional funding through doctoral scholarships, projects won in dedicated competitions, private scholarships offered by companies, scholarships offered by co-tutelle partners from abroad or from foreign doctoral students' universities, ERASMUS scholarships and through the participation as members of projects headed by PhD advisors.

The additional documentation and the meetings with doctoral coordinators and students confirm the availability of additional funding.

There are no specific recommendations.

The indicator is fulfilled

Performance Indicator *A.1.3.3.² At least 10% of the total amount of doctoral grants obtained by the university through institutional contracts and of tuition fees collected from the doctoral students enrolled in the paid tuition system is used to reimburse professional training expenses of doctoral students (attending conferences, summer schools, training, programs abroad, publication of specialty papers or other specific forms of dissemination etc.).

Part of the amounts obtained by the doctoral school through institutional contracts and tuition fees collected from doctoral students is redirected to fund expenses and training costs of doctoral students and to support the travel and subsistence of foreign PhD defense committee members. The percentage is well above 10%.

The meetings with students and graduated confirmed the availability of such funding. There are no specific recommendations.

The indicator is fulfilled



Criterion A.2. Research infrastructure

The research infrastructure is aligned with doctoral studies' research lines and allows students to carry out the required experiments for the validation of their research works. It is worth mentioning the research labs at CAMPUS Research Institute, recently incorporated as part of the research infrastructure of the doctoral school.

Standard A.2.1. The IOSUD has a modern research infrastructure to support the conduct of doctoral studies' specific activities.

The research infrastructure is aligned with doctoral studies' research lines and allows students to carry out the required experiments for the validation of their research works. It is worth mentioning the research labs at CAMPUS Research Institute, recently incorporated as part of the research infrastructure of the doctoral school.

Performance Indicator A.2.1.1. The venues and the material equipment available to the doctoral school enable the research activities in the evaluated domain to be carried out, in line with the assumed mission and objectives (computers, specific software, equipment, laboratory equipment, library, access to international databases etc.). The research infrastructure and the provision of research services are presented to the public through a specific platform. The research infrastructure described above, which was purchased and developed within the past 5 years will be presented distinctly.

Students can access all the research facilities and equipment at CAMPUS Research Institute, CEOSpaceTech - Research Center for Spatial Information, CETTI - Center for Technological Electronics and Interconnection Techniques, CNMIP - Center for Microscopy Microanalysis and Information Processing, Advanced Studies on Electronic Devices and Circuits Lab, EDIL - Experimentation of Micronanoelectronics Processes, Devices and Integrated Systems Lab. More specifically, the CAMPUS Research Institute was recently finalized (2016) with 13 new fully equipped research laboratories.

The provided annexes detail the research infrastructure, and a specific presentation of the research infrastructure of CAMPUS and the Center for Microscopy-Microanalysis was made during the meeting with CSUD and the responsible of doctoral domain.

There are no specific recommendations.

The indicator is fulfilled

² The indicators marked with an asterisk (*) hold a special status, referring exclusively to the evaluation of doctoral studies domains, as per Article 12 from the annex No.1 of the Order of the minister of education No. 3651/12.04.2021 approving the Methodology for evaluating university doctoral studies and the system of criteria, standards and performance indicators used in the evaluation. In case they are not met, the Agency extends a period of maximum 3 years to IOSUD to correct the respective deficiencies.



Criterion A.3. Quality of Human Resources

**general description of the criterion analysis.*

Standard A.3.1. At the level of each domain there are sufficient qualified staff to ensure the conduct of doctoral study program.

The staff that belong to the doctoral school has accredited the necessary research production level to be part of the school following the regulations of the National Council for Attestation of University Degrees, Diplomas and Certificates (CNATDCU). PhD students are fairly distributed among advisors. The only point to be improved refers to indicator A.3.1.2, which is accomplished but very close to the threshold.

Performance Indicator A.3.1.1. Minimum three doctoral thesis advisors within that doctoral domain, and at least 50% of them (but no less than three) meet the minimum standards of the National Council for Attestation of University Degrees, Diplomas and Certificates (CNATDCU) in force at the time when the evaluation is carried out, which standards are required and mandatory for obtaining the enabling certification.

