

Guidance and benchmarking tool for institutional self-assessment

The purpose of this material is to present the "golden standard" for research and innovation excellence accepted in the EU, to accomplish a Core Report on Institutional Capacity (1.4) in each PC HEI. This guidance and benchmarking tool is not based on comparison with concrete EU institutions. Benchmarking against other PC HEIs is considered very useful because the institutions operate in the same general context of knowledge and industrial structures and trends. Since PC HEIs are facing global pressures similar to those in the EU, efforts to approach this standard will bring competitive advantage.

The objectives of this material is in strong relation with the objectives of the project:

- a) help each PC HEI identify areas of research and innovation capacity that need attention, assessment and self- awareness;
- b) offer a checklist of the most typical innovations and research support structures and policies applied in established HEIs in the EU and around the globe, and help PC HEIs assess how these structures and policies are already present and developed in their institution,
- c) inform the final benchmarking exercise among PC HEIs from the three PCs, which will be used in the next stages of the project and will help PC-PC cooperation and exchange of good practices.

Technology-based innovations in education reshape the environments in which HEI operate. In general, they tend to open learning environments, both to the digital world and the physical and social environment. They also bring new actors and stakeholders into the educational system, not least the education industries, with their own ideas, views and dreams about what the future of education can hold. The education industry could be an essential partner in any education innovation strategy. Instead of being regarded as providers of goods and services, different relationships between HEI and industry could foster an innovation-friendly environment, with a greater focus on methods over technologies.

In order to achieve these goals, this guide provides a viable model for diagnostic and benchmarking analysis of PC HEIs from multiple perspectives of academic performance and with reference to various performance indicators. It promotes an innovative, multi-dimensional and flexible approach to evaluation. It compares the performance of HEI in the five broad dimensions of university activity:

1. The output of educational institution
2. Research and knowledge transfer
3. International orientation
4. Stakeholders
5. Innovation in education

By performing this benchmarking, an evaluation of the various indicators will be carried out, creating an analysis of each PC HEIs, a comparison of the analyzed subjects, as well as highlighting the most

important measures that should be followed in order to increase the innovation in the HEI. Indicative areas of benchmarking and performance metrics include two dimensions:

1. Internal dimension of HEI: human resources, post-graduate training, publishing activity and impact, patents and scientific achievements, level of development of entrepreneurial culture within the PC HEI, commitment to research excellence, to social responsibility, administrative capacity for managing applied research, administrative capacity for managing research addressing societal challenges, diversity of the research agenda, funding for research, support for mobility, international and national-level collaborations in research, research labs, innovation labs, etc.
2. Stakeholder dimension: existing partnerships between the university and enterprises/industry, existing structures, support mechanisms and arrangements for knowledge transfer/exchange and start-up/spin-offs support for the regional economy, involvement of the university in regional innovation clusters, existence of support structures or support policies for start-ups by local entrepreneurs, entrepreneurship courses, incubators, accelerators, etc.

The process of indicator selection is illustrated below. The indicators are selected primarily for reasons of relevance to the project, not for the mere availability of data, and are supplemented on the basis of literature and other reports. Below you can find a conceptual framework for the indicators, indicator definition and indicators processes.

