

U-Ranking 2017

Synthetic Indicators
of Spanish Universities

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Acknowledgements

The ISSUE (acronym for *Indicadores Sintéticos del Sistema Universitario Español*, in English 'Synthetic Indicators of the Spanish University System') project, developed by the Ivie (The Valencian Institute of Economic Research) and the BBVA Foundation, is an essential part of a program of activities carried out by both institutions to document and analyze the role of knowledge in social and economic development. This report presents the basic products of the project, U-Ranking and U-Ranking Volume, their methodology and results for the 2017 edition (fifth presented).

The approach of ISSUE, the selection of variables on which the rankings compiled are based and the methodology used when treating the data have been thoroughly discussed by the Ivie team with a large group of experts on the assessment of universities, university information and management. We would like to thank these specialists from fourteen universities for their invaluable collaboration.

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We would like to give special thanks to the extensive collaboration of the IUNE Observatory¹ in regard to research and innovation and technological development data. As well as participating in meetings on the availability and suitability of various sources and the problems of their treatment, the IUNE Observatory, and specially the INAECU team, directed by Professor Elías Sanz-Casado, have provided complete Bibliometric data regarding the research of all Spanish universities (source: Thomson-Reuters), from which many of the indicators relating to research have been calculated.

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¹ The IUNE Observatory is the result of work carried out by a group of researchers from the universities that make up the "Alianza 4U" (Universidad Carlos III de Madrid, Universidad Autónoma de Madrid, Universitat Autònoma de Barcelona and Universitat Pompeu Fabra). The general coordinator of IUNE is Elías Sanz-Casado, professor at the Department of Librarianship and Documentation of the Carlos III University Carlos III in Madrid and director of INAECU (Research Institute for Higher Education and Science).

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The results of the ISSUE project are, therefore, fruit of the collaboration of many people and institutions that share our interest in analyzing the performance of Spanish universities and facilitating comparable and synthetic images of them. Nevertheless, the indicators presented and the resulting conclusions are the sole responsibility of the U-Ranking team.

1. Introduction

This report presents the results of the research undertaken by the Ivie to develop the fifth edition of Synthetic Indicators of the Spanish Public University System (ISSUE), based on an analysis of university teaching activities, research, and innovation and technological development.

The developed indicators provide the basis for compiling different rankings of Spanish universities. The first of these rankings is **U-Ranking**, which analyzes the performance of the University System, synthesizing the universities' achievements in teaching, research and innovation and technological development in a single index. The fact that a smaller university achieves good results is relevant, but we should not ignore that their impact on their environment may be far smaller than a larger university with less outstanding results. For this reason we provide a second overall ranking, the **U-Ranking Volume**, which considers the combined effect of both variables, results and size, and classifies the universities according to their total contribution to the universities' missions. In addition to these two general rankings, we construct other more specific ones: **U-Ranking Dimensions**, focused on the classification of universities in each of the dimensions that make up the mission of the universities: teaching, research and innovation and technological development, and **U-Ranking Degrees**, which ranks the degrees offered by the different universities providing useful information to potential students for their decision making in the choice of a University.

All of these rankings are approximations of university results, allowing them to be compared from different perspectives. Through such comparisons, synthetic indicators assess their performance by answering to relevant questions, such as the following:

- Which Spanish universities show the greatest volume of results? Which universities are more productive or efficient? Do the universities at the top of the rankings coincide with these two perspectives?

- Do the positions of Spanish universities in international rankings meet the criteria in terms of volume of activity or in terms of output? Are the positions of Spanish universities in the U-Rankings correlated with the best-known international rankings such as that of Shanghai²?
- Do the universities with the best research results stand out for their teaching results? Are research results correlated with technological development and innovation?
- Do universities maintain their positions over time?
- Are the general rankings on university activities as a whole similar to those obtained when comparing specific qualifications? Is the internal heterogeneity of universities high?
- Is employability a relevant factor when it comes to measuring the results of the universities? What impact could employability have if it were included in the construction of the university rankings? Is there any relationship between the current rankings and the employability of universities? How would rankings change if the level of employability of each institution was added?

Answering all these questions could be of great interest to form a vision of the Spanish public University system, identifying the strengths and weaknesses of each institution that is part of it, as well as to classify the position of universities within the university system. That is the purpose of this project and report, as noted in an earlier study by the Ivie, published by the BBVA Foundation (Pérez and Serrano [dirs.] 2012), the Spanish University system has greatly increased its size in recent decades but it is far from being homogenous. Not acknowledging its

² Academic Ranking of World Universities (ARWU).

heterogeneity makes it difficult to assess. Thus, this assessment requires that the different specialization and changing characteristics of each university are taken into account, as well as their real possibility of competing in different areas (Aldás [dir.] et al 2016).

Rankings as synthetic indicators of results

The performance of Spanish universities receives constant attention, and debates about the exploitation of the resources used and their results are increasingly frequent. The driving force behind this interest are the significant amount of resources currently dedicated to these activities and the recognition of the important role universities play in generating and transmitting knowledge, two key areas in the social and economic development of countries today.

In Spain, discussions about university results frequently focus on public universities. There are two reasons for this: the volume of their activity accounts for most of the Spanish university system and the origin of the majority of the resources used is public; the assessment of their results is therefore considered to be of general interest. There is also a more practical reason. In Spain, traditionally, it has been more feasible to assess the resources and results of public universities based on relatively homogeneous data, because until recently most of the numerous private universities (there are currently 34³) did not provide the necessary data to carry out analyses. However, the participation of private universities in public statistics and information systems is increasing, and a project such as U-Ranking, which aims to provide an overall view of the Spanish university system, should take on the challenge of including these institutions. In this regard, the fifth edition of U-Ranking follows the same criteria as past editions in incorporating into the ranking system those private universities which have provided sufficient information of adequate quality, so that the data can be homogeneous with that of the public universities in order to construct synthetic indicators. After reviewing the available information, U-Ranking

2017 incorporates, as we will see further on, thirteen private universities which meet these characteristics.

Assessments to measure university results in many countries, as well as in Spain, are increasingly using rankings to classify institutions from different perspectives and with different criteria. Some of the international university rankings have found their place in debates about the quality of these institutions, becoming widely used references to assess the position of universities and national University systems. Thus, for example, the presence of twelve Spanish universities (14.3% of the total of 84 public and private Spanish universities) among the first 500 institutions of the world according to the Shanghai Ranking, with only one in the top 200, is a fact often mentioned as proof of the limited quality and insufficient international projection of our university system.

Researchers, public and private institutions, university associations, along with companies in information and media are increasingly taking more initiatives to compile rankings. The objectives and interests of such initiatives and their scope are diverse, both in terms of university activities studied (many rankings focus on research), as well as in terms of coverage (national and international), the data used and its treatment. Some recent reports (Rauhvargers 2011, 2013) stressed the importance of carefully assessing the criteria with which the rankings are compiled when demonstrating their significance and interpreting results.

Indeed, the rankings are a particular way to approach the assessment of university results and their appeal lies in the fact that they offer simple and concise information. This facilitates comparisons while simplifying them, and can make them sensitive to the criteria and procedures followed when constructing indicators. It is for this reason that the value given to the rankings should not be separated from how they are compiled or from the metric used.

These precautions are not always present when using rankings. On the one hand, the reputation of a good position in a ranking turns them into an intangible asset to universities. Therefore, some develop strategies to convey information about themselves (signaling) by advertising their more

³ 32 out of 34 private universities have been active during the 2016-2017 academic year.

favorable results, and also to improve their positioning in the rankings. Certainly, the expected return of a good position in a ranking is significant, given that it can affect areas as diverse as recruiting students, attracting researchers, obtaining resources and the social projection of institutions.

On the other hand, the growing interest in these classifications is because they are perceived as useful tools (despite being imprecise) for various purposes and different stakeholder groups in universities because:

- a) The information they provide to the users of university services is easy to interpret in terms of attractiveness or quality of institutions.
- b) They provide comparative information to governments, with the possibility of being used to assign resources or for the accountability of universities to society.
- c) They complement the work of university quality assurance agencies and provide information to analysts interested in having homogenized indicators available.

Approach of the project

In Spain different university rankings are being regularly presented, compiled with diverse perspectives and methodologies. What sets the rankings proposed by ISSUE apart is that its rankings (U-Ranking, U-Ranking Volume, U-Ranking Dimensions, U-Ranking Degrees) are developed according to criteria that respond to many recent international recommendations. One of them is that indicators should be created with the objective of studying university activities from a broad perspective, i.e. examining teaching, research, and innovation and technological development activities. Another important feature, as we have mentioned, is that ISSUE offers rankings by degrees (U-Ranking Degrees) giving specific guidance to students when choosing what to study.

Among the criteria used in developing ISSUE that should be noted are the following:

- Developing multiple university rankings, in which university activities are examined from a general perspective, as well as in specific

fields (teaching, research, innovation and technological development), but also in terms of the performance achieved (U-Ranking) and the total output (U-Ranking Volume) of each university.

- Taking into account the diverse perspectives and interests that potential users of the data have when using the rankings. In particular, special attention has been paid to the importance that many people give to specific areas such as degrees when comparing universities. To deal with this concern, a web tool has been developed which enables users to create personalized rankings in terms of Bachelor's degrees (U-Ranking Degrees). It has been designed to guide students, their families and counsellors when choosing a university in which to study. The advantage of recognizing that users have different preferences is that the following problem can be avoided when constructing synthetic indicators: their excessive dependence on expert opinions (subjective and sometimes contentious) regarding the weights that should be attributed to teaching or research.

The project therefore offers two different products:

- A general collection of rankings on Spanish universities, based on the criteria of the project's team and the experts consulted, allowing each institution to be compared with others from different points of view: U-Ranking, U-Ranking Volume and U-Ranking Dimensions.
- A web tool that provides personalized rankings for different Bachelor's degrees, grouped according to area of study and which allows universities to be compared taking into account the interests and criteria of each user (mainly students enrolling in universities) on their choice of studies, the regions considered and the importance given to teaching and research: U-Ranking Degrees.

It is important to note that all the classifications are obtained from a common basis: the data correspond to the same set of variables and the same methodology has been followed when treating and aggregating variables, except

obviously with regard to decisions taken by users when creating their *personalized* rankings.

Structure of the report

After this Introduction, the remainder of this report is structured in four chapters, with the following content. Chapter 2 details the methodology followed in preparing the different rankings. Chapter 3 describes the approach for the personalization of the rankings by the user and the web tool created to present the results to students. Chapter 4 provides an analysis of the main aggregated results, focusing on the comparison of the U-Rankings with the main international ranking of reference. Also, to assess robustness, a sensitivity analysis of our results to variations in some of the assumptions used in making the rankings is carried out. In addition, the results of the regional university systems are analyzed, as well as the impact of incorporating information on the employability of the universities on the order of the rankings. Finally, Chapter 5 summarizes the main features and results of the project.

New developments in the fifth edition of U-Ranking

This fifth edition of the U-Ranking Project corresponding to 2017 offers, as in previous editions, the general rankings U-Ranking, U-Ranking Volume and U-Ranking Dimensions, as well as personalized rankings for Bachelor's degrees. In addition, it presents the following new features:

For the third year running, U-Ranking incorporates private universities in its analysis and thus acknowledges the importance of these institutions in the Spanish University System. As in the last edition, U-Ranking 2017 includes 13 institutions, one of them analyzed for the first time. However, another institution, which was included in the third and fourth edition, has remained outside this year's analysis because, according to the strict methodological criteria, it did not provide sufficient information for a reliable calculation of its indices.

In this regard, this year's edition introduces several new novelties with the aim of improving the information used to calculate the rankings, in

addition to the, obvious, updating of the data of the 25 indicators used.

Also, this study continues to rely on the collaboration with the Spanish Ministry of Education, Culture and Sports, which allows the ISSUE Project access to the Integrated System of University Information (SIIU). The SIIU is a web-based platform that collects, processes, analyses and disseminates data of the Spanish university system providing homogeneous and comparable statistical information of the Spanish universities. This platform provides detailed information on the degrees offered by each university, in which schools they are taught and on the percentage of foreign students in each degree. In addition it provides homogeneous information on the success, assessment and drop-out rates for each area of learning for a great number of universities.⁴

This Edition's most important developments focus on the teaching-dimension indicators. First of all, we incorporate data on *full-time equivalent* students instead of the number of people. In this way, especially teaching resources indicators such as budget per student or faculty member per student better reflect the reality of the different universities. For example, the dedication to studies of a student enrolled in a distance-learning university is different to that of a student in an on-site university. In addition, the different specializations of the institutions can influence the students' dedication to studies. This improvement has been possible thanks to the publication by SIIU of the number of credits enrolled and the calculation of full-time equivalent students by educational level and by area of learning from the 2009-10 to 2014-15 academic years. This new information has allowed redefining the following indicators:

- Faculty member per 100 students: Full-time equivalent faculty and research staff in centers belonging to the University per 100 full-time equivalent students in studies of 1st and 2nd cycle, Bachelor's and Master's

⁴ For the calculation of the personalized rankings, information comes from the CRUE which supplies data by groups of degrees and universities whereas the Ministry's information is provided at an upper level, by area of learning.

degrees and students in Doctoral degrees (all of these students registered in centers belonging to the University).

- Budget per student: Effective income of the University by number of full-time equivalent students in studies of 1st and 2nd cycle, Bachelor's and Master's degrees and of students in Doctoral degrees (all of these students registered in centers belonging to the University).
- Percentage of postgraduate students: Full-time equivalent students registered in Master's degrees over the total number of full-time equivalent students registered in studies of 1st and 2nd cycle, Bachelor's and Master's degrees (all of these students registered in centers belonging to the University).

Secondly, following our aim to adjust to reality by considering all the peculiarities of universities, we have modified the definition of the numerator of the teaching resources indicator «Faculty member per student». In previous editions, this indicator was defined as «Faculty member with PhD per student». In the fifth edition we use faculty and research staff regardless of their having a PhD degree or not. This change is due to two reasons: a) on the one hand, it is a resources indicator, which is measuring the size of the groups and the teaching resources available to the University, while the quality of the teaching staff is already measured by the indicator «Percentage of faculty members with PhD over faculty and research staff»; b) it should be taken into account that U-Ranking also analyzes private universities and the composition of their faculty staff is different from that of the public universities. Thus, while 84% of the full-time equivalent faculty members in public universities have a PhD degree, in private universities this percentage only reaches 63%.

Regarding the research indicators, an indicator relating to internationalization has been modified thanks to the availability of information more adjusted to the issue to be measured. This indicator is «European or international research funds by faculty member with PhD» and was initially defined as "effective income from abroad due to applied research". In the absence of more accurate information, in previous editions we constructed this indicator with 2008 and 2010

data from CRUE on the «Effective income from abroad by applied research». The latest edition of *Universidad Española en Cifras* provides 2014 information on funding for basic research activities by its origin.

Basic research includes research projects and grants and it is more in line with the research output measured by U-Ranking, while applied research also includes R&D contracts and consultancies which are, in many cases, a result of the innovation and technological development activities of universities.

One of U-Ranking's guiding principles is to provide the most useful and detailed information as possible for the different target publics which are potential users. A university ranking allows to observe the relative position of one institution with respect to others, but it is not easy for university managers or researchers to analyze in depth the performance of a specific university, to assess the aspects in which it stands out or its distance from the average of the system or from a certain university that is taken as a reference. For this reason, as in last year's edition, the www.u-ranking.es website also offers a **Panel of Indicators**⁵ for each University, which is a file containing the values for each of the 25 indicators used and the mean value of the universities so that managers can observe the relative distance to the average of the system and use the data file to make a direct comparison with other universities. The added value⁶ of the indicators is presented on a scale of 0 to 100, with 0 being the minimum value obtained by a university of the system and 100 for the university that scores the most. In this way, it facilitates the comparison between very different indicators, offers a general profile of each university and guarantees the confidentiality agreement signed with the CRUE not to publish individual data of the universities. Each panel of indicators also shows the university's position in U-Ranking, U-Ranking Volume and U-Ranking Dimensions, along with basic information regarding its year of foundation,

⁵ See appendix 3 for the panel of indicators of the 61 universities analyzed.

⁶ Without distinction by learning areas, fields of knowledge or degrees.

ownership, number of students, teachers and degrees, amongst other data.

Finally, the fifth edition of U-Ranking includes an analysis of how the results would be affected by the incorporation of employability. Currently, there is no periodical and accurate information that would enable us to assess the differences in results from the universities in terms of the employability of their graduates and ensure its analysis over time. There exists occasional data, from the Spanish Ministry of Education, Culture and Sports or from the Spanish Institute of Statistics (INE), which provides information on the employment of University students, however the continuity of this data is, at present, not guaranteed. Thus, although U-Ranking does not usually include this variable, its 2017 edition carries out an exercise that aims to analyze the impact that the incorporation of employability could have on the ranking.

2. Methodology

In the context raised by the reflections and criteria described, the starting point of the ISSUE project was an in-depth look at the most important national and international rankings, so as to identify possible ways of reducing their shortcomings. The most significant problems of rankings arise in the following areas: (1) university activities studied, (2) disaggregation by subject or type of studies, (3) data availability and use, (4) methodological rigor in the treatment of data and construction of indicators, (5) recognition of the user's perspective when creating and providing data, and (6) user-friendly tools to select their preferences in the rankings.

The project has studied the shortcomings in all these areas and the following section describes how they have been addressed.

2. 1. THE DESIGN OF RANKINGS

In the previous editions of the ISSUE project, and due to its novelty, an entire chapter was dedicated to the limitations of rankings and the improvements that a new tool like this one should include. The reader can view previous reports — found on the U-Ranking website (www.u-ranking.es)— for a detailed analysis of these aspects, which are summarized in this fifth edition.

The development and use of rankings entails a number of **risks** that should be forewarned. First of all, it is not wise to orient strategies focused on improvements of variables studied, instead of to the problems that underlie them: the improvement of the institutions should be based on principles of efficiency which will then be reflected in the indicators. The use of indicators that are not very robust, with values highly sensitive to the criteria of measuring the variables and aggregation procedures, and that focus on what should be measured and not only on what can be measured, must be avoided. Finally, a very common risk of rankings is to focus only on the elite forgetting the rest. This may inadequately compare institu-

tions with very different specializations and resources.

Some of the published rankings show **limitations** that users should be aware of. In the case of universities outside the circle of the great universities, many rankings are exclusively based on indicators which focus on research activity and unreliable reputation factors. For example, the exclusive use of these indicators to rank Spanish universities is in many cases inappropriate and risky, leading to wrong conclusions.

In the first three U-Ranking reports, a detailed review on the issues to be considered in the design of a good ranking, and their inclusion in the ISSUE project, was carried out. In this report it is not necessary to repeat the aforementioned analysis, however, we summarize some of the most relevant aspects:

- The study *Principles of Berlin on University Rankings* (Centrum für Hochschulentwicklung, CHE 2006) stresses, among other recommendations, to indicate clearly what the target audience of the ranking is, to be clear about what each indicator measures to be methodologically scrupulous, to focus on the outcomes rather than inputs and to maintain a high ethical standard, given the responsibility and impact that rankings have.
- The results of discussions held by the European University Association and the International group of Experts in Rankings (CHE 2006) insist on the importance of providing a global vision of all the institutions, addressing their multidimensional nature and diversity, respecting the user's perspective and maintaining the independence and temporal sustainability of the ranking.

The U-Ranking system expressly includes all the principles which were recently discussed internationally and proposed by the EU. The following sections detail the many aspects that have been

taken into account when working with these criteria.

2.2. ACTIVITIES STUDIED

One of the main failings of certain rankings, particularly international ones, in providing a general assessment of universities is that the activities are examined from a very partial perspective. The problem stems from the limited data availability on the results of teaching activities, and innovation and development technology, which are far less abundant than research.

In fact, most of the important rankings focus on analyzing research, taking little account of another significant function of universities which is teaching and barely considering technological development activities, despite their increasing importance. The rankings which are biased towards research are frequently interpreted as representative of university activity as a whole and they may not be.

There are three possible reasons for this: 1) the data available is used and, without a doubt, the abundance, quality and homogeneity of data on research is much greater than in the other two areas; 2) research activity is considered the most important distinctive element of universities in the last two centuries; and 3) the opinion holds that the research quality of professors is a proxy variable for other areas, and therefore it is enough to observe the results in this area to predict the others.

The first reason is practical, but can induce bias by omission in indicators and rankings. The second needs some clarification in that it is a powerful argument regarding postgraduate studies but less so in relation to the degree, especially in mass university systems, such as those of most developed countries today. In fact, in most of these systems there is a significant concentration of research activity in a small number of universities, while in a large number of institutions there is fundamentally teaching activity. The third reason is a hypothesis, which validity should be tested by developing indicators for all activities and testing whether the correlation between teaching and research results

is high. If the validity of this hypothesis is not tested, and given that the intensity of university teaching specialization, research and innovation and technological development varies greatly⁷, overlooking the direct indicators of teaching and innovation and technological development can bias the rankings.

Therefore, it is important to take advantage of the data available on university activity in the field of teaching, and innovation and technological development, so that the rankings reflect university activity as a whole more accurately. In addition, this also allows us to recognize the different specialization profiles of universities, as some focus more on basic research (as occurs in many of those most often included in the world rankings), others on higher education and professional development, and others on applied research, innovation and technological development.

Studying these three dimensions is a first step in the direction of addressing the different perspectives on university systems and the different interests that potential users of the rankings may have. Thus, a degree student probably shows greater interest in teaching, while a postgraduate student and teachers focus more on aspects related to the quality of research. On the other hand, a company interested in signing a contract for a line of specific research, may want to identify which university has a greater capacity to apply research or produce patents. If the data focuses solely on research results then these distinct approaches cannot be carried out accurately.

The U-Ranking system specifically studies these three categories of university activities, analyzing the data available on each of them in Spain. The national (not international) dimension of the project ensures that reasonably homogeneous data is available with a set of variables representing the activity of Spanish public universities and a certain number of private universities. It would certainly be desirable that data on the rest of the private universities were available in the future with a guarantee of similar quality and homogeneity as those included in the

⁷ See Pérez and Serrano (dirs.) (2012, ch. 1 and 4).

ranking, which would improve the scope of the project.

The total amount of 61 universities is sufficiently high for the data available to allow a contrast of the hypothesis to which we referred earlier: if research results can predict correctly those of teaching or not. The project has examined this specific objective, with the results presented in Section 4.

2.3. DISAGGREGATION OF ACTIVITIES

A further shortcoming noticed when analyzing current rankings is that many deal with universities in a unitary manner, not recognizing the diversity of areas in which these institutions can offer professional development or conduct research. This problem needs little explanation: to be more useful, a ranking has to inform as far as possible the user on specific areas or scientific fields of their interest, since universities may not be homogeneous in the quality of each of their areas.

It is for this reason that a ranking system can be improved if it provides data disaggregated by areas of study, fields of knowledge or specific degrees. This last level of detail could be very significant for students, given that their fundamental interest is generally linked to the quality of the specific studies that they want to pursue.

For the disaggregation, the U-Ranking project had to work in several directions. Firstly, it followed the criteria that it is important to start with the most disaggregated data available, maintaining its detail whenever possible, so as not to lose the wealth of its heterogeneity. Secondly, the disaggregated data had to be dealt with rigorously in order to homogenize it properly before adding it to the indicators. And third, the problems of combining (for the construction of some of the indicators studied) the data disaggregated according to scientific fields or degrees with other data aggregated at university or branch of knowledge level had to be solved. When there is no disaggregated data, or its disaggregation makes no sense, the aggregated data has been allocated to the various elements of the set, following the criteria considered more reasonable in each case.

Addressing the above problems is not trivial. For example, in the case of the rankings on specific Bachelor's degrees of Spanish universities, to deal with data on areas with different levels of disaggregation a series of matrices have been created that connect them. In order to do this, accurate connections had to be established between university, branch of knowledge, Web of Science category, areas of the National Evaluation and Foresight Agency (ANEP) and Bachelor's degrees.

In allocating research results to each degree, the starting point was data disaggregated by the Web of Science categories (more than 250 items). Given that one classification is not perfectly nested in another, both classifications have been connected, and the two types of errors that could be made have been taken into account:

1. *Inclusion error.* That is, attributing to a given degree the research carried out by teachers from other areas. For example, attributing to the Pharmacy degree of a given university, the research in "Hematology" that has actually been conducted by teachers from the Faculty of Medicine and who only teach in Medicine.
2. *Exclusion error.* That is, excluding research by teachers in areas that are not exactly the subject of the degree courses they teach in, as a result of being too restrictive when allocating areas to degrees. For example, if in Economy we only allocate the category "Economics", then important research may be missed in the area of "Business and Finance", theoretically closer to Business Administration degrees but also carried out by economists who teach in the degree of Economy.

These problems do not have a perfect solution and we had to choose one of the alternatives. We have opted for a more inclusive criterion: that is, when in doubt about whether to associate a category or scientific field to a degree we have chosen to include it, thus minimizing exclusion errors on the grounds that they are more serious errors.

2.4. INDICATORS, AREAS AND DIMENSIONS

The main pillar of a ranking system is, undoubtedly, the rigor of the procedure followed when dealing with existing problems so that the created classification is based on appropriate data and is treated with reasonable methodological criteria. Many of the rankings have clear shortcomings in this aspect, which the recent international literature has analyzed in detail.

The U-Ranking system considers that a university ranking should consider all their activities and be structured according to the three following major dimensions:

- *Teaching*
- *Research*
- *Innovation and technological development*

The assessment of each of these dimensions can take into account multiple areas of activity and indicators. However, many experts agree that an excessive number of them obscure the meaning of a ranking and complicate the construction of synthetic indices, a complex matter as it is. Following a criterion of (relative) simplicity, four **areas** have been studied in each of the three large dimensions aforementioned:

- *Access to financing*
- *Output obtained*
- *Quality (particularly in the results and in some cases, resources and processes)*
- *Internationalization of the activities*

The main reference to assess universities should be the results, but these can be studied both from the perspective of total volume as well as from the perspective of their quality. If there were a market that assessed the differences in quality, then results showing a higher quality would have a higher price. These prices hardly exist in the area of public universities. The differences in rates, currently very diverse between regions and degrees, respond in many cases to factors that have nothing to do with quality. However, some indicators can supplement, in part, this limited information. Thus, for example, there are indicators on the quality of teaching and research

and also on a very relevant feature today regarding the specialization (and quality) of universities: their internationalization.

However, as we pointed out in the introduction, the assessment of the quality of the output is incomplete if we want to take into account the impact of the university system on its environment. A university can generate high-quality results, but if its size is very small, its contribution to technological development or to the production of human capital through its graduates may have a much smaller influence on the productive environment than a university with somewhat lower levels of quality in its output but a significantly larger size. This obliges us to introduce also the size factor in the rankings system, thus generating U-Ranking Volume.

Each of the four areas mentioned has been analyzed using a series of indicators. For each area, between one and three indicators have been taken into account, depending on the availability and suitability of data, and according to the dimension that is being studied.

Table 1 shows the indicators studied, after analyzing the availability of data and discussing alternatives with the group of experts working on the project. Agreements were reached by analyzing the suitability of each indicator in capturing significant data on the area and dimension it forms part of it.⁸ It is important to stress that the data used is obtained from sources allowing the project database and the rankings based on it not to require universities to provide data directly to U-Ranking.