36 out of 51 PhD supervisors meet the minimum standards of CNATDCU (71%). Annex 15 details this information for each of the PhD advisors. Therefore, the indicator is clearly accomplished.

There are no specific recommendations.

The indicator is fulfilled

Performance Indicator *A.3.1.2. At least 50% of all doctoral advisors have a full-time employment contract for an indefinite period with the IOSUD.

27 out of 51 PhD supervisors are IOSUD tenured (53%). Therefore, the indicator is accomplished. Yet, the value is borderline, above all, considering that 19 of the PhD supervisors are emeritus professors. The self-assessment report includes a strategy to attract young leaders, and during the meetings the panel was informed that new young professors has obtained their qualification.

As a recommendation, the doctoral school should not only rely on young professors to increase the indicator but work on attracting some senior professors with more experience.

The indicator is fulfilled

Performance Indicator A.3.1.3. The study subjects in the education program based on advanced higher education studies pertaining to the doctoral domain are taught by teaching staff or researchers who are doctoral thesis advisors / certified doctoral thesis advisors, professors / CS I or lecturer / CS II, with proved expertise in the field of the study subjects they teach, or other specialists in the field who meet the standards established by the institution in relation with the aforementioned teaching and research functions, as provided by the law.

The SD-ETTI training programme is taught by teachers or researchers that



belong to the required profiles of this indicator. Annex 10 details the subjects of the training programme during the academic year 19/20 and the lecturers in charge of each subject.

There are no specific recommendations.

The indicator is fulfilled

Performance Indicator *A.3.1.4. *The percentage of doctoral thesis advisors who concomitantly coordinate more than 8 doctoral students, but no more than 12, who are themselves studying in doctoral programs³ does not exceed 20%.*

The percentage of doctoral supervisors who coordinate more than 8 students, but not more than 12 is not higher than 16%, which complies the required value.

There are no specific recommendations.

The indicator is fulfilled

Standard A.3.2. *The Doctoral advisors within the domain are carrying out a scientific activity visible at international level.*

The internationalization of the doctoral school is manifested through the international activities and publications of the research staff. They clearly achieve the the score requested by CNATDCU standards.

Performance Indicator A.3.2.1. *At least 50% of the doctoral thesis advisors in the evaluated domain have at least 5 Web of Science- or ERIH-indexed publications in magazines of impact, or other achievements of relevant significance for that domain, including international-level contributions that indicate progress in scientific research - development - innovation for the evaluated domain. The aforementioned doctoral thesis advisors enjoy international awareness within the past five years, consisting of: membership on scientific boards of international publications and conferences; membership on boards of international professional associations; guests in conferences or expert groups working abroad, or membership on doctoral defense commissions at universities abroad or co-leading with universities abroad. For Arts and Sports and Physical Education Sciences, doctoral thesis advisors shall prove their international visibility within the past five years by their membership on the boards of professional associations, membership in organizing committees of arts events and international competitions, membership on juries or umpire teams in artistic events or international competitions.*

All PhD supervisors have more than 5 Web of Science indexed publications, which represents the 100% of PhD supervisors. 75% PhD supervisors (38 out of 51) have confirmed international visibility in the last 5 years through participation in scientific

³ 3 years for the doctoral university studies with the duration stipulated at Article 159, paragraph (3), respectively 4 years for the doctoral university studies with the duration stipulated at Article 174, paragraph (3) of the Law of national education No.1/2011 with subsequent amendments and additions, with additional extension periods approved as per Article 39, paragraph (3) of the Code of doctoral studies approved by the GD No. 681/2011 with subsequent amendments and additions.



committees, international conferences and journals, international professional associations, invited to international conferences or expert commissions, participation in international thesis committees or thesis supervisors. Evidence is provided in annex 1. The target value of the indicator is more than met.

There are no specific recommendations.

The indicator is fulfilled

Performance Indicator *A.3.2.2. At least 50% of the doctoral thesis advisors in a specific doctoral study domain continue to be active in their scientific field, and acquire at least 25% of the score requested by the minimal CNATDCU standards in force at the time of the evaluation, which are required and mandatory for acquiring their enabling certificate, based on their scientific results within the past five years.

38 of the SD-ETTI doctoral supervisors (75%) have at least 25% of the score required by the CNATDCU standards in force. Therefore, the indicator is also more than met. Evidence is provided in annex 1.