GUIDANCE AND BENCHMARKING TOOL FOR INSTITUTIONAL SELF-ASSESSMENT

	Name	Purpose	Definition	Interpretation	Data elements
I.	OUTPUT OF THE EDUCATIONAL INSTITUTION				
I.1.	Administrative management				
I.1.1.	Size of the institution	To measure the size of institution in terms of students, staff and academic offer	<ul style="list-style-type: none"> - Number of students enrolled - Total number of academic employees - Number of full-time academic employees - Number of academic programs - Number of schools and academic departments - Time reference: 2013 - 2017 		Time reference: Previous 5 years Formulas: Σ (number of degree students enrolled) Σ (number of academic employees) Σ (number of full-time academic employees) Σ (number of academic programs) Σ (number of schools and academic departments)
I.1.2.	Existence of innovation policy and/or strategy in the HEI	To assess the perceived importance of innovation issues within the HEI as well as the commitment of the HEI towards innovation	Inclusion of innovation in the policy and/or strategy of the HEI	A policy/ strategy plan with indicators related to innovation would suggest that innovation is taken into account at the managerial level and in institutional financial plans. This indicator measures the extent of the HEI's institutional commitment towards innovation on a long term basis.	Descriptive indicator: please describe whether innovation is included in the developmental strategy of the HEI and what importance is attached to it. Provide references and examples. - Does policy and/or strategy for innovation exist at the university: Yes/No - Is the existing policy/strategy for innovation integrated into financial management: Yes/No
I.1.3.	Percentage of programs with accreditation score that is above average	To measure the quality of the education programmes	Percentage of accredited programmes with a score that is above average (refers only to accreditation performed by national	Accreditation requires substantial effort on the part of the HEI. If the HEI has a large proportion of accredited programmes, the quality of education it	Formula: Σ (number of accredited programmes with above average score) /total programs accredited at the

			or international agencies and official bodies)	provides is likely to be higher	university*100
I.1.4.	Number of co-funded or shared laboratories and buildings	To measure joint access to R&D space /facilities/ equipment/services providing opportunity for collaboration and joint development between business/industry and the university	Number of co-funded and/or shared laboratories/ buildings/ facilities	This indicator measures the degree of cooperation of industry / business with university in sharing facilities	\sum (number of shared or co-funded laboratories)
I.2.	Human resources				
I.2.1.	Number of administrative staff	To measure the availability of administrative staff	Number of administrative employees with full time positions at the HEI	To measure the availability of administrative staff to support the teaching and research process	Time reference: previous year Formula: \sum (total administrative staff with full-time positions within the HEI)
I.2.2.	Number of academic staff who have PhD degree	To measure the number of academic staff who have PhD degree	Number of staff who have PhD degree in the area in which they are teaching	This indicator measures the number of academic staff with relevant qualification	Time reference: previous year Formula: \sum (total academic staff with PhD degree)
I.2.3.	Number of non-academic employees with temporary teaching or research positions at the HEI	To measure the openness of the teaching and research processes to knowledge and expertise outside academia	Number of non-academic employees with temporary academic positions at the HEI, e.g. part-time lecturer and/or pursuing a master or doctorate degree	This indicator measures the mobility of non-academic employees and provides information about the relationship between academia and the external environment	Time reference: previous year Formula: \sum (total non-academic employees working part-time in teaching positions at the HEI)
I.2.4.	Number of HEI academic employees with temporary positions outside academia	To measure the mobility of academic staff	Number of HEI employees with temporary positions outside academia – sabbaticals	This indicator measures the mobility of academic staff and provides information about the relationship between academia and the external environment	Time reference: previous year Formula: \sum (total academic employees with temporary positions outside academia)
I.3.	Students				
I.3.1.	Bachelors graduation rate	To measure the productivity of bachelor degrees at the HEI	Percentage of new entrants that successfully complete their bachelor studies	The graduation rate shows how well the university's bachelor programmes are organized and reflects the effectiveness of teaching	Inputs: - Number of Bachelor degrees awarded in the previous 3 years - Number of new entrants in Bachelor programmes (in the same period -x, x

