LITERATURE REVIEW ON QUALITY INDICATORS FOR QUALITY MANAGEMENT SYSTEMS

- Clustering Document -

SMART-QUAL
Structured Indicators to Manage HEI Quality System
Intellectual Output 1

Project Reference: 2020-1-BE01-KA203-074900

1. Introduction

Higher education quality management systems (QMS) are often criticised for being too-process oriented, box-ticking and insufficiently focused on consequential and generalizable outcomes. One of the reasons underlying these critics relies on the fact that QMS tend to rely on a large quantity of quality indicators, which makes their accuracy and timely analysis difficult, and consequently undermine their adequate use for decision-making at different levels (strategic, tactical, or operational).

In this context, the main objective of the SMART-QUAL project is to support higher education institutions (HEIs) in the implementation of effective internal QMS, by designing a set of quality indicators to support them. The indicators will be aligned in a structured catalogue according to the three main levels of decision making (strategic, tactical, and operational).

The quality indicators to be designed are meant to be applied by the institutions within their QMS and, as such, contribute to improve in the short and long term these systems (making them more efficient and effective).

The Activity 2 of SMART-QUAL project (*Literature Review on Quality Indicators for Quality Management Systems*) aims to collect quality indicators from relevant literature sources. The activity, together with Activity 1[1], contribute to collect and cluster a relevant corpus of quality indicators used in QMS and/or highlighted in specialized literature. This corpus will be the framework to build our final Quality Indicators Scoreboard (QIS).

The methodology followed in this activity consists in documental analysis of relevant sources recommended by the project' experienced partners, trying to cover all the scope of SMART-QUAL project, namely, all the three missions of university. Up to 39 unique and valid resources have been analyzed, a mean of 4,3 resources per partner. These resources are of different types: scientific articles, project and institutional reports, books and other scholar

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[1] See report of 19h Febrary 2021 about this Activity, focused on collecting indicators and best practices identified in different Quality Management Systems.

publications and management documents, and partners collected up to 302 indicators from them, that will be added to the 223 quality indicators collected in the previous activity.

In this report, we are going to describe the results of the Activity 2 and cluster the Quality Indicators found, analyzing its coverage and identifying the relevant learnings we must consider in final QIS. The codification and integration of indicators will be a task of the next activity. This document is supplemented with a spreadsheet where all the indicators are gathered.

2. Results

2.1. Sources analyzed

Among the total of 49 resources analyzed, 39 are unique and valid resources. In Figure 1 some metadata are described.

Figure 1. Description of resources analyzed.

Type of resource	%
Scientific article	58%
Report	23%
Management doc.	8%
Others	11%
Date	%
2020-2018	46%
2017-2014	18%
2013-2011	10%
Older	26%
Peer reviewed (articles)	%
Yes	100%

Scientific article is the type of resources mostly collected, followed by reports. We can find reports about other projects and studies, and institutional reports from bodies like the European University Association, the European Commission or different Quality Agencies. Management document, books or conference proceedings are other type of resources considered.

Almost a half of resources analyzed where published/released in the last 3 years, so we can confirm that we have analyzed quite updated sources that lower the risk of ignoring current trends and uses in Quality Indicators. Besides, all scientific articles are peer reviewed, ensuring a minimum level of quality. Reports are not normally peer reviewed but, as the intellectual output of an institution or project, its multilateral nature guarantee a level of consistency.

Finally, we would like to point out some strengths of the analyzed resources:

a) Some relevant projects are considered. For example, the SQELT project is another Erasmus+ initiative aiming to build a core dataset focused on Learning & Teaching indicators. 4 out of 9 partners have considered outputs related with this project, representing an undeniable precedent of SMART-QUAL project. This project identified more than 800 indicators used in HEIs. Other relevant projects or studies carry out a collection and clustering of quality indicators in different contexts: Anglo-Saxon, Latin-American and European.

b) Management documents are also analyzed, focusing on quality indicators currently used by HEIs in different context and getting a point of view different than the scholar one.

c) It is easier to find resources about Teaching & Learning, but different resources collected are focused specifically on Research and Relations with Society. This will help us to cover all the project scope.

d) Up to 12 resources analyzed propose a subset of common quality indicators to be used in different scopes (6 for Teaching & Learning, 6 for Research, and 5 for Relations with Society), regions (Europe, the Nordic countries, Latin-America or world-wide) or idiosyncrasies (open science, politecnic HEIs, sustainability assessment…). This 12 resources will be a good starting point to build the SMART-QUAL QIS.