There are no specific recommendations.

The indicator is fulfilled

Domain B. EDUCATIONAL EFFECTIVENESS

The capacity of attraction of external students is above the required limit, but the doctoral field should work on improving this indicator. The selection process is carefully implemented according to the established regulations, including a personal interview with candidates. The training program is monitored by the CSD and compulsory subjects about Ethics and research methodology are included as part of the training of doctoral students.

Criterion B.1. The number, quality and diversity of candidates enrolled for the admission contest

The capacity of attraction of external students that belong to other higher education institutions is above the required threshold. Yet, as the value of the indicator is close to the limit, it is recommended to take actions for increasing the number of external students.

Standard B.1.1. The institution organizing doctoral studies has the capacity to attract candidates from outside the higher education institution or a number of candidates exceeding the number of seats available.

The ratio of students that are graduates coming from other master's degree programs different to those organized by UPB is accomplished. However, and due to the decreasing trend in the last years, it is recommended to take special actions to increase this ratio, also focusing on foreign students.

Performance Indicator *B.1.1.1. The ratio between the number of graduates of masters' programs of other higher education institutions, national or foreign, who



have enrolled for the doctoral admission contest within the past five years and the number of seats funded by the state budget, put out through contest within the doctoral domain is at least 0.2 or the ratio between the number of candidates within the past five years and the number of seats funded by the state budget put out through contest within the doctoral studies domain is at least 1,2.

31% of the candidates admitted to SD-ETTI are graduates of other master's degree programs than those organized by UPB, which gives a ratio 0.3, above the 0.2 required. However, during the last two years the number of students with a master's degree outside UPB has reduced.

As a recommendation for the future, the CSUD should carefully monitor this indicator and try to attract more students coming from different national and international Universities.

The indicator is fulfilled

Standard B.1.2 Candidates admitted to doctoral studies demonstrate academic, research and professional performance.

The admission to the doctoral study program is clearly defined by the Doctoral School Regulations and all the information is easily accessible through the website. Each applicant is individually evaluated attending to its profiles, number of years of previous studies, CV and motivation and scientific interest. A personal interview is also conducted as part of the selection process. The procedures are adequately implemented and help to reduce the dropout rate below the required limit.

Performance Indicator *B.1.2.1. Admission to doctoral study programs is based on selection criteria including: previous academic, research and professional performance, their interest for scientific or arts/sports research, publications in the domain and a proposal for a research subject. Interviewing the candidate is compulsory, as part of the admission procedure.

The selection process at SD-ETTI is clearly established by the Doctoral School Regulations and publicly available at the doctorate school website both in English and Romanian. More specifically, it is defined the required number of years of studies that applicants should comply. The process is complemented with the presentation of applicants' own preoccupations with scientific research, of the studied bibliography and the direction in which the doctoral thesis would be finalized. Finally, a personal interview is conducted. The Admissions Committee is composed of the Director of SD-ETTI or another member of the CSD, as chair, and four other members that are PhD supervisors who work in the field.

There are no specific recommendations.

The indicator is fulfilled

Performance Indicator B.1.2.2. The expelling rate, including renouncement / dropping out of doctoral students 3, respectively 4, years after admission⁴ does not exceed 30%.



The dropout rate for SD-ETTI PhD students is 15%, which is below the 30% required by this indicator. Annex 6 lists the students that dropped out and the reasons why.

There are no specific recommendations.

The indicator is fulfilled

Criterion B.2. The content of doctoral programs

The training program is adequate and includes the compulsory subject about Ethics and Intellectual Property. However, the specific subjects' program should explicitly include the learning outcomes. Students receive a adequate guidance from staff and there is enough human resources to support the required guidance.

Standard B.2.1. The training program based on advanced university studies is appropriate to improve doctoral students' research skills and to strengthen ethical behavior in science.

The training program is adequate and includes the compulsory subject about Ethics and Intellectual Property. However, the specific subjects' program should explicitly include the learning outcomes. Students receive a adequate guidance from staff and there is enough human resources to support the required guidance.