The logic underlying this selection of indicators, disclosed in summary form, is the following:

Teaching

- Teaching *resources* are characterized by budgetary allocations per student, and faculty and research staff per student, with special attention paid to faculty members with PhD

⁸ In order to ensure the transparency of the process in developing indicators, the definition of each indicator, its source and its time frame are all included in Appendix 1 and in the following website of the project: www.u-ranking.es.

Table 1. List of indicators, areas and dimensions

Dimension	Area	Indicator
Teaching	Resources	Faculty member per 100 students
		Budget / Student
		Faculty member with PhD / Faculty members
	Production	Success rate
		Evaluation rate
		Drop-out rate
	Quality	Attractiveness index
		Percentage of postgraduate students
		Cut-off mark ¹
	Internationalization	Percentage of foreign students
		Percentage of students in exchanges programs
		Percentage of students registered in programs imparted in non-official languages
Research	Resources	Competitive public resources per faculty member with PhD
		Contracts with PhDs, research grants and technical support over total budget
		Citable documents with ISI reference per faculty member with PhD
	Production	Total <i>sexenios</i> ² over possible <i>sexenios</i>
		Doctoral theses read per 100 faculty members with PhD
		Mean impact factor
	Quality	Percentage of publications in the first quartile
		Citations per document
		European or international research funds per faculty member with PhD
	Internationalization	Percentage of publications with international co-authorship
		Income from licenses per 100 faculty members with PhD
		Income from consultancy contracts per 100 faculty members with PhD
Innovation and Technological Development	Resources	Income from CPD ³ courses per faculty member with PhD
		Number of patents per 100 faculty members with PhD
		CPD hours per faculty member with PhD
	Production	Number of contracts by faculty member with PhD
		Commercialized patents per faculty member with PhD
		Triadic patents per 100 faculty members with PhD
	Quality	Income from international contracts per faculty member with PhD
		Income from international contracts per faculty member with PhD
		Income from international contracts per faculty member with PhD

¹ Mark of the last student who gained admission to a degree with limited places. ² Monetary compensation received for research activity based on the last six years. ³ Continuing professional development.

Source: Own elaboration.

- Teaching *output* is measured by using results obtained by students, analyzing how many students undergo evaluation, how many succeed in those evaluations and how many drop out.
- The *quality* of teaching is very difficult to observe at present, but we studied as a proxy the ability to attract students from other provinces, the quality of students as measured by the cut-off mark of each area and the percentage of postgraduate students.
- The *internationalization* of teaching is shown by the percentage of foreign students, the percentage of students in exchange programs and by courses offered in non-official languages.

Research

- The *research* process is characterized by two types of resources: competitive public funds raised and the provision of research staff, scholarships and qualified technical support.
- *Output* is accounted for by citable papers published in each area, in the six years of research work that are achieved with publications, as well as in the number of doctoral theses, which are an indicator of the training activity of a researcher in a given area.
- The *quality* of the research is reflected in the impact the publications have and the citations that these papers generate.
- Finally, a greater proportion of international publications, international co-authoring and the percentage of research funds from external sources indicate a greater *international* vocation in research activity.

Innovation and technological development

- The *resources* studied cover the three main activities of innovation and technological development: income from patents, income from consulting contracts and income from

the offer of continuing professional development.

- In terms of measurement of gross *output* in these activities, the total number of patents, the hours of professional development and the number of contracts for services.
- As an indicator of *quality*, due to the limited availability of data, only patents that are commercialized by faculty members with PhD are included.
- The *internationalization* of the transfer of knowledge is reflected through triadic patents (valid in Europe, US and Japan) and income for international contracts.

The list in table 1 defines the objective, which aims to be completed in the medium term, given that not all the ideal data is available today. In part, this is due to the ongoing process of adaptation of the Spanish university system to the European Higher Education Area (EHEA), which has nearly finished, but there are also other causes for data deficiencies in certain areas⁹. The project is open in this sense, with the possibility of completing this information as it improves, especially in the different areas of innovation and technological development.

In this sense, the second edition of U-Ranking introduced several improvements thanks to the inclusion of new indicators and data sources. As shown in table 2, while the 2013 version contained 23 indicators, the last editions incorporated 25 of the 31 indicators defined in table 1.

⁹ Specifically in this edition, the following variables were not taken into account for reasons of availability or quality of data: Index on Attraction Capacity, percentage of students in non-official language programs, hours of continuing professional development, number of professor contracts and number of patents commercialized per PhD professor. The relationship between indicators used will be adjusted as the availability of quality information increases and is consolidated.

Table 2. Indicators and level of disaggregation of U-Ranking 2013-2017

	2013 Ranking	2014 and 2015 Rankings	2016 and 2017 Ranking
Defined indicators	31	31	31
Used indicators	23	25	25
Degree level ¹	5	8	9
Area of study level	1	1	0
Branch of knowledge level	9	7	8
University level	8	9	8

¹ Bachelor's degree or Bachelor's degree group. The category 'bachelor's degree group' is the result of aggregating more than 2,312 degrees offered by Spanish universities analyzed into 139 groups.

Source: Own elaboration.

2.5. TIME COVERED BY THE DATA

University rankings, though they aspire to offer an image of the current position of each institution, cannot be conceived of as a snapshot of a given year. Many indicators have the character of a flow, and as such, can present high variability from year to year, both in the quality of the information and in the distance between the reality and what the information reflects. Other indicators reflect the accumulation of results over long periods of time.

The rankings referred to usually recognize this problem by taking comparison periods longer than a single year, either using moving averages (like the 5 or 10 years of the ISI Rankings of the Universidad de Granada) or even considering the complete history of the University (as in the case of the treatment of the Nobel Prize and Fields Medal winners in the Shanghai Ranking). This methodological approach provides greater interannual stability of the rankings and permits specific random disturbances to be smoothed out by considering a longer time range.

Our approach aims in this direction and, as information has become available, we have converged towards a 6-year moving average for nearly all the indicators. Most of the variables linked to research and to innovation and technological development, taken from Thomson-Reuters (2010-2015) and the RedOtri (2009-2014), are already being calculated as a mean of six years. Furthermore, in this year's edition, many of the teaching results have been reached with data by university from 6 academic years supplied by CRUE through its reports *La Universidad Española en Cifras 2010, 2012, 2014* and *2015*; and by SIIU which, depending on the variable, has also supplied information for the academic years 2009-2010 to 2015-2016.

Table 3 shows the updating in terms of years and time series registered by the indicators used in the ranking for 2017. Four indicators of the Innovation and Technological Development dimension obtained from the Spanish RedOtri survey on *Research and Knowledge Transfer* have been updated. This year's edition provides data from 2009 to 2014, completing a series of 6 years. Furthermore, the indicator *European or international research funds per faculty member with PhD* within the Internationalization Area of the Research dimension has been updated, using data by CRUE for 2014.

The described orientation of the methodology on which the calculation of the U-Ranking system is based leads one to expect that the rankings of universities will not present, from one year to another, sudden changes. The existence of an inertia in the rankings seems to be a desirable property, since the quality of university institutions does not change radically in the short term, though some of their annual results may do so.

Table 3. Time series used in the 2017 rankings

Dimension	Area	Indicator	2017 Ranking
Teaching	Resources	Faculty member per 100 students	2012-13 to 2014-15
		Budget / Student	2010, 2012, 2012 and 2014
		Faculty member with PhD / University teachers	2012-13 to 2015-16
	Production	Success rate	2009-10 to 2014-15*
		Evaluation rate	2009-10 to 2014-15*
		Drop-out rate	2009-10 to 2014-15*
	Quality	Attractiveness index	-
		Percentage of postgraduate students	2009-10 to 2014-15
		Cut-off marks	2016-17
	Internationalization	Percentage of foreign students	2009-10 to 2014-15
Percentage of students in exchanges programmes		2010-11, 2012-13, 2013-14 and 2014-15	
Percentage of students registered in programmes imparted in non-official languages		-	
Research	Resources	Competitive public resources per faculty member with PhD	2010-2015
		Contracts with PhDs, research grants and technical support contracts over total budget	2009-2014
	Production	Citable documents with ISI reference per faculty member with PhD	2010 to 2015
		Total <i>sexenios</i> over possible <i>sexenios</i>	2012 to 2014
		Doctoral theses completed per 100 faculty members with PhD	2010 to 2015
	Quality	Mean impact factor	2010 to 2015
		Percentage of publications in the first quartile	2010 to 2015
		Citations per document	2010 to 2015
	Internationalization	European or international research funds per faculty member with PhD	2014
Percentage of publications with international co-authorship		2010-2015	
Innovation and Technological Development	Resources	Income from licenses per 100 faculty members with PhD	2009-2014
		Income from consultancy contracts per 100 faculty members with PhD	2009-2014
		Income from CPD courses per faculty member with PhD	2010, 2012, 2013 and 2014
	Production	Number of patents per 100 faculty members with PhD	2010-2015
		Hours of CPD per faculty member with PhD	-
		Number of contracts by faculty member with PhD	-
	Quality	Commercialized patents per faculty member with PhD	-
	Internationalization	Triadic patents per 100 faculty members with PhD	2009-2014
Income from international contracts per faculty member with PhD		-	

*For the calculation of the personalized rankings we are still using the information supplied by the CRUE for the academic years 2010-11, 2012-13, 2013-14 and 2014-15 which is offered by degree and university.

Source: Own elaboration.

2.6. CRITERIA FOR THE CONSTRUCTION OF INDICATORS

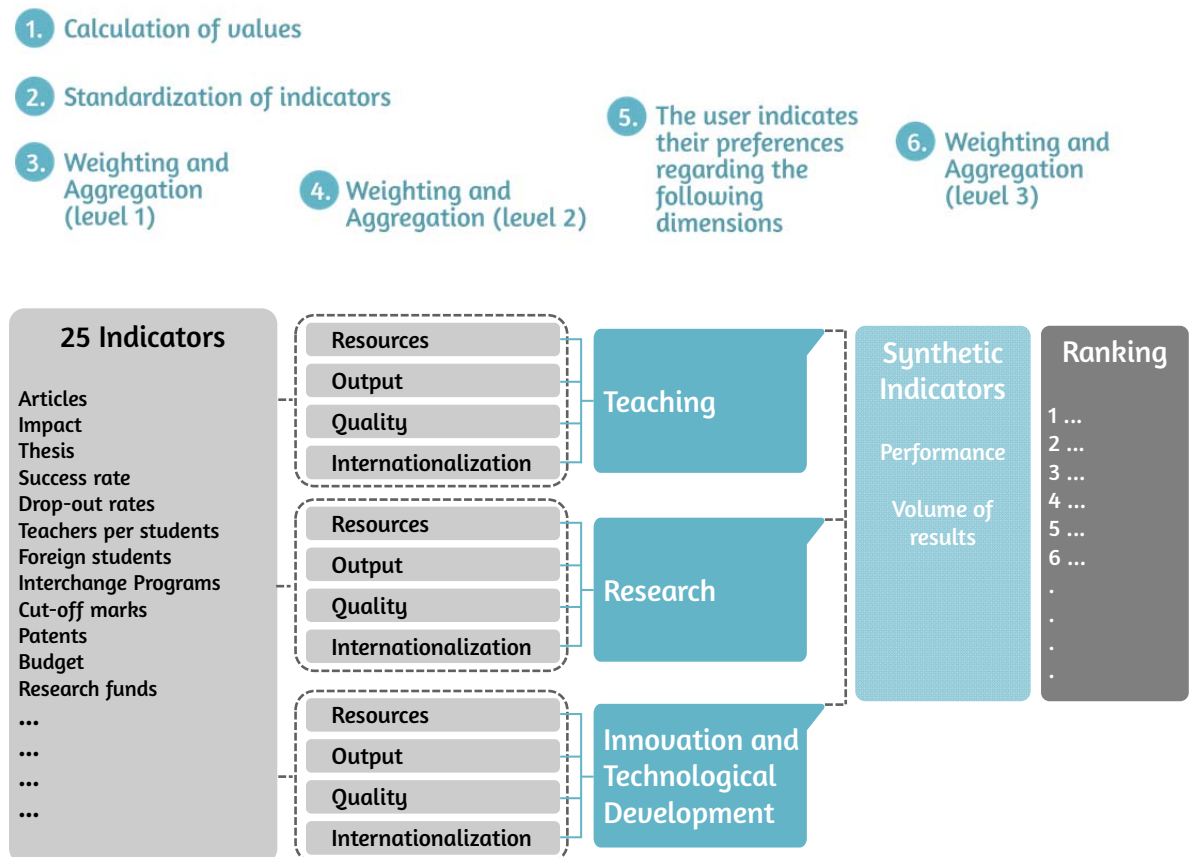
Key to being able to trust the meaning of the rankings is that the processes on which they are based should be transparent and respect the foundations established by statistical publications for the construction of indicators. In this regard, the project team contacted specialists in the subject and analyzed the methodological principles established in the specialized literature, especially in the *Handbook on constructing composite indicators: methodology and user guide* (The Organisation for Economic Co-operation and Development [OECD] 2008).

The underlying process of drawing up any of the rankings of universities constructed is structured according to the following steps—the fifth step being unnecessary in the case of the partial

rankings of teaching, research and innovation and technological development:

1. Preparation of the data bank and estimation and allocation of missing values
2. Standardization of indicators
3. Weighting and aggregation of indicators within the areas of each dimension
4. Weighting and aggregation of area indicators, within the dimensions
5. Weighting and aggregation of the dimensions
6. Obtaining of rankings

The following scheme graphically illustrates the time sequence of the steps. To complete each of them it is necessary to solve the corresponding technical problems, as described below and dealt with according to the approaches indicated.



2.6.1. Allocation of missing data

The starting point for any ranking is to have available the necessary information on the variables to be considered in order to construct each indicator. A first technical problem to be solved is the treatment of the data missing from certain universities in some of the variables to be used. For example, the number of theses read in the last year in a particular university may not be available. Such gaps may be due to several factors, whether technical (an error in loading the data), or of availability (the university may not have generated certain information or not done so in time) and even strategic (a university may opt not to give certain information because it is not in its interests to do so).

Not facing this problem rigorously would condition the comparability of the universities, the quality of the aggregate indices, and the final results. Specifically, to calculate the ranking ignoring such missing information would be equivalent to allocating a value for that variable equivalent to the mean of the rest of the variables forming the dimension. This criteria is especially problematic if it is the university itself that does not reveal the information for strategic reasons, as that mean value might favor it. On the other hand, to calculate the ranking on the assumption that the real value of the missing variable is zero would be to penalize the university unfairly if there has been a technical problem of data availability or of deadlines.

To estimate and allocate the missing values of each variable we have proceeded as follows:

1. From a matrix of correlations¹⁰ we identify, for each variable, the two variables with the highest correlation (in absolute terms) and associate them with the variable to be estimated.
2. We estimate a linear model (by minimum squares) between the variable to be allocated and the two most correlated variables—that is, those which the variable to be estimated had the highest absolute

correlation. For the estimation of this model we use only the information from the same area of study, thus acknowledging the different operational situation of each subject area in the areas studied.

3. From the parameters estimated in the above model we calculate the estimated value of the missing variable, using the said parameters and the existing information for that university in the related variables.

For example, let us suppose a university for which there are no data on doctoral theses directed by a faculty member with PhD (T) in an engineering degree. After analyzing all the variables of the Spanish universities we observe that, within the engineering degrees, the theses directed are highly correlated with the research *sexenios* obtained as a proportion of the total of possible *sexenios* of its teaching staff (S) and also with the percentage of postgraduate students of that university (P). On the basis of this ratio, $T = f(S,P)$, we estimate linear model $T = a_0 + a_1S + a_2P$. Once the values of a_0 , a_1 and a_2 have been estimated, the theses directed in that engineering degree of that university are estimated from the data available on *sexenios* and postgraduate students.

2.6.2. Standardization of indicators

One of the pillars upon which the construction of synthetic indicators rests is the proper standardization of the information, that is, its transformation in order to homogenize it and make possible its comparison and aggregation. There are numerous systems of standardization, such as the Gaussian (subtracting from each variable its arithmetic mean and dividing by its standard deviation), relative order (ordering the values according to their relative value), distances from the mean or the median, and the ratio between the variable and its mean or its median.

The standardization chosen must be in consonance with the method of aggregation to be used subsequently. Because as a general rule the geometric aggregation method has been chosen, requiring the value of the standardized variables to be positive, we must exclude the Gaussian and absolute distances from the mean

¹⁰ The correlations matrix is constructed by calculating, for each possible pair of indicators, their linear correlation coefficient.

and from the median, which necessarily generate negative values, as alternatives of standardization.

For this reason, the standardization method chosen is the calculation of the ratio between the variable and its median. Taking into account that the median is the value separating each distribution into two halves, the standardized results will be centered on the value 1: values below the median are bounded between 0 and 1, while those above will be greater than 1.

2.6.3. Weighting and aggregation of indicators within an area

Once the missing values have been allocated and the basic indicators standardized, we aggregated these to obtain a first synthetic indicator for each area. Thus, for example, to obtain the value of the indicator for the *quality* area in the *Research* dimension we aggregate the standardized values of the *Mean impact factor of publications* and the *Percentage of publications in the first quartile*.

As in the case of standardization, there exist numerous aggregation procedures, such as the arithmetic, the geometric or those based on factor analysis. The choice of one method or the other has implications in aspects like the substitutability of the indicators or the importance of extreme values (both large and small). The aggregation criterion chosen implies a weighting of the indicators, which is important to bear in mind.

It must be taken into account that some universities might have zeros in some indicator of a specific area (for example, they may not possess *Triadic patents*). For this reason we have opted in this phase for an arithmetic aggregation, ruling out the geometric aggregation because the presence of a zero in the product would cause the whole area analyzed to take a nil value.

As the weighting of the indicators shows the importance assigned to each variable when aggregating it into a synthetic indicator, we also reflect on this question. This is a classic problem in the construction of such indices and generally requires a judgment on the relative importance of each element. In the case of economic aggregates the weights are offered by prices —

which reflect the market valuation of the goods, services or factors exchanged— but in many other cases there are no prices and the indicators have to be constructed following other criteria, frequently based on subjective opinions.

There are three possible approaches to weighting: 1) assignation of identical weights (which also implies a judgment, since the weight of one indicator is conditioned by the number of indicators included); 2) consultation among experts to identify the most widely held opinions (by means of surveys or methods such as the Delphi); 3) weighting according to the user's preferences. These three alternatives have been used in each case according to the level of aggregation to be achieved.

At this first level of aggregation (of simple indicators into synthetic indicators for each area) we have opted for the first system, that is, equal weighting. This is because in most cases the indicators capture different aspects of the area analyzed, but there are no clear arguments for granting one of them greater or lesser importance. Also, the nature of the information captured in each indicator is fairly homogeneous and in that case there is less interest in giving greater weight to one indicator or another, because in many cases they are correlated. This occurs, for example, in the case of the mean impact of publications index and the percentage of these in the first quartile. Consequently, the different simple indicators will enter into the calculation of the arithmetic mean with the same weight.

2.6.4. Weighting and aggregation of the area indicators within each dimension

At the second level of aggregation the indicators of the different areas are grouped into an indicator for each of the three dimensions considered: teaching, research, and innovation and technological development. At this stage there are reasons for following a different aggregation criterion, as after the arithmetic aggregation of the previous stage no area indicator presents zeros.

Table 4. Weights by area

	Resources	Production	Quality	Internationalization
Teaching	25.4	30.4	23.9	20.3
Research	20	30	30	20
Innovation and Technological Development	34.2	26.3	21.1	18.4

Source: Own elaboration.

This stage proceeds by means of a *geometric* aggregation method. Among the most interesting properties of geometric aggregation is that it limits the substitutability among the components that it aggregates. In other words, geometric aggregation penalizes those universities that have neglected any of the four transversal areas (*Resources, Output, Quality, Internationalization*) as against those that attend to them in a balanced manner.

As to the weight to be given to each area within each dimension at this second level of aggregation, during the design phase of the project, we carried out a survey of university experts, applying the Delphi method, instead of granting them the same weight, as in the previous stage.

One reason for changing the criterion is that if all the areas were aggregated with the same weight, this being a geometric mean the number of areas considered would influence the result. For example, if we had decided to group the indicators of quality and internationalization in a single area, their influence on the dimension would have been less than if considered separately. Another reason is that, unlike what occurred with the basic indicators, in this case there may be reasons to grant different values to each of the areas. Thus the decisions on the number of areas to be considered and their weights are relevant, and we have preferred to ask experts about the importance that should be given to each area. To make this valuation easier we followed the criterion that the number of areas should be small, and similar within each dimension.

Table 4 shows the weights given to the different areas by the experts consulted¹¹.

2.6.5. Weighting and aggregation of the dimensions to obtain the rankings

The last phase of the methodology establishes how the different rankings of the ISSUE project are drawn up. This offers university rankings of each of the three dimensions separately, but for this it is no longer necessary to take any further step beyond those described in the above sections. On the other hand, to draw up the rankings combining the three dimensions it is necessary to perform a new aggregation and, once again, decide the most reasonable criteria for doing so.

In the transition from the dimensions to the final ranking we consider that the importance attributed to each dimension can be very different depending on the interests of the people contemplating the ranking, that is, of its potential users: students, researchers, managers, society. For this reason, we have come to the conclusion that the user's perspective can be the key to giving more or less importance to each of the dimensions. It could be unconvincing to impose weights from a specific standpoint—for example, that of a group of experts, who consider that research is the most important—especially for individuals with another standpoint, for example, for students or careers guidance staff who consider that it is more important to attend to the teaching aspects.

¹¹ Two rounds of consultation were carried out, after which a reduction of 2.1 percentage points was obtained in the mean interquartile range.

After due reflection, therefore, we have opted to consider two alternatives.

1. First, U-Ranking Degrees offers the option of the system earlier described as *personalized ranking*, based on the user's own preferences. We understand that in this case users are more likely to seek to compare the universities with fairly closely defined interests and diverse criteria, probably different from those of the experts. For this reason, with the help of a web tool, users can state the importance for them of each of the three dimensions when placing the degrees in order, and the tool automatically offers them the ranking corresponding to the preferences revealed by the user.

To apply this first approach we have considered various alternatives for the choice of weights by the user. We opted for the procedure known as Budget Allocation Process, that is, for the distribution by the user of 100 points among the dimensions to be valued. This method, widely used in marketing to find out a consumer's valuation of the characteristics of a product, has the principal advantage of forcing the user to adopt a more active and reflexive position by having to distribute the points, being therefore more aware of the opinion that he/she displays.

2. Second, for the general rankings (U-Ranking and U-Ranking Volume), corresponding to the universities' activities as a whole, the three dimensions are weighted on the basis of the experts' opinions, according to a survey such as that mentioned above when aggregating areas into dimensions, and a Delphi process to achieve convergence among the experts' opinions.

The weights finally granted to teaching, research, and to technological development and innovation, are those corresponding to the Delphi among the experts, respectively 56%, 34% and 10%.

2.7. PERFORMANCE RANKINGS VS. VOLUME RANKINGS

When comparing universities, it is relevant whether or not their size is taken into account. Making one choice or the other is not in itself a methodological advantage or failure, but implies adopting a particular perspective which affects the rankings and must be borne in mind when interpreting the results.

In the same way as when analyzing the activity of a firm or a country we can consider its volume of output or its performance in its achieving them, and both positions are reasonable, so it occurs in the case of analysis of the results of universities. Neither of the two approaches is, *a priori*, more valid than the other, and the choice depends on the intended use of the results. Likewise the per capita GDP is more useful than total GDP when comparing the quality of life between countries or regions, but the volume or the growth of GDP are also important for explaining, for example, the employment generated. So, although in some cases the performance of the results may be more important than their volume, in other cases the size may also be relevant. A very productive and at the same time large university is more beneficial to society than one that offers the same quality but has a small size; likewise, a very large university with a poor level of results is a much bigger problem than a small university with the same level of results.

2.7.1. Interest of the two approaches

The existing rankings adopt on occasions an approach based on the performance of the results and in other cases on the volume of results. For example, some of the most cited international rankings—especially, the Academic Ranking of World Universities (ARWU), known as the Shanghai Ranking—are volume rankings.

The Shanghai Ranking can be said to be one rather of volume, because most of the variables from which it is built—number of Nobel prize-winners or Fields medalists among their ex-students or staff, widely cited researchers, publications in Nature or Science, articles

published in indexed journals— are not relativized by the size of the university. Such variables form the greater part of the weight in the ranking, while only one—an indicator of academic performance—is expressed in *per capita* terms. So, the universities' positions are conditioned both by their quality and by their size, both qualities being necessary for reaching good positions in this ranking.

Other rankings, on the other hand, make their comparisons from the point of view of quality. Such is the case of the QS World Universities Ranking, whose indicators are taken from surveys of academic reputation or are variables standardized by size. There are also examples of rankings that expressly contemplate both approaches, and make differentiated comparisons based on quality or on the total volume of results, as does the I-UGR Ranking¹² of research results (www.rankinguniversidades.es).

The reason for acknowledging the interest of both approaches is that the size of institutions can be relevant for valuing the contributions of the universities, but correcting the results for size permits us to compare the universities from a perspective that makes them, in a certain sense, more homogeneous. However, since it has already been pointed out that it is not the same for the university system that a university of high (low) quality is large or small, we should ask whether the universities' positions would be the same in terms of performance as in terms of volume of results and underline the specific meaning of both rankings. To sum up:

- The rankings of volume of production are based on indicators not relativized by size, and depend on both the university's performance and its size. Thus, a university may generate a greater volume of research results than another of smaller size, even though the second is more productive.
- The performance rankings are based on indicators of results corrected by size, and seek to measure the output per unit of inputs or resources used. For example, scientific output is measured as a function

of the number of faculty members with PhD and the teaching results are relativized by the number of students. This enables some smaller universities to obtain a better final result in the ranking than other much larger ones.

An interesting question is whether size influences performance positively or negatively, that is, whether performance/efficiency increases or decreases with the size of the university. In the first case, the universities' positions in the rankings of volume would be favored by two factors (size and performance). The testing of the two hypotheses is an empirical matter, which can be analyzed by drawing up both types of rankings using the same approach, as the ISSUE project does. This test will be presented later.

2.7.2. Treatment of the size of universities

The selection of simple indicators with which we started implies that all are relativized depending on the variable considered most appropriate (students, faculty members, budget, etc.), so that size does not have a direct influence on the results. Consequently, the general scheme of the methodology described leads to measuring each university's results independently of its size, so these are performance rankings. Therefore, to construct volume rankings, the size variable has to be added to the indicators hitherto described. This task has been undertaken following the criteria detailed below.

The first criterion for introducing the role of size into the system of rankings defined in the rest of the project is to preserve, as far as possible, the methodological homogeneity of both rankings, calculating them on the basis of the same set of indicators and with the same aggregation criteria. This criterion makes it advisable not to draw up the ranking of volume simply by not relativizing those indicators that can be expressed in total terms—for example, reflecting the income from patents or the doctoral theses read without dividing them by the number of faculty members with PhD—as the Shanghai Ranking does.

The reason for not proceeding thus is that some variables like those cited can be presented in

¹² This ranking was last updated in 2014.