2.2. Quality indicators collected

During this activity partners have collected 302 quality indicators, that will be added to the 223 quality indicators collected in the previous activity. Some characteristics are described below.

Above 75% of the quality indicators are classified as Quantitative by partners. In Figure 2 we can see the predominance of Teaching & Learning indicators as it was expected, but a remarkable fact is that the other scopes are also covered. There are also some combinations of scopes, as some indicators could be suited in the monitoring of more than one university missions, depending on the approach considered.

Figure 2. Scope coverage.

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Scope	%
Teaching & Learning	46%
Research	25%
Relations wih Society	14%
Combinations	15%

As far as decision-making level is concerned (Figure 3), project partners have classified the indicators mostly in tactical and combination of levels. This make sense as the strategical use of indicators depends on the approach and objectives of each HEIs, and the tactical-operational nature are more generalizable between HEIs. The high amount of combinations of decision-making levels (around a third of indicators), indicates also different uses per each indicator. Despite this fact, some indicators have been identified in a strategical level and will be a good basis for the future SMART-QUAL proposal.

Figure 3. Decision-making level practices identified.

Decision-making level	%
Strategic	13%
Tactical	36%
Operational	20%
Combinations	31%

Finally, in Figure 4 the coverage of ESG is described. Almost every standard is covered by indicators. The biggest amount of indicators is related with Research & development (70), followed by indicators about Student admission, progression, recognition and certification indicators (43), and External relations (40). It would be interesting to carry out further research of indicators related with Public Information and Cyclical External Quality Assurance, though the latter is quite more a qualitative condition determined by national legislation than a quantifiable standard.

Figure 4. ESG+A3ES adaptation coverage (indicators might be classified in more than 1 standard).

ESG (A3ES adaptation)	Indicators
1. Policy for quality assurance	14
1.1 Policy for quality assurance and pursuit of quality objectives	14
2. Quality assurance in the nuclear processes of the institutional mission	203
2.1 Design and approval of programs	4
2.2 Student-centred learning, teaching and assessment	31
2.3 Student admission, progression, recognition and certification	43
2.4 Ongoing monitoring and periodic review of programs	6

2.5 Research and development / targeted research and high level professional development	70
2.6 External relations	40
2.7 Internationalisation	9
3. Quality assurance in the management of resources and support services	33
3.1 Human resources	19
3.2 Material resources and services	13
4. Management and publication of information	20
4.1 Information management	13
4.2 Public information	1
5. Periodical assessment	9
5.1 Cyclical external quality assurance	0
5.2 Cyclical internal monitoring, evaluation and continuous improvement of the QMS.	9

A list of a subset[2] of the indicators collected, clustered by university mission adressed, can be found in the Annex. Partners have collected the most relevant indicators based on each resource approach or conclusions, and their own qualified experience. As the codification and integration of indicators will be a task of the next activity, the indicators in the list are neither treated nor harmonized.

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[2] Indicators classified in a combination of missions are not included in this list. A complete list of indicators can be found in the spreadsheet supplemented.

3. Principal findings to consider in QIS

To sum up, we can identify some main findings from the literature review carried out in this activity of SMART-QUAL project:

a) Adequate variety, updating and relevance of resources analyzed. Almost a half of resources analyzed where published/released in the last 3 years, and relevant antecedents, like SQELT project, are considered. Up to 12 proposals of common indicators to be used have been identified.

b) The resources analyzed and the quality indicators collected cover the scope of the project. The risk of undervalue Research and Relations with Society missions, in front of the prolific topic of Teaching & Learning, is correctly managed. As far as ESG coverage is concerned, Figure 4 shows also the variety of quality dimensions covered.

c) Further conceptual leveling will be required between partners in order to agree on main classificatory elements. This need is identified in the fact that the same indicator has been classified in a different nature, decision-making level or mission, depending on the resource and/or the partner background. Far from being a limitation it is a challenge that an harmonized and international QIS should address if it pretends to be useful and understandable.

d) The latter is related with the idea that the SMART-QUAL project is not a theoretical project about indicators, quality or Higher Education. Our aim is to collect and analyze what is being done and propose a harmonized, synthetic and applicable scoreboard of indicators for QMS based on resources, best practices and relevant experiences. Accordingly, SMART-QUAL will have to put forward a well-founded proposal of, for example, relevant indicators for a decision-making level.

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5. Annex: indicators collected

The following 3 tables show a gross (non-treated) subset of indicators collected, clustered by university mission adressed. Indicators classified in a combination of missions are not included (a complete list of indicators can be found in the spreadsheet supplemented).