					<p>being the standard length of bachelor programmes in years).</p> <p>Formula: $\frac{\sum(\text{graduates } ba)_{\text{year } T}}{\sum(\text{new entrants } ba)_{\text{years } T-x \text{ to } T}} * 100$ </p> <p>Example of the formula for 2017: $\frac{\sum(\text{graduates } ba)_{2014-2017}}{\sum(\text{new entrants } ba)_{2011-2014}} * 100$ <i>T=standard reference year (2017)</i> <i>x=standard length of bachelor programme</i> </p>
I.3.2.	Masters' graduation rate	To measure the productivity of masters' degrees at the HEI	The percentage of new entrants that successfully completed their masters' studies	The graduation rate shows how well the university's masters' programmes are organized and reflects the effectiveness teaching	<p>Inputs:</p> <ul style="list-style-type: none"> - Number of Master degrees awarded in the previous 3 years - Number of new entrants in Master programmes (in the same period -x, x being the standard length of bachelor programmes in years, typically 150% of the published time for the programme). <p>Formula: $\frac{\sum(\text{graduates } ba)_{\text{year } T}}{\sum(\text{new entrants } ba)_{\text{years } T-x \text{ to } T}} * 100$ <i>T=standard reference year (2017)</i> <i>x=standard length of bachelor programme</i> </p> <p>Example of the formula for 2015-2017: $\frac{\sum(\text{graduates } ba)_{2015-2017}}{\sum(\text{new entrants } ba)_{2011-2014}} * 100$ </p>
I.3.3.	PhD graduation rate	To measure the productivity of PhD degrees at the HEI	The percentage of new entrants that successfully completed their PhD studies	The graduation rate shows how well the university's PhD programmes are organized and reflects the effectiveness	<p>Inputs:</p> <ul style="list-style-type: none"> - Number of PhD degrees awarded in the previous year (year T)

				of its teaching and research.	<p>- Number of new entrants in PhD programmes (in period T-x, x being the standard length of the PhD programme in years).</p> <p>Formula: $\frac{\sum(\text{graduates phd})_{\text{year T}}}{\sum(\text{new entrants phd})_{\text{years T-x to T}}} * 100$ <i>T= reference year x=standard length of PhD programme</i></p> <p>Example of the formula for 2017: $\frac{\sum(\text{graduates ma})_{2017}}{\sum(\text{new entrants ma})_{2014-2017}} * 100$</p>
I.3.4.	Student-staff ratio	To measure the intensity of mentoring/ tutoring and of contact between students and teachers	Number of students per member of academic staff (full-time employed). Staff solely involved in research is excluded.	Indicator for the (expected) intensity of mentoring/ tutoring and of contact between students and teachers.	<p>Time reference: current year</p> <p>Inputs: - Number of students (head count); - Number of academic staff (fte); staff solely involved in research are excluded.</p> <p>Formula: $\frac{\sum(\text{students major} + (\text{students minor} * 0.5))}{\sum(\text{academic staff (fte)} - \text{academic staff involved in research only (fte)})}$</p>
I.4.	Financial				
I.4.1.	Expenditure on teaching	To measure the percentage of total institutional expenditure dedicated to teaching activities	Percentage of total institutional expenditure dedicated to teaching activities	This indicator highlights the priority given to teaching activities, in relation to research and knowledge exchange	<p>Time reference: current year</p> <p>Formula: Percentages of expenditure on teaching activities.</p>
I.4.2.	Expenditure on research	To measure the percentage of expenditure on research activities	The percentage of expenditure allocated to research activities	This indicator highlights the priority given to research activities, in relation to teaching and knowledge exchange	<p>Time reference: current year</p> <p>Formula: Percentage of expenditure on research activities</p>
I.4.3.	Income from private sources	To measure the total	The total amount of external	The amount of income from third parties	Time reference: current year