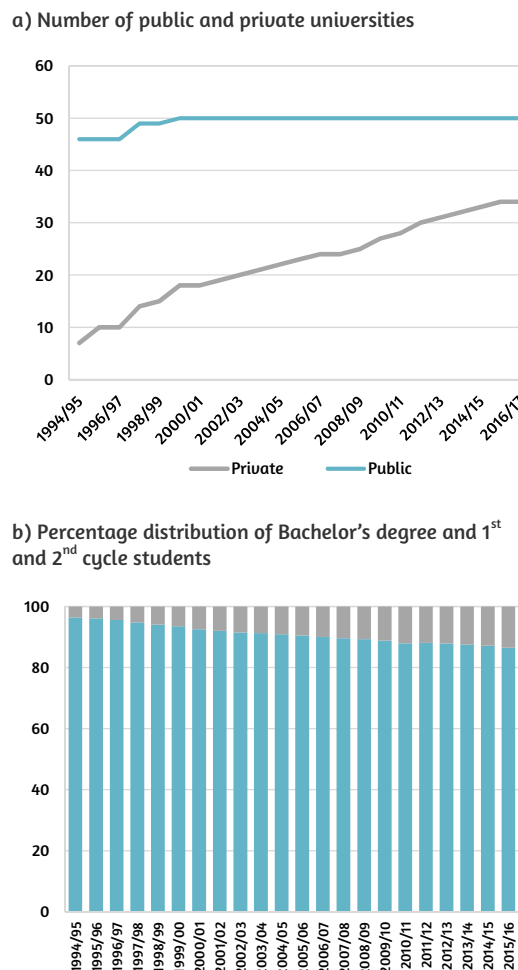
absolute terms but others cannot, being rates or indices —such as the percentage of publications in the first quartile or the mean impact of publications factor—. If some variables are expressed in absolute terms and others are not, the relative importance of the size within the results would fall only on the variables that can be expressed in absolute terms. In that case, the importance accorded to size would depend implicitly on the proportion of those variables that can be expressed in absolute terms. For example, in the variables considered in our study only 13 of the 25 indicators finally used could be expressed in absolute terms, which would be equivalent to the acknowledged importance of size being 52%. This percentage would be arbitrary because it would reflect the proportion of indicators that form part of the database and can be expressed in absolute terms.

So this solution is unsatisfactory, and we have explored other alternatives for introducing size. The option chosen consists of calculating the total volume of results of each university by multiplying the performance index by a measure of size. We have considered three indicators of the size of a university: the number of faculty members, the number of students, and the budget. Each one has its specificities and can be a better proxy of different aspects of the university's activity that do not have the same importance in each of them. To avoid skewing the size proxy in one or other direction in the most general indices—which could favor some institutions by giving greater weight to one of the aspects—we have taken as indicator of size the standardized arithmetic mean of the three variables.

2.8. PRIVATE UNIVERSITIES

Private universities are an important part of the Spanish university system. As shown in figure 1, they have experienced a large growth in the last twenty years, multiplying by four their number to 34 institutions out of 84 that make up the entire Spanish university system today (see panel a). Likewise, the amount of students has more than tripled in number, exceeding 178,000 Bachelor's degree students. As shown in panel b of figure 1, the market share of private university Bachelor's degree students has increased, being higher than 13% in the 2015-2016 academic year.

Figure 1. Evolution of the number of private universities and students. 1994/95 to 2016/17 academic years



Note: Information for the 2015-16 academic year students contains provisional data.

Source: Registro de Universidades Centros y Titulaciones (2016) and Spanish Ministry of Education, Culture and Sport.

For these reasons, in the third edition of U-Ranking we decided to include those private universities for which the quantity and quality of available information complied with the methodological standards of this project, which was possible for 11 private institutions.

Due to the idiosyncrasies of private universities, two of the indicators defined in the methodology, "Total *sexenios* over possible *sexenios*" (Research) and "Cut-off marks"¹³ (Teaching), are

¹³ The cut-off mark is the mark of the last student who gained admission to a degree with limited places. This

not applicable to these institutions. In the first case, the *sexenios* are a monetary compensation that the Spanish Ministry of Education, Culture and Sport gives to teachers in recognition of their research activity based on six years.¹⁴ In the second case, students must pass a university admissions test (PAU) and upper secondary education tests in order to study a degree regardless of whether it is offered by a public or private university. In the case of private universities, although it is a requirement, the mark obtained does not always constitute a criterion of admission, since the majority of these universities have their own procedures, based on specific tests, personal interviews and academic record. Therefore, private universities do not publish cut-off marks for their degrees.¹⁵

Furthermore, it should be emphasized that, in general, information on innovation and technological development is more limited in private universities. It was already difficult, in the case of public universities, to obtain public and homogeneous information, since there are few sources. The Spanish RedOtri survey on *Research and Knowledge Transfer* is the main source of data and requires active participation of the universities that must complete the survey and authorize the diffusion of data. So far, there was less participation on behalf of private universities than public ones, due either to their management model or because their specialization makes them focus less on these activities.

All these things considered, for this year's edition we have reviewed all the information available for private universities and our criteria has been to include those institutions which can

provide at least 18 indicators out of the 25 considered for the public system.¹⁶ Specifically, in the fifth edition of U-Ranking the following private universities are analyzed:

- Mondragon Unibertsitatea
- Universidad a Distancia de Madrid
- Universidad Antonio de Nebrija
- Universidad Católica de Valencia San Vicente Mártir
- Universidad de Deusto
- Universidad de Navarra
- Universidad Europea Miguel de Cervantes
- Universidad Pontificia Comillas
- Universitat de Vic
- Universitat Internacional de Catalunya
- Universitat Oberta de Catalunya
- Universitat Ramon Llull
- Universidad San Jorge

In the 2017 edition the number of private universities analyzed remains the same as last year's edition, however, the Universidad Europea de Madrid has ceased to be included since the information available on one of the indicators is more than 6 years old. On the other hand, another university, the Universidad Antonio de Nebrija, which meets the minimum requirement of 18 indicators, has been incorporated for the first time to the study.

mark is only a guideline and varies from one year to the next, depending on the number of free places and the marks of the students registered.

¹⁴ Recently, certain private universities have signed agreements with the National Evaluation Committee on Research Activities (CNEAI) for the recognition of their research activity; however, this information is not available yet.

¹⁵ For private universities, the cut-off mark for each degree is 5 since the prerequisite is to pass the university admissions test.

¹⁶ Since the indicators are based on moving averages, the requirement has been for each of the chosen indicators, with data offered by CRUE, to have information that would enable to calculate them.

3. Rankings personalized by the user

The appropriate response to one of the issues related to the aggregation of the information analyzed in the previous point—the importance assigned to each of the aspects of a complex problem when evaluating it synthetically—may depend on the user. Certainly, in the case of the universities, there are different dimensions in their performance, but also different profiles of users interested in them: undergraduate or postgraduate student, teacher, manager, member of the governing team or of the Board of Directors, head of university policy in the Public Administration, journalist, interested citizen, etc. The importance granted by each to the different activities of the universities may be different and their interest may focus on one or more of their activities. For example, students are likely to focus their interest on those aspects of the university related with the degree that they wish to study and teachers may focus more on research.

Given the high number of users that might value the universities' activity from this particular viewpoint, it makes sense to consider the possibility of drawing up personalized rankings, established taking into account the interest from which the user contemplates the universities. The U-Ranking project considers this question for the case of Bachelor's degrees, in order to offer a tool to facilitate for students, their families and careers advisers, information on the ranking of degrees, taking into account their specific interests.

3.1. EXAMPLES OF PERSONALIZED RANKINGS

The possibility of constructing synthetic indicators acknowledging the preferences of users has been possible for a relatively short time, thanks to the interactivity permitted by web tools. Through them, the user can value for him/herself each one of the dimensions

considered, indicating which areas he/she wants to consider and which are the most important for him/her. Web technology allows these preferences revealed by the users to be incorporated and combined with other elements contributed by the experts, such as the selection of variables and aggregating them in intermediate indicators according to criteria as described in section 2.

Two interesting examples of this approach, referring to very distinct areas, are those corresponding to the quality of life index Better Life Index, drawn up by the OECD, and the CHE Ranking, a ranking of university degrees drawn up by the German Center for Higher Education.

The OECD draws up a synthetic index that allows countries to be ranked according to their characteristics in various areas relevant to the quality of life (access to housing, income, education, security and safety, etc.), according to the aspects most valued by the user. These valuations are introduced through the website, on which a score must be assigned to each one of the dimensions of quality of life considered.

The experts prepare the set of relevant dimensions and variables and, after the user has introduced his/her valuation of each area, the web tool shows a synthetic index of quality of life that takes into account the weights awarded by the user.

A similar approach is used by one of the university rankings analyzed, the [CHE Ranking](#), drawn up by Germany's Center for Higher Education for the journal *Zeit*. In this case, the student who wishes to choose a degree should select the subject he/she wishes to study, the type of course that interests him/her and the aspects that he/she considers most important (the teaching, the subsequent employment opportunities, research, etc.). Based on these preferences, a personalized university ranking is created.

OECD Better Life Initiative

Index Countries Topics

Create Your Better Life Index

How do you define a better life? Use our interactive tool to see how your country performs on the topics you feel make for a better life.

Start with all topics rated equally or set your own preferences here.

Create Your Better Life Index
Rate the topics according to their importance to you:

- Housing
- Income
- Jobs
- Community
- Education
- Environment
- Governance
- Health
- Life Satisfaction
- Safety
- Work-Life Balance

Share this index

The petal size shows how each country performs on each topic.
The height indicates the general position in the rankings.

WHAT SHOULD I STUDY? > CHE RANKING

Keyword Search | | About the Ranking | My Campus

CHE UNIVERSITY RANKING 2017/18

Germany's largest university ranking

Which subject? | What type of institution/degree? | Show ranking

CHE Ranking	RELIABLE Scientifically consolidated	INDIVIDUAL Choose own criteria	EASY Get result with a few clics
-----------------------	--	--	--

Example:

CHE Ranking

Show ranking

← to home page

ECONOMICS

UNIV./UAS | [SUBJECT DESCRIPTION](#) [SWITCH TO GRAPHICAL VIEW](#)

Here you find an overview of the universities in the ranking with some selected results.
Click on the names of the universities to see detailed results! [more information](#)

● top group ● middle group ● bottom group - not grouped

SHOW VALUES

Please choose up to 6 criteria

5. Publications per year (F) ⚙

4. Courses offered (S) ⚙

3. Graduations in appropriate time bachelor's [%] (F) ⚙

2. Overall study situation (S) ⚙

1. Total main subject students (F) ⚙

SORTING

🔼 alphabetical 🔼 according to rank groups 🔼 1/5 🔼 2/5 🔼 3/5 🔼 4/5 🔼 5/5

Mark and compare universities

<input type="checkbox"/> Uni Augsburg	610	●	-	●	●
<input type="checkbox"/> Uni Bamberg	820	●	●	●	●
<input type="checkbox"/> Uni Bayreuth	1260	●	●	●	●
<input type="checkbox"/> FU Berlin	790	-	●	-	●
<input type="checkbox"/> HU Berlin	740	-	●	-	●
<input type="checkbox"/> HWR Berlin	350	-	●	●	-
<input type="checkbox"/> TU Berlin	560	-	●	-	●
<input type="checkbox"/> Uni Bonn	1560	●	●	●	●
<input type="checkbox"/> TH Deggendorf	150	-	-	-	-
<input type="checkbox"/> Uni Düsseldorf	930	●	●	●	●
<input type="checkbox"/> Uni Duisburg-Essen/Essen	970	●	●	●	●
<input type="checkbox"/> Uni Freiburg	2340	-	●	-	●
<input type="checkbox"/> Uni Göttingen	1310	●	●	●	●
<input type="checkbox"/> Uni Halle-Wittenberg	220	-	●	-	●
<input type="checkbox"/> Uni Hamburg	790	-	●	-	●
<input type="checkbox"/> Uni BW Hamburg	130	-	●	-	●
<input type="checkbox"/> Uni Heidelberg	1180	●	●	●	●
<input type="checkbox"/> Uni Kiel	1510	-	●	-	●
<input type="checkbox"/> Uni Köln	1770	-	●	-	●
<input type="checkbox"/> Uni Lüneburg	170	-	-	-	-
<input type="checkbox"/> Uni Magdeburg	320	-	●	-	●
<input type="checkbox"/> Uni Mannheim	880	●	●	●	●
<input type="checkbox"/> Uni Marburg	430	●	●	-	●
<input type="checkbox"/> LMU München	1600	●	●	●	●
<input type="checkbox"/> Uni Münster	830	●	●	●	●
<input type="checkbox"/> HFWU Nürtingen	380	●	●	●	-
<input type="checkbox"/> HS Osnabrück	150	●	●	●	-
<input type="checkbox"/> Uni Passau	70	-	-	-	●
<input type="checkbox"/> Uni Potsdam	580	-	●	-	●
<input type="checkbox"/> Uni Regensburg	500	●	●	●	●
<input type="checkbox"/> HS Rhein-Waal/Kleve	440	-	-	-	-

Academic studies and teaching

Contact to students (S) ⚙

Courses offered (S) ⚙

Overall study situation (S) ⚙

Research orientation (S) ⚙

Study organisation (S) ⚙

Support in the study entry phase (F) ⚙

Teacher support (S) ⚙

Equipment

IT-infrastructure (S) ⚙

Library (S) ⚙

Rooms (S) ⚙

Result of study

Graduations in appropriate time bachelor's [%] (F) ⚙

Graduations in appropriate time master's [%] (F) ⚙

International orientation

International orientation bachelor's [points] (F) ⚙

International orientation master's [points] (F) ⚙

Support for stays abroad (S) ⚙

Students

Total main subject students (F) ⚙

Job market and career-orientation

Bachelor theses in cooperation with an enterprise [%] (F) ⚙

Contact to professional practice master's [points] (F) ⚙

Contact to work experience bachelor's [Points] (F) ⚙

Job market preparation (S) ⚙

Master theses in cooperation with an enterprise [%] (F) ⚙

Share of professors with work experience [%] (F) ⚙

Teaching by practitioners [%] (F) ⚙

Research

Doctorates per professor (F) ⚙

Publications per year (F) ⚙

Research reputation [%] (P) ⚙

Third party funds per academic [TE] (F) ⚙

Town and University

Population of the town (F) ⚙

Proportion of students in this town [%] (F) ⚙

Student accommodation rent [€] (F) ⚙

Students at this campus (F) ⚙

Restore pre-selection
(S)-Students' judgements; (F)-Facts; (P)-Professors' judgements

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3.2. DESCRIPTION OF THE WEB TOOL FOR GENERATING PERSONALIZED RANKINGS OF DEGREES

This personalized rankings approach has been used in the U-Ranking Project to arrange degrees in order, constructing rankings of universities for the different Bachelor's degrees. In the future it is intended to extend this approach to other aspects of university activities, in particular to Master's degrees, when the necessary databases are available.

The value of a tool like this depends greatly on the effort made to facilitate its use. The objective of U-Ranking is to present a simple intuitive tool to minimize the number of clicks needed to obtain the relevant information, which is above all the corresponding ranking. This ease of use must be present both when limiting the degrees to be compared and when permitting the user to declare his/her preferences in order to draw up the personalized rankings.

The opinion as to when a user-friendly procedure has been achieved must also take into account the user's point of view. Therefore, to harmonize the tool with the most frequent potential users we performed trials among students of 17-18 years, who are less familiar with the concepts of the university world than the experts participating in the project. On the basis of these trials the necessary corrections were made to the tool in order to adapt it better to students and make understanding of the results easier.

The tool is presented on the screen of the project's website via the *Select University* tab. When this part of the screen is clicked, it shows the three questions that must be answered in order to obtain a ranking of a university adapted to the interests of the student in three aspects:

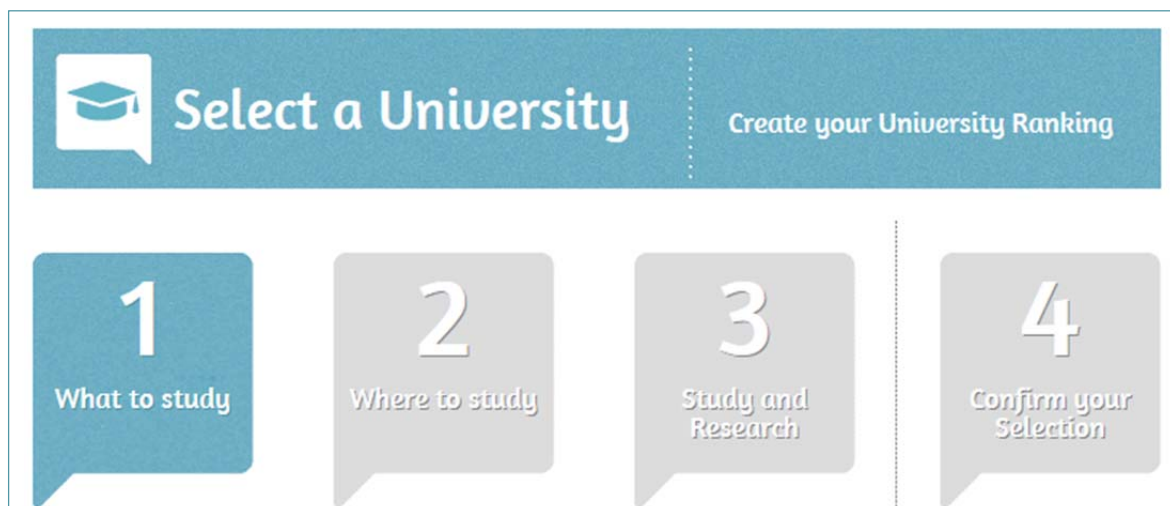
- *What to study*
- *Where to study*
- *Study and research*

When each of the three questions are clicked, a selection box opens in which the user has to choose, respectively:

- The Bachelor's degree or degrees that he/she wishes to study
- The autonomous community or regions whose universities he/she wants to compare
- The importance for the user of the teaching, research and innovation and technological development activities.

The user can choose either one or several options in the first two questions (one or several degrees; one, several or all of the autonomous communities).

To avoid having to make the choice among the over 2,600 different Bachelor's degrees offered by Spanish universities, the first selection window shows 2,312 degrees grouped into 26 *areas of study*.



Choose or find a degree

You can select various degrees from different areas of study

- Artistic Studies
 - Performing Arts and Dance Degrees
 - Fine Art Degrees
 - Creation and Performance of Music Degrees
 - Conservation and Restoration Degrees
 - Design Degrees
 - Film and Media Arts Degrees
- Philology, Literature, Languages and Translation
- Humanities, History and Philosophy
- Communication and Documentation Sciences
- Education, Sport and Exercise Sciences
- Law
- Economics and Business
- Social Studies and Administrative Science
- Geography and Planning
- Human Resources and Labour relations
- Biological Sciences
- Physics
- Geology, Environment and Marine Science
- Mathematics
- Chemistry
- Computer Science
- Civil Engineering and Architecture
- Industrial Engineering
- Agrifood Engineering
- Nursing and Podiatry
- Pharmacy
- Physiotherapy
- Medicine and Dentistry
- Other Health Sciences
- Psychology
- Veterinary

When one of these areas is clicked, a drop-down list is displayed showing the Bachelor's degrees that it contains. Thus, for example, when the "Artistic Studies" area of study is selected the Bachelor's degrees contained in this area of study are displayed.

The names of the degrees that appear in the drop-down list are not exhaustive or literal either, as those Bachelor's degrees with very similar names have been grouped, as for example "Humanities" and "Humanities and social studies" have been grouped under the name "Humanities Degrees". In this way the initial more than 2,300 Bachelor's degrees have been reduced to 139, to make the user's decision easier. However, irrespective of this initial reduction, the final results do show the complete title of the degree, as well as the center where it is taught in case there are various options.

Choose where you want to study

You can select several regions

- Any region
 - Andalusia
 - Aragon
 - The Canary Islands
 - Cantabria
 - Castile and Leon
 - Castile-La Mancha
 - Catalonia
 - Madrid
 - Navarre
 - The Valencian Community
 - Extremadura
 - Galicia
 - The Balearic Islands
 - La Rioja
 - The Basque Country
 - Asturias
 - Murcia

The second step is to choose the autonomous community or regions that are being considered as places in which to study. For this, the user must mark those chosen on the following table, one of the options being "Any region". The option of restricting the search to specific

autonomous communities is a response to the fact that many students do not contemplate geographical mobility as an alternative, or contemplate it restrictively. In this case, their interest will be to know which of the studies offered are valued best in the territories that he/she is considering. Anyway, complementary information is offered so that they can position their options relative to the remaining offers of the Spanish University System.

Thirdly, the user must declare his/her preferences with regard to the importance given to study and research when valuing the universities' profiles, assigning the 100 points available to him/her according to the weight he/she wishes to grant to teaching, research, and innovation and technological development.

The screenshot displays a user interface for the U-Ranking 2017 tool. At the top, a blue speech bubble contains the number '4' and the text 'Confirm your Selection'. Below this, a smaller blue box contains the text 'Remember you can return to any section to change your preferences'. A large blue arrow button with a graduation cap icon and the text 'Create your own ranking' is positioned below the reminder. The interface is divided into three numbered sections:

- Section 1:** A blue speech bubble with the number '1' and the text 'Economics Degrees' below it.
- Section 2:** A blue speech bubble with the number '2' and a list of autonomous communities: 'Andalusia', 'Madrid', 'Navarre', and 'The Valencian Community'.
- Section 3:** A blue speech bubble with the number '3' and a breakdown of preferences: 'Teaching 56%', 'Research 34%', and 'Innovation and Technological Development 10%'.

 At the bottom of the interface, another large blue arrow button with a graduation cap icon and the text 'Create your own ranking' is visible.

As the user chooses the degrees and the autonomous communities of his/her interest and distributes the 100 points among the three dimensions in such a way as to reflect his/her preferences, the decisions are registered in the boxes below. Once the information is introduced in the three fields, the "Create your own ranking" button appears on screen.

When this button is clicked the personalized ranking corresponding to the selection criteria introduced is displayed, showing in order the corresponding Bachelor's degrees of the universities that offer those studies in the territories considered. The user is also informed that there are other options in addition to those selected in the same area of study, in case he/she is interested. This more complete set of alternatives is offered in a pdf file.

The first column shows the position of the Bachelor's degree in the personalized ranking. The second shows the value of the index reached for the particular degree. As we observe in the example, various Bachelor's degrees can occupy the same position in the ranking, since the indices are rounded to one decimal because greater precision is not considered to reflect, more accurately, differences among the degrees.

Together with the names of the Bachelor's degrees appears a link to the web address of each university. Next the cut-off mark of the last year is indicated and the price per credit on first registration, information that is completed when various centers of a university impart the same Bachelor's degree, if it is offered in one center or there is any commentary relating to the cost of the degree. The last columns at the right show the information on the environment which will be described in the next section.

To sum up, the web tool for constructing personalized rankings is easy to use, very flexible, and is underpinned by a rigorous methodology identical to the one described in previous sections on how general rankings are constructed. Therefore, it is a complement to the latter with a high potential for students, families and careers counsellors, as well as for the universities themselves. For this potential to be effective, it is essential to keep all the supporting information up-to-date and to constantly incorporate improvements, taking the users' experience into account, work which is currently underway.

Pharmacy
In the selected regions there are 16 options for the chosen degrees

Also available in pdf.



Ranking	Index	University	Degree	WWW	2016/2017 (*)		Environment
					Cut-off mark	Cost	
1	1.3	Universitat de Barcelona	Grado en Farmacia	WWW	9.46	26.83	€ ☀️ 🏛️ 🚗
2	1.2	Universidad Miguel Hernández de Elche	Grado en Farmacia	WWW	9.99	24.89	€ ☀️ 🏛️ 🚗
2	1.2	Universidade de Santiago de Compostela	Grado en Farmacia	WWW	9.41	13.93	€ ☀️ 🏛️ 🚗
2	1.2	Universitat de València	Grado en Farmacia	WWW	10.22	24.89	€ ☀️ 🏛️ 🚗
3	1.1	Universidad de Granada	Grado en Farmacia	WWW	8.99	12.62	€ ☀️ 🏛️ 🚗
3	1.1	Universidad de Murcia	Grado en Farmacia	WWW	11.13	16.78	€ ☀️ 🏛️ 🚗
3	1.1	Universidad de Sevilla	Grado en Farmacia	WWW	9.72	12.62	€ ☀️ 🏛️ 🚗
4	1	Universidad Complutense	Grado en Farmacia	WWW	10.40	28.22	€ ☀️ 🏛️ 🚗
4	1	Universidad de Alcalá de Henares	Grado en Farmacia	WWW	9.96	28.22	€ ☀️ 🏛️ 🚗
4	1	Universidad de Salamanca	Grado en Farmacia	WWW	8.15	24.17	€ ☀️ 🏛️ 🚗
4	1	Universidad del País Vasco	Grado en Farmacia	WWW	9.40	19.84	€ ☀️ 🏛️ 🚗

3.3. COMPLEMENTARY INFORMATION ON THE UNIVERSITIES' ENVIRONMENTS

The geographical and social environment in which a university is situated influences the users' valuations of its services. In particular, the costs of accessing the services can condition decisions affecting their demand. This seems to be indicated by, for example, the distribution of foreign students of the Erasmus Program. For this reason, it has been considered appropriate to include information on environmental variables as a complement to that offered by the rankings.

After reflecting on how to include such information, we came to the conclusion that the data of the environment should be treated differently from the rest of the variables considered, since they represent circumstances external to the universities and not features that are under their control. For this reason, we

decided to provide the information without integrating it with the indicators computed in the ranking as a complement to them.

We have included four categories of environmental variables: a) climate —temperatures and rainfall— b) cost of living —housing prices—, c) accessibility —airports, railways and their connections— and d) socio-cultural environment —art and entertainment activities. This information is presented by means of a system of icons (similar to that of hotel guides) to make easier the identification of the advantages of the universities in these four aspects. The web tool offers up to four icons against each university, one for each environmental category considered, when the environment reinforces the university's attraction. The size of the icon indicates, intuitively, what university environments offer him/her a better quality of life (see, for example, the following diagram).

To decide the size of the corresponding icons, a synthetic indicator¹⁷ has been calculated for each of them, based on the data available, which in general is by province. After arranging the provinces in order of these indices, a large icon is assigned to those universities located in provinces situated in the tertile with highest value in the distribution (best climate, highest cost, greatest connectivity, most socio-cultural opportunities) and an identical but smaller icon to those in the second tertile (between 33% and 66%); finally, those in the third tertile are indicated with even smaller icons.



It should be taken into account that three of the four environmental characteristics are more favorable the larger the icon (climate, transport and socio-cultural opportunities), while a higher cost of living must be understood as less attractive.

The same as in previous editions, the 2017 edition also includes the price per credit for over 2,300 Bachelor's degrees analyzed by U-Ranking, based on information provided by the Spanish Ministry of Education, Culture and Sport. In recent years university fees have increased considerably and unequally. These prices, despite the maximum limit set by the Spanish Ministry, can vary depending on the autonomous community, the university, the cycle —Bachelor, Master, Doctorate— the level of experimentality of the degree and the ownership of the center¹⁸ offering

¹⁷ The synthetic indicators were constructed, for those environmental variables with more than one indicator, by first standardising each indicator with respect to its distance (ratio) from the median and then applying a geometric mean to those indicators. Next, each sample was divided into three sets bounded by the tertiles of each distribution in order to subsequently assign them to each group.