Annexed table 1. Teaching & Learning gross list of quality indicators collected.

Name	Description
Supportive learning enviroment	Students' feeling of legitimation within the univeristy community
Overall student satisfaction	The proportion of coursework graduates who were satisfied with the overall quality of their course
Staff with teaching qualification	Proportion of staff who have attained a teaching qualification
Use of reasearch findings to inform teaching	Extent to which academic staff are aware of and use research on the relationship between teaching strategies and student learning in the educational
Median salary	The median salary level of graduates who were in full-time employment.
Atrittion rate	Proportion of student drop-out from course
Employer satisfaction	Satisfaction of employers with graduates
Policies for minority enrolment	Relevant policies for increased minority policies enrolment
Student enrollment	Number of students enrolled
% of teaching staff holding a PhD	Proportion of teaching staff holding a PhD
Student-staff ratio	Number of student per each staff unit
Overall student satisfaction	Overall satisfaction of students
Drop-out rate	Proportion of students who don't achieve a degree
% gratuate employment	Proportion of graduates employment some time after garuation
% student mobility	Proportion of students that undertake a mobility during their studies
Number of students enrollment	Contextual infromation. Distinguished by programm level.
Graduation rate	Proportion of bachelor's students and master's students passing each year (namely, not drop-out)
Percentatge of students completing in nominal time	Percentage of students completing in nominal time
Percentatge of students completing in nominal time plus one	Percentage of students completing in nominal time + 1
Share of students on exange	Share of foreign students comming or students going abroad
Share of full professors	Share of professors not in recruitment positions (PHD students, postdocs…)
Quality of library services	Quality of physical and virtual library service
Teaching experience	Overall quality of study programmes, courses and students' experience of teaching
Student workload	Student workload (according to relevant quality criteria to be identified, e.g. number of learning hours per semester week, number of courses)
Appropiateness of intended learning outcomes	Appropriateness of intended learning outcomes (exemplary quality criteria include clear formulation and transparency of goals of study modules and courses, correlation of intended learning outcomes to contents of study programmes and courses)

RSP	Ratio of students to professors
RPC	Ratio of professors to clerks
RSC	Ratio of students to clerks
Number of bachelors' degrees	number of students graduating in bachelor degrees
Number of masters' degrees	number of students graduating in master's degrees
Number of degrees by foreigners and student exchange	number of foreign students graduating from courses offered by the university
Percentage of employment of graduated	Ratio of the number of students who found employment to the total number of graduate students
Teaching offer.	It is related to the amount of teaching hours provided by the Department to the Faculties.
Lecturing	Full time teaching staff/student ratio
Lecturing	Students that graduate within a ''suitable'' length of time
Fulfilment of social needs	Students enrolled on their chosen course
International student mobility	Exchange students
Social sustainability	To involve students in social actions through to promote students associations on sustainbality issues
Curricular environmental sustaibality	To improve the sustainability offer with entire courses or new degree or masters
Student progression	Statistics that indicate to which extent students are able to efficiently and succesfully complete the programme.
Student/staff ratio	A statistic that indicates how many students, on average, there are for each staff member.
Internationalization statistics	Indicators that reveal to which extent students gain 'international experience' during the programme. This can be in the form of students partaking in exchange programmes, but also in the form of international elements in the curriculum or events.
Gender balance concerning staff & students	The extent of which there is a gender balance in student and/or staff population.
Learning outcomes	The learning outcomes of the programme constitute a clear an programme-specific application of the international demands regarding level, content and orientation of the curriculum
Teaching staff	Teaching staff recruited by the programme are able to optimally present the students with the opportunities needed to reach the learning outcomes
Facilities	The programme presents students with adequate and easily accessible facilities and study guidance
Teaching environment	The teaching environment stimulates students to play an active role in their learning process and contributes to rapid study progress.
Assessment	The assessment of students reflects the learning process and concretises the intended learning outcom
Information for students	The programme offers complete and easily understood information regarding all phases of the study tract
Student's entry levels	Starting levels of students, used as a proxy indicator of future scholastic achievement.
Faculty/student ratio	(en blanc)
Resources	Resources, financial and otherwise, spend on creating an optimal learning environment.
Student satisfaction	Surveys that probe the satisfaction of students with the curriculum, facilities, evaluations and their experience within the programme in a wider sense.
Education outputs	A collection of indicators that shed light on the relative succes of students following graduation.