Performance Indicator B.2.1.1. *The training program based on advanced academic studies includes at least 3 disciplines relevant to the scientific research training of doctoral students; at least one of these disciplines is intended to study in-depth the research methodology and/or the statistical data processing. The training program of SD-ETTI includes 3 compulsory disciplines about Ethics, Research Methodology and Scientific Authoring and Project Management. Annex 11 details the curricula for the three subjects. The training program is complemented with other specific disciplines selected by the PhD advisor and endorsed by the CSD. Some of the most popular courses from the PhD training programme have also been provided. The training program provides 30 ECTS and student should pass all the disciplines to end the cycle. It is expected that by 2024 all the courses and materials at the doctoral school will be in English, which is also an opportunity to attract foreign students.*

There are no specific recommendations.

The indicator is fulfilled

Performance Indicator B.2.1.2. *At least one discipline is dedicated to Ethics and Intellectual Property in scientific research or there are well-defined topics on these subjects within a discipline taught in the doctoral program.*

There is a compulsory discipline dedicated to ethics in scientific research and intellectual property.

Its curriculum is detailed in annex 11.

⁴ 3 years for the doctoral university studies with the duration stipulated at Article 159, paragraph (3), respectively 4 years for the doctoral university studies with the duration stipulated at Article 174, paragraph (3) of the Law of national education No. 1/2011 with subsequent amendments and additions.



There are no specific recommendations.

The indicator is fulfilled

Performance Indicator B.2.1.3. *The IOSUD has mechanisms to ensure that the academic training program based on advanced university studies addresses „the learning outcomes”, specifying the knowledge, skills, responsibility and autonomy that doctoral students should acquire after completing each discipline or through the research activities⁵.*

The disciplines' curricula details the competencies, skills and abilities that doctoral students should acquire after completing the subjects. Annex 11 illustrates these aspects on the three compulsory disciplines of the training program. Additionally, and at the request of the evaluation panel, the curricula of some specific subjects has also been provided.

As a recommendation, the disciplines' curricula should explicitly address the learning outcomes that students are expected to achieve. Currently, they include the competences. But while competences generally describe the desirable knowledge, learning outcomes are a more specific description of what students will be able to do in some measurable way.

The indicator is fulfilled

Performance Indicator B.2.1.4. *All along the duration of the doctoral training, doctoral students in the domain receive counselling/guidance from functional guidance commissions, which is reflected in written guidance and feedback or regular meeting.*

SD-ETTI has implemented a set of procedures to guide doctoral students.

In addition to the doctoral supervisor, there is a Steering Committee that monitors PhD students and supervisors through regular meetings, and a guiding commission that works with the doctoral supervisor to define the structure and content of the research program and assists the doctoral student during the entire doctoral program.

The meeting with students and graduates showed that in general they were satisfied with the tutoring activities of their supervisors.

There are no specific recommendations.

The indicator is fulfilled

Performance Indicator B.2.1.5. *For a doctoral study domain, the ratio between the number of doctoral students and the number of teaching staff/researchers providing doctoral guidance must not exceed 3:1.*

The number of professors / researchers providing guidance at SD-ETTI is 266, which means that the ratio between the number of doctoral students and the number of

⁵ Or by what the graduate should know, understand and to be able to do, according to the provisions of the Methodology of 17 March 2017 regarding inscription and registration of higher education qualifications in the National Register of Qualifications in Higher Education (RNCIS) approved by the Order No.3475/2017 with subsequent amendments and additions.



teaching staff/researchers providing doctoral guidance is less than 1:1. Therefore, the indicator is accomplished.

There are no specific recommendations.

The indicator is fulfilled

Criterion B.3. The results of doctoral studies and procedures for their evaluation.

Productivity of doctoral students that finished their PhD over the last 5 years is adequate, with many publications in high ranked journal and conferences that guarantee the quality of research. Foreign researchers regularly participate in the evaluation commissions with no over-representation of a specific researcher.

Standard B.3.1. Doctoral students capitalize on the research through presentations at scientific conferences, scientific publications, technological transfer, patents, products and service orders.

The research production of doctoral students far exceeds the limits set by the indicators. Publications are aligned with the research lines of the doctoral school and many of them corresponds to high ranked journals and conferences that guarantee a novel contribution.