¹⁸ U-Ranking also includes Bachelor's degrees imparted by private centres attached to public universities. In general, the price of these degrees includes an extra cost above public prices.

that degree. As can be appreciated in table 5, the current range of fees by regions is considerable, even more if differences of experimentality and cycle are considered.

For this reason, it can be considered relevant that, as a guide, the user of U-Ranking will be able to know the price per credit at first registration for each Bachelor's degree. The prices included in U-Ranking correspond to those established for the academic year 2016-2017. Also, the cost was included by degree course offered by private universities when this information was available on their web pages.

Table 5. Public price per credit at the time of first enrolment by region. 2016-2017 academic year (€/credit)

Region	Average price	Min. price	Max. price
Andalusia	12.62	12.62	12.62
Aragon	20.15	13.77	25.83
Asturias	17.13	12.11	22.03
The Balearic Islands	17.92	12.88	23.13
The Canary Islands	15.21	12.30	18.95
Cantabria	13.50	10.65	16.65
Castile-La Mancha	15.81	12.13	18.87
Castile and Leon	23.34	17.07	30.25
Catalonia*	25.14	18.95	29.65
The Valencian Community	20.39	16.31	24.89
Extremadura	14.74	10.31	18.51
Galicia	11.89	9.85	13.93
Madrid*	25.94	23.09	28.22
Murcia	15.58	14.38	16.78
Navarre	19.22	15.90	22.53
Basque Country	16.88	14.08	19.84
La Rioja	18.37	14.14	23.51
UNED	16.06	13.00	21.60

* Tuition fees in Catalonia vary depending on the student's income. For statistical purposes the average price for each category has been calculated, according to the information available in the regional bulletin. In the maximum category the highest credit price is 39.53 and the lowest 19.77; in the medium category the highest price is 35.77 and the lowest 17.89; and in the minimum category the highest price is 25.27 and the 12.64 lower and range from the set price to 50% of this price.

Source: Spanish Ministry of Education, Culture and Sport.

4. Main results

This chapter offers the principal results obtained in this fifth edition of U-Ranking, corresponding to 2017, in which both the general rankings and the personalized rankings of Bachelor's degrees have been updated. Both rankings are available in full on the project website www.U-ranking.es.

The 2017 rankings will be analyzed from six different perspectives in order to emphasize the contribution made by the project and its methodology: a) comparing them with other rankings already known in order to evaluate their similarities and differences; b) assessing the sensitivity of the results to changes in some of the hypotheses put forward, specifically the relative weights assigned to the teaching and research activities, and the importance of considering or not the size of the university; c) comparing the 2016 results with those of the 2017 edition; d) analyzing the differences in the performance of the various regional university systems; e) analyzing, as a one-off exercise for the 2017 edition, the results on graduate employability and the impact of this new factor on the U-Ranking 2017.

4.1. U-RANKING

Table 6 offers the ranking of 61 Spanish universities according to their indices of performance (U-Ranking). Keeping in mind that performance is the relationship between the volume of the results of the universities in the areas analyzed and the resources used to accomplish them, i.e. if two universities generate the same results, the one that makes use of less resources to achieve them will have a higher performance. The order is based on the value of the synthetic indicator obtained by each university, offered in the second column. This indicator has been rounded to one decimal as a greater detail of the index would not reflect more accurately the differences among universities,

given the set of decisions adopted in the process of construction of indicators already described.

As the table shows, various universities obtain the same index and therefore present the same position in the ranking. As a result of this criterion, the 61 universities are grouped into eleven levels of performance. Those universities with the same index have been ordered alphabetically within their group. Only those cardinal and ordinal aspects of the universities that make notable differences will be commented upon.

Two important changes have been made in table 6 of this edition. First, universities that are 15 years or younger are marked with an asterisk (*), so the reader can put into context the results in the following sense. While a university must be able to show since the start its teaching potential, because its graduates must acquire all the competences associated to a degree, however, most results in research or innovation and technological development require a certain amount of time in order to create research teams and generate physical capital (i.e. equipment and infrastructures) which are needed to develop their full potential. Thus, pointing out the universities with 15 years or less of existence allows the reader to better understand why the results for these universities in research and transfer are often lower.

The second significant change in table 6 is that at the end it includes a list of the universities that have not been analyzed because of insufficient information to construct the indices. The aim is to point out the transparency exercise involved in generating and communicating the needed information by the universities included in the rankings, regardless of the position they occupy.

Regarding the results, an aspect worth mentioning is that the range of the index from which this ranking is derived continues to show, as in previous editions, significant differences of performance among the Spanish universities, the

Table 6. U-Ranking of the Spanish universities

Ranking	Index	University	Ranking	Index	University	Ranking	Index	University
1	1.8	Universitat Pompeu Fabra	6	1.1	Universitat de Lleida	9	0.8	Universitat Oberta de Catalunya
2	1.5	Universitat Politècnica de Catalunya	6	1.1	Universitat Jaume I de Castellón	10	0.7	UNED
3	1.4	Universidad Carlos III de Madrid	6	1.1	Universitat Ramon Lull	10	0.7	Universidad A Distancia de Madrid*
3	1.4	Universidad de Rovira i Virgili	7	1	Universidad Complutense de Madrid	11	0.6	U. Europea Miguel de Cervantes*
3	1.4	Universitat Politècnica de València	7	1	Universidad de Granada	11	0.6	Universidad San Jorge*
4	1.3	Universidad de Autónoma de Madrid	7	1	Universidad de Málaga	IE Universidad Universidad Alfonso X El Sabio Universidad Camilo José Cela Universidad Cardenal Herrera-CEU Universidad Católica San Antonio Universidad Católica Santa Teresa de Jesús de Ávila Universidad del Atlántico Medio * Universidad Europea de Canarias* Universidad Europea de Madrid Universidad Europea de Valencia* Universidad Europea del Atlántico* Universidad Fernando Pessoa-Canarias* Universidad Francisco de Vitoria* Universidad Internacional de Andalucía Universidad Internacional de La Rioja* Universidad Internacional Isabel I de Castilla* Universidad Internacional Menéndez Pelayo Universidad Internacional Valenciana* Universidad Loyola Andalucía* Universidad Pontificia de Salamanca Universidad San Pablo-CEU Universidad Tecnología y Empresa* Universitat Abat Oliba CEU*		
4	1.3	Universidad de Cantabria	7	1	Universidad de Salamanca			
4	1.3	Universitat Autònoma de Barcelona	7	1	Universidad de Sevilla			
5	1.2	Universidad de Deusto	7	1	Universidad Politécnica de Cartagena			
5	1.2	Universidad de Illes Balears	7	1	Universidad Rey Juan Carlos			
5	1.2	Universidad de Navarra	7	1	Universidade da Coruña			
5	1.2	Universidad Miguel Hernández de Elche	8	0.9	Universidad Antonio de Nebrija			
5	1.2	Universidade de Santiago de Compostela	8	0.9	Universidad de Burgos			
5	1.2	Universitat de Barcelona	8	0.9	Universidad de Cádiz			
5	1.2	Universitat de València	8	0.9	Universidad de Castilla-La Mancha			
6	1.1	Mondragón Unibertsitatea	8	0.9	Universidad de Extremadura			
6	1.1	Universidad de Alcalá	8	0.9	Universidad de Huelva			
6	1.1	Universidad de Alicante	8	0.9	Universidad de Jaén			
6	1.1	Universidad de Almería	8	0.9	Universidad de La Rioja			
6	1.1	Universidad de Córdoba	8	0.9	Universidad de León			
6	1.1	Universidad de Murcia	8	0.9	Universidad de Oviedo			
6	1.1	Universidad de Zaragoza	8	0.9	Universidad de Valladolid			
6	1.1	Universidad del País Vasco	8	0.9	Universitat de Vic			
6	1.1	Universidad Pablo de Olavide	8	0.9	Universitat Internacional de Catalunya			
6	1.1	Universidad Politécnica de Madrid	9	0.8	Universidad Católica de Valencia*			
6	1.1	Universidad Pública de Navarra	9	0.8	Universidad de La Laguna			
6	1.1	Universidade de Vigo	9	0.8	U. de Las Palmas de Gran Canaria			
6	1.1	Universitat de Girona	9	0.8	Universidad Pontificia Comillas			

Notes: Universities are ordered from the highest to the lowest index value. Universities with the same index value are ordered alphabetically. Universities that have not been analyzed due to lack of data are shaded in dark grey.

*Universities 15 years or younger.

Source: BBVA Foundation-Iuie

most productive ones doubling the results of those in the last positions. As an example of this, the first university of the U-Ranking triples the performance value of the last one.

In U-ranking, the leading group is formed by fifteen universities occupying the first to the fifth positions (various universities share the same position). These universities are: Pompeu Fabra in first place, followed in second place by Universitat Politècnica de Catalunya. The third place corresponds to Carlos III of Madrid, Rovira i Virgili and Politècnica de València. The fourth place is occupied by three universities: Autónoma de Madrid, Universidad de Cantabria and Autònoma de Barcelona. In fifth place, the first two private universities appear, Universidad de Navarra and Universidad de Deusto, along with five public: Illes Balears, Miguel Hernández de Elche, Santiago de Compostela, Universitat de Barcelona and Universitat de València.

In sixth place, which is the last position above average, consists of 16 universities, featuring two new private ones, Ramon Llull and Mondragon. Other groups of universities with similar levels of performance are found in the following positions:

eight share the seventh position (equivalent to the average of the system), thirteen others are found in eighth place, five are in the ninth position, and finally, two are in the tenth and another two in eleventh place.

If we take a look at the universities in the top five positions, they are the same 15 universities as in the 2016 edition, with the exception of the inclusion of the University of Deusto and the exclusion (with only a one-place difference) of the Universidad Politécnica de Madrid and the Universitat Ramón Llull.

In sum, the 2017 U-Ranking results reveal much stability, indeed reasonable to expect as there are no major structural changes resulting from legislative amendments.

4.2. U-RANKING VOLUME

Table 7 shows the index and the ranking of Spain's 61 public universities according to their volume of results (U-Ranking Volume), which differs from that of performance because it is

Table 7. U-Ranking Volume of the Spanish universities

Ranking	Index	University	Ranking	Index	University	Ranking	Index	University
1	4.2	Universidad Complutense de Madrid	21	1	Universidad de Extremadura	29	0.2	Universitat de Vic
2	3.7	Universitat de Barcelona	21	1	Universidad de Cádiz	30	0.1	Universidad Antonio de Nebrija
3	3.2	Universitat de València	21	1	Universidad de Rouira i Virgili	30	0.1	Universidad A Distancia de Madrid*
4	3.1	Universidad del País Vasco	22	0.9	Universidade da Coruña	30	0.1	Universidad San Jorge*
4	3.1	Universitat Politècnica de València	22	0.9	Universidad de Cantabria	31	<0.1	Universidad Europea Miguel de Cervantes*
5	3	Universidad de Granada	22	0.9	Universidad de Illes Balears	IE Universidad Universidad Alfonso X El Sabio Universidad Camilo José Cela Universidad Cardenal Herrera-CEU Universidad Católica San Antonio Universidad Católica Santa Teresa de Jesús de Ávila Universidad del Atlántico Medio* Universidad Europea de Canarias* Universidad Europea de Madrid Universidad Europea de Valencia* Universidad Pablo de Olavide Universidad Fernando Pessoa-Canarias* Universidad Francisco de Vitoria* Universidad Internacional de Andalucía Universidad Internacional de La Rioja* Universidad Internacional Isabel I de Castilla* Universidad Internacional Menéndez Pelayo Universidad Internacional Valenciana* Universidad Loyola Andalucía* Universidad Pontificia de Salamanca Universidad San Pablo-CEU Universidad Tecnología y Empresa* Universitat Abat Oliba CEU*		
5	3	Universidad de Sevilla	23	0.8	Universitat Ramon Lull			
6	2.8	Universitat Politècnica de Catalunya	23	0.8	Universitat Jaume I de Castellón			
7	2.7	Universitat Autònoma de Barcelona	23	0.8	Universidad de Navarra			
8	2.6	Universidad Politécnica de Madrid	23	0.8	Universidad Miguel Hernández de Elche			
9	2.4	Universidad de Zaragoza	23	0.8	Universidad de Las Palmas de Gran Canaria			
10	2.3	Universidad de Autónoma de Madrid	24	0.7	Universitat de Girona			
11	2.2	Universidad de Santiago de Compostela	24	0.7	Universidad de Jaén			
12	2	UNED	24	0.7	Universidad de Almería			
13	1.8	Universidad de Málaga	24	0.7	Universitat Oberta de Catalunya			
14	1.7	Universidad de Murcia	24	0.7	Universidad Europea del Atlántico			
15	1.6	Universidad de Salamanca	25	0.6	Universidad de León			
15	1.6	Universidad Carlos III de Madrid	25	0.6	Universitat de Lleida			
16	1.5	Universidad de Alicante	25	0.6	Universidad de Deusto			
17	1.4	Universidad de Oviedo	25	0.6	Universidad Pública de Navarra			
18	1.3	Universidad de Valladolid	26	0.5	Universidad de Huelva			
18	1.3	Universitat Pompeu Fabra	27	0.4	Universidad Politécnica de Cartagena			
19	1.2	Universidad de Castilla-La Mancha	27	0.4	Universidad de Burgos			
19	1.2	Universidad de Alcalá	27	0.4	Universidad Católica de Valencia*			
19	1.2	Universidade de Vigo	27	0.4	Universidad Pontificia Comillas			
19	1.2	Universidad Rey Juan Carlos	28	0.3	Universidad de La Rioja			
20	1.1	Universidad de Córdoba	28	0.3	Mondragón Unibertsitatea			
21	1	Universidad de La Laguna	29	0.2	Universitat Internacional de Catalunya			

Notes: Universities are ordered from the highest to the lowest index value. Universities with the same index value are ordered alphabetically. Universities that have not been analyzed due to lack of data are shaded in dark grey.

*Universities 15 years or younger.

Source: BBVA Foundation-luie

obtained without correcting the effect of the size of each university. The underlying idea to justify the need for an index of this type is that a small university can also have a great performance (i.e. its researchers can publish almost all of their articles in first quartile [Q1] journals), but if its size is very small, the impact on the environment will be limited. A very large university may have a low performance (i.e. the percentage of articles published in Q1 journals is small), but its size makes the total output bigger (the total number of published Q1 articles will be higher), with a significantly relevant total impact.

Table 7 shows the universities ranked by the volume index. Standing out in first place is the Universidad Complutense, with an index (4.2) half a point higher than the university in second place, that of Barcelona (3.7). In third position is the Universitat de València, in the fourth the Politècnica de València and Universidad del País Vasco, and in fifth, the Universidad de Sevilla and Universidad de Granada. These seven universities are the same that occupied the first four places in the 2016 edition.

The top ten places are completed by the Universidad Politécnica de Catalunya (6), Autónoma de Barcelona (7), Politécnica de Madrid (8), Universidad de Zaragoza (9) and Universidad Autónoma de Madrid (10).

Following are the rest of the universities grouped in most cases by the same level of results. The number of different positions in this order is thirty-one, much more than in the performance ranking.

The most relevant changes at the top of the ranking correspond to Universidad de Zaragoza, Universitat Politècnica de Catalunya and Universidad del País Vasco, each rising two places, while Universidad Politécnica de Madrid dropped two positions.

As to private universities, the fact that they have a lower size than public universities is highlighted. Thus, in table 7, it can be observed that all the private universities are located in the lower half of the list, those private universities best positioned by their volume of results being the Universitat Ramon Lull and Universidad de Navarra.

4.3. U-RANKING VOLUME VS. U-RANKING PERFORMANCE

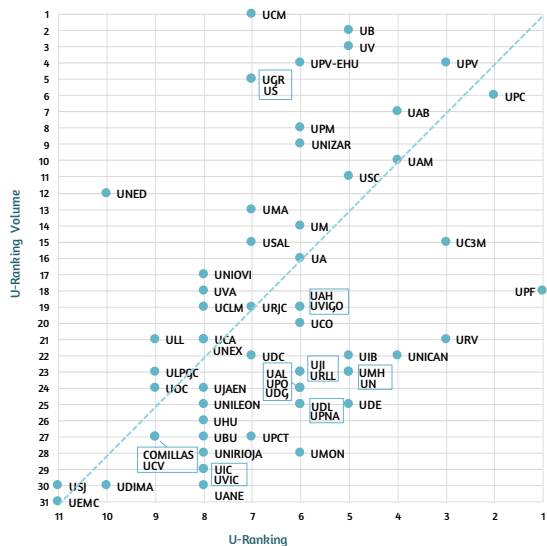
The comparison of the above two tables indicates that the differences between the U-Ranking Volume and U-Ranking, which measures the performance, are substantial. But both approaches can be useful, depending on the question to be answered.

The differences in the values of the indicators are much greater in the volume ranking due to the importance of size. The indicator of total results ranges from 4.2 to 0.1, very much wider than for the indicator of performance, which goes from 1.8 to 0.6.

Figure 2 combines the two types of rankings and facilitates the comparison of the position of each university in both. The results of U-Ranking Volume, which depend on the size, are shown on the vertical axis, while on the horizontal axis the results of U-Ranking, which measures the performance and corrects the effects of size, are seen.

Figure 2. U-Ranking vs. U-Ranking Volume of the Spanish public universities

Position in each ranking



See appendix 2 for a list of the University abbreviations used. Source: BBVA Foundation-Iuie.

The universities are ordered from top to bottom on the first and from right to left on the second. In each case the scale is different, to reflect that each ranking establishes a different number of groups of universities with the same index. As can be observed, the dispersion of points in the figure is significant and reflects that there is no definite correlation between the two rankings. Therefore, size does not seem, in general, to have any positive or negative influence on performance.

In the top part of the figure are the universities with the highest output: Universidad Complutense, Universitat de Barcelona, Universidad de Granada, Universidad de Sevilla, Universidad Politécnica de Madrid, Universitat Politècnica de València, Universitat de València, Universidad del País Vasco, Universitat Autònoma de Barcelona, Universitat Politècnica de Catalunya, Universidad Autónoma de Madrid, Politécnica de Madrid, UNED, Santiago and Zaragoza.

However, not all of these large universities show a good performance. In fact, other smaller ones stand out in this regard (see them more to the right in the figure). An example of the former case is UNED, a large university with a great volume of results that is placed among the top 12 in U-Ranking Volume. And an example for the later is the Universitat Pompeu Fabra, which shows the highest performance in U-Ranking, as well as other medium- or small-sized and very productive universities, such as Universidad Carlos III or Universitat Rovira i Virgili.

In fact, examples of higher or lower performance can be found among universities of very different sizes.¹⁹ Figure 3 shows this by representing the size indicator on the horizontal axis and the index of U-Ranking Volume for each university on the vertical axis. Those situated above the diagonal achieve results higher than the average performance, the gradient of the vector radius joining each position to the origin being the measure of their performance. It is visually evident that size is not a determinant of the universities' performance. There are institutions

¹⁹ As mentioned previously, the indicator of size is the result of calculating the standardized arithmetic mean of the number of students, faculty members and budget of each university.

of large size like the Universitat de Barcelona, the Universitat de València, the Polytechnics of Madrid, València and Catalunya or the Autonomous Universities of Barcelona or Madrid, which performance is high. However, some universities of smaller size such as Universitat Pompeu Fabra, Carlos III de Madrid, Rovira i Virgili or Universidad de Navarra also present high performance indices. There are large institutions like the Universities of Barcelona and Valencia, the Polytechnics of Madrid, València and Catalunya or the Autonomous Universities of Barcelona and Madrid, which show a high performance as their volume indices are superior to what it would correspond to them strictly by their size. Or take the opposite example: the UNED, which is situated far below the diagonal. However, some universities of smaller size such as Universitat Pompeu Fabra and Carlos III de Madrid also have high performance rates.

4.4. U-RANKING VS. SHANGHAI RANKING

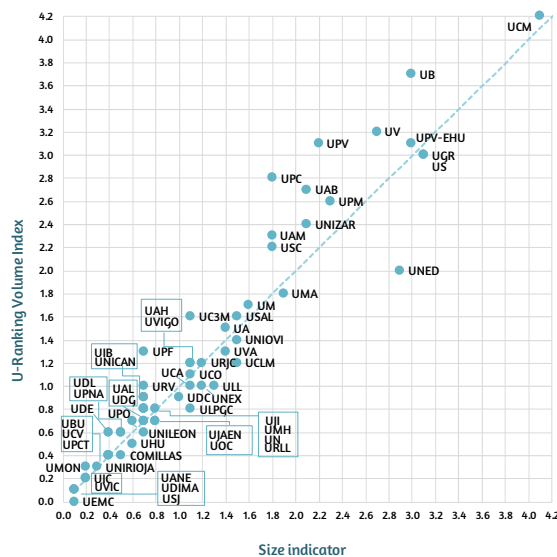
Given the popularity attained by some international rankings, many universities are interested in being compared with the best in the world. For this reason, it is obligatory to ask to what extent the U-Rankings constructed offer results different or similar to the former. As external reference for comparison we will consider especially the Shanghai Ranking, which without a doubt has become the most widely known to date.

Regarding the Shanghai Ranking, as we see in figure 4, only 12 Spanish universities appear in the latest list of the top 500. With the exception of the Universitat de Barcelona, all of them are below the 200th place. Therefore, a comparison between U-Ranking and Shanghai Ranking would be very limited. However, a recent study (Docampo 2015) offers a version of the Shanghai Ranking adapted to the Spanish universities that includes all the private and public universities, allowing a better comparison.

The results of the U-Ranking Volume and the Shanghai Ranking are much more alike than those of our two U-Rankings with each other, as shown by the following figures. The first of them (figure 5) represents on the horizontal axis the position of the Spanish universities in U-Ranking Volume, while the vertical axis represents the Shanghai Ranking. Regardless of the different number of levels that each ranking sets, both offer a fairly similar order, and therefore the universities are mostly grouped around areas I and III of the figure.

The universities located in area II of the figure are comparatively better situated in our ranking. The case of the UNED stands out, occupying a clearly better position in U-Ranking Volume than in that of Shanghai Ranking. The universities in area IV, on the contrary, are comparatively better placed in the adaptation for Spain of the Shanghai Ranking. The common denominator in many cases is that these are small but more productive universities, such as Pompeu Fabra or Rovira i Virgili, whose greater efficiency already became apparent in the U-Ranking's measurement of performance.

Figure 3. U-Ranking Volume vs. Size indicator*

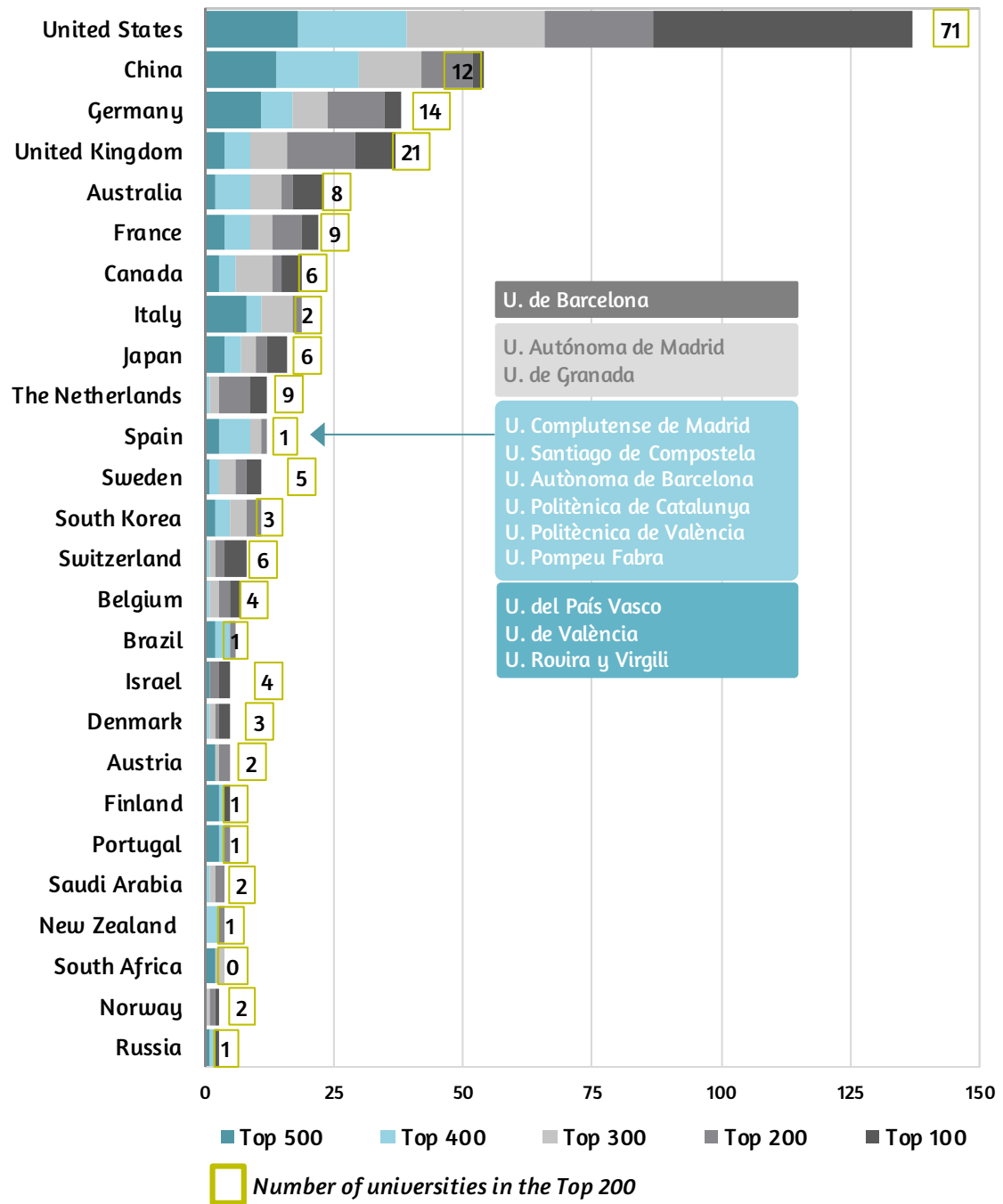


(*) The Size indicator is a standard arithmetic mean of the teachers, students and budget of each university.

See appendix 2 for a list of the University abbreviations used.

Source: BBVA Foundation-Iuie.

Figure 4. Spanish universities in the 2016 Shanghai Ranking

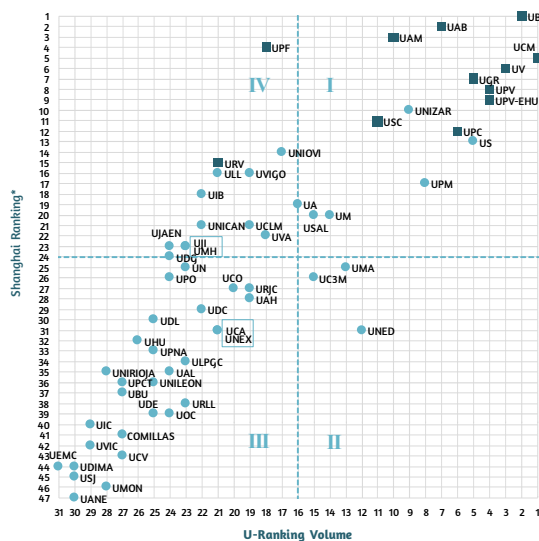


Note: Ordered from the countries' highest to lowest number of universities in the Top 500.

Source: Academic Ranking of World Universities (CWCU 2016).

