

EXTERNAL EVALUATION REPORT

for

UNIVERSITY OF ORADEA (UO)

DOCTORAL FIELD

Engineering and Management

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Contents

- I. Introduction
- II. Methods used
- III. Analysis of performance indicators
- IV. SWOT Analysis and Recommendations
- V. Overview of judgments awarded and of the recommendations
- VI. Conclusions and general recommendations
- VII. References

I. Introduction

This report summarizes the findings from the external evaluation of doctoral field of Engineering and Management (EM) at University of Oradea (UO). First, some background information is given as context, then the resources and methods used to prepare this report are listed. Next, an analysis of the performance indicators is given, followed by a SWOT analysis and the recommendations. Finally, conclusions are made.

General Background

University of Oradea is an accredited, state higher education institution, whose mission is to train specialists in various fields of engineering, sciences and culture, to generate new knowledge. The financial resources of the UO come from the several sources: allocations from the state budget for basic financing, tuition fees and other own revenues, grants and contracts of RDI, sponsorships, and allocations from the state budget with special destinations.

There are seven Doctoral Schools at UO within the structure of the faculties that manage eighteen doctoral fields in Engineering and science. The focus of this report is on the doctoral domain in Engineering and Management. ARACIS chose to evaluate the doctoral programs in Industrial Engineering (IE) and Engineering Management (EM) together as there are similarities.

Both programs are organized within the Doctoral school of Engineering Sciences. Currently (2020-2021), there are 35 doctoral students enrolled in the IE doctoral program.

The Doctoral field of Engineering and Management

The Doctoral field of Engineering and Management is relatively new, being established in the 2016-2017 academic year. There are four dedicated doctoral supervisors in EM and 16 doctoral students currently enrolled.

Objectives/Mission: The doctoral field of Engineering and Management, (organized within the Doctoral school of Engineering Sciences), has the mission of generating and transferring knowledge to society through; academic training, at the highest level of performance, and promoting excellence in the processes of scientific research, development, innovation and knowledge transfer to the Romanian society, thus responding to the need for its economic progress. The main objectives of the doctoral field of Engineering and Management include: optimizing and streamlining training programs based on advanced studies; ensuring and continuous improvement of the quality of activities carried out within the doctoral field of Engineering and Management; stimulating, developing research capacity and capabilities, while promoting new research directions; and, internationalization and increasing visibility at national and international level.

Curriculum: The curriculum of the doctoral field of Engineering and Management is prepared according to the provisions of the national legislation and internal regulations of the University of Oradea. The structure of the Curriculum includes development of: Professional and transversal skills; compulsory disciplines (Methodology of scientific research in the fundamental field, Ethics and academic integrity in the fundamental field), ending with the presentation of the scientific research project; Evaluation and presentation of the doctoral thesis before the Guiding Commission; and, Public presentation of the doctoral thesis before the Specialized Commission.

Doctoral Supervisors: Within the doctoral field of Engineering and Management, there are four supervisors who have obtained the habilitation certificate, being professors of the University of Oradea. The doctoral supervisors are conducting significant scholarly activities in the field generating internationally visible publications.

Research: The doctoral school has, for each field, its own scientific research plan, included in the strategic plan of the faculty to which the doctoral field of Engineering and Management is

assigned. The research topics of the doctoral theses are included in the Scientific Research Plan of the Doctoral school of Engineering Sciences and are part of the scientific area of the fundamental field of Engineering and Management.

Research centers / laboratories: At the level of the Faculty of Managerial and Technological Engineering, which manages the doctoral field of Engineering and Management, there is an internally certified research center, called the Research Center Research Center in Integrated Engineering and Advanced Technologies - CCIITA.

Functioning of the internal quality assurance system at the level of the evaluated doctoral school that manages the field of evaluated doctoral university studies

University of Oradea has as the priority objective of continuous improvement of the teaching processes, educational effectiveness, quality management and operational procedures which is reflected in the performance indicators. During the doctoral training internship, feedback mechanisms are implemented such as distributing anonymous questionnaires seeking to identify key areas for improvement as well as capturing the level of student satisfaction with the doctoral program as a whole. The questionnaires are analyzed by a commission established at the level of IOSUD, and the obtained results are passed in a report.