Reputation	The reputation of the programme or institution, both internally and externally. Can be among external stakeholders, but also society at large.
Insitutional expenditure	Various indicators that shed light on the extent of which the institute financially prioritizes various expenditures on the student's behalf.
Social and societal competences	Student satisfaction survey about measures of encouraging contact among students from different backgrounds (social, ethnic, religious)/provision of opportunities for students to be involved socially/provision of student support for managing non-academic responsibilities (e.g. work,family)/experience in discussions with diverse others
Teaching skills	Indicators that shed light on the extent teaching staff invests and takes parts in activities that increase teaching skills and competences.
Student interaction with learning tools	Various proxy measures that indicate how and how much students interact and engage with the provided (online) learning tools. Especially with modern online platforms a lot of this data is automatically collected and, often, readily available for analysis
Coursework performance	A measure of how 'important' intra-coursework is relative to final examinations.
Curriculum	This combines both the content and structure of the curriculum; whether it covers sufficient ground to guarantee the learning outcomes are obtained as well as whether it forms a cohesive logical structure.
Assessment	The extent of which the assessment/evaluation of the students' work can be demonstrated to be reliable and valid.
Staff	Both quality and quantity of teaching staff combines into this singular indicator.
Facilities/resources	This combines both the programme-specific as well as institution-wide facilties, services and resources provided to the students. This is reviewed in light of the needs of students of a specific programme.
Internal QA	Structure and organization of the internal QA departments, and how this is intended to structurally improve the quality of the programme.
Ratio of students per teacher	Measures the ratio between the number of students in higher education or in each partition and the number of academic staff in higher education or in that same partition.
Percentage of higher education students in each course, institution, region, subsystem, subsector, gender and level of education that complete their degree in the expected number of years	Measures the percentage of higher education students in each partition that conclude their degree in the expected number of years. It measures the success of students in concluding their degree and also the efficiency and quality of institutions.
Ratio of students per teacher holding a doctorate	Measures the ratio of students to teachers holding a doctorate. It is an indicator of the characteristics of the system and institutions with implications for its efficiency and quality.
Final mean classification of each degree's (undergraduate or integrated master) graduates	Measures the final mean classification of the graduates of each degree (undergraduate or integrated master) in year X
Ratio of students per FTE teacher	Measures the ratio of students to FTE academic staff. It is an indicator of the characteristics of the system and institutions with implications for its efficiency and quality.
Academic staff number	Measures the number of staff per study programme or higher education institution
Level of student satisfaction	Measures the level of student satisfaction through student surveys

Students per staff ratio	Measures the number of students per academic staff
Percentage of academic staff holding a doctorate	Measures the number of doctorates per number of staff
Percentage of graduates	Measures the number of graduates per number of students
Graduation rate	Measures the number of graduates per number of students enrolled
Dropout rate	Measures the number of dropout students per number of enrolled students
Progression rate	Measures the progression rates per study programme
Number of enrollments until completion	Average number of enrollments until completion of the study programme
Time to degree completion (per degree)	Average time to complete a degree (per degree)
Graduates' grade	Average grade of the graduates
Teachers' workload	Official teaching commitment in semester hours per week
Quality of teaching staff	Percentage of teaching staff who participated in activities to improve their learning skills
Quality of students' assessments/ examinations	Teaching staff peer evaluation of assessment/examination protocols
Students' experience	Freshmen and/or undergraduates and/or graduates and/or postgraduates and/or alumni level of satisfaction about their study experience/student life cycle
Dropout	Number of students who abandoned their study programme/who changed to another institution/who left higher education per year and per study programme
Non-completion of study programmes	Number of students who did not complete the programme modules they had started/the first year of study/ the undergraduate programmes (Bachelor graduation)/ undergraduate programmes within the planned programme duration (Bachelor graduation on time)/graduate programmes (Master graduation)/thegraduate programmes within the planned programme duration (Master graduation on time)/ their long first degree (=more than 4 years) (long first-degree graduation)/their long first degree within the planned programme duration (long first-degree graduation on time)/ the postgraduate programmes (postgraduate graduation)/the postgraduate programmes within the planned programme duration (postgraduate graduation on time)
Students' coursework performance	Personal student coursework grades and earned credit points
Level of satisfaction with the organisation of course sessions	Level of satisfaction of students about organisation of course sessions/flexible learning (flexibility in the requirements, time and location of study, teaching, assessment and certification)
Learning support services	Expert assessment and/or satisfaction of students and/or satisfaction of teaching staff about the quality support for students from disadvantaged backgrounds (e.g., minorities, disabled, refugees)
Three-years BA success rate	Percentage of students enrolled in the three years BAs who successfully got their Degree
Four-years BA success rate	Percentage of students enrolled in the four years BAs who successfully got their Degree
2 or 3 years "Diplome Universitaire de Technologie" rate	Percentage of students enrolled in 2 or 3 years DUT who successfully got their Degree
2 years Master degree success' rate	Percentage of students enrolled in the 2 years Master Degree who successfully got their Degree
Score of perceived quality of teaching through pedagogical surveys	Surveys filled by students who answer series of closed questions about their instructors