Performance Indicator B.3.1.1. *For the evaluated domain, the evaluation commission will be provided with at least one paper or some other relevant contribution per doctoral student who has obtained a doctor's title within the past 5 years. From this list, the members of the evaluation commission shall randomly select 5 such papers / relevant contributions per doctoral study domain for review. At least 3 selected papers must contain significant original contributions in the respective domain.*

The provided documentation in annex 5 demonstrates that, during the last 5 years, doctoral student who has obtained a doctor's title contributed with more than 700 international scientific publications in specialized journals and at prestigious conferences. The content of selected papers from annex 5 corresponds to the topics of the doctoral domain.

There are no specific recommendations.

The indicator is fulfilled

Performance Indicator *B.3.1.2. *The ratio between the number of presentations of doctoral students who completed their doctoral studies within the evaluated period (past 5 years), including posters, exhibitions made at prestigious international events (organized in the country or abroad) and the number of doctoral students who have completed their doctoral studies within the evaluated period (past 5 years) is at least 1.*

The ratio is greater than 4 for graduates during the last 5 years, with more than 370 presentations at international events, detailed in annex 5

There are no specific recommendations.

The indicator is fulfilled



Standard B.3.2. The Doctoral School engages a significant number of external scientific specialists in the commissions for public defense of doctoral theses in the analyzed domain.

The doctoral school keeps contact with international experts that regularly participates in the public defense of doctoral theses. Additionally, they are distributed over the defended doctoral thesis so that there no over representation of a specific foreign researcher.

Performance Indicator *B.3.2.1. *The number of doctoral theses allocated to one specialist coming from a higher education institution, other than the evaluated IOSUD should not exceed two (2) in a year for the theses coordinated by the same doctoral thesis advisor.*

A significant number of external scientific members in the commissions for public defense of doctoral theses is demonstrated in annex 17. Their presence does not exceed the value of 2 for the theses coordinated by the same doctoral supervisor in a year.

There are no specific recommendations.

The indicator is fulfilled

Performance Indicator *B.3.2.2. *The ratio between the doctoral theses allocated to one scientific specialist coming from a higher education institution, other than the institution where the defense on the doctoral thesis is organized, and the number of doctoral theses presented in the same doctoral study domain in the doctoral school should not exceed 0.3, considering the past five years. Only those doctoral study domains in which minimum ten doctoral theses have been presented within the past five years should be analyzed.*

The distribution of the number of theses per external referent in the doctoral thesis defense committee has a peak value of 18, which means a ratio of 0.1 below the limit of 0.3. The indicator is accomplished.

There are no specific recommendations.

The indicator is fulfilled

Domain C. QUALITY MANAGEMENT

The quality assurance system has been designed and implemented following the legal framework, the general framework for doctoral studies elaborated by the Quality Service of IOSUD UPB and the internal procedures of the doctoral schools. The transparency and accessibility of information is guaranteed through the doctoral schools' websites, that record all the legal framework, procedures and updated information of interest to doctoral students. Finally, the internationalization of the doctoral school is supported by the agreements with foreign institutions, the invitation



to international experts to deliver courses and by the presentation of the educational offer at international events.

Criterion C.1. Existence and periodic implementation of the internal quality assurance system

There is a defined framework for Quality Assurance, with procedures that have been implemented. The framework includes procedures for collecting information about students and advisors, the training program and the infrastructure. There are also procedures to detect deficiencies and an Action Plan to handle the detected deficiencies, with a specific person responsible to keep track of the actions and a deadline.

Standard C.1.1. There are an institutional framework and procedures in place and relevant internal quality assurance policies, applied for monitoring the internal quality assurance.

There is a defined framework for Quality Assurance, with procedures that have been implemented. The framework includes procedures for collecting information about students and advisors, the training program and the infrastructure. There are also procedures to detect deficiencies and an Action Plan to handle the detected deficiencies, with a specific person responsible to keep track of the actions and a deadline.