II. Methods Used

This report is based on the information supplied by University of Oradea Internal Evaluation Report of the Doctoral Field of Engineering and Management and several Zoom meetings/discussions with program administrators, research centers, program coordinator, faculty advisors, doctoral students, doctoral graduates and their employers. On site visit was not possible due to the COVID virus pandemic (see references section for resources used).

III. Analysis of Performance Indicators

Standards and Performance/Field Indicators

Evaluation Criteria for doctoral programs at UO are grouped under parts A, B and C and their multiple sections are listed in the internal evaluation report. The following conclusions are based on the Engineering and Management Doctoral Field's internal evaluation report of the

field of engineering and management and the meetings/discussions listed in References. The internal evaluation report was thorough and very well prepared. The information needed for the analysis was available in detail.

To avoid repetitions, only assessment results and sections thought to be significant are discussed.

A. Institutional Capacity Indicators

A.1. Institutional, administrative, managerial structures and financial resources

A.1.1. IOSUD - The University of Oradea has implemented the efficient functioning mechanisms provided in the specific legislation regarding the organization of doctoral studies. The activity within IOSUD - University of Oradea is carried out in accordance with the provisions of national legislation and internal regulations.

All criteria for performance sub indicators under A.1.1.1 were fulfilled.

All criteria for performance sub indicators under A.1.1.2 were fulfilled.

A.1.2. IOSUD has the logistical resources necessary to fulfill the mission of doctoral studies.

All criteria for performance sub indicators under A.1.2.1 were fulfilled.

PhD students enrolled at IOSUD_UO in the form of education without tuition are funded from the budget for the maximum duration of a doctoral study cycle (3-4 years), and the university has mechanisms to verify this condition (UNIWEB Platform).

All criteria for performance sub indicators under A.1.2.2 were fulfilled.

According to the provisions of the Operational Procedure regarding the evaluation of doctoral students, each doctoral thesis is accompanied by both the Antiplagiarism Report generated by the Sistemantiplagiat software as well as the Resolution of the doctoral supervisor on the similarity report.

A.1.3. IOSUD ensures the optimal use of financial resources and the revenue from doctoral studies are completed by supplementary funding besides the one granted by the Government.

All criteria for performance sub indicators under A.1.3.1 were fulfilled

All criteria for performance sub indicators under A.1.3.2 were fulfilled

All criteria for performance sub indicators under A.1.3.3 were fulfilled.

The percentage of professional training expenses of PhD students in the field of Engineering and Management in the total budget revenues and fees is over 10%.

A.2. Research Infrastructure

A.2.1. IOSUD has a modern research infrastructure, which supports the development of activities specific to doctoral studies.

All criteria for performance sub indicators under A.2.1.1 were fulfilled.

A.3. Quality of human resources

A.3.1. In each doctoral field there is qualified personnel, with adequate expertise necessary for the development of the doctoral studies program

All criteria for performance sub indicators under A.3.1.1 were fulfilled

All criteria for performance sub indicators under A.3.1.2 were fulfilled

All criteria for performance sub indicators under A.3.1.3 were fulfilled

All criteria for performance sub indicators under A.3.1.4 were fulfilled

A.3.2. The doctoral advisors in the area of study conduct internationally visible scientific activity.

All criteria for performance sub indicators under A.3.2.1 were fulfilled.

All criteria for performance sub indicators under A.3.2.2 were fulfilled.

Within the evaluated doctoral field of Engineering and Management, 4 doctoral supervisors prove five publications indexed Web of Science or ERIH and 4 doctoral supervisors prove at least 2 mentions that highlight the international visibility they enjoy, through the elements specified in the second part of this indicator. Within the PhD field of Engineering and Management, four PhD supervisors prove five indexed publications Web of Science or ERIH and four PhD supervisors out of a total of four supervisors prove at least 2 mentions that highlight the visibility, through the elements specified in the second part of this indicator.