Mentoring rate	This shows the ratio betweeen the number of students and the number of instructors at carious level
Number of hours of university pedagogy training offered to teachers	The training opportunities offers to HEIs staff
Average duration of studies	Shows the distribution of students by degrees (BA, MA, Ph.D)
Student results	Observation and analysis of student results.
The implication of the student	The student is a co-producer of his training.
The functioning of the institution	The methods applied by the institution, the institutional dynamics, its pedagogical policy.
Student satisfaction	Refers to the objectives of training and teaching.
Teaching Resources - Teaching staff	Proportion of teaching staff with verified doctorate qualifications (PhD or equivalent)/with verified teaching qualifications/participating in professional development activities, per subject field
Learning Resources - Library related	Title and number of books and/or periodical print subscriptions and/or periodical online subscriptions held in library per subject field or per study programme
Financial investment and income in T&L - Institutional expenditure	Percentage of total institutional expenditure dedicated to L&T activities (core education expenditure)
Gender balance - Students	Ratio of female to male Bachelor/Master/postgraduate students enrolled per subject field or study programme
Quality of teaching staff, quality teaching and teaching staff engagement - Teaching staff competences	Satisfaction survey of students about teaching staff's subject-matter competences/methodological competences/vocational training competences/digital skills competences/social competences (e.g., team, communication and leadership competences)/respect and interest for students/encouraging students' autonomous thinking and acting/pedagogical knowledge and skills (e.g., knowledge of teaching models and learning processes)/sensitivity to class level and progress/fostering sustainability values (social, ecological, economical)/feedback to students (e.g., on work in progress, test, completed assignments)
Quality learning and student engagement - Student workload	Student assessment of workload (e.g., selfassessment, learning diary, think-aloud protocols)
Quality learning and student engagement - Overall quality of learning experience	Satisfaction survey of students about overall quality of their learning experience
Student success - Coursework performance	Assessment/examination grades and earned credit points during the study
Completion rate	Completion rate
Student success - satisfaction	Student success - satisfaction
Admissions by gender/face/geographic/specials/socio-economic	Admissions by gender/face/geographic/specials/socio-economic
Percentage of full professor on the total academic staff	Percentage of full professor on the total academic staff
Percentage of women on the total number of professors	Percentage of women on the total number of professors
Highest degree	Habilitation is a degree which is a prerequisite to become a full professor (bachelor, master, doctorate)
Professional category	Teacher professional category (Assistant, Assistant Professor, Associate Professor, Full Professor)
Employment regime	Employment regime of the HEIs teachers (Full time with exclusivity; Full time without exclusivity; Part time)
Internationalisation	Last degree awarded in Portugal; Last degree not awarded in Portugal

Number of doctors' theses with a favourable award	Number of doctors' theses with a favourable award / total number of doctorate candidates (per academic course or degree)
Number of students	Number of students enrolled / Square metres for the teaching activity and their complementary services (per degree).
Number of hours for professional training of staff	Number of hours for professional training of staff / Total number of staff in administration and services
Number of master's/ post-graduate courses	Number of Masters and Post-graduate courses / Number of graduates (per academic course and degrees)
number of teaching staff	the standard teaching staff/student
Number of students	the standard teaching staff/student
mobility actions	Incentives for the qualification of the teaching and non teaching staff
Colloquium/Forum/Congress	Incentives for the qualification of the teaching and non teaching staff
number of Department	courses pedagogical efficiency indicators
retention rate	courses pedagogical efficiency indicators
Enrolment of students at the University	number of students enrolled at Islamic University in Uganda
Percentage of foreign students	Proportion of students with a foreign nationality to the number of full-time students in the academic course
Percentage of academic staff with a PhD degree	Proportion of Doctors from full-time staff number in the academic course
Percentage of graduate studies (official Master's and PhD)	Includes official Master's and PhD courses offered by the institutions in the academic course relative to the overall official studies
Percentage of graduate students (enrolled in official Master's and PhD)	Represents the students who are enrolled in graduate studies, that is, in official Master's and PhD courses in the academic course 2007/2008 relative to the total number of students enrolled in official courses (undergraduate and graduate studies)
Full time teaching staff/student ratio	Full time teaching staff/student ratio
Students that graduate within a ''suitable'' length of time	Students that graduate within a ''suitable'' length of time
Students enrolled on their chosen course	Percentage of students that successfully enrol in one of the degrees which is either their first or second preference as a proportion of the total number of students that begin year one of the degree
Student/staff ratio	Average ratio for FTE total student numbers on non-franchised courses and total teaching only, plus teaching/research staff.
Library and computing spend	Spending averaged over three years on the academic services: central libraries and information services and central computers and computer networks per FTE student numbers.