In the figure 5 we have highlighted with dark squares the universities that are expressly mentioned among the top 500 of the Shanghai Ranking 2016 —not only in the adaptation for Spain. As can be observed, they are all at the top in the adaptation by Docampo (2015), and the majority are among the top places of U-Ranking Volume: Universitat de Barcelona, Universidad Autónoma de Madrid, Universitat Autònoma de Barcelona, Universidad Complutense, Universitat de València, Universitat Politècnica de València, Universidad de Granada, Universidad del País Vasco, Universidad de Santiago de Compostela and Universitat Politècnica de Catalunya. The remaining ones are the Universitat Pompeu Fabra and Universitat Rovira i Virgili, situated around the center of U-Ranking Volume.

Figure 5. U-Ranking Volume vs. Shanghai Ranking*
Position in each ranking



(*) Results correspond to our adaptation of the Shanghai Ranking by Docampo (2015) for Spanish universities. 13 private universities that appear in Docampo's ranking have been excluded and are not analyzed in U-Ranking. The numbers assigned in Docampo's ranking have been changed to facilitate the comparison.

■ Universities in the Shanghai Ranking Top 500 2016.

See appendix 2 for a list of the University abbreviations used.

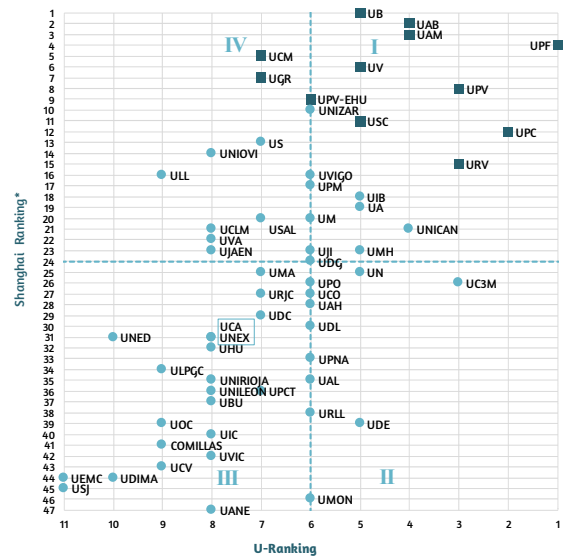
Source: BBVA Foundation-Iuie, ARWU (CWCU 2016) and Docampo (2015).

The inclusion of private universities does not alter the high consistency of our volume ranking with the Shanghai Ranking. As seen in figure 5, all the private universities analyzed are found in area III. Hence, the less prominent places in U-Ranking Volume also correspond with those in

the lowest positions in Docampo's adaptation (2015).

Up to what point the comparison between the Shanghai Ranking adapted to Spain and the U-Ranking, which measures the performance, offers conclusions different to the above is shown in figure 6. In it, almost half of the universities change area between one ranking and the other. In short, the differences with Shanghai are much more substantial in the case of the U-Ranking of performance than in that of U-Ranking Volume, which agrees with the characteristic of the Shanghai Ranking already pointed out: it scarcely corrects the indicators used to take into account the size and, therefore, it is more a ranking of volume of results than of performance.²⁰

Figure 6. U-Ranking vs. Shanghai Ranking*
Position in each ranking



(*) Results correspond to our adaptation of the Shanghai Ranking by Docampo (2015) for Spanish universities. 13 private universities that appear in Docampo's ranking have been excluded and are not analyzed in U-Ranking. The numbers assigned in Docampo's ranking have been changed to facilitate the comparison.

■ Universities in the Shanghai Ranking Top 500 2016.

See appendix 2 for a list of the University abbreviations used.

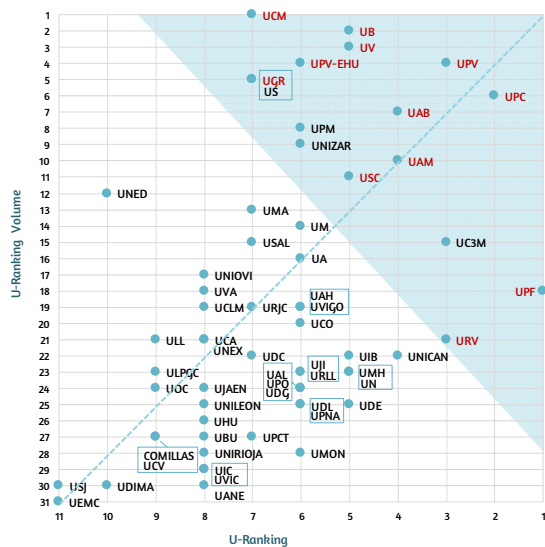
Source: BBVA Foundation-Iuie, ARWU (CWCU 2016) and Docampo (2015).

²⁰ As an example, the Shanghai Ranking uses as an indicator of teachers' quality the number of teachers who have received a Nobel Prize or a Fields Medal, not this number divided by the number of professors of the university.

To view the simultaneous level of consistency of both U-Rankings (performance and volume) with the Shanghai Ranking, the shaded area in graph 7 shows the sixteen universities that stand out in U-Ranking, both for their high performance and their great volume of results. The Spanish universities that appear in the Shanghai Ranking 2016 are marked in red. The results are clear: the shaded area that, according with U-Ranking, gathers the group of Spanish universities with best practices in terms of volume of results and performance, contains also all the Spanish universities featured in the Shanghai Ranking. The only four exceptions are the Universidad Politécnica de Madrid and the Carlos III that still have not been included in the Top 500 of the Shanghai Ranking, and the Universities of Sevilla and Zaragoza which were excluded in the latest edition, but none of the Spanish universities among the top Shanghai positions are placed outside the efficient frontier identified by U-Ranking.

Figure 7. U-Ranking and the Spanish universities in the Top 500 of Shanghai Ranking

Position in each ranking



Spanish universities in the Top 500 of the Shanghai Ranking are marked in red. See appendix 2 for a list of the University abbreviations used.

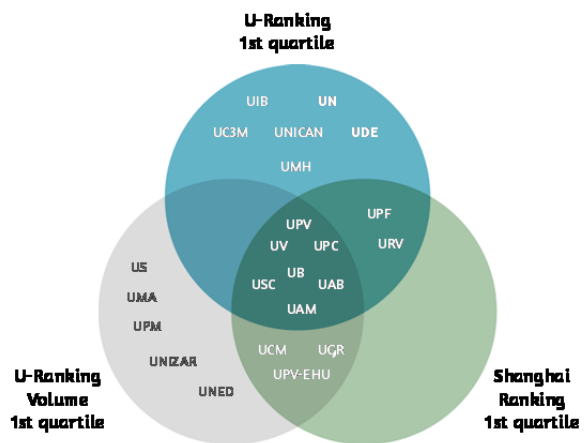
Source: BBVA Foundation-luie and ARWU (CWCU 2016).

To illustrate at the same time the extent to which the three rankings compared generate different groupings of the universities a Venn diagram can be used, representing the universities that form part of the first quartile in each of the

classifications and the intersections among the three.

In the center of the diagram (figure 8) appear the seven universities situated in the first quartile in the three rankings. They are Universitat de Barcelona, Universitat de València, Universitat Autònoma de Barcelona, Universidad Autónoma de Madrid, Polytechnics of València and of Catalunya and Universidad de Santiago de Compostela. Five other universities are in the first quartile of two of the rankings: Universitat Pompeu Fabra and Rovira I Virgili in Shanghai and U-Ranking (performance); and Universidad del País Vasco, Universidad de Granada and Complutense de Madrid in Shanghai and U-Ranking Volume. Finally, eleven universities stand out by only one of the three criteria considered.

Figure 8. U-Rankings vs. Shanghai Ranking



The 12 Spanish universities in the Top 500 of the Shanghai Ranking 2016 and the 15 first universities in U-Ranking and U-Ranking Volume are included. See appendix 2 for a list of the University abbreviations used.

Source: BBVA Foundation-luie and ARWU (CWCU 2016).

In sum, these results show important coincidences between the rankings when identifying the universities that stand out, but also significant differences that reflect the different approach of each ranking. It is especially interesting to observe that of the twelve universities that the Shanghai Ranking (not Docampo's adaptation) places in its Top 500, seven also appear in the first quartile of our two rankings, in the intersection of the three circles of the diagram; Universitat Pompeu Fabra

heads our ranking of performance and Universitat Rovira i Virgili occupies a dominant place, and three more belong to the first quartile of the U-Ranking Volume, Universidad de País Vasco, Complutense de Madrid and Universidad de Granada.

In brief, it can be said that, of the twelve Spanish universities included in the Top 500 of the Shanghai Ranking, ten are to be found in our quartile with greatest volume of results according to the U-Ranking Volume and nine among our most productive universities according to the U-Ranking of performance. Consequently, our classifications present a substantial harmony with those of the Shanghai Ranking, which strengthens their interest as instruments for identifying best practice. They also allow us to see that there may be differences in the rankings according to the perspective with which they were drawn up, and at the same time indicate that some universities are well positioned from any perspective.

4.5. COMPARISON OF RESULTS OF OTHER INTERNATIONAL RANKINGS

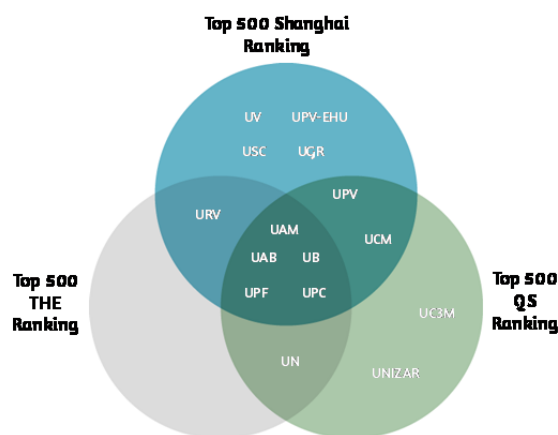
Although the Shanghai ranking is consolidating its influence as the most cited international indicator, there exist other initiatives of high international repute, such as the Times Higher Education (THE) or the QS-Ranking. The principal differences between these two initiatives and the Shanghai ranking are that they (i) try to measure the role of teaching and (ii) incorporate subjective valuations based on surveys of international employers and experts. The results for the Spanish universities in the three initiatives present similarities but also some differences, as shown in figure 9.

In the intersection of the three rankings we find a set of five universities (Universitat Autònoma de Barcelona, Universitat de Barcelona, Universitat Pompeu Fabra, Universitat Politècnica de Catalunya y Universidad Autónoma de Madrid) which appear systematically in the top positions of our rankings and also belong to the group of universities at the *frontier* of figure 7 —that is, those universities that are not dominated by

hardly any other university—. Finally, among the universities that belong to the Top 500 of THE, only the Universidad de Navarra and the Universitat Rovira i Virgili are not on the efficient frontier of U-Ranking, and among those in the Top 500 of the QS Ranking only the Universidad de Navarra is not within the border established by U-Ranking.

These results again confirm the presence of a group of Spanish universities in the top positions within our university system, regardless of the prism with which it is analyzed and that the discrepancies between our ranking and any of the well-known international rankings are not any greater than those among them.

Figure 9. Comparison of the results of three international rankings. 2016-2017



See appendix 2 for a list of the University abbreviations used.

Source: ARWU (CWCU 2016), THE (2016) and QS (2016).

4.6. RESEARCH VS. TEACHING: SENSITIVITY ANALYSIS

One of the biggest problems inherent to any composite indicator is the effect of the relative weight of the elements composing it. The ISSUE project, methodological genesis of U-Ranking, expressly considers that teaching and research can have different importance for each user of the universities' services. This is acknowledged to the point of allowing a web tool to draw up

personalized rankings that take into account the user's preferences in this sense.

The question posed in this section is how much the general rankings of the universities would change if the weights allocated to teaching and to research were to change. In the results presented above the weights used to calculate the rankings were those obtained by applying the Delphi method capturing the opinions of the experts who collaborated in the project as well as other available information.²¹ But other experts or other users could give different valuations. Consequently, we should analyze whether the results are sensitive or not—in the latter case we will say that they are *robust*—to changes in the weights of these dimensions.

The previous question is important for valuing to what extent we can rely on the results of the rankings, given the possible arbitrariness of the attribution of one weight or another to research or any other university activity. Specifically, would the results change much if a greater weight was granted to research, as in other well-known rankings? Another interesting question is if a university can occupy a high place in a ranking if the weights of teaching and research change to suit its interests? As we will see, the answer to this question is negative.

Studying the sensitivity of rankings to changes of the weights of teaching and research permits us to analyze also whether the universities' results in these two activities are correlated. Most rankings place great emphasis on research because the information on the results of this activity is abundant and seems more precise and reliable. But, although it is often argued that teaching and research are highly correlated, this hypothesis has barely been tested for lack of

indicators of teaching results. We will revisit this question in a later section.

That the research dimension is easier to measure should not be an argument for not measuring the quality of teaching. Likewise, the existence of a positive correlation between the quality of teaching and that of research should not hide the fact that disparity is also possible: if for the same level of research quality there are different teaching results between universities, ignoring this information biases the results in favor of one and against the other.

To value the effect of the selection of the weights given to teaching and to research we performed an analysis of sensitivity to their variations on the ranking of performance. For this, we calculated three rankings that are differentiated by the very different relative weights of research and of teaching, as indicated below:

- Option 1: Teaching 20 / Research 70 / Innovation 10
- Option 2: Teaching 45 / Research 45 / Innovation 10
- Option 3: Teaching 70 / Research 20 / Innovation 10

We opted to leave the weight of innovation and technological development with a fixed value of 10 points so as not to hinder comparisons of the effect of a greater or lesser relative weight of the other two variables. If together with a reduction of the weight of research we applied a reduction of the weight of innovation (or vice versa), we could not know to which of the two variations the changes in the ranking were due.²²

²¹ The weights used are 56% for teaching, 34% for research and 10% for innovation and technological development. The weights were established on the basis of the opinion of the experts consulted, and agree practically with the distribution of resources among the teaching, research and transfer activities in the universities' budgets. It also reflects an intensity of research activity in accordance with the results of the Spanish universities: if we consider that in the top universities of the world by their research results these activities had a weight of 85-90%, the corresponding figure for the Spanish universities would be 35%.

²² Furthermore, significantly increasing the weight of the activities relating to innovation and technological development would not be justified, given their limited importance in the budgets of the Spanish universities. Certainly, in the Polytechnic universities the weight of these activities is greater, but disaggregated information is not available to value more precisely the results of each in this aspect of their specialization.

Figure 10 shows the effect on the position in the ranking of each of Spain's 61 universities analyzed when the weight of research is increased, according to the three weightings chosen.

The evolution of the universities, when the weight of research increases, frequently presents movements from right to left (regressions) characterized by:

- The drops and moderate rises in the weight of research (option 2 and 3) barely involve changes in the ranking with respect to the U-Ranking (performance).
- If the weight of research drops to 20% (option 3), variations are minor with few universities being affected in more than one position, one way or the other. The only exceptions are two private universities, Universidad San Jorge and Antonio de Nebrija, which improve two places with this option.
- When the weight of research rises moderately up to 45% (option 2), the ranking still remains stable, with no university being affected in more than one position, either up or down.
- When significant changes occur in the ranking, the weight of research doubles from its starting position (from 34% to 70% of option 1), never surpassing variations of more than four positions. The fundamental pattern of these changes is that the universities worsen their position in the ranking more intensely when applied to universities at the bottom part in the original ranking. If we focus on the changes of more than two positions, only six cases appear (all private universities): Mondragon, Antonio de Nebrija, Pontificia de Comillas, A distancia de Madrid, Europea Miguel de Cervantes and San Jorge.
- This last result reveals another pattern of sensitivity of the ranking to changes in weights: because of their high degree of specialization in teaching, private universities are much more sensitive than public universities to increases in the weight of research.

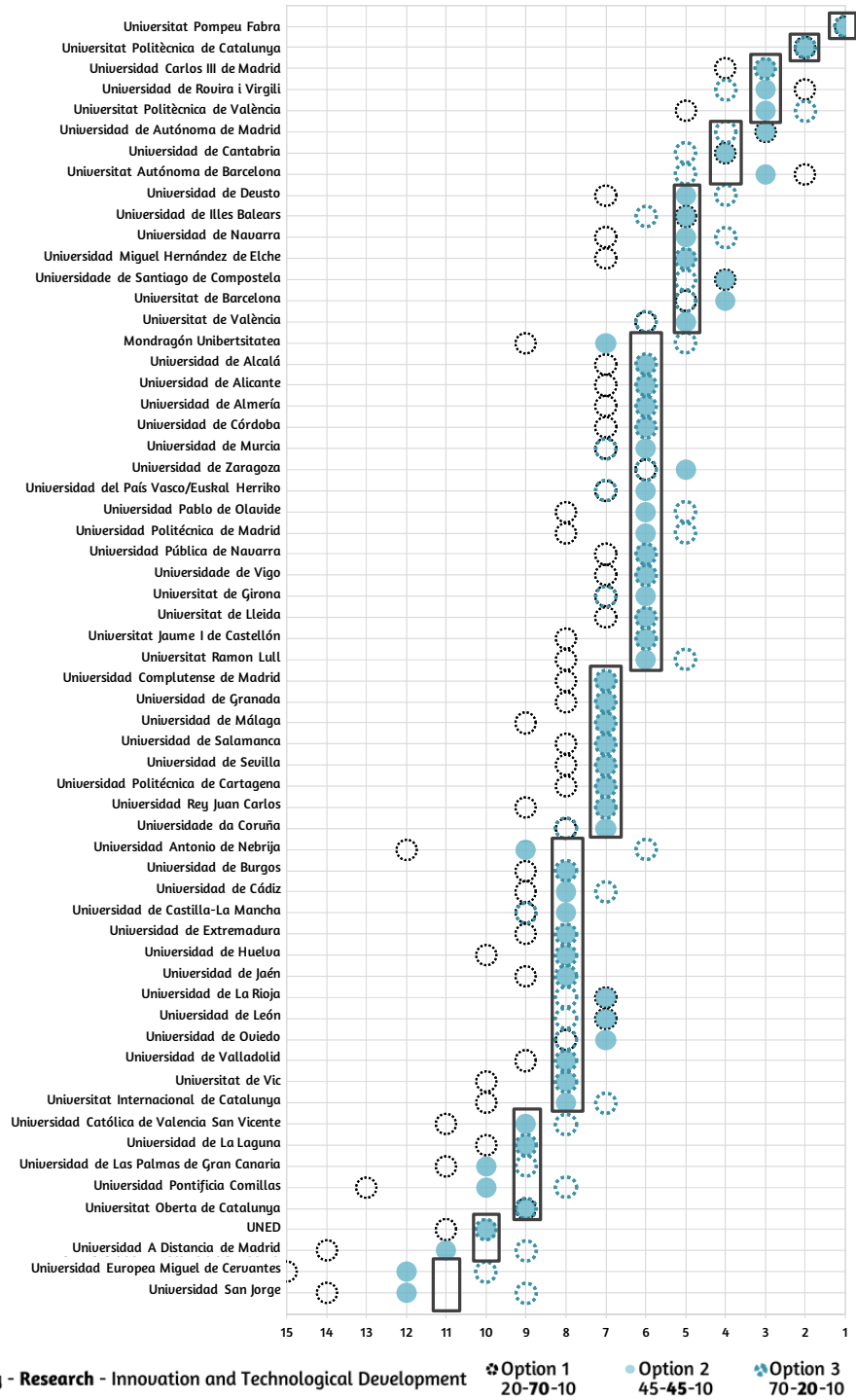
Thus, the rankings are sensitive to changes in the weights given to teaching and to research, especially if we compare weightings as different as those corresponding to our options 1 and 3. When these weights change less, variations are minor and, definitely, alterations never occur for this reason in the classifications. A university does not pass from the top places to the bottom ones no matter how substantial the changes in the weights may be, but it is true that some can improve by some places in the ranking if greater importance is accorded to teaching or research.

We must consider that, as with any type of measuring instrument, the sensitivity to changes is desirable. If the instrument is insensitive to the weights that reflect different attribution of importance to different factors, it would not be reliable. U-Ranking, as seen, proves to be tolerant to moderate changes in the weights, but sensitive to very significant changes.

If instead of focusing on the analysis of sensitivity of the ranking, in other words, in the positions of the universities, we consider the values of the index by which U-Ranking is obtained, we observe that their stability when changing the weights of teaching and research is very notable. Figure 11 presents the synthetic indicator from which the U-Ranking is derived for research weights of 20% and 70%. It shows that a drastic change in the weights would cause an increase of only three decimal points or more for Universitat Pompeu Fabra, Rovira i Virgili and Autònoma de Barcelona, improving their index. On the contrary, only some private universities such as Pontificia de Comillas, Miguel de Cervantes, Antonio de Nebrija, A distancia de Madrid and San Jorge would experience a fall in the index of three decimal points or more.

To offer another sample of the stability of the groups of universities, the Venn diagram in figure 12 presents the results of the U-Ranking for the three weights described above. Based upon the value of the index, each circle contains the dominant universities. Looking at the diagram we see that changing the weights does not alter the index so much as to cause the appearance or disappearance of universities in those top positions. None appears with a moderate change (research 45%), and in the extreme cases where a small value is given to research (20%) only

Figure 10. Evolution of U- Ranking according to variations in the weight of research



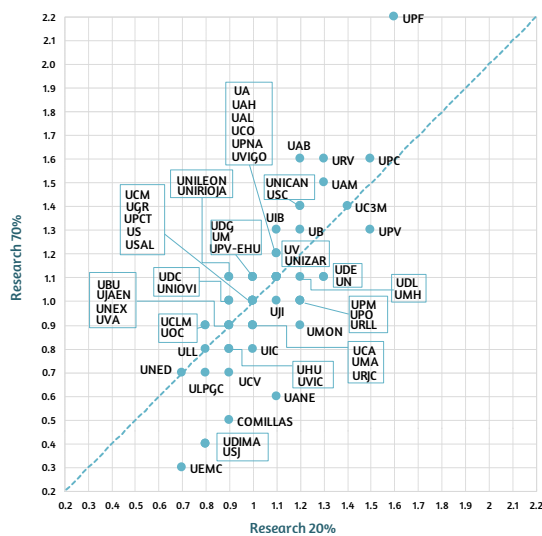
Note: Universities are ordered by their position in the global performance ranking with the following weights: 56/34/10.

Source: BBVA Foundation-Ivie.

two private universities, Mondragon and Ramon Lull, and two public, Politécnica de Madrid and Pablo Olavide, are incorporated to the top list. On the other hand, if more weight is given to research these two private universities would leave the first positions, and Universidad de Navarra, Miguel Hernández and Deusto would then also appear among the top places.

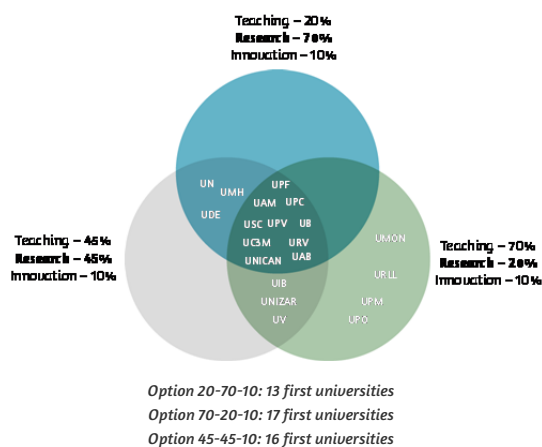
Figure 11. U-Ranking for two different weights in research

Weights of Teaching/Research/Innovation: 70/20/10 us. 20/70/10. Index



See appendix 2 for a list of the University abbreviations used.
Source: BBVA Foundation-luie.

Figure 12. The role of research in U-Ranking
Top universities according to different weights given



See appendix 2 for a list of the University abbreviations used.
Source: BBVA Foundation-luie.

4.7. RANKINGS OF TEACHING, RESEARCH, AND INNOVATION AND TECHNOLOGICAL DEVELOPMENT

The methodology used constructs indicators of results of the three activities of the universities, which are then aggregated to draw up the two overall rankings presented (U-Ranking and U-Ranking Volume). These results for each university in each of the three dimensions can be analyzed and arranged in order to obtain a *teaching ranking*, a *research ranking* and an *innovation and technological development ranking*. Each of them can be calculated according to both variants: volume of results and performance.

Figure 13 shows by means of *box plots* the distribution corresponding to the indices of the different dimensions and the overall index of a university in the case of performance (panel a) and volume of results (panel b). The extremes of the black lines represent the maximum and minimum values reached by the indices in each dimension and define the range of variation of the index; the top of the central box indicates the 75% percentile, while the 25% percentile is marked by the bottom of the box, so that between them is situated 50% of the distribution (interquartile range). The border between the two parts of the box defines the median value. From the comparative analysis of the two panels four essential features stand out:

- The comparison of panels *a* and *b* permits us to observe that the differences between the public universities are much greater if their volume of results is analyzed and not their performance. This feature is observed in any of the dimensions considered, but in the activities of innovation and technological development it is greater than in teaching and research. Given the total weight of public universities in the university system, this pattern applies to the average of the system.
- In the case of private universities, since they all have a smaller size, the situation is the opposite, and the volume index has much greater homogeneity than the performance index.

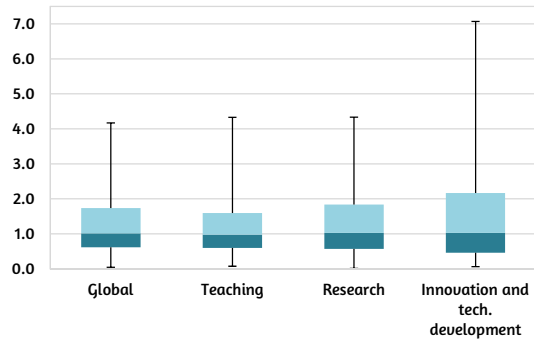
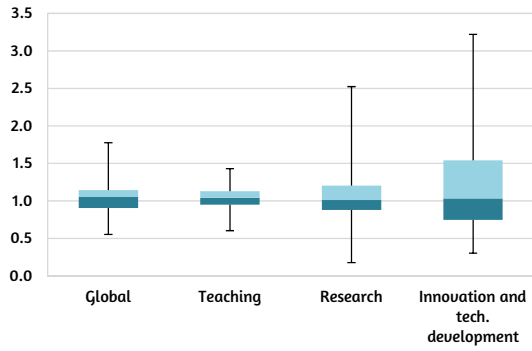
Figure 13. U-Ranking. Distribution of the indices obtained in each dimension

a) U-Ranking (performance)

b) U-Ranking Volume

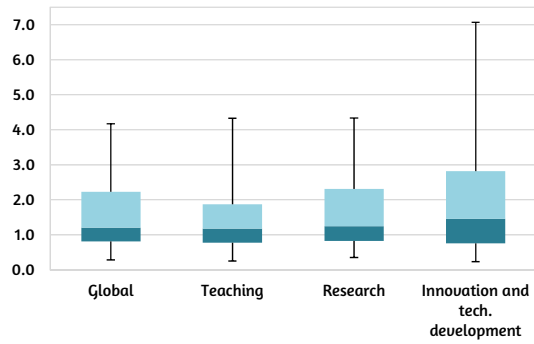
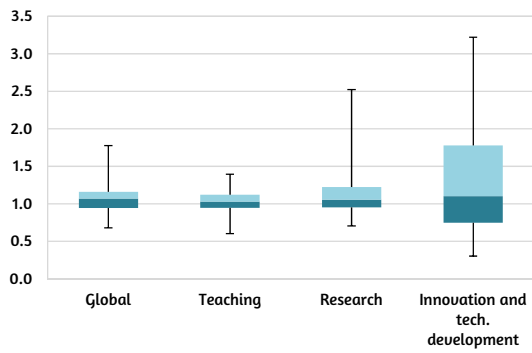
a1. Total universities

b1. Total universities



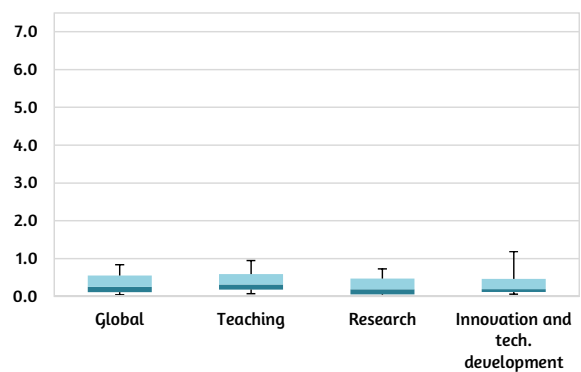
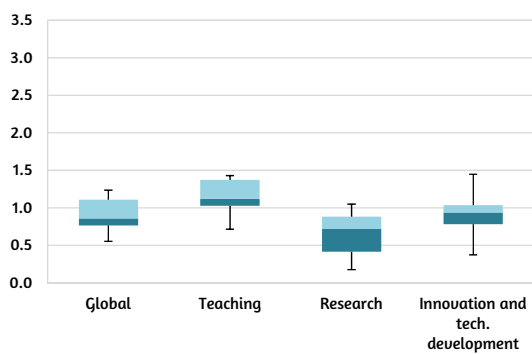
a2. Public universities

b2. Public universities



a3. Private universities

b3. Private universities



Source: BBVA Foundation-Ivie.