B. Educational Efficiency

B.1. The number, quality and diversity of the candidates who attended the entrance exam

B.1.1. The institution which organises doctoral studies displays the capacity to attract candidates outside the higher education institution or a higher number of candidates than the number of state funded places.

All criteria for performance sub indicators under B.1.1.1 were fulfilled.

The report shows the number of master's degree graduates of other higher education institutions in the country or abroad who have registered for the admission competition for doctoral studies and the number of places financed from the state budget put up for

competition at the 2016- admissions 2019 in the field of PhD Engineering and Management is $7/6 = 1.16$

B.1.2. The candidates admitted to the doctoral studies display professional and research academic performance

All criteria for performance sub indicators under B.1.2.1 were considered remote.

Following the admission colloquium, each member present of the commission will give each candidate a grade (an integer, between 10 and 1) for each evaluation criterion. The average given by each member of the commission is obtained as a weighted arithmetic average of the marks awarded for each evaluation criterion. The candidate's admission average is the arithmetic average of the averages resulting from the marks awarded by each member of the competition committee.

All criteria for performance sub indicators under B.1.2.2 were fulfilled

The average dropout rates for the four years considered is de $3/13=0,2307$ - percentage 23.07%, not exceeding the value of 0.3 - percentage 30%.

B.2. The contents of the doctoral studies program

B.2.1. The advanced academic training programme is suitable for the development of doctoral students' research abilities and the consolidation of their ethical scientific behavior

All criteria for performance sub indicators under B.2.1.1 were fulfilled.

All criteria for performance sub indicators under B.2.1.2 were fulfilled.

All criteria for performance sub indicators under B.2.1.3 were fulfilled

All criteria for performance sub indicators under B.2.1.4 were fulfilled

All criteria for performance sub indicators under B.2.1.5 were fulfilled

B.3.1. Research is capitalized by doctoral students through conference presentations, scientific papers, technological transfer, patents, products, orders of services.

Criteria for performance sub indicators under B.3.1.1; Because the Ph.D. field in Engineering and Management was created in the academic year 2016- 2017, this performance indicator cannot, at this moment, be quantified.

Criteria for performance sub indicators under B.3.1.2; Because the PhD field in Engineering and Management was created in the academic year 2016- 2017, this performance indicator cannot, at this moment, be quantified.

B.3.2. The doctoral school is supported by a significant number of external scientific specialists within the committees for the public defense of doctoral theses in the evaluated domain.

Criteria for Performance sub indicators under B.3.2.1; Not the case.

Criteria for Performance sub indicators under B.3.2.2; Not the case.

C.1. The existence and regular operation of the system of internal quality assurance

C.1.1. There is an institutional framework and policies and procedures are applied for the internal assurance of relevant quality

All criteria for performance sub indicators under C.1.1.1 were fulfilled

All criteria for performance sub indicators under C.1.1. were fulfilled

C.2.1. Significant information for doctoral students, future candidates, general interest data respectively, are available in an electronic format

All criteria for performance sub indicators under C.2.1.1 were fulfilled

C.2.2 IOSUD/Doctoral School assures students' access to the necessary resources to carry out doctoral studies

All criteria for performance sub indicators under C.2.2.1 were fulfilled

All criteria for performance sub indicators under C.2.2. were fulfilled.

All criteria for performance sub indicators under C.2.2.3 were fulfilled.

C.3. The degree of internationalization

C.3.1. There is an applied strategy to enhance the degree of internationalization of doctoral studies.

All criteria for performance sub indicators under C.3.1.1 were fulfilled.

All criteria for performance sub indicators under C.3.1.2 were fulfilled

All criteria for performance sub indicators under C.3.1.3 were fulfilled.

The IOSUD-UO representatives participated in numerous international conferences to attract new international doctoral students. The degree of internationalization of doctoral studies is ensured through mobility agreements concluded by IOSUD / Doctoral Schools, with foreign universities, research institutes, companies that carry out activities in the studied field. The University of Oradea through IOSUD / Doctoral Schools provides financial support for the

organization of doctorates in international co-supervision and invitation of first-rate foreign experts.