Annexed table 2. Research gross list of quality indicators collected.

Name	Description
Share of publications in highest ranking jounrnals	Percentatge of publications in journals classified as "hghest rank" according to Norwegian index
Publication points	Based on some Index (Norwegian Scientific Index or Danish BFI system
Research agreements	All contracts where a firm funds the Research Organization to perform research on behalf of the firm, with the results usually provided to the firm. Include collaborative agreements where both partners provide funding and share the results. Exclude cases where the firm funds a research chair or other research of no expected commercial value to the firm. Also exclude consultancy contracts.
Invention disclosures	Descriptions of inventions or discoveries that are evaluated by the Office staff or other technology experts to assess their commercial application.
Patent applications	New priority patent applications. Exclude double counting, such as a patent application for the same invention in more than one patent jurisdiction
Patent grants	Technically unique patents granted. Count a patent grant for the same invention in two or more countries as one technically unique patent. If a technically unique patent grant has been counted in a previous year, it cannot be counted again.
Licences executed	Include all licenses, options and assignments (LOAs) for all types of Intellectual Property (copyright, know-how, patents, trademarks, etc.). Count multiple (identical) licenses with a value each of less than 500 Euros as one license. A license grants the right to use IP in a defined field of use or territory. An option grants the potential licensee a time period to evaluate the technology and negotiate the terms of a license. An assignment transfers all or part of the right to IP to the licensee.
License income earned	Total income from all types of know-how and IP (patents, copyright, designs, material transfer agreements, confidentiality agreements, plant breeder rights, etc.) before disbursement to the inventor or other parties. Include license issue fees, annual fees, option fees and milestone, termination and cash-in payments. Exclude license income forwarded to other institutions than those served by the KTO or to companies.
Spin-offs established	A new company expressly established to develop or exploit IP or know-how created by the Research Organization with a formal contractual relationship for this IP or know-how, such as a license or equity agreement. Include, but do not limit to, spin-offs established by the institution's staff. Exclude start-ups that do not sign a formal agreement for developing IP or know-how created by the institution.
PU output	The PU output, for the i-th UDA (University Disciplinary Areas) of the j-th university, is calculated as the sum of publications with at least one author from university j belonging to Area i.
PC output	The PC output is a similar index to the PU, but takes into account authors' "contribution", measured as the ratio between the number of authors belonging to that UDA (University Disciplinary Areas) and the total number of authors of the publication

SS output (scientific strenght)	Equals to the weighted average of total publications by each university within each UDA (University Disciplinary Areas). The weights, in particular, are referred to the impact factor of the journal in which each publication is included
Number of pubblications	Number of scientific publications by university staff
Amount of external funding	Economic funds obtained through activities with third parties
Expenses.	It considers the operating expenses of the Department
Funding.	Indicator considers the amount of funds raised by the Department from local, national and international research programs.
PhD students.	Number of PhD students in the Department.
Scientific output.	It evaluates the Departments scientific output on the basis of some bibliometric criteria.
Research	Per-researcher Income from research
Research	Doctoral theses per PhD
Postgraduate students	Postgraduate students
Sustainabitily Community Outreach	To promote research on sustainability (increase the number of researchers in this field, to collaborate with expert groups and to attend seminars)
Research	Total research output of the programme/HEI.
Percentage of revenue from research	Measures the relative weight of the revenue coming from research in the total revenue generated by the institution
Scientific production with peer review per FTE teacher	Measures the scientific production per FTE teacher
Impact of scientific production per FTE teacher	Measure the impact of scientific production per FTE teacher
Research effort index per FTE teacher	Measures the dedication and involvement in research activities
Ratio of publications referenced in SCOPUS in which at least one of the authors is affiliated to the institution, per FTE teacher	Measures the ratio between the number of publications referenced in SCOPUS in which at least one of the authors is affiliated with the institution (or another partition) and the total number of teachers in full-time regime in this unit of analysis. It is an indicator of efficiency and impact.
Ratio of citations referenced in the SCOPUS database in which at least one of the authors is affiliated to the institution per FTE teacher	Measures the ratio between the number of citations referenced in the SCOPUS database in which at least one of the authors is affiliated to the institution (or another partition) and the total number of FTE academic staff in this unit of analysis. It is an indicator of efficiency and impact.
Ratio of patents obtained in which at least one of the authors is affiliated to the institution per FTE teacher	Measures the ratio between the number of patents registered in the Instituto Nacional de Propriedade Intelectual (INPI)'s database in which at least one of the authors is affiliated into the institution (or another partition) and the total number of FTE academic staff in this unit of analysis. It is an indicator of efficiency and impact.
Academic staff publications	Measures the number of academic staff publications
Academics in research units	Measures the average number of academics per funded research units
Doctoral students supervised per academic	Measures the number of candidates enrolled in doctoral programmes per number of academic staff holding a PhD
Publications per academic holding a PhD	Measures the number of publications indexed in bibliographic databases per number of academics holding a PhD
R&D expenses per academic holding a PhD	Expenses with R&D per academic holding a PhD
Patents per academic holding a PhD	Number of patents per academic holding a PhD
Publicatios and presentations at academic conferences per FTE teacher	Number of publications and/or presentations at academic conferences during a certain time period per full-time-equivalent member of the teaching staff and/or per subject field