- Second, the differences in terms of performance present an increasing scale when going from teaching to research and from the latter to innovation and technological development for both public and private universities. Thus for example, the range of the teaching index is 0.8 points, that of research 2.4 and that of innovation and technological development 3.0. The relative differences of the interquartile ranges are even greater in the case of this last dimension.
- In construction, the median for the total number of universities in the distribution of the indices is 1 (see figures 13.a1 and 13.b1). However, when we analyze the private universities (figures 13.a3 and 13.b3), we clearly observe the difference that exists in specialization to which we have been making reference. Fixing our attention on the indices of performance, we observe that the median is higher than the average of the system in the teaching dimension, somewhat below in the innovation and technological development dimension, but, above all, it is half in research.

Table 8 shows the coefficients of correlation between the different rankings and performance indices for each pair of activities. Once again, we can observe that the behavior is different depending on whether a university is private or public. While the correlation is high and fairly homogeneous among the three dimensions in the public universities, the strongest correlation in private universities occurs between research and technological innovation and is very low among the rest of dimensions.

These results suggest that complementarity exists among the different activities, but is limited, especially with reference to teaching and innovation, where correlation is low among the public institutions but, specially, amongst the private universities. But above all, they warn that if the aim is to analyze the university system as a whole, the existence of groups with different characteristics that result from the coexistence of private and public institutions cannot be ignored. If we did, it could lead to biases in the analysis of the reality of the university system.

Table 8. Correlation coefficients of the indices and U-rankings by dimension

a) Index			
	Total	Public U.	Private U.
Teaching - Research	0.15	0.52	0.14
Teaching - Innovation and Technological Development	0.37	0.62	0.05
Research - Innovation and Technological Development	0.51	0.48	0.48
b) Ranking			
	Total	Public U.	Private U.
Teaching - Research	0.18	0.50	0.19
Teaching - Innovation and Technological Development	0.41	0.59	0.33
Research - Innovation and Technological Development	0.44	0.43	0.53

Note: The ranking values are calculated by means of a Spearman correlation coefficient and the index values by means of a Pearson correlation coefficient.
Source: BBVA Foundation-luie.

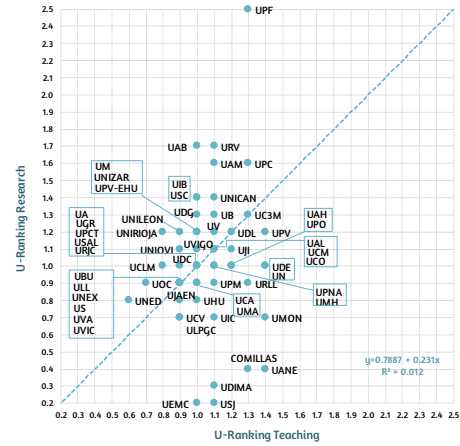
A validation of these differences can be obtained by checking if the hypothesis that research results can predict correctly those of teaching is true or not, this being the basic assumption of many rankings that concentrate exclusively on the research dimension. Therefore, the rates of performance in research are represented against the rates of performance in teaching (figure 14.a). We can see that this relationship is practically undetectable, since the coefficient of determination of the regression line barely exceeds 1%.

If we examine the heterogeneity of the universities and focus the analysis only on the public system (Figure 14.b), the adjustment between the synthetic indices of teaching and research improves and reaches a coefficient of determination of 0.23, giving evidence of stronger relationship than in the private system but, in any case, limited. In the subset of private universities, the relationship is even smaller than for the overall system (figure 14.c).

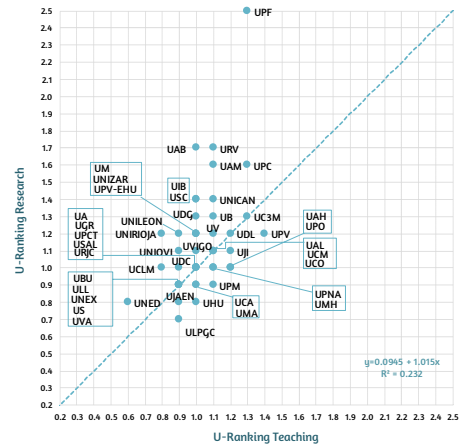
Finally, after describing the results of the rankings of teaching, research and innovation and technological development, tables 9 and 10 present in detail the results of the eight rankings drawn up for all Spanish universities (general performance U-Ranking and its ranking for the three dimensions of teaching, research and innovation, and general U-Ranking Volume and its ranking by each of the aforesaid dimensions). In the performance ranking a well-defined pattern of teaching specialization of private universities can be seen: all improve when comparing their position in teaching ranking with the overall ranking and worsen when considering the research ranking. That pattern is also shown in panel c of figure 14: almost all the private universities are located below the diagonal because their research rate is lower than their teaching rate (the only exception is the Universitat Oberta de Catalunya which has the same indices and the Universitat de Vic which would improve). In the case of the public universities, on the other hand, the opposite happens in the majority of cases.

Figure 14. U-Ranking. Teaching vs. Research Index

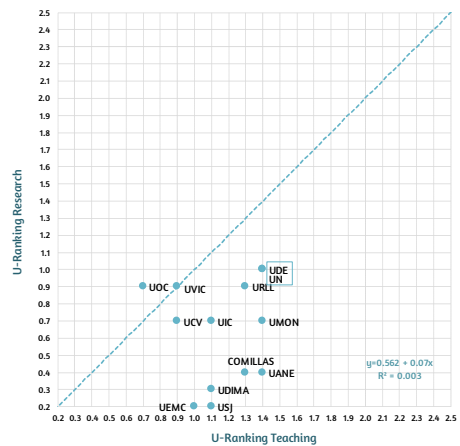
a) Public and private universities



b) Public universities



c) Private universities



See appendix 2 for a list of the University abbreviations used.

Source: BBVA Foundation-luie.

Table 9. U-Ranking for Teaching, Research and Innovation and Technological Development

University	Global		Teaching		Research		Innovation and Tech. Development	
	Ranking	Index	Ranking	Index	Ranking	Index	Ranking	Index
Universitat Pompeu Fabra	1	1.8	2	1.3	1	2.5	4	2.6
Universitat Politècnica de Catalunya	2	1.5	2	1.3	3	1.6	1	3.2
Universidad Carlos III de Madrid	3	1.4	2	1.3	5	1.3	3	2.7
Universidad de Rovira i Virgili	3	1.4	4	1.1	2	1.7	8	2.1
Universitat Politècnica de València	3	1.4	1	1.4	6	1.2	2	3.1
Universidad de Autónoma de Madrid	4	1.3	4	1.1	3	1.6	10	1.6
Universidad de Cantabria	4	1.3	4	1.1	4	1.4	7	2.2
Universitat Autònoma de Barcelona	4	1.3	5	1	2	1.7	9	1.8
Universidad de Deusto	5	1.2	1	1.4	8	1	16	1
Universidad de Illes Balears	5	1.2	5	1	4	1.4	10	1.6
Universidad de Navarra	5	1.2	1	1.4	8	1	15	1.1
Universidad Miguel Hernández de Elche	5	1.2	4	1.1	8	1	6	2.3
Universidade de Santiago de Compostela	5	1.2	5	1	4	1.4	8	2.1
Universitat de Barcelona	5	1.2	4	1.1	5	1.3	12	1.4
Universitat de València	5	1.2	4	1.1	6	1.2	15	1.1
Mondragón Unibertsitatea	6	1.1	1	1.4	11	0.7	12	1.4
Universidad de Alcalá	6	1.1	3	1.2	8	1	12	1.4
Universidad de Alicante	6	1.1	5	1	8	1	5	2.5
Universidad de Almería	6	1.1	4	1.1	7	1.1	12	1.4
Universidad de Córdoba	6	1.1	4	1.1	7	1.1	13	1.3
Universidad de Murcia	6	1.1	5	1	6	1.2	16	1
Universidad de Zaragoza	6	1.1	5	1	6	1.2	9	1.8
Universidad del País Vasco	6	1.1	5	1	6	1.2	18	0.8
Universidad Pablo de Olavide	6	1.1	3	1.2	8	1	15	1.1
Universidad Politécnica de Madrid	6	1.1	4	1.1	9	0.9	2	3.1
Universidad Pública de Navarra	6	1.1	4	1.1	8	1	11	1.5
Universidade de Vigo	6	1.1	5	1	7	1.1	15	1.1
Universitat de Girona	6	1.1	5	1	5	1.3	19	0.7
Universitat de Lleida	6	1.1	3	1.2	6	1.2	17	0.9
Universitat Jaume I de Castellón	6	1.1	3	1.2	7	1.1	19	0.7
Universitat Ramon Lull	6	1.1	2	1.3	9	0.9	16	1
Universidad Complutense de Madrid	7	1	4	1.1	7	1.1	19	0.7
Universidad de Granada	7	1	5	1	8	1	19	0.7
Universidad de Málaga	7	1	5	1	9	0.9	14	1.2
Universidad de Salamanca	7	1	5	1	8	1	15	1.1
Universidad de Sevilla	7	1	6	0.9	9	0.9	9	1.8
Universidad Politécnica de Cartagena	7	1	5	1	8	1	20	0.6
Universidad Rey Juan Carlos	7	1	5	1	8	1	19	0.7
Universidade da Coruña	7	1	6	0.9	8	1	18	0.8
Universidad Antonio de Nebrija	8	0.9	1	1.4	12	0.4	16	1
Universidad de Burgos	8	0.9	6	0.9	9	0.9	19	0.7
Universidad de Cádiz	8	0.9	5	1	9	0.9	15	1.1
Universidad de Castilla-La Mancha	8	0.9	7	0.8	8	1	19	0.7
Universidad de Extremadura	8	0.9	6	0.9	9	0.9	19	0.7
Universidad de Huelva	8	0.9	5	1	10	0.8	18	0.8
Universidad de Jaén	8	0.9	6	0.9	10	0.8	17	0.9
Universidad de La Rioja	8	0.9	7	0.8	6	1.2	18	0.8
Universidad de León	8	0.9	6	0.9	6	1.2	21	0.5
Universidad de Oviedo	8	0.9	6	0.9	7	1.1	19	0.7
Universidad de Valladolid	8	0.9	6	0.9	9	0.9	16	1
Universitat de Vic	8	0.9	6	0.9	9	0.9	21	0.5
Universitat Internacional de Catalunya	8	0.9	4	1.1	11	0.7	17	0.9
U. Católica de Valencia San Vicente Mártir	9	0.8	6	0.9	11	0.7	17	0.9
Universidad de La Laguna	9	0.8	6	0.9	9	0.9	23	0.3
U. de Las Palmas de Gran Canaria	9	0.8	6	0.9	11	0.7	23	0.3
Universidad Pontificia Comillas	9	0.8	2	1.3	12	0.4	22	0.4
Universitat Oberta de Catalunya	9	0.8	8	0.7	9	0.9	12	1.4
UNED	10	0.7	9	0.6	10	0.8	17	0.9
Universidad A Distancia de Madrid	10	0.7	4	1.1	13	0.3	18	0.8
Universidad Europea Miguel de Cervantes	11	0.6	5	1	14	0.2	17	0.9
Universidad San Jorge	11	0.6	4	1.1	14	0.2	21	0.5

Note: Universities are ordered from the highest to the lowest global index value. Universities with the same index value are ordered alphabetically. Source: BBVA Foundation-Luiz.

Table 10. U-Ranking Volume for Teaching, Research and Innovation and Technological Development

CODUNI	University	Global		Teaching		Research		Innovation and Tech. Development	
		Ranking	Index	Ranking	Index	Ranking	Index	Ranking	Index
UCM	Universidad Complutense de Madrid	1	4.2	1	4.3	1	4.3	9	3
UB	Universitat de Barcelona	2	3.7	2	3.4	2	4	5	4.3
UV	Universitat de València	3	3.2	4	3.1	4	3.4	8	3.1
UPV-EHU	Universidad del País Vasco	4	3.1	4	3.1	3	3.6	13	2.4
UPV	Universitat Politècnica de València	4	3.1	5	3	8	2.5	2	6.7
UGR	Universidad de Granada	5	3	3	3.2	5	3.1	14	2.2
US	Universidad de Sevilla	5	3	6	2.7	6	2.9	4	5.6
UPC	Universitat Politècnica de Catalunya	6	2.8	8	2.3	6	2.9	3	5.9
UAB	Universitat Autònoma de Barcelona	7	2.7	9	2.2	3	3.6	6	3.7
UPM	Universidad Politécnica de Madrid	8	2.6	7	2.6	11	1.9	1	7.1
UNIZAR	Universidad de Zaragoza	9	2.4	10	2.1	8	2.5	6	3.7
UAM	Universidad de Autónoma de Madrid	10	2.3	11	2	6	2.9	11	2.8
USC	Universidade de Santiago de Compostela	11	2.2	12	1.8	7	2.6	6	3.7
UNED	UNED	12	2	12	1.8	9	2.3	12	2.6
UMA	Universidad de Málaga	13	1.8	12	1.8	13	1.7	14	2.2
UM	Universidad de Murcia	14	1.7	13	1.6	10	2	16	1.7
UC3M	Universidad Carlos III de Madrid	15	1.6	14	1.5	15	1.5	10	2.9
USAL	Universidad de Salamanca	15	1.6	14	1.5	14	1.6	17	1.6
UA	Universidad de Alicante	16	1.5	15	1.4	16	1.4	7	3.6
UNIOVI	Universidad de Oviedo	17	1.4	15	1.4	14	1.6	21	1
UVA	Universidad de Valladolid	18	1.3	16	1.3	17	1.3	19	1.4
UPF	Universitat Pompeu Fabra	18	1.3	19	1	12	1.8	15	1.9
UAH	Universidad de Alcalá	19	1.2	17	1.2	19	1.1	18	1.5
UCLM	Universidad de Castilla-La Mancha	19	1.2	17	1.2	16	1.4	21	1
URJC	Universidad Rey Juan Carlos	19	1.2	17	1.2	18	1.2	22	0.9
UVIGO	Universidade de Vigo	19	1.2	17	1.2	17	1.3	20	1.2
UCO	Universidad de Córdoba	20	1.1	18	1.1	19	1.1	19	1.4
UCA	Universidad de Cádiz	21	1	18	1.1	21	0.9	20	1.2
UNEX	Universidad de Extremadura	21	1	19	1	19	1.1	23	0.8
ULL	Universidad de La Laguna	21	1	17	1.2	18	1.2	26	0.4
URV	Universidad de Rovira i Virgili	21	1	21	0.8	18	1.2	17	1.6
UNICAN	Universidad de Cantabria	22	0.9	21	0.8	20	1	17	1.6
UIB	Universidad de Illes Balears	22	0.9	22	0.7	20	1	20	1.2
UDC	Universidade da Coruña	22	0.9	20	0.9	20	1	23	0.8
ULPGC	U. de Las Palmas de Gran Canaria	23	0.8	19	1	23	0.7	27	0.3
UN	Universidad de Navarra	23	0.8	20	0.9	23	0.7	24	0.7
UMH	Universidad Miguel Hernández de Elche	23	0.8	21	0.8	23	0.7	17	1.6
UJI	Universitat Jaume I de Castellón	23	0.8	20	0.9	22	0.8	25	0.5
URLL	Universitat Ramon Lull	23	0.8	19	1	23	0.7	24	0.7
UAL	Universidad de Almería	24	0.7	22	0.7	23	0.7	22	0.9
UJAEN	Universidad de Jaén	24	0.7	21	0.8	23	0.7	24	0.7
UPO	Universidad Pablo de Olavide	24	0.7	22	0.7	24	0.6	24	0.7
UDG	Universitat de Girona	24	0.7	22	0.7	21	0.9	25	0.5
UOC	Universitat Oberta de Catalunya	24	0.7	23	0.6	23	0.7	20	1.2
UDE	Universidad de Deusto	25	0.6	23	0.6	25	0.5	25	0.5
UNILEON	Universidad de León	25	0.6	23	0.6	22	0.8	27	0.3
UPNA	Universidad Pública de Navarra	25	0.6	24	0.5	25	0.5	23	0.8
UDL	Universitat de Lleida	25	0.6	23	0.6	24	0.6	25	0.5
UHU	Universidad de Huelva	26	0.5	23	0.6	25	0.5	25	0.5
UCV	U. Católica de Valencia San Vicente Mártir	27	0.4	25	0.4	27	0.3	26	0.4
UBU	Universidad de Burgos	27	0.4	25	0.4	26	0.4	27	0.3
UPCT	Universidad Politécnica de Cartagena	27	0.4	25	0.4	26	0.4	28	0.2
COMILLAS	Universidad Pontificia Comillas	27	0.4	23	0.6	28	0.2	28	0.2
UMON	Mondragón Unibertsitatea	28	0.3	26	0.3	28	0.2	27	0.3
UNIRIOJA	Universidad de La Rioja	28	0.3	26	0.3	26	0.4	28	0.2
UVIC	Universitat de Vic	29	0.2	27	0.2	28	0.2	29	0.1
UIC	Universitat Internacional de Catalunya	29	0.2	27	0.2	28	0.2	28	0.2
UDIMA	Universidad A Distancia de Madrid	30	0.1	27	0.2	30	<0,1	29	0.1
UANE	Universidad Antonio de Nebrija	30	0.1	27	0.2	29	0.1	29	0.1
USJ	Universidad San Jorge	30	0.1	28	0.1	30	<0,1	29	0.1
UEMC	Universidad Europea Miguel de Cervantes	31	<0,1	28	0.1	30	<0,1	29	0.1

Note: Universities are ordered from the highest to the lowest global index value. Universities with the same index value are ordered alphabetically.
Source: BBVA Foundation-Ivie.

4.8. PUBLIC AND PRIVATE UNIVERSITIES' RESULTS COMPARED

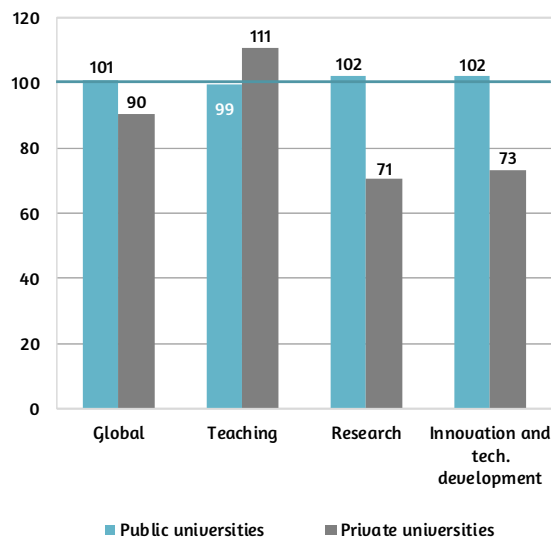
The increased weight of private universities in the Spanish university system is making the comparison of the results that depend on the ownership of the universities –public or private– much more relevant. It is undeniable that many variables may cause non-equivalent results: private universities are much younger on average, many are located in geographic areas with higher per capita income, with a less diversified range of courses than the public system and also with a smaller size. But the first step is to find evidence that these differences in the results do exist. The indices of the U-Ranking system allow us to address this issue with accurate data.

Figure 15 shows the average results for U-Ranking indices for each one of the key dimensions —teaching, research and innovation and technological development—, as well as for the global index of results. If we take the average of the whole system as basis 100, built as an average weighted by the weight of the individual indices of universities, we observe that the performance of the private universities is 10 points less than the public system. Analyzing the dimensions we see that this result is due, primarily, to a different specialization than other universities, much more focused on the teaching dimension, in which they achieve a greater performance than public universities. This teaching specialization makes their research results to be well below the public universities (their performance being 29 points lower) and also the results in innovation and technological development.

Averages may always hide a more complex reality. An average value can be caused by consistent values in all universities or by a great heterogeneity of results. This heterogeneity, which is shared by the private and public systems, is clearly visible in Figure 16. In all the panels (global, teaching and research) we can observe how the distribution of both types of universities along the range of values of the index is a clear indicator of the diversity in the results.

Figure 15. Average performance of the Spanish public and private universities

Total of universities = 100



Source: BBVA Foundation-luie.

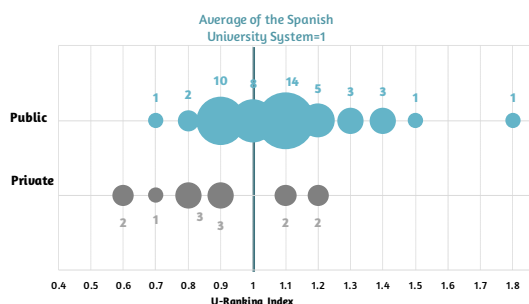
If we focus on panel *a*, we observe that regarding the public universities, although they are distributed along the whole range of values of the global index of U-Ranking, a third of them (13) are below average whilst almost two-thirds of the private ones (9) have lower values than the average, hence their lower overall performance. The situation is the opposite when looking at the teaching dimension (panel *b*), where both groups maintain their heterogeneity, but the better performance of the private institutions can be seen by the fact that nearly 70% of them (9) are above the average values, which is only true for 39% of the public universities. Panel *c* shows that research is dominated by public universities, as no private university exceeds the average of the system.

In short, the public and private systems are both heterogeneous with respect to the performance of the institutions that comprise them, there being a great diversity in the overall, teaching and research results. However, the public system stands out with respect to private universities in their research achievements and to a lesser extent in their innovation results. On the other hand, the teaching specialization of the private system achieves better results in this dimension.

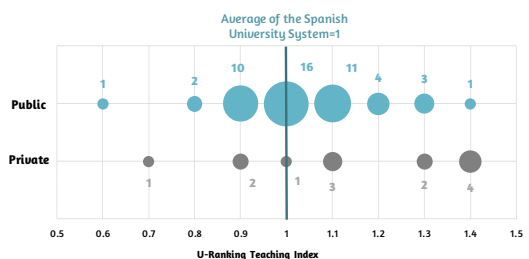
Figure 16. U-Ranking index of the public and private universities-2017

Index and number of universities with the same index

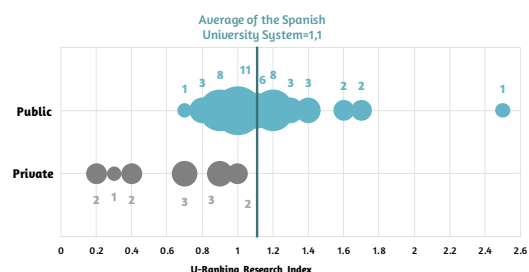
a) Global



b) Teaching



c) Research



Source: BBVA Foundation-luie.

4.9. U-RANKING 2016 AND 2017

The direct comparison of the 2016 and 2017 U-Rankings has an inherent difficulty due to the inclusion of some private universities with enough available information or the exclusion due to the contrary. This fact may cause changes in the position of some universities, which are not due to the improvement or decline in performance, but to the inclusion or exclusion of the preceding university in the ranking. For this reason, we will not only calculate the correlation

in the position occupied, but also the level of correlation of the indices, which represents a much more denotative relationship between both editions. The aim of this section is not to examine the performance of the institutions, which analysis has already been carried out before, but to confirm the stability of results between both editions.

The results obtained by the U-Ranking project in 2017 are highly correlated with those presented in the 2016 edition. As table 11 shows, the coefficients of correlation between the indices and the rankings corresponding to the two editions are very high. All the correlations, both those referring to the positions in the ranking (Spearman) and to the values of the synthetic indicator (Pearson), are significant to 1% and, for the overall index, present coefficients higher than 0.95 in all cases. This result is not surprising but it is important because it means that data updates have not significantly altered the results and give reliability to the methodology used.

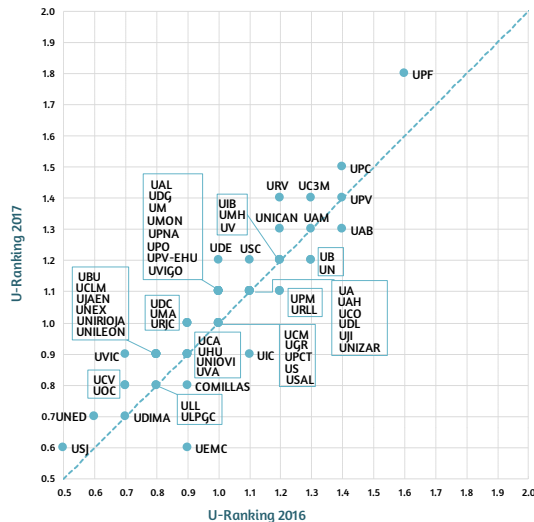
The close fit between the indicators of both editions of the ISSUE project can also be appreciated in the following figures, which show on the horizontal axis the synthetic indicator of each public university in 2017 and on the vertical axis the results for 2016, both for U-Ranking (figure 17) and for U-Ranking Volume (figure 18). As can be observed in the case of the volume index, the correlation is almost perfect, therefore, few changes are produced.

	Performance		Volume	
	Ranking	Index	Ranking	Index
Global	0.92	0.91	1.00	0.99
Teaching	0.94	0.91	0.95	0.96
Research	0.82	0.78	0.89	0.92
Innovation and Technological Development	0.94	0.90	0.83	0.91

Note: The ranking values are calculated by means of a Spearman correlation coefficient and the index values by means of a Pearson correlation coefficient.
Source: BBVA Foundation-luie.

Figure 17. U-Ranking (performance) of the Spanish public universities. 2016 and 2017

Index



See appendix 2 for a list of the University abbreviations used.

Source: BBVA Foundation-luie.