Conclusion for A, B, and C: Overall, all criteria for performance indicators A, B, and C appear to be addressed in detail and fulfilled in critical areas (*see details in the internal evaluation report, Part - The degree of fulfilling performance criteria, standards and indicators*).

The doctoral school in EM at UO is working hard on ways on how to improve quality/performance indicators that are first time applied to some doctoral schools. Some of these indicators are challenging to meet for a young EM doctoral program (established in 2016-2017 academic year) at UO. Completing doctoral research in three years is difficult as mentioned by almost all doctoral students, especially with requirements for publishing at least two articles before defending their thesis.

For those indicators that could not be met fully, there is evidence that they can be met in the near future. It is important that the indicators should be predictable, not changed over time.

IV. SWOT Analysis and Recommendations

Strengths and Opportunities: The doctoral program of Engineering and Management at UO has many *strengths and opportunities*. Some of these are: EM domain is very attractive to students from multiple disciplinary backgrounds due to EM's multidisciplinary nature. Industry 4.0 offers lots of opportunities in doctoral research in EM. PhD students/graduates in EM will be needed in preparing for Industry 4.0. A wide range of topics in technical, managerial, organizational, and financial can be addressed by application-oriented EM research. The doctoral program in UO is working to find niche areas of research and market segments to focus on. Such efforts can differentiate UO from other EM doctoral programs with more resources. New topics are being introduced in cyber security, cognitive entropy, energy management, climate crisis challenges and technology transfer. Another opportunity is that a new industrial park is being established at Oradea, which will have a new technology transfer building for research and labs with new equipment. This is a great opportunity as the center is expected to be a hub for research and industry co-operation. The new industrial park is also an indicator of investment in UO. Also, IE and EM students should have the opportunity to work together, increasing the cooperation between the two doctoral fields as expertise from both fields will be necessary for success in Industry 4.0 and technology transfer.

There are also opportunities in increasing enrollments through internationalization. International students from Indonesia, India and Middle East have been coming to UO, some receiving funds from ERASMUS. Even though the pandemic has slowed this process, efforts to increase international students seem to be successful.

There exist a good relationship established between UO and the industry. Partnership between companies and the university is very beneficial for both. One employer (a former faculty) mentioned the importance of continued communication and partnership with UO. The company has contracts and partnership agreements with the university. Another employer in the automotive field keeps in contact with EM students, proposing new research topics and projects. They also have contracts and partnership agreements with UO doctoral program. A local manufacturer of plastic parts wants to hire graduates to improve production with new technology and support PhD students by providing equipment for testing. One may conclude that university and industry partnership is well established at UO.

Doctoral students were very complementary of the doctoral program supervisors. They are personally involved in student progress. They make sure students collaborate with each other in research ideas and use of research tools. Another strength mentioned was the curriculum. First year focused on research methods, ethics, writing papers and statistics. Second year courses focused on the thesis topics determined by the student and the doctoral guidance committee. A proposal is submitted and presented by the student. Committees are put together by the students and the supervisor together. This student-centered approach is a strength.

Areas for improvement/weaknesses: One can make some recommendations in terms of opportunities for improvement that may be seen as *weaknesses*: There is evidence of real competition for students from other universities with doctoral programs in EM with more resources. Seeking better cooperation with companies and other universities and identifying niche areas of expertise and research may be very helpful. Another potential issue may be the existence of doctoral programs both in IE and EM. This may lead to internal competition. Emphasizing the cooperation opportunities is very helpful as both fields complement each other with distinctive focuses.