Performance Indicator C.1.1.1. *The Doctoral school in the respective university study domain shall demonstrate the continuous development of the evaluation process and its internal quality assurance following a procedure developed and applied at the level of the IOSUD, the following assessed criteria being mandatory:*

- (a) the scientific work of Doctoral advisors;*
- (b) the infrastructure and logistics necessary to carry out the research activity;*
- (c) the procedures and subsequent rules based on which doctoral studies are organized;*
- (d) the scientific activity of doctoral students;*
- (e) the training program based on advanced academic studies of doctoral students;*
- (f) social and academic services (including for participation at different events, publishing papers etc.) and counselling made available to doctoral students.*

The SD-ETTI internal quality assurance is defined by the IOSUD-UPB institutional framework (annex 12), with the procedures to monitor the scientific activity of doctoral supervisors and students, the infrastructure and the procedures and rules that organize the doctoral studies. The internal evaluation of the SD-ETTI evolution is carried out annually and coordinated by the Commission for evaluation and internal quality monitoring (CEMSD). There is a self-evaluation score sheet that every year both supervisors and students must submit to CEMSD. This commission also is in charge of collecting questionnaires related to the students satisfaction and every year elaborates the Annual Report for the evaluation and monitoring of the evolution of the doctoral school, which analyzes all the procedures and activities developed for the



year. This report contains the action plan to remedy the detected deficiencies.

The meetings with PhD supervisors and students confirmed that the procedures are implemented and information is collected.

There are no specific recommendations.

The indicator is fulfilled

Performance Indicator *C.1.1.2. Mechanisms are implemented during the stage of the doctoral study program to enable feedback from doctoral students allowing to identify their needs, as well as their overall level of satisfaction with the doctoral study program in order to ensure continuous improvement of the academic and administrative processes. Following the analysis of the results, there is evidence that an action plan was drafted and implemented.

The Operational Procedure for the Internal Evaluation and Monitoring of the Evolution of the Doctoral Schools defines the doctoral satisfaction assessment questionnaires for the training program and for the scientific research program (annex 12). They collect information about students' needs and their level of satisfaction. There is also a specific form for the action plan where, for each detected deficiency, there is a definition of the measures to prevent such deficiency, a deadline for the implementation of the selected strategy a responsible to keep track of the changes.

There are no specific recommendations.

The indicator is fulfilled

Criterion C.2. Transparency of information and accessibility of learning resources

All the information about regulations, advisor and research lines is available through the website of the Doctoral School (<http://www.sdetti.upb.ro/>). The content is well structured and information can be easily found. More information about public defenses should be included. Students have also access to the electronic resources through international databases and UPB library, to anti-plagiarism software and labs and equipments required for their research.

Standard C.2.1. Information of interest to doctoral students, future candidates and public interest information is available for electronic format consultation.

All the information about regulations, advisor and research lines is available through the website of the Doctoral School (<http://www.sdetti.upb.ro/>). The content is well structured and information can be easily found. More information about public defenses should be included.

Performance Indicator C.2.1.1. The IOSUD publishes on the website of the organizing institution, in compliance with the general regulations on data protection, information such as:



- (a) the Doctoral School regulation;
- (b) the admission regulation;
- (c) the doctoral studies contract;
- (d) the study completion regulation including the procedure for the public presentation of the thesis
- (e) the content of training program based on advanced academic studies
- (f) the academic and scientific profile, thematic areas/research themes of the Doctoral advisors within the domain, as well as their institutional contact data
- (g) the list of doctoral students within the domain with necessary information (year of registration; advisor
- (h) information on the standards for developing the doctoral thesis
- (i) links to the doctoral theses' summaries to be publicly presented and the date, time, place where they will be presented; this information will be communicated at least twenty days before the presentation

. Students can easily access through the website of the Doctoral School (<http://www.sdetti.upb.ro/>) to all the information related to the doctoral studies: general regulations of the Doctoral School and specific regulations for admission and study completion, the doctoral studies contract in Romanian and English, the content of the training programme and the profiles and research lines of PhD advisors. Additionally, and under the section PhD students, it is shown the list of doctoral students with the year of registration and advisor and the procedures for developing the doctoral thesis.

As a recommendation, the website should include information about the doctoral theses' summaries to be publicly presented and the date, time, place where they will be presented.

The indicator is fulfilled

Standard C.2.2. The IOSUD/The Doctoral School provides doctoral students with access to the resources needed for conducting doctoral studies.

Students have access to the electronic resources through international databases and UPB library, to anti-plagiarism software and labs and equipments required for their research.

Performance Indicator C.2.2.1. All doctoral students have free access to one platform providing academic databases relevant to the doctoral studies domain of their thesis.