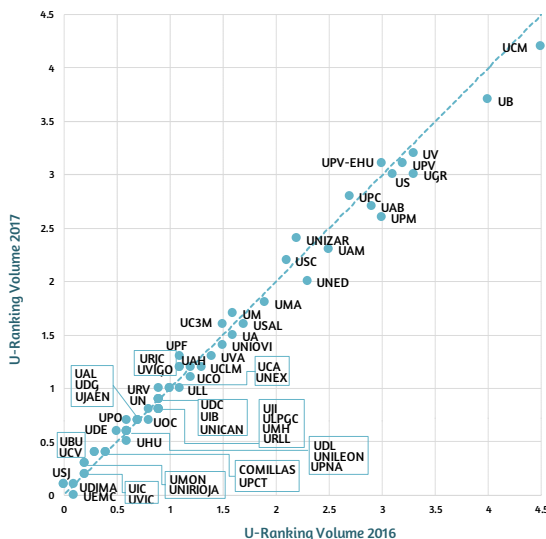
4.10. REGIONAL UNIVERSITY SYSTEMS

Universities undertake their teaching and research activities in a certain geographic context that influences them in different ways. On the one hand, if they are public, investment efforts as well as incentive policies, quality assessments and plans to boost internationalization vary greatly from one region to another. On the other hand, the socio-economic environments of each region are different: there are differences in the levels of income, the population's educational levels, type of industries, labor market, urbanization, etc. For all these reasons, it is interesting to analyze the performance of the universities by delimiting their action area, the so-called *regional university systems*.

Figure 19 shows the averages of the 2017 U-Ranking index of all universities, both public and private, of each autonomous community. The three distance-learning universities have been removed from this analysis because, given their teaching method, it would be difficult to assign their scope of action to a particular region.

Figure 18. U-Ranking Volume of the Spanish public universities. 2016 and 2017

Index



See appendix 2 for a list of the University abbreviations used.

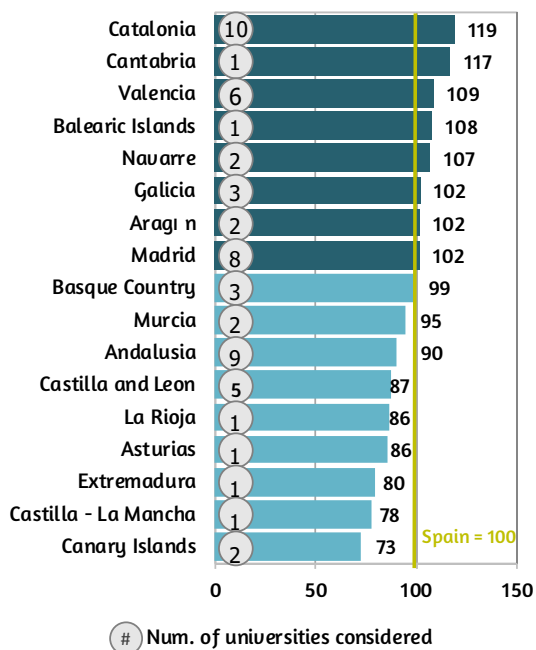
Source: BBVA Foundation-luie.

The results show, firstly, large differences regarding performance, among the regional university systems: the autonomous community with the highest performance exceeds by 46 percentage points the region with the lowest performance.

The region of Catalonia has Spain's most powerful university system, with a performance rate almost 20% higher than the average. It is closely followed by Cantabria, which only has one university (17% above the average). Next are the Valencian Community (9%), Balearic Islands (8%), Navarre (7%) and a group made up of Madrid, Galicia and Aragon (2% above the average).

Among the regional university systems below the average, we can distinguish several levels: some are close to the average —País Vasco, Murcia—, others are equal or 10% below —Andalusia, Castile and Leon, La Rioja and Asturias—, while other communities are less than 20%, as in the cases of Extremadura, Canary Islands and Castile-La Mancha.

Figure 19. Performance of the regional university systems. U-Ranking 2017
Spain = 100

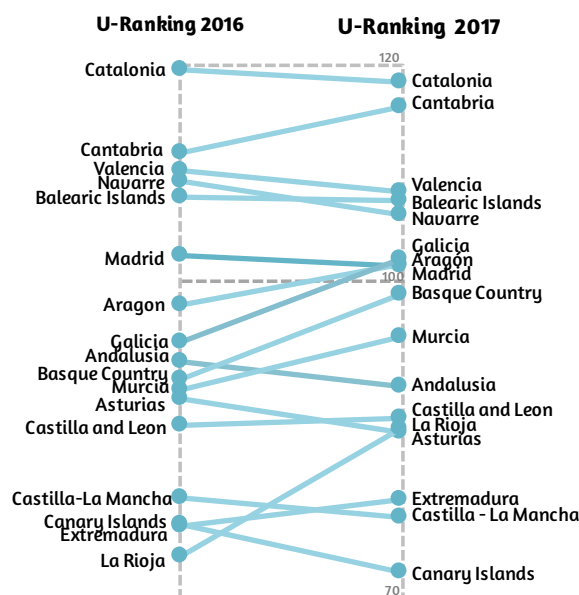


Source: BBVA Foundation-luie.

When comparing the regional university systems, we must take into account that private universities, which on average have a lower performance, tend to be concentrated, as we already have seen, in regions with high levels of income and large potential markets. However, the regions with more private universities are not the ones that appear in the last positions.

Figure 20 compares the results obtained by the autonomous communities in the 2016 edition with the results from the present edition. First of all, we can highlight the stability of the results. The most outstanding movements correspond to the growths of Cantabria, Galicia, Basque Country, Aragon, and, especially, La Rioja. The improvement in performance with respect to the national average does not necessarily mean an improvement in the position in the ranking. Thus, we see that Cantabria, as pointed out, increased its index from 112 in 2016 to 117 in 2017. However, it continues to be in second place, although it is closer to the first. There are no major setbacks in the index, but the most significant occur in Canary Islands, Andalusia and Asturias.

Figure 20. Evolution of the regional university systems. 2016 and 2017
Spain = 100



Source: BBVA Foundation-luie.

4.11. EMPLOYABILITY

U-Ranking uses the performance of universities in teaching, research and transfer to rank them according to each of these areas and, aggregately, by their overall results. It is interesting to note that a very important aspect, such as the employability of graduates, is not usually included in the system of indicators used to generate university rankings. Employability appears to be, and certainly is, a goal that universities must pursue and should mark the difference among them, given how important this variable is for graduates. Ultimately, if a person looks for a university with good results in teaching and research to pursue their studies, it is also because, fundamentally, they consider it will allow them to find a better job more quickly.

The main reason why employability is not included in most rankings is, in our opinion, the lack of adequate data. For example, in the Spanish case, the information should be adequate in several ways. First, continuity should be guaranteed because including them in one edition is sense-

less if the information is not updated to use in future editions. Second, the data offered should be available individually for each university. The two main sources that analyze the employability of university graduates in Spain do not meet one of these two requirements. So, even though the report “*Inserción laboral de los estudiantes universitarios*” from the Spanish Ministry of Education, Culture and Sports on the transition to the labor market of 2009-2010 graduates using the Social Security registration data is an excellent exercise, future updates for other cohorts are uncertain. Also, the survey on the labor market transition of university graduates with 2014 data carried out by INE (2016) to 30,000 university graduates in 1st and 2nd cycle is very valuable and intended to be ongoing, however, the information is not provided by university so it cannot be used to generate university rankings.

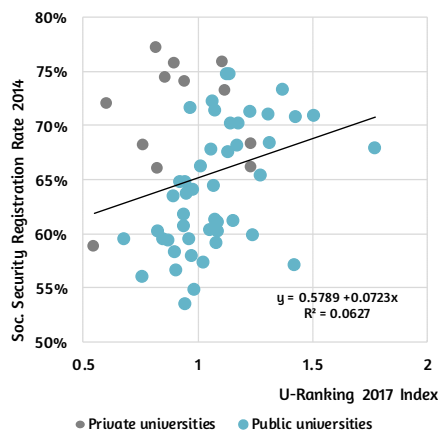
In this context, taking advantage of this one-time availability of information at university level, the U-Ranking 2017 edition includes an analysis of the impact that the inclusion of data on graduate employability would have on the elaboration of the rankings. It is referred to as a 'one-off exercise' since it is not possible to repeat in future editions, unless the Ministry of Education, Culture and Sports reconsiders making the information available over a continuous period.

The first important question is what relationship exists between the general, teaching and research classifications provided by U-Ranking 2017 and the graduate employability of each university. If the relationship is strong, then the inclusion of this new variable might be unnecessary since other factors are implicitly predicting the results of employability. On the other hand, if no relationship exists, the only way to consider employability is by explicitly including it.

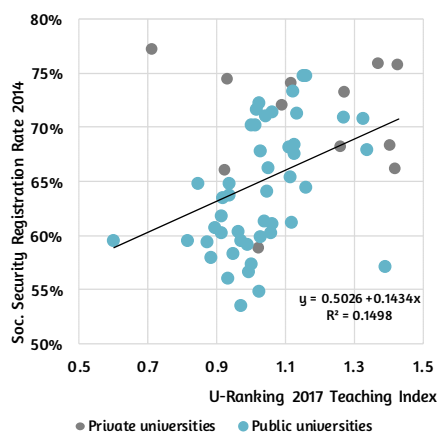
Figure 21 shows the relationship between the Social Security registration rate in 2014 of each university in U-Ranking 2017 and the global, teaching and research indices at two decimals. The graph is “silent” in the sense that it does not identify the universities because U-Ranking provides information only with a single decimal. The Social Security registration rate in 2014 for each university is obtained as the average of the Social Security registration rate corresponding to each 1st and 2nd cycle degree weighted by its

Figure 21. Relationship between U-Ranking 2017 and the 2014 Social Security Registration Rate

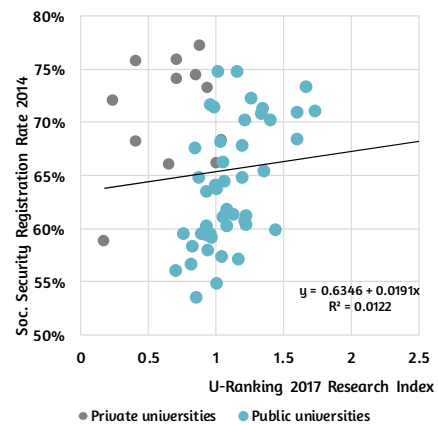
a) U-Ranking Global Index



b) U-Ranking Teaching Index



c) U-Ranking Research Index



Source: Ministry of Education, Culture and Sports and BBVA Foundation - Iuie.

number of graduates. The registration rate considered in the study is the one reached four years after graduation, corresponding, as mentioned previously, to the 2009-2010 academic year graduates. The results reveal that the relationship between the order of the universities listed in U-Ranking and the employability rate is practically null, although somewhat more intense in teaching. In any case, it is very weak, confirming that if employability is to be considered in university rankings, it has to be included expressly.

Two issues must be resolved before including employability. The first issue is which indicator should be used to measure employability and, second, what weight it should have in the configuration of the ranking. The answer to the first question is not so obvious. The use of the Social Security registration rate can represent an unequal treatment towards universities that are located in areas with a high unemployment rate among university graduates. For this reason, we use a homogeneous indicator of employability (IHE) in this analysis, which is defined as follows for university i that is located in the autonomous community j :

$$IHE_i = \frac{TAFILIA_i}{1 - TPARO_j}$$

where $TAFILIA_i$ is the registration rate in 2014 of university i , obtained, as noted previously, by the average of the Social Security registration rate corresponding to each degree weighted by its number of graduates and $TPARO_j$ is the unemployment rate of the population with higher education in the autonomous community j where the university is located²³. In this way, the registration rate is corrected for the difficulties posed by the environment. For example, the Universitat Pompeu Fabra has a 68% Social Security registration rate, well above the rate of the Universidad de Cordoba (60%). However, in 2014, the unemployment rate of the population with higher education in Catalonia was 12%, while in Andalusia 21%. Therefore, in this case, a higher employability rate of 8 percentage points is achieved in an environment with an unemployment rate of

the population with higher education that is 9 points lower. So, the IHE would give an equal result of employability for both universities (77%) by correcting the effect of this situation.

Figure 22 (panel a) places the universities in order according to the IHE, but also provides the Social Security registration values. Panel b offers the average by autonomous communities and panel c shows the differences between public and private universities. This figure confirms the correcting effect of the IHE. In universities located in regions with high unemployment levels, such as Andalusia or the Canary Islands, the IHE is much higher than the Social Security registration rate, while these differences are much lower in communities such as Navarre and La Rioja. In general, it can be appreciated that less changes are evident in high levels of employability and greater differences in low levels, which is where correction primarily takes part.

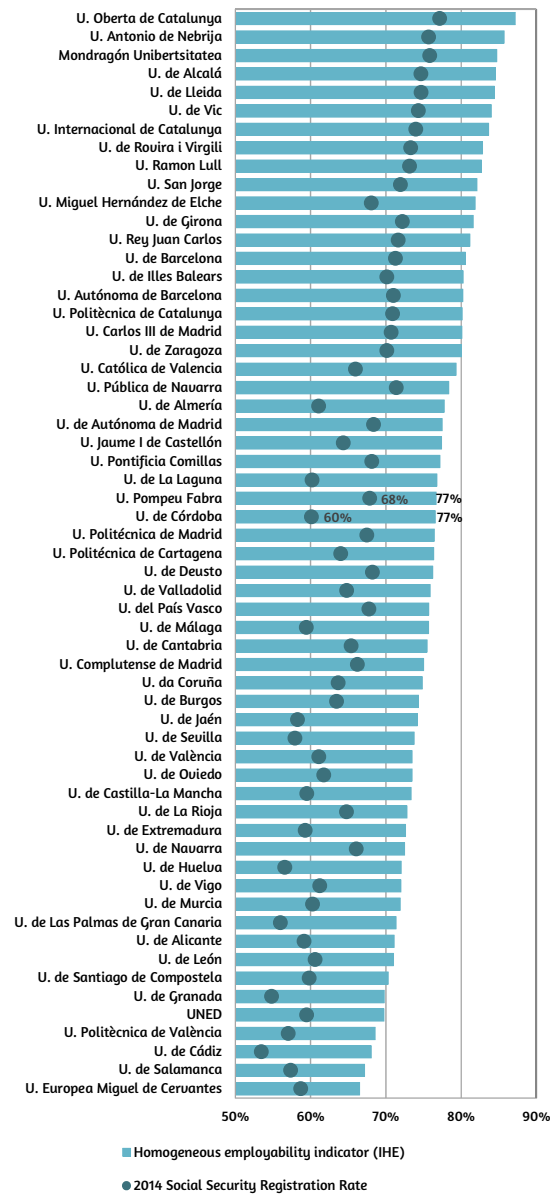
In terms of regions (panel b), this effect can be seen more clearly. In those cases where employability is higher, both indices offer a similar order. However, in Andalusia, Extremadura or the Canary Islands, the corrected index reduces the differences with other autonomous communities. While private universities have higher employability rates than public universities, their advantages are more intense when using the Social Security registration rates compared to the corrected IHE index, because they are located mainly in regions with more favorable labor markets for university students.

The second issue to consider before analyzing the impact of the possible inclusion of employability in U-Ranking is what weight should be given to this dimension in relation to teaching, transfer or research. As explained in the methodology, the distribution of the weights in U-Ranking was determined by a panel of experts. To analyze employability, since it is not strictly a modification of the ranking, we decided to assign it a high value (20%) and to allocate the remaining 80% to teaching, research and transfer, maintaining the original proportions among them. Table 12 lists the weights used in the simulation carried out.

23 The unemployment rate considered for UNED is the same as Spain.

Figure 22. Homogeneous employability Indicator (IHE) and 2014 Social Security Registration Rate

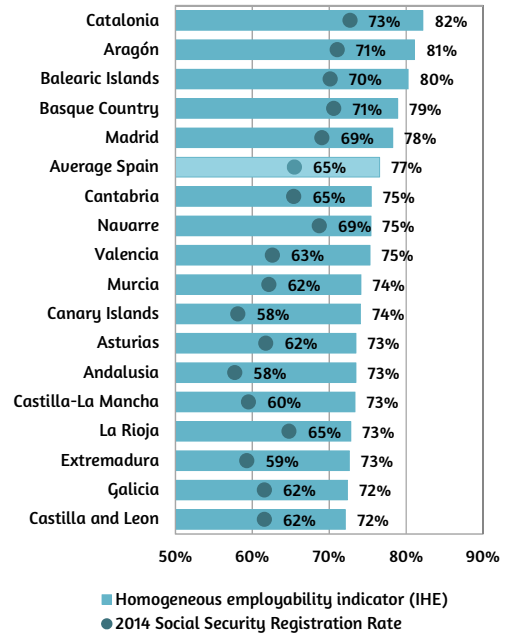
a) By university



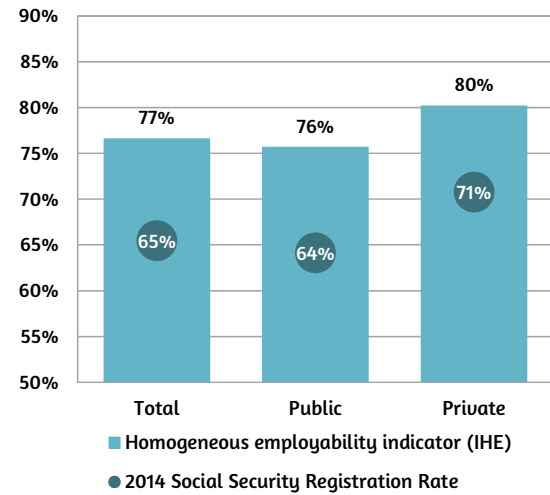
Information on the Social Security Registration Rate corresponding to the Universidad Pablo de Olavide and Universidad a Distancia Madrid is not available.

Source: Ministry of Education, Culture and Sports and BBVA Foundation -Iuie.

b) By region



c) By university degree



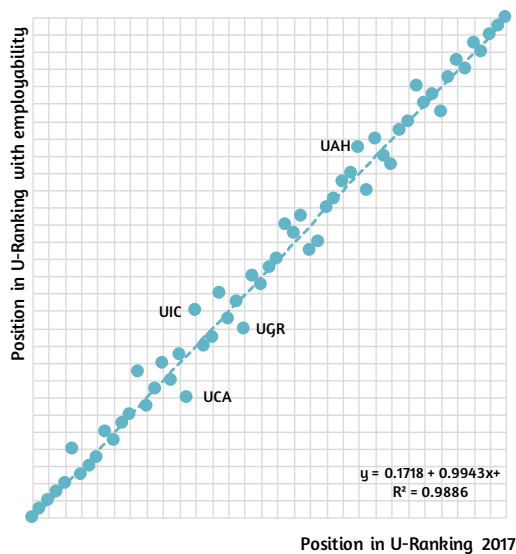
Source: Ministry of Education, Culture and Sports and BBVA Foundation -Iuie.

Table 12. Weights of the four dimensions used in the simulation carried out with the inclusion of employability in U-Ranking

Dimension	Original weights	Weights used in simulation
Teaching	56.0	44.8
Research	34.0	27.2
Innovation and Technological Development	10.0	8.0
Employability	--	20.0
Total	100.0	100.0

Source: BBVA Foundation - Iuie.

Figure 23. University position in U-Ranking vs. position in hypothetical U-Ranking with employability



See appendix 2 for a list of the University abbreviations used.

Source: BBVA Foundation - Iuie.

Figure 23 shows the results that U-Ranking 2017 would offer if employability were included with the weights indicated in table 4. Once more, following the U-Ranking criterion of using a single decimal index, the figure does not identify the universities with the exception of four which are used as a sample to indicate the main trends. The main conclusions derived from this exercise are:

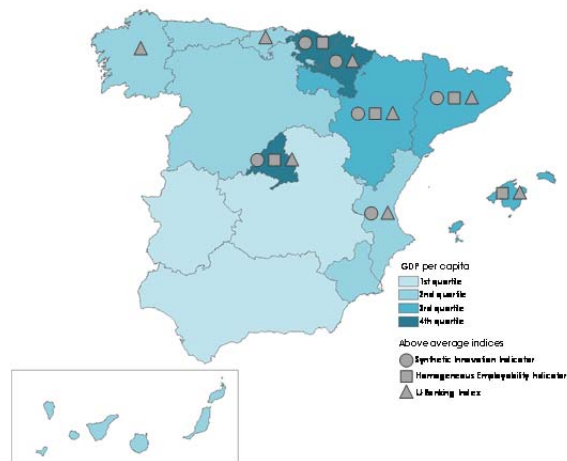
- Changes in the order in which the universities appear are few. Most universities are located on the diagonal, indicating that they would occupy the same position with employability included as in the current ranking.
- No university would increase or decrease its position in more than two places.
- The most significant changes, but always to a minor degree according to the above, occur with universities in regions with higher unemployment rates (see the cases of Universidad de Cádiz and Universidad de Granada in the figure), slightly worsening their position, while some private universities (UIC) or those in a more favorable labor market environment (Universidad de Alcalá de Henares) could experience improvements, but always minor.
- However, the main change that occurs in the ranking when including a high weight (20%) indicator such as IHE that shows no extreme differences (the university with the highest IHE is only 1.3 times superior to the university with the lowest) is that it generates a more homogeneous picture of the Spanish university system since some dominant universities reduce their advantages, and less prominent ones are closer to the average.

As a conclusion, the synergies of the universities with their environment are made evident in the opportunities created to cooperate in the field of research and innovation, but also affect the employability of their graduates. The employability of graduates is higher in some of the top universities not only because of their quality, but also due to more favorable job opportunities offered by the student's personal environment or the productive system of advanced regions. This last favorable circumstance does not occur in universities that are located in less developed regions—mostly public universities—and that are often teaching-centered. The greatest problems of employability facing their graduates are not necessarily due to the training they received, and therefore, university rankings should treat this issue with caution.

Map 1 shows the importance that environment has on the university results measured by U-Ranking. As observed, those regions that according to our index show higher performance levels, are also those with a higher GDP per capita and a higher employability of graduates measured with IHE. They are usually regions with a more developed knowledge economy in accordance with the synthetic indicator of innovation suggested by Reig et al. (2017).

However, the smaller number of opportunities offered by the environment of some universities is an obstacle that can be overcome. On an individual basis, this is achieved by encouraging graduates to be more willing to move, to consider various higher education institutions and wider labor markets, and this is a responsibility of the university. As a group, their challenge is greater because it requires that universities contribute with their human and technological capital to the medium-term transformation of the productive structure of their environment by means of the so-called 'third mission' of the universities.

Map 1. Knowledge economy, employment and U-Ranking results per region



Source: Ministry of Education, Culture and Sports, BBVA Foundation –Iuie and Reig et al (2017).

5. Conclusions

The aim of the ISSUE (Synthetic Indicators of the Spanish University System) project is to generate classifications and analyze the Spanish universities on the basis of broad data sets that consider the principal dimensions of their activities: teaching, research and innovation and technological development. This project builds two main rankings: U-Ranking, which correcting for the institutions' size, measures the performance of the Spanish universities and ranks them according to their level, and U-Ranking Volume, which measures the output without correcting for size. The ISSUE methodology is rigorous and is aligned with the recommendations of the recent international studies on this subject.

Aggregating the information on the results of the universities in different areas presents difficulties. Not considering them and contemplating the different indicators separately is not a practical solution, since most people interested in comparing the universities do not want to face large and complex volumes of information. Students, faculty members, researchers, university managers or politicians, and communications media appreciate having synthetic indicators available. The rankings — provided they are constructed with suitable and clear criteria and metrics— are useful in this sense, because they condense the results of universities in several areas, reducing the effort that the users must make to obtain and analyze the information.

The indices on which U-Ranking is based permit us to overcome both limitations in good measure by analyzing the teaching, research and transfer results of all the public universities of Spain (48) and of the 13 private universities that offer the information needed to make the comparison. In the near future we will incorporate the rest of the private universities for which similar information is available to that used to analyze the 61 universities that are now included.

The rankings were constructed from a set of 25 variables that take into account three relevant aspects: (i) the universities' different missions (teaching, research, innovation and technological development); (ii) the existence of differences in the results of a university in the different areas of study; and (iii) the importance of considering the preferences of the users of university services when constructing some rankings.

The project has generated two general rankings of the universities —that of volume of results (U-Ranking Volume) and that of performance (U-Ranking)— as well as six partial rankings: teaching, research and innovation and technological development, in terms both of volume and of performance. The set of rankings offers eight profiles of each of the universities, which can be of interest for assessing them from different perspectives. In some cases the images of a university projected by each ranking are the same, and in others they are different. It corresponds to the users of the information — university or political leaders, researchers, students, analysts, etc.— to consider which of these images are the most relevant for their needs or interests.

The main novelty of the 2017 edition, apart from improvements in the information available and the methodological changes outlined in previous sections, is an exercise, only carried out for this edition, which consists in incorporating employability in the calculation of the ranking in order to analyze its effects. We do not expect, however, to include the employability analysis in future editions, as the collection of the data used is not intended to be repeated each year.

The main results derived from the analysis of the 2017 edition of U-Ranking, are:

1. The synthetic indicators from which the rankings are obtained show that the differences in performance among

universities are relevant: the level of the indicator of those with better results triples that of the universities with the worst performance.

2. The differences among universities in terms of volume of results are much higher, since they are influenced by performance and the different sizes of the universities.
3. Public universities dominate the Spanish university system. The universities Pompeu Fabra, the Polytechnic universities of Catalonia and Valencia, Carlos III and Rovira i Virgili lead the 2017 U-Ranking.
4. The leadership of some of these universities is especially outstanding in the research and innovation and technological development dimensions. More specifically, two Catalan universities lead the research (Pompeu Fabra) and innovation and technological development (Politécnica de Catalunya) rankings. The Universitat Politècnica de València together with the private universities Deusto, Navarra, Antonio de Nebrija and Mondragon head the teaching ranking. The Universitat Pompeu Fabra also leads the overall ranking of performance.
5. There is a group of universities, formed by institutions with varied profiles, but among which predominate those of larger dimension- that occupy the most prominent places regarding volume of results and also performance. Most of them appear at the top 500 universities in the well-known international rankings, such as Shanghai, THE and QS. Thus, U-Ranking confirms that Spanish universities that frequently appear in the international rankings are those with greater volume of results which are more productive. The repeated quality signals given by these institutions identify, rather robustly to the use of different criteria, which Spanish universities stand out for their excellence.
6. With regard to the private universities, we confirm their high specialization and remarkable performance in teaching which exceeds by 11% the Spanish average. Six out of ten universities with a high level of performance in teaching are private. To evaluate this result in perspective, it is important to note that the private universities that have been included have higher indicators than the majority of those not included due to lack of information, in view of the values which are available. Thus, these good results could experience a change if U-Ranking ever included all the private universities.
7. The specialization in teaching of the private universities has its counterpart in a worse position with respect to the public system regarding research performance: on average 29% less than the mean value of the university system. None of the ten universities with best performance in research is private. Public universities present higher levels of performance in research, and also in innovation and technological development activities, than private ones. The mean distance of these universities is 27 percentage points below the national average.
8. Some international initiatives in this area are already very well known —such as the Shanghai Ranking or THE— and have increased the visibility of the classifications of universities and the social demand for such rankings. But these rankings place the emphasis on the indicators of research and training of high international prestige, leaving out most of the activity of our university system, focused on the teaching of the Bachelor's degree and not really competing in these leagues. This orientation towards indicators of research is also characteristic of most of the existing national rankings, drawn up with guarantees of quality by other specialists but considering indicators of the activities of universities that are too partial. Our results highlight the key importance of combining research performance with teaching performance measures. Using the first as proxy of the second causes a very biased view of reality because the correlation between both measures is very low. The incorporation of private universities mitigates even more the relationship between both dimensions and confirms the need to recognize the heterogeneity of the Spanish university system.