		amount of external research income and income from knowledge transfer from private sources	research income and income from knowledge transfer from private sources as percentage of total income of the institution	(external research and knowledge exchange income) signals knowledge exchange between academia and business. Contract research complements patent indicators	Formula: (revenues from tuition fees + revenues from CPD + revenues from private + research contracts + revenues from licensing + royalties or copyrights) / total income
I.4.4.	Funding per student	To measure and compare per student funding in PC HEIs	Per student funding is calculated as the sum of operational grant and teacher salaries per student. This indicator is calculated for state and state integrated schools only.	Per student funding is a measure of adequacy of government funding.	Time reference: current year Formula: Funding per student
II.	RESEARCH AND KNOWLEDGE TRANSFER				
II.1.	Publication output				
II.1.1.	Research publications (absolute numbers)	To measure the number of publications in academic journals	The number of departments' research publications indexed in the Web of Science Core Collection database, where at least one author is affiliated to the source university or higher education institution.	The number of publications in academic journals is a measure of the institution's research activity and its capability to produce research publications at the international level.	Time reference: last 3 years Formula: Number of research publications indexed in Thomson Reuters database
II.1.2.	Citation rate	To measure the average number of times the departments' research publications are cited in other research	The average number of times the departments' research publications are cited in other published research, adjusted (normalized) at the global level for the field of science and the year in which a publication appeared.	Indicator of the scientific impact of research outputs within international scientific communities. The measure takes into account differences in citation customs across academic fields ('normalization').	Time reference: Publication last 3 years Formulas: - CWTS/Thomson Reuters - Web of Science Core Collection - Google Scholar
II.2.	Patents				
II.2.1.	Patents awarded (absolute numbers)	To measure the number of patents assigned to the university	The number of patents assigned to (inventors working at) the university over the reference period.	The number of patents is an established measure of technology transfer as it indicates the degree to which discoveries and inventions made in academic institutions may be transferred to economic actors for further industrial /	Time reference: last 10 years Formula: Counts on the level of patent families

				commercial development.	
II.2.2.	Co-patents with industry	To measure the percentage of the number of patents assigned to the university which were developed in cooperation with industry	The percentage of the number of patents assigned to (inventors working at) the university over the reference period indicated, which were co-applied with at least one applicant from the industry.	If the university applies for a patent with a private firm, this demonstrates that it shares its knowledge with external partners and shows the extent to which it is willing to share its technological inventions for further commercial development.	Time reference: last 10 years Formula: (number of co-patents with industry) 2006-2017/number of patents2006-2017*100
II.3.	Collaboration				
II.3.1.	Number of joint publications with non-academic authors	To measure collaboration with non-academic partners.	Number of joint publications with non-academic authors	Publications in peer-reviewed journals, professional magazines and conference proceedings.	Time reference: 2013-2017 last 3 years -Number of university scholarly publications that list an author affiliate with an address referring to a for-profit business enterprises or private sector R&D unit (excludes for-profit hospitals and educational institutions). - Number of scholarly publications with non-academic partners - Google Scholar or CWTS/Thomson Reuters - Web of Science Core Collection /if available/
III.	INTERNATIONAL ORIENTATION				
III.1.	Student and teaching/administrative mobility				
III.1.1.	Student mobility	To measure the number of students participating in international joint degree programmes.	A composite of international incoming exchange students, outgoing exchange students and students in international joint degree programmes.	Having an international student body and offering students the opportunity to complete part of their degree abroad signals the international orientation of the university.	Time reference: last 3 years Formula: (Incoming students + Students sent out in international exchange programmes + Students in international joint degree programmes)/3
III.1.2.	Teaching and/or administrative staff mobility	To measure the number of academic and/or administrative staff involved in mobility	A composite of international incoming exchange academic and/or administrative staff, outgoing exchange academic	Having an international academic and/or administrative staff body and offering them the opportunity to improve their competencies abroad signals the	Time reference: last 3 years Formula: $\sum(\text{Incoming academic and/or administrative staff} + \text{academic and/or$