Students have free access services to the most representative libraries of publications for the ETTI field (the contract is attached in annex 13): Thomson Reuters, Scopus, Scencedirect, IEEE Xplore, or Springer Nature. Additionally, the UPB library (<http://www.library.pub.ro/>) offers additional access to other resources.

There are no specific recommendations.

The indicator is fulfilled



Performance Indicator C.2.2.2. *Each doctoral student shall have access, upon request, to an electronic system for verifying the degree of similarity with other existing scientific or artistic works.*

All PhD supervisors have an access to the software Turnitin and offer all PhD students, upon request, access to verify the similarity of their works. Through the online meetings, students confirm its availability.

There are no specific recommendations.

The indicator is fulfilled

Performance Indicator C.2.2.3. *All doctoral students have access to scientific research laboratories or other facilities depending on the specific domain/domains within the Doctoral School, according to internal order procedures.*

All doctoral students have access to the research infrastructure, detailed in annex 2. The access is coordinated by the doctoral supervisor, following the rules of each lab. The access to special infrastructures outside UPB must be planned in advance.

There are no specific recommendations.

The indicator is fulfilled

Criterion C.3. Internationalization

The internationalization of the doctoral school is supported by the agreements with foreign institutions so that local students can have internships abroad, by the invitation to international experts to deliver courses and by the presentation of the educational offer at international events.

Standard C.3.1. There is a strategy in place and it is applied to enhance the internationalization of doctoral studies.

The internationalization of the doctoral school is supported by the agreements with foreign institutions so that local students can have internships abroad, by the invitation to international experts to deliver courses and by the presentation of the educational offer at international events.

Performance Indicator *C.3.1.1. *IOSUD, for every evaluated domain, has concluded mobility agreements with universities abroad, with research institutes, with companies working in the field of study, aimed at the mobility of doctoral students and academic staff (e.g., ERASMUS agreements for the doctoral studies). At least 35% of the doctoral students have completed a training course abroad or other mobility forms such as attending international scientific conferences. IOSUD drafts and applies policies and measures aiming at increasing the number of doctoral students participating at mobility periods abroad, up to at least 20%, which is the target at the level of the European Higher Education Area.*

SD-ETTI keeps active ERASMUS agreements, collaboration agreements and co-supervision agreements with many foreign institutions detailed in annex 9. 60% of



PhD students have completed an internship abroad or other form of mobility, so the indicator target value is accomplished. Due to the pandemic situation, the participation in conferences during 2020 was online. It is expected that the participation in the H2020 project AI4Media project "A European Excellence Center for Media, Society and Democracy" will increase the mobilities of doctoral students.

There are no specific recommendations.

The indicator is fulfilled

Performance Indicator C.3.1.2. *In the evaluated doctoral study domain, support is granted, including financial support, to the organization of doctoral studies in international co-tutelage or invitation of leading experts to deliver courses/lectures for doctoral students.*

Annex 9 shows that currently there are 5 PhD students in international co-tutelage and 2 PhD students in national co-tutelage. Annex 3 details the presentation conducted at UPB by international experts (24 since 2017).

There are no specific recommendations.

The indicator is fulfilled

Performance Indicator C.3.1.3. *The internationalization of activities carried out during the doctoral studies is supported by IOSUD through concrete measures (e.g., by participating in educational fairs to attract international doctoral students; by including international experts in guidance committees or doctoral committees etc.).*

SD-ETI and UPB presents its educational offer at international fairs and exhibitions. Annex 14 includes a list of 38 of such events in the last five years. During this period a total of 12 foreign students have enrolled in the doctoral field, showing also a rising trend. Finally, foreign examiners regularly participate in the evaluation board of PhDs. More specifically, 13 foreign experts were present in the 87 PhD defenses

There are no specific recommendations.