9. Differences in the results of the universities are also seen at regional level. Catalonia, Cantabria, the Valencian Community, Navarre, the Balearic Islands, Galicia, Aragon and Madrid are the regions with the most productive university systems, with average levels higher than that of the whole of Spain. Differences in performance among the regional university systems are great: 46 percentage points between the best-performing region and the worst-performing region.
10. The incorporation of employability to the calculation of rankings is a desirable goal but it requires (i) to have adequate information in terms of quality and continuity and (ii) to distinguish the internal factors of universities that affect the occupation of the graduates from the external factors over which universities have no control. Particularly for the 2017 edition, we have analyzed the employability of Spanish graduates by means of the construction of a homogeneous indicator of employability (IHE) that takes into account the said restrictions. According to this index, Catalonia, Aragon, the Balearic Islands and Madrid achieve above average results in graduates' employability. It also should be noticed that the IHE for public universities (less concentrated in large metropolitan areas than private ones) is lower by four percentage points than that of private universities.
11. The recalculation of U-Ranking 2017 including employability brings about very few changes in the classification of the universities. No university improves or worsens its position more than two places. The most affected would be those that are located in environments with high levels of post-university unemployment. The main change caused by the incorporation of the IHE would show a somewhat more homogeneous university system, as outstanding universities would see their advantages reduced and those less prominent would come nearer to the average as neither employability nor teaching differentiate universities, but rather their innovation and technological development.

12. Fostering employability also carries two implications for universities. On the one hand, it forces them to raise the culture of mobility among their graduates, which reduces the impact of regional differences on the university unemployment rates. And on the other hand, it challenges them to contribute with their human and technological capital to the increase of production in their environment, thus increasing their capacity to generate jobs.

The interest shown in rankings is clearly more focused on teaching when students use them to choose a university to study at. In this situation it is probable that the student will be interested above all in the quality of the university in certain studies, more than in the quality of research or in the quality of the teaching in general. In response to the demands for information from this perspective, U-Ranking offers a web tool that generates *personalized rankings* of Bachelor's degrees. These rankings are obtained taking into account students' preferences as to what they want to study, where they are willing to study it, and the importance they attribute to teaching aspects. The project intends to extend this analysis in the future to postgraduate degrees, but the information currently available does not allow this.

The role of the web tool developed is to offer students information of quality and rankings very easy to obtain. In this way we facilitate their task of assessing the options that best fit their criteria, when choosing the university in which to study for a degree. If the rankings are constructed rigorously they can help to orientate with reasonable criteria decisions that are complex for non-experts, and even for professionals such as careers advisers. Actually, no ranking is without problems but the alternative is to dedicate much effort to gathering and sorting a lot of information. The difficulties and the cost of doing so often lead to making the decision in almost total absence of information. We therefore consider that a well-founded system of rankings like the one offered—and the complementary information on cut-off marks, cost of registration and characteristics of the surrounding environment—may be of utility, since by enormously easing the task it will permit many people to make better informed decisions.

The wide use of this web tool in its five years of life confirms this fact.

One general conclusion from the results of the project is that it confirms a notable diversity among the Spanish public universities with regard to their capacity to generate results and to their performance. This diversity is also very notable with regard to their teaching and research specialization and their capacity to stand out in specific subject areas or degrees. In fact, some general characteristics of each university constitute an important element in explaining their results in each of their activities, but a notable internal diversity is also appreciated in many cases, examples of excellence existing in specific degrees in institutions that are not, in general terms, outstanding and vice versa, the results in specific degrees are below the average level of quality of the university.

The broad dataset on the universities offered by U-Rankings permits us to outline very relevant features of the diversity of the Spanish university system and inside each of the universities. Acknowledgement of this diversity is very important to various objectives: to evaluate the universities' results; to guide their strategies for improvement and university policies in a more targeted way; to orientate the potential users of teaching services; and to supply information to firms and institutions interested in knowing the universities' capacity to generate R&D&I results.

Appendix 1: Glossary of Indicators

Appendix 1. Glossary of indicators and statistical sources of U-Ranking 2017

Dimension	Area	Indicator and definition	Source	Period	Disaggregation
Teaching	Resources	Faculty member per 100 students: Full-time equivalent faculty and research staff in centers belonging to the University per 100 full-time equivalent students in studies of 1 st and 2 nd cycle, Bachelor's and Master's degrees and students in Doctoral degrees (all of these students registered in centers belonging to the University)	SIIU CRUE	2012-13 to 2014-15	Branch of knowledge
		Budget / Student: Effective income of the University by number of full-time equivalent students in studies of 1 st and 2 nd cycle, Bachelor's and Master's degrees and of students in Doctoral degrees (all of these students registered in centers belonging to the University)	SIIU CRUE	2010, 2013, 2012 and 2014	University
		Faculty member with PhD / Faculty members: Full-time equivalent faculty members with PhD in centers belonging to the University over total full-time equivalent faculty and research staff in centers belonging to the University	CRUE	2010-11, 2012-13, 2013-14 and 2014- 15	University
	Output	Success rate: Number of credits passed by grade students registered in an academic year over total credits evaluated within the same course (excluding transfer and recognized credits)	SIIU'	2009-10 to 2014- 15	Branch of knowledge
		Evaluation rate: Number of credits evaluated by grade students registered in an academic year over total credits registered within the same course (excluding transfer and recognized credits)	SIIU'	2009-10 to 2014- 15	Branch of knowledge
		Drop-out rate: Number of students registered in academic year t who, two years after registering in the first year of a degree, abandon it without graduating, over the total number of students registered in year t	SIIU'	2009-10 to 2014- 15	Branch of knowledge
	Quality	Attractiveness index	-	-	-
		Percentage of postgraduate students: Full-time equivalent students registered in Master's degrees over the total number of full-time equivalent students registered in studies of 1 st and 2 nd cycle, Bachelor's and Master's degrees (all of these students registered in centers belonging to the University)	SIIU	2009-10 to 2014- 15	Branch of knowledge
	Internationalization	Cut-off mark: Mark of the last <i>general group</i> ² student that gained admission to a degree with limited places	SIIU	2016-17	Bachelor's degree
		Percentage of foreign students: Non-Spanish students of 1 st and 2 nd cycle, Bachelor's and Master's degrees over the total number of students of 1 st and 2 nd cycle, Bachelor's and Master's degrees	SIIU	2009-10 to 2014- 15	Bachelor's degree
Percentage of students in exchange programs: Spanish students of 1 st and 2 nd cycle and Bachelor's degrees who participate in the ERASMUS programme, over the total number of students of 1 st and 2 nd cycle and Bachelor's degrees		CRUE	2010-11, 2012-13, 2013-14 and 2014- 15	Branch of knowledge	
		Percentage of students registered in programs imparted in non-official languages	-	-	-

Appendix 1. Glossary of indicators and statistical sources of U-Ranking 2016 (continued)

Dimension	Area	Indicator and definition	Source	Period	Disaggregation
Research	Resources	Competitive public resources per faculty member with PhD: Competitive public resources for undirected research projects, including both projects and complementary actions and ERDF funds, over the total number of faculty members with full-time equivalent PhD	DGICT CRUE	2010 to 2015	Branch of knowledge
		Contracts with PhDs, research grants and technical support over total budget: Competitive resources obtained for research staff training, Juan de la Cierua, Ramón and Cajal and support technicians over total effective income	DGICT CRUE	2010 to 2015	Branch of knowledge
	Output	Citable documents with ISI reference per faculty member with PhD: Documents with ISI reference published per 100 faculty members with full-time equivalent PhD	IUNE (Thomson Reuters) CRUE	2010 to 2015	Branch of knowledge
		Total <i>sexenios</i>³ over possible <i>sexenios</i>: <i>Sexenios</i> obtained over the total possible <i>sexenios</i> for the universities' tenured research staff	CRUE	2012 to 2014	Branch of knowledge
		Doctoral theses read per 100 faculty members with PhD: Doctoral theses read per 100 faculty members with full-time equivalent PhD	MECD CRUE	2010 to 2015	Branch of knowledge
	Quality	Mean impact factor: Mean impact factor of the publications with at least one author affiliated to the University	IUNE (Thomson Reuters)	2010 to 2015	Bachelor's degree group
		Percentage of publications in the first quartile: Publications corresponding to journals in the first quartile of relevance within the Thomson Reuters classification by areas, over the total number of publications belonging to that area	IUNE (Thomson Reuters)	2010 to 2015	Bachelor's degree group
		Citations per document: Citations received per document from the date of publication to the date of data gathering	IUNE (Thomson Reuters)	2010 to 2015	Bachelor's degree group
	Internationalization	European or international research funds per faculty member with PhD: Effective income received from abroad due to applied research per 100 faculty members with full-time equivalent PhD in centers belonging to the University	CRUE	2014	University
		Percentage of publications with international co-authorship: Publications with at least one co-author affiliated to a foreign institution over the total number of publications	IUNE (Thomson Reuters)	2010 to 2015	Bachelor's degree group

Appendix 1. Glossary of indicators and statistical sources of U-Ranking 2016 (continued)

Dimension	Area	Indicator and definition	Source	Period	Disaggregation
Innovation and Technological Development	Resources	Income from licenses per 100 faculty members with PhD⁴: Income generated by the use and exploitation of licenses of the university for each 100 faculty members with PhD	IUNE (OTRIs and MECD)	2009 to 2014	University
		Income from consultancy contracts per 100 faculty members with PhD⁴: Income from R&D and consultancy contracts and from provision of services per 100 faculty members with PhD	IUNE (OTRIs and MECD)	2009 to 2014	University
		Income from continuing professional development (CPD) courses per faculty member with PhD⁴: Fees received from registration both for CPD and for the university's own postgraduate programs (master, specialist and expert) per faculty member with PhD	IUNE (OTRIs and MECD)	2010, 2012, 2013 and 2014	University
	Output	Number of patents per 100 faculty members with PhD⁴: Number of national patents granted to each Spanish university by the Spanish Patents and Trade Marks Office per 100 faculty members with PhD	IUNE (INVENES and MECD)	2010 to 2015	University
		CPD hours per faculty member with PhD⁴	-	-	-
		Number of contracts per faculty member with PhD⁴	-	-	-
	Quality	Patents commercialized per faculty member with PhD ⁴	-	-	-
Internationalization	Triadic patents per 100 faculty members with PhD⁴: Number of simultaneous protections of inventions in different countries obtained through an international patent application, per 100 faculty members with PhD	IUNE (OTRIs and MECD)	2009 to 2014	University	
	Income from international contracts per faculty member with PhD⁴	-	-	-	

¹For the calculation of the personalized rankings, information provided by the CRUE for the academic years 2010-11, 2012-13, 2013-14 and 2014-15 is used since it is offered by areas of study and university.

²General group: students finishing high school or students graduated in Advanced Vocational Training or foreign students.

³ Monetary compensation received for research activity based on the last six years. This indicator is only considered for public universities

⁴ The faculty members with PhD used for calculating the indicators of Innovation and Technological Development are those in the following categories: Professor, University School Professor, Associate Professor, University School Associate Professor, and Assistant Professor, registered each year in the centers belonging to the public universities. In the case of private universities it considers university professors with permanent contracts registered each year.

Appendix 2: List of University Abbreviations

Abbreviation	University	Type
COMILLAS	Universidad Pontificia Comillas	Private
UA	Universidad de Alicante	Public
UAB	Universitat Autònoma de Barcelona	Public
UAH	Universidad de Alcalá de Henares	Public
UAL	Universidad de Almería	Public
UAM	Universidad Autónoma de Madrid	Public
UANE	Universidad Antonio de Nebrija	Private
UB	Universitat de Barcelona	Public
UBU	Universidad de Burgos	Public
UC3M	Universidad Carlos III	Public
UCA	Universidad de Cádiz	Public
UCLM	Universidad de Castilla-La Mancha	Public
UCM	Universidad Complutense	Public
UCO	Universidad de Córdoba	Public
UCV	Universidad Católica de Valencia San Vicente Mártir	Private
UDC	Universidade da Coruña	Public
UDE	Universidad de Deusto	Private
UDG	Universitat de Girona	Public
UDIMA	Universidad a distancia de Madrid	Private
UDL	Universitat de Lleida	Public
UEMC	Universidad Europea Miguel de Cervantes	Private
UGR	Universidad de Granada	Public
UHU	Universidad de Huelva	Public
UIB	Universitat de les Illes Balears	Public
UIC	Universitat Internacional de Catalunya	Private
UJAÉN	Universidad de Jaén	Public
UJI	Universitat Jaume I	Public
ULL	Universidad de La Laguna	Public
ULPGC	Universidad de Las Palmas de Gran Canaria	Public
UM	Universidad de Murcia	Public
UMA	Universidad de Málaga	Public
UMH	Universidad Miguel Hernández de Elche	Public
UMON	Mondragon Unibertsitatea	Private
UN	Universidad de Navarra	Private
UNED	Universidad Nacional de Educación a Distancia	Public
UNEX	Universidad de Extremadura	Public
UNICAN	Universidad de Cantabria	Public
UNILEON	Universidad de León	Public
UNIOVI	Universidad de Oviedo	Public
UNIRIOJA	Universidad de La Rioja	Public
UNIZAR	Universidad de Zaragoza	Public
UOC	Universitat Oberta de Catalunya	Private
UPC	Universitat Politècnica de Catalunya	Public
UPCT	Universidad Politécnica de Cartagena	Public
UPF	Universitat Pompeu Fabra	Public
UPM	Universidad Politécnica de Madrid	Public
UPNA	Universidad Pública de Navarra	Public
UPO	Universidad Pablo de Olavide	Public
UPV	Universitat Politècnica de València	Public
UPV-EHU	Universidad del País Vasco	Public
URJC	Universidad Rey Juan Carlos	Public
URLL	Universitat Ramon Llull	Private
URV	Universitat Rovira i Virgili	Public
US	Universidad de Sevilla	Public
USAL	Universidad de Salamanca	Public
USC	Universidade de Santiago de Compostela	Public
USJ	Universidad San Jorge	Private
UV	Universitat de València	Public
UVA	Universidad de Valladolid	Public
UVIC	Universitat de Vic	Private
UVIGO	Universidade de Vigo	Public

Appendix 3: Universities' Panel of Indicators

1. Mondragon Unibertsitatea
2. Universidad a distancia de Madrid
3. Universidad Antonio de Nebrija
4. Universidad Autónoma de Madrid
5. Universidad Carlos III
6. U. Católica de Valencia S. Vte. Mártir
7. Universidad Complutense
8. Universidad de Alcalá de Henares
9. Universidad de Alicante
10. Universidad de Almería
11. Universidad de Burgos
12. Universidad de Cádiz
13. Universidad de Cantabria
14. Universidad de Castilla-La Mancha
15. Universidad de Córdoba
16. Universidad de Deusto
17. Universidad de Extremadura
18. Universidad de Granada
19. Universidad de Huelva
20. Universidad de Jaén
21. Universidad de La Laguna
22. Universidad de La Rioja
23. U. de Las Palmas de Gran Canaria
24. Universidad de León
25. Universidad de Málaga
26. Universidad de Murcia
27. Universidad de Navarra
28. Universidad de Oviedo
29. Universidad de Salamanca
30. Universidad de Sevilla
31. Universidad de Valladolid
32. Universidad de Zaragoza
33. Universidad del País Vasco
34. U. Europea Miguel de Cervantes
35. U. Miguel Hernández de Elche
36. U. Nacional de Educación a Distancia
37. Universidad Pablo de Olavide
38. Universidad Politécnica de Cartagena
39. Universidad Politécnica de Madrid
40. Universidad Pontificia Comillas
41. Universidad Pública de Navarra
42. Universidad Rey Juan Carlos
43. Universidad San Jorge
44. Universidade da Coruña
45. U. de Santiago de Compostela
46. Universidade de Vigo
47. Universitat Autònoma de Barcelona
48. Universitat de Barcelona
49. Universitat de Girona
50. Universitat de les Illes Balears
51. Universitat de Lleida
52. Universitat de València
53. Universitat de Vic
54. Universitat Internacional de Catalunya
55. Universitat Jaume I
56. Universitat Oberta de Catalunya
57. Universitat Politècnica de Catalunya
58. Universitat Politècnica de València
59. Universitat Pompeu Fabra
60. Universitat Ramon Llull
61. Universitat Rovira i Virgili

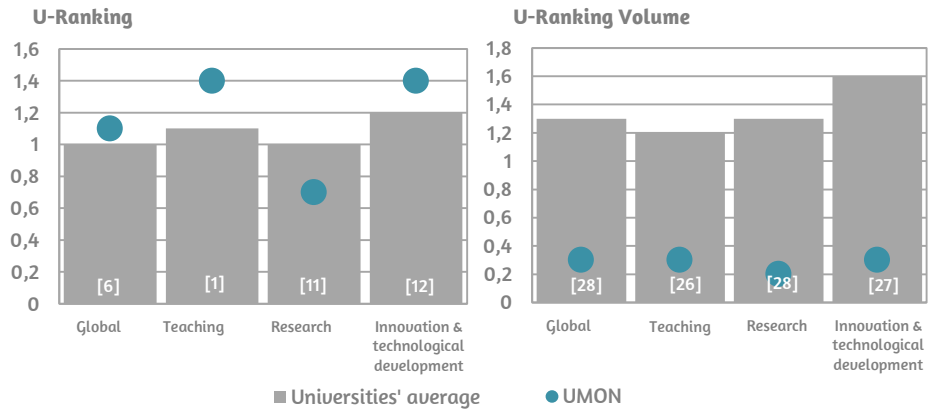
Year of foundation: 1.997
 Type of ownership: Private
 Bachelor's degree students¹: 3.602
 Master's degree students¹: 563
 Faculty members¹: 391
 Administration and service staff¹: 122
 Budget²: not available
 Bachelor's degrees³: 15
 Master's degrees³: 15

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

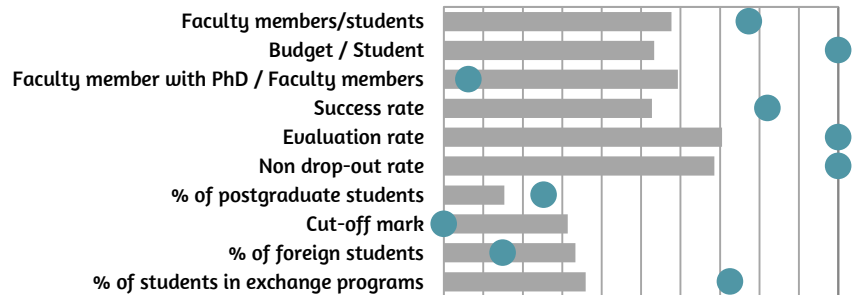
Index and position in the ranking between brackets



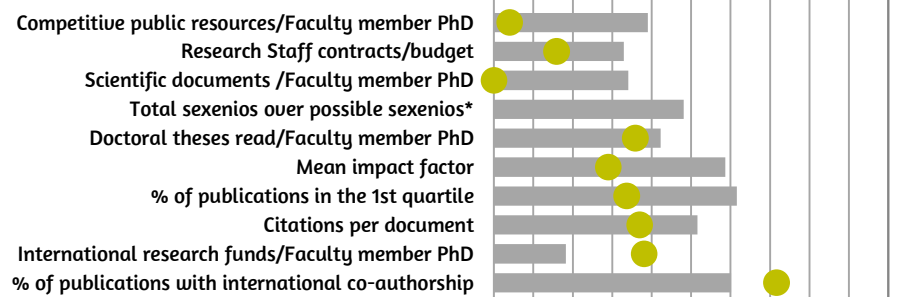
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

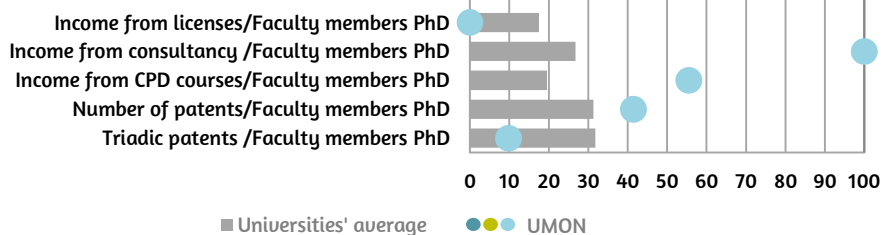
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

UNIVERSIDAD A DISTANCIA DE MADRID



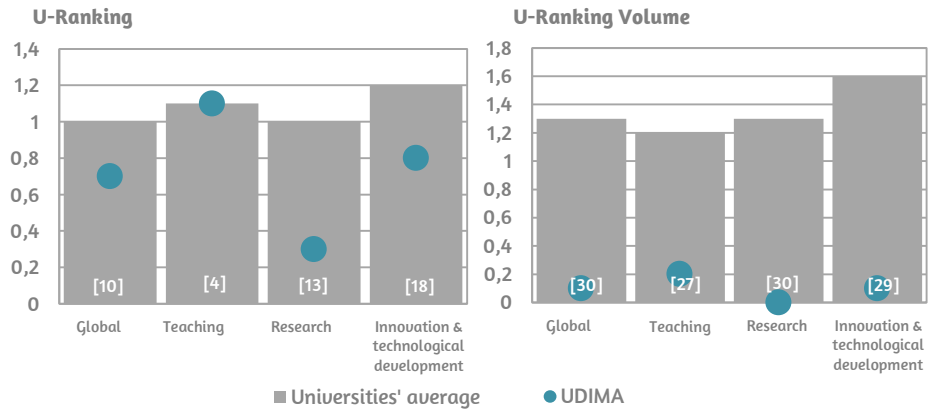
Year of foundation: 2.008
 Type of ownership: Private
 Bachelor's degree students¹: 3.286
 Master's degree students¹: 3.724
 Faculty members¹: 198
 Administration and service staff¹: 66
 Budget²: not available
 Bachelor's degrees³: 25
 Master's degrees³: 36

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

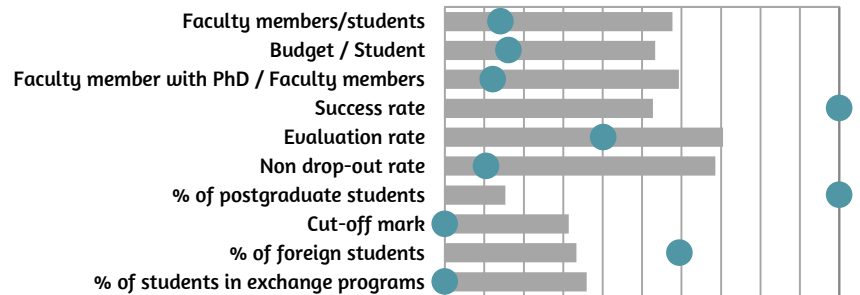
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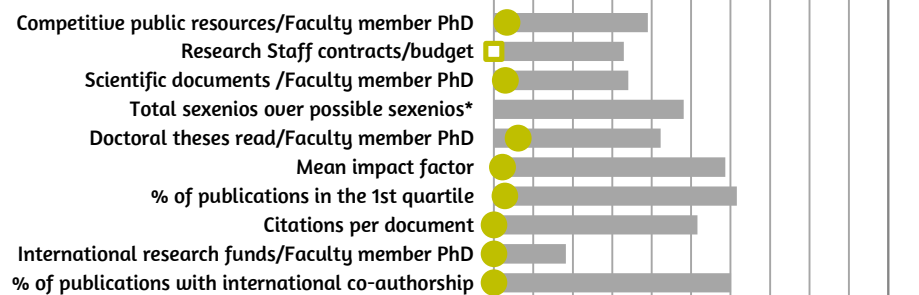
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

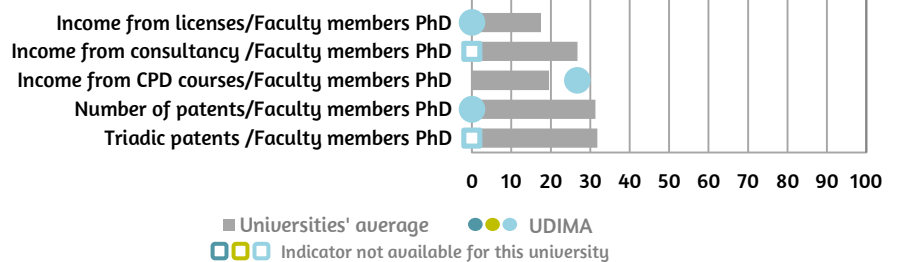
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

UNIVERSIDAD ANTONIO DE NEBRIJA



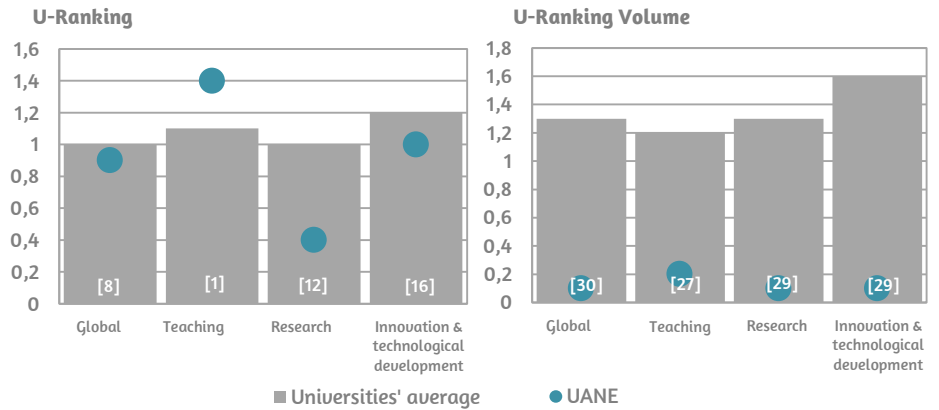
Year of foundation: 1.995
 Type of ownership: Private
 Bachelor's degree students¹: 2.851
 Master's degree students¹: 2.245
 Faculty members¹: 594
 Administration and service staff¹: 221
 Budget²: not available
 Bachelor's degrees³: 29
 Master's degrees³: 31

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

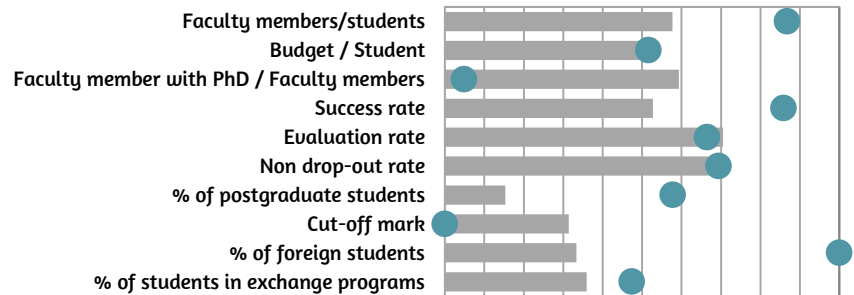
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