			and/or administrative staff, and teaching and/or administrative staff in international joint degree programmes.	international orientation of the university.	administrative staff sent out in international exchange programmes + academic and/or administrative staff in international joint degree programmes)/3
III.2.	Joint publications				
III.2.1.	International joint publications	To measure the percentage of international joint publications in academic journals	The percentage of the departments' research publications that list at least one affiliate author's address in another country.	The number of international joint publications reflects the degree to which a university's research is connected to international networks.	Time reference: last 3 years Formula: (score on international co - publications)/ total publication output *100
III.3.	International grants				
III.3.1.	Number of projects/grants won under international competition	To measure the number of international projects won under international competition	This indicator is represented by the sum of all projects or grants won by the researchers, staff or students of the HEI in conditions of international competition or with International Funds	This indicator demonstrates the ability of attracting international funding and creating partnerships between HEIs	Time reference: last 3 years Formula: Number of international grants
III.3.2.	Amount of grants/ donations/ contracts arising from international funds	To measure the commitment to, and success in, getting funding from international funds	Value per year of funding from international projects / grants	The indicator reflects the capacity of the HEI to attract international funding	Time reference: current year Formula: Value per year of funding from international projects
IV.	STAKEHOLDERS				
IV.1.	Partnerships with the industry environment				
IV.1.1.	Students' contact with the work environment during studies	To measure the extent to which the university utilizes industrial partnerships to improve graduates; employability area	A composite measure of the opportunities students have to gain practical experience and experience contact with the world of work.	The inclusion of work experience in programs, and direct contact with the work environment, is an important factor to enhance the employability of students.	Time reference: last 3 years (1) Percentage of degree programs that include compulsory internship in the curriculum; (2) Percentage of students doing an internship; (3) Teaching by practitioners from outside the university departments;

					(4) Percentage of degree theses made in cooperation with industry/ external organizations.
IV.2.	Project and grants in cooperation				
IV.2.1.	Number of R&D sponsored agreements, contracts and collaborative projects with non-academic partners	To measure problem solving activities/ cooperation in R&D with non-academic partners.	Number of R&D sponsored agreements, contracts and collaborative projects with non-academic partners	This indicator measures capacity for cooperation with non-academic partners	Time reference: current year Formula: Number of R&D sponsored agreements, contracts and collaborative projects with non-academic partners
IV.2.2.	Amount of grants/ donations/ contracts arising from Social Engagement partnerships	To measure the commitment to, and success in, getting funding for Social Engagement Partnerships	Value per year of funding from partnerships in Social Engagement actions	The indicator measures the capacity to engage partners in innovative social actions promoted by HEIs	Time reference: current year Formula: - Value per year of funding from social engagement partnerships - Percentage of grants/ donations/ contracts in the total income of the University
IV.3.	Start-ups and spin-offs				
IV.3.1.	Number of start-ups and spin-offs established	To measure a specific mechanism of transfer of technology which is directly aimed at commercializing HEI knowledge	The number of start-up and spin-offs (i.e. firms established on the basis of a formal knowledge transfer arrangement between the institution and the firm) recently created by the institution	This indicator measures a total number of start-ups and spin-offs established. A new firm that is based on knowledge created at a university signals a successful case of knowledge transfer from academia to industry.	Time reference: last 10 years Formula: $\frac{\sum(\text{new start-up and spin-off firms})}{\text{fte academic staff}} \times 100$
IV.3.2.	Number of research centers, technology transfer offices and business incubator or accelerators	To measure the availability and level of development of HEI research centers, technology transfer offices and business incubator or accelerators	Number of HEI research centers, technology transfer offices and business incubator or accelerators that facilitate innovation by researchers and students.	University technology transfer offices (TTOs) are responsible for the commercialization of research that takes place at a university. They engage in a variety of commercial activities that are meant to facilitate the process of bringing research results to market.	Time reference: last 10 years Formulas: - Number of HEI research centers, - Number of technology transfer offices - Number of technology and