The indicator is fulfilled

IV. SWOT Analysis

<p><u>Strengths:</u></p> <ul style="list-style-type: none"> - The high number of projects in which PhD advisors are involved, which means an additional funding and also a way to engage more students - The new facilities at CAMPUS Research Institute allows the development of more ambitious research projects and increase the number of doctoral students - The high volume and quality of research production 	<p><u>Weaknesses:</u></p> <ul style="list-style-type: none"> - The Quality Assurance system requires more time to be mature, with all the procedures and action plans fully implemented. - The number of foreign students is low, so more actions should be taken in this point.
<p><u>Opportunities:</u></p> <ul style="list-style-type: none"> - The presence of many technological companies able to support and fund PhDs closely related to their activities. - European actions, such as Marie Curie, represent an opportunity to attract talent. 	<p><u>Threats:</u></p> <ul style="list-style-type: none"> - Too many emeritus professors that can compromise the number of available PhD advisors in the near future - There is an over representation of research works related to artificial intelligence than can cause the progressive abandonment of other research lines

V. Overview of judgments awarded and of the recommendations

No	Type of indicator (*, C)	Performance indicator	Judgment	Recommendations
1		A.1.1.1	Fulfilled	it is suggested to keep track of the CSD meetings using minutes of the meetings with a clear specification of date, attendants, agenda, decisions taken and questions raised by the attendants. They can be provided as evidence for future evaluations
2		A.1.1.2	Fulfilled	
3		A.1.2.1	Fulfilled	
4		A.1.2.2	Fulfilled	
5		A.1.3.1	Fulfilled	

6	*	A.1.3.2	Fulfilled	
7	*	A.1.3.3	Fulfilled	
8	C	A.2.1.1	Fulfilled	
9	C	A.3.1.1	Fulfilled	
10	*	A.3.1.2	Fulfilled	the doctoral school should not only rely on young professors to increase the indicator but work on attracting some senior professors with more experience
11		A.3.1.3	Fulfilled	
12	*	A.3.1.4	Fulfilled	
13	C	A.3.2.1	Fulfilled	
14	*	A.3.2.2	Fulfilled	
15	*	B.1.1.1	Fulfilled	the CSUD should carefully monitor this indicator and try to attract more students coming from different national and international Universities
16	*	B.1.2.1	Fulfilled	
17		B.1.2.2	Fulfilled	
18		B.2.1.1	Fulfilled	
19		B.2.1.2	Fulfilled	
20		B.2.1.3	Fulfilled	the disciplines' curricula should explicitly address the learning outcomes that students are expected to achieve
21		B.2.1.4	Fulfilled	
22	C	B.2.1.5	Fulfilled	
23	C	B.3.1.1	Fulfilled	
24	*	B.3.1.2	Fulfilled	
25	*	B.3.2.1	Fulfilled	
26	*	B.3.2.2	Fulfilled	
27		C.1.1.1	Fulfilled	
28	*	C.1.1.2	Fulfilled	
29	C	C.2.1.1	Fulfilled	the website should include information about the doctoral theses' summaries to be publicly presented and the date, time, place where they will be presented
30		C.2.2.1	Fulfilled	
31		C.2.2.2	Fulfilled	
32		C.2.2.3	Fulfilled	
33	*	C.3.1.1	Fulfilled	
34		C.3.1.2	Fulfilled	
35		C.3.1.3	Fulfilled	

The recommendations contained in the report shall be resumed in the indicators' analysis. Other general recommendations may be made that do not fit



within a particular indicator.

VERY IMPORTANT!!! – *Each identified weakness must be correlated with at least one recommendation to improve the situation!*

VI. Conclusions and general recommendations

Several important issues raised during the evaluation are resumed and some general conclusions are drawn on the quality of the education provided within the doctoral study domain under review; the Experts' Panel also presents general assessments about the institution. Other general recommendation may also be presented, which cannot be related to a specific indicator and have not been presented at point V.

A decision is proposed, together with the reasons for granting it (if the Experts' Panel members do not reach a consensus, each of them can propose and argue his/her own decision).

VII. Annexes

The following types of documents shall be attached:

- *The detailed schedule of the evaluation visit – MANDATORY.*
- *The survey questionnaire applied to doctoral students or academic staff in the doctoral study domain under review, the results - optional (e.g., in graphic form) and their interpretation - if applicable.*
- *Scanned documents – any document requested from the IOSUD during the evaluation visit and received, which is not found in the internal evaluation file received before the visit and referred to in the report.*
- *Pictures – if relevant issues are raised regarding the condition of the student residences, cafeterias, premises for teaching and learning activities, library etc.*
- *Screenshots/Print screens of the Doctoral School/IOSUD website proving specific claims in the report, accompanied by the date when they were accessed and saved.*
- *Any other documents relevant to the evaluation process referred to in the report.*

Sergio Toral Marín