All students mentioned that the expected time to graduation of three years is not be enough, especially for those employed full time. Several students asked for extensions beyond 3 years. However, they were required to pay extension fees. One student mentioned that the university was closed for a while due to the pandemic. The student mentioned that such fees should be waived. Time extensions without additional costs will be extremely beneficial. The requirement for publishing, one proceeding and one indexed journal article, before defending theses is challenging. There is financial support for publishing, but a student mentioned that the reimbursement process is very slow. Scholarships for doctoral students are available, but they have been limited. Government budget for student support is very limited. University has grants available, but they don't seem to be enough. Increasing funding and its duration by seeking additional sources of funds other than governmental/university ones may be helpful. It was also mentioned that it is difficult to get research support from the local industry as they tend to be subsidiaries of multinationals. All of the concerns listed above may lead to recruitment and retention issues where some students may be leaving the program before graduation and fulfillment results in some performance indicators. (see B.3.1.2, B.3.2.1 and B.3.2.2) in the following section), There have not been any doctoral graduates in E&M even though this may mostly be explained by the doctoral programs short history. This may be changing soon with expected graduations pending.

Many of multinational companies in Romania have their research departments in their home countries, making it difficult to get grants from them. An opportunity here may be to offer certificate programs to the industry with short courses for profit. The proceedings from such efforts can increase both the availability of student funds and industrial cooperation.

V. Overview of judgments awarded and of the recommendations

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
1.	PI	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:	fulfilled	Fulfilled, no specific recommendations.

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		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.		
2.	PI	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.	fulfilled	Fulfilled, no specific recommendations
3.	PI	A.1.2.1. The existence and effectiveness of an appropriate IT system to keep track of doctoral students and their academic background.	fulfilled	Fulfilled, no specific recommendations
4.	PI	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.	fulfilled	Fulfilled, no specific recommendations
5.	IP	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	fulfilled	Fulfilled, no specific recommendations

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		evaluated domain within the past 5 years. The grants address relevant themes for the respective domain and, as a rule, are engaging doctoral students.		
6.	PI *	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%.	fulfilled	Fulfilled, no specific recommendations
7.	PI *	A.1.3.3. 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.).	fulfilled	Fulfilled, no specific recommendations
8.	CPI	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	fulfilled	Fulfilled, no specific recommendations
9.	CPI	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.	fulfilled	Fulfilled, no specific recommendations

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
10.	PI *	A.3.1.2. At least 50% of all doctoral advisors have a full-time employment contract for an indefinite period with the IOSUD.	fulfilled	Fulfilled, no specific recommendations
11.	PI	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.	fulfilled	Fulfilled, no specific recommendations
12.	PI *	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 programs does not exceed 20%.	fulfilled	Fulfilled, no specific recommendations
13.	CPI	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	fulfilled	Fulfilled, no specific recommendations

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		juries or umpire teams in artistic events or international competitions.		
14.	PI *	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	fulfilled	Fulfilled, no specific recommendations
15.	PI *	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.	fulfilled	Fulfilled, no specific recommendations
16.	PI *	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.	All criteria for performance sub indicators under B.1.2.1 were considered remote.	Seems fulfilled. There is extensive student selection criteria listed in Self Study report. Previous academic research performance is considered. Document the process.
17.	PI	B.1.2.2. The expelling rate, including renouncement / dropping out of doctoral students 3, respectively 4, years after admission does not exceed 30%.	fulfilled	Fulfilled, no specific recommendations
18.	PI	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.	fulfilled	Fulfilled, no specific recommendations

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
19.	PI	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.	fulfilled	Fulfilled, no specific recommendations
20.	PI	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 activities.	fulfilled	Fulfilled, no specific recommendations
21.	PI	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.	fulfilled	Fulfilled, no specific recommendations
22.	CPI	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.	fulfilled	Fulfilled, no specific recommendations
23.	CPI	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	this performance indicator cannot, at this moment, were quantified.	The Ph.D. field in Engineering and Management was created in the academic year 2016- 2017. There have not been any graduates yet. Seems that some students are close to graduation. Consider reviewing student retention issues.
24.	PI *	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	this performance indicator cannot, at this moment, were quantified.	The Ph.D. field in Engineering and Management was created in the academic year 2016- 2017. There have not been any graduates yet. Seems that some students are close to graduation. Consider reviewing student retention issues.