				Business incubators or accelerators help start-up or spin-off to develop by providing services such as management training or office space.	science parks, with which the university collaborates in research projects - Number of business incubator or accelerators
IV.3.3.	Number of clusters in the region	To measure a specific mechanism of transfer of technology and innovation which is directly aimed at utilizing HEI knowledge	Total number of clusters established in the region with which the University and the Research Centers collaborate in various research projects	This indicator measures university involvement with clusters and ongoing innovation processes in these clusters	Time reference: last 15 years Formula: Total number of partnerships of HEI & clusters
IV.4.	External organizations				
IV.4.1.	Number of academic staff participating in professional bodies, networks, organizations and boards	To measure collaboration with non-academic partners and staff mobility.	Percentage of academic staff participating in professional bodies, networks, organizations and boards	This indicator measures the involvement of academic staff with the external environment.	Percentage of academic staff participating in professional bodies, networks, organizations and boards
IV.4.2.	Number of external organizations or individuals, involved in HEI governance	To measure collaboration/mobility with non-academic partners.	Number of external organizations/ individuals participating in advisory/ steering/ validation/ review boards of the HEI and its institutes or centers	This indicator measures the involvement of external organizations in HE governance	Number of external organizations/ individuals participating in advisory/ steering/ validation/ review boards of the HEI and its institutes or centers
IV.4.3.	Number of educational outreach projects	To measure the level of development of Educational Outreach projects	Number of Educational Outreach project targeting non-institutional beneficiaries (beneficiaries outside higher education)	Educational Outreach is an important element of the relationship between the HEI and the external environment	Time reference: 2017 Number of extracurricular and alternative courses or activities organised by the HEI and targeted at beneficiaries outside the HEI
V.	INNOVATION IN EDUCATION				
V.1.	Innovation and entrepreneurship courses				

V.1.1.	Number of courses focused on the areas of innovation and entrepreneurship	To measure the level of development of teaching in the areas of innovation and entrepreneurship.	Number of courses focused on innovation and entrepreneurship included in the curricula	This broad domain assists students in obtaining an orientation of possibly establishing their own businesses. Therefore it allows the student to create their own job opportunities but also to make creative contributions to other businesses.	Time reference: current year Formula: Total number of courses focusing on the areas of innovation and entrepreneurship that are included in the curricula
V.1.2.	Innovative forms of assessment	To measure the number of practical assessment exams	Number of practical examinations (e.g. projects) which use innovative forms of assessment (assessment of practical work by faculty and structured practical cases).	This indicator measures the share of forms of assessments of students in practical examinations which are more interactive and focus on technical or practical qualifications and competencies.	Time reference: current year Formula: Total number of practical assessment exams
V.2.	Innovation and educational outcomes				
V.2.2.	Quality of courses & teaching	To measure the quality of courses and teaching	An assessment of the quality of teaching provision	The quality of courses and teaching is a crucial element of the quality of degree programmes.	<ul style="list-style-type: none"> - Is there a system to monitor and measure an assessment of the quality of teaching, based on a student satisfaction surveys: Yes/No - Breadth of courses offered: Low/Medium/High (*please provide justification) - Quality of basic courses is regularly monitored: Yes/No - Number of interdisciplinary courses or programmes - Laboratory courses are offered (engineering only): Yes/No
V.3.	Employees participation in innovation				
V.3.1.	Number of creative and social innovation projects in which HEI employees and students are involved	To measure the engagement of HEI staff in non-patent public domain entrepreneurial activities, including	The number of faculty, staff and students that declare to have undertaken a creative commons or a social innovation project	Such activities are an important element of the relationship between the HEI and the external environment	Number of non-patent innovation projects (social innovation and other non-patented innovation) of HEI staff and students.

		creative commons & social innovation			
V.3.2.	Number of innovation prizes awarded by business and public sector associations or funding agencies (national and international)	To measure collaboration with non-academic partners	Number of innovation prizes awarded by business & public sector associations/funding agencies (national/international) to students or HEI staff	This indicator assesses recognition of outstanding transfer of technology and innovation activities	Number of innovation prizes awarded by business & public sector associations/funding agencies (national/international) to students or HEI staff