Ph.D. success' rate	Percentage of students enrolled in a Ph.D who successfully got their Degree
Rate of obtaining research contracts versus bids	Indicates the percentage of research contracts obtained by a HEI in comparision to the number of bids it has submitted
Papers and Citations	Papers and Citations
Research-income expenditures	Research-income expenditures
Research awards	Research awards
Peer reviewed scientific production per full-time equivalent academic	Peer reviewed scientific production per full-time equivalent academic
Own revenues for academic research per full-time equivalent academic	Own revenues for academic research per full-time equivalent academic
Number of papers in top 10% divided by the Total academic staff (FTE)	Number of papers in top 10% (yearly average) divided by the Total academic staff (FTE)
Percentage of papers in top 10%	Percentage of papers in top 10% (yearly average)
Percentage of papers with international collaborations	Percentage of papers with international collaborations (yearly average)
Number of Papers indexed in WoS (WoS = Thomson Reuters Web of Science) classified journals with relative influence score	Publications in Web of Science well classified journals.
Number of WoS–AHCI publications, national or international	Publications in the Web of Science - Arts and Humanities Citation Index.
Number of scientific books published with international publishing houses, in an international language	Number of scientific books published with international publishing houses, in an international language
Number of book chapters published with international publishing houses, in an international language	Number of book chapters published with international publishing houses, in an international language
Number of citations	Number of citations
Number of OSIM patents / international patents / triadic patents	Patents from Romenia (OSIM) / International / Recognized simultaneoulsly by the European Patent Office (EPO), the United States Patent and Trademark Office (USPTO) and the Japan Patent Office (JPO).
Number of organized international scientific conferences: main organizer / member	Number of organized international scientific conferences: main organizer / member
Number of applications to international / national research competitions	Number of applications to international / national research competitions
Number of invited professors / researchers at foreign universities or research centres	Number of invited professors / researchers at foreign universities or research centres
Research	Categorised by the researchers (no research; some research; relevant research)
Number of articles in magazines	Number of articles in magazines such as referee / Total number of researchers (per knowledge area).
Budget resources used in research activitie	Budget resources used in research activities / Total number of researchers (by areas of knowledge)
Number of seminars	Number of seminars carried out, outside of the university scope / Total number of teach and research staff
publications by faculty	indicator of quality of the teaching staff of each institution
publications/articles	indicator of quality of the teaching staff of each institution
Funding of research activities at the University	Amount of funds raised to research
Research facilities available at the University	Facilities directed to support research (such as technology, libraries, laboratories, link to the cyber world, and mechanisms to support the provided technology)

Faculties/ departments research scholarly activities at the University	Number of scholarly activities at the university
Staff to conduct/ supervise research at the University	Number of staff available to conduct/supervise research at the University
Students' success in conducting research at the University	Success of students conducting research at the university
Publishing researched work	Number of publications
Third-party funding/total funding	Represents the income that institutions receive for research from different public and private institutions.
Employer's expenses (nonacademic and academic staff support)/total funding	Represents the non-academic and academic expenses supported by the institutions, relative to the total funding received by the institutions.
Global Relative Impact	The ratio between the actual number of citations obtained by the Documents and the expected citations for the same set of documents if they were to perform as the world average. The expected citations are calculated multiplying the number of published documents by the world average number of citations per document.
The ratio of the number of documents to the number of doctorates awarded	The ratio of the number of documents to the number of doctorates awarded.
Per-researcher Income from research (in thousands of euros)	Reflects the income (in thousands of euros) obtained to each researcher
Doctoral theses per PhD	Reflects the number of successful doctoral theses in relation to the total number of PhD holders (i.e. potential thesis directors)

Annexed table 3. Relation with Society gross list of quality indicators collected.