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		studies within the evaluated period (past 5 years) is at least 1.		
25.	PI *	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.	Not the case	Not fulfilled. There have not been any graduates yet. This indicator may be fulfilled in the near future.
26.	PI *	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.	Not the case	Not fulfilled. There have not been any graduates yet. This indicator may be fulfilled in the near future.
27.	PI	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.	fulfilled	Fulfilled, no specific recommendations
28.	PI *	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	fulfilled	Fulfilled, no specific recommendations

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		administrative processes. Following the analysis of the results, there is evidence that an action plan was drafted and implemented.		
29.	CPI	<p>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:</p> <ul style="list-style-type: none"> 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. 	fulfilled	Fulfilled, no specific recommendations
30.	PI	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.	fulfilled	Fulfilled, no specific recommendations
31.	PI	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.	fulfilled	Fulfilled, no specific recommendations
32.	PI	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.	fulfilled	Fulfilled, no specific recommendations
33.	PI *	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,	fulfilled	Fulfilled, no specific recommendations

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		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.		
34.	PI	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.	fulfilled	Fulfilled, no specific recommendations
35.	PI	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.).	fulfilled	Fulfilled, no specific recommendations

VI. Conclusions and general recommendations

Internationally, Engineering and Management programs at graduate level are both popular as they serve an essential need from industry, academia, and applied research. The popularity seems to stem from the multidisciplinary nature of the curricula and research and cooperation with the industry. Students, practicing engineering professionals and administrators of technical organizations with diverse backgrounds are attracted to the field of Engineering and Management as they all find themselves operating in a competitive project management environment.

The Doctoral Field in Engineering and Management at UO has clear and well-defined objectives and well thought out curricula, fulfilling a unique need for a multidisciplinary doctoral program

addressing critical issues such as in technology transfer. The program attracts international students. The doctoral program has been fulfilling quality assurance measures in critical areas meeting standards imposed, given its short history, small size, and limited resources (see section III and IV). Student research under the guidance of the supervisors are leading to scholarly publications, research proposals and industry/government partnerships. The doctoral program has also been successfully seeking international cooperation in research and education.

Some students may like to see more provisions in enabling collaborations with other students in exchanging ideas and experiences. Perhaps a research forum, held once or twice a year to enable collaborations with masters and doctoral students and other domains (especially with Industrial Engineering) in exchanging ideas and experiences may be very helpful where each doctoral student presents an outline of their research/methodology to other doctoral students and the faculty of the interested programs. We do this annually and invite industry and government representatives also. It is also a good recruiting tool to increase PhD enrollments.

Overall, the doctoral program of Engineering and Management at UO, given limited resources mentioned above, is a successful program with the opportunity to grow significantly in terms of faculty and students. There is support from upper university administration. The Dean clearly seems to support the EM program due to its research focus in multiple areas. It seems like new faculty supervisors may be added, growing the program and its resources. Cooperation both the IE program and with other EM programs in Romania is encouraged by developing its own niche areas of research.

The doctoral students and employers are complementary of the doctoral program. It seems to be an ideal environment where students and their advisors are working together to make the program a success. The program also contributes significantly to the local development challenges. All indications are there that the EM doctoral program will grow significantly in the near future.

As an external evaluator, I give my high approval of the Doctoral field in Engineering and Management at UO.

VII. References and resources:

- Doctoral field of Engineering and Management at University of Oradea (UO), Internal-Evaluation Report (2021).
- 15.11.2021 ZOOM meeting: 12:00 pm. EM Team who prepared Internal-Evaluation Report.
- 15.11.2021 ZOOM meeting: 14:30 pm. EM Doctoral Supervisors for IE and EM.
- 16.11.2021 ZOOM meeting: 11:30 pm. Doctoral Students.
- 16.11.2021 ZOOM meeting: 14:00 pm. IE and EM Doctoral Graduates.
- 17.11.2021 ZOOM meeting: 14:00 pm. Employers of Doctoral Graduates.