Name	Description
Stat-ups in the region	Stat-ups in the region
% alumni in regional job market	Share of graduated that is working in reginal job market
Quality of third-party contracts	Ratio of funds procured by universities from external actors to the number of contracts signed
ResPat: No. research patents	Number of patents registered by the university
FundsPat	Economic value generated from the sale or licensing of patents
ASO: No. spin offs	Number of spin offs founded by the university
Quality of museum goods	Number of objects of museum value present for each research area
Environmental sustainability	To organize a sustainaible and efficient use of resources (incentive for the use of sustainable transport, use of plastic, type os energy, etc)
Operations/Educations	To include new challenges in written policies for local and global sustainability
Number of patents per FTE teacher	Measures the knowledge production capacity with potential for commercial application
Royalty revenue and licensing agreements per FTE teacher	Measures the ability to generate revenue for the institution from knowledge transfer activities
Percentage of revenue from services rendered	Measures the relative weight of the revenue generated by the institution in consultancy activities, the provision of services and professional development or specialization courses that are not integrated in first and second cycle degrees.
Contribution to the qualification of the active population of the NUTS III	Measures the contribution to the qualification of the active population, in the region where the institution is inserted (NUTS III)
Ratio of revenue in service provision per FTE teacher	Measures the ratio between the volume of revenue from service provision, including continuous training, of the institution (or other partition), and the number of FTE academic staff. It is an indicator of efficiency and capacity to generate own revenue through the provision of services.
Percentage of revenue from services rendered compared to the operating budget	The indicator represents the proportion between the volume of revenue from the provision of services, including lifelong training actions of the institution (or other partition), and the operating budget of that unit. It is an indicator of efficiency and capacity to generate own revenue through the provision of services.
Professional insertion's rate	Professionnal situation of the graduate students at the end of the first and second years after the year of graduation
Professional integration's rate	Professionnal situation of the graduate students after a given period of time
Percentatge of subsidized students	Indicates the percentage of students who receive a financial support
Erasmus exchange students in the total students' population	Indicates the percentatage of exchange students within the total students' population
Knowledge- transfer business connections	Knowledge- transfer business connections
Knowledge-transfer community connections	Knowledge-transfer community connections
Employer reputation	Employer reputation
Employability	Employability
Co-patents per polytechnic higher education institution	Co-patents per polytechnic higher education institution

Patents per polytechnic higher education institution	Patents per polytechnic higher education institution
Royalties and licence agreements revenue per full-time equivalent academic	Royalties and licence agreements revenue per full-time equivalent academic
Contribution to active population qualification of the region	Contribution to active population qualification of the region
Attractiveness of young population for the region	Attractiveness of young population for the region
Overall total number of patent applications	Overall total number of patent applications (yearly average)
Percentage of funding from third parties on total funding	Percentage of funding from third parties on total funding
Third party funds (coming from public and private sources) per academic staff (expressed in FTE)	Third party funds (coming from public and private sources) per academic staff (expressed in FTE)
Existence of a strategy for technology transfer and innovation, included in the mission statement and/or in the strategic plan	Existence of a strategy for technology transfer and innovation, included in the mission statement and/or in the strategic plan
Number of R&D contracts with non-academic partners / Number of teaching staff FTE	Number of R&D contracts with non-academic partners / Number of teaching staff FTE
Existence of entrepreneurship fostering initiatives	Existence of entrepreneurship fostering initiatives
Number of cultural events promoted by the university open to community	Number of cultural events promoted by the university open to community
Number of university members (staff and students) engaged in civic projects for community / Number of university members	Number of university members (staff and students) engaged in civic projects for community / Number of university members
Number of athlets involved in sports events held at the university's infrastructures	Number of athlets involved in sports events held at the university's infrastructures
Patents	Number of registered patents / Number research projects (by areas of knowledge).
Patenting ideas got out of research	Number of patents ideias generated by research
Making of prototypes got out of research	Number of prototypes generated by research
Making products out of research	Number of products generated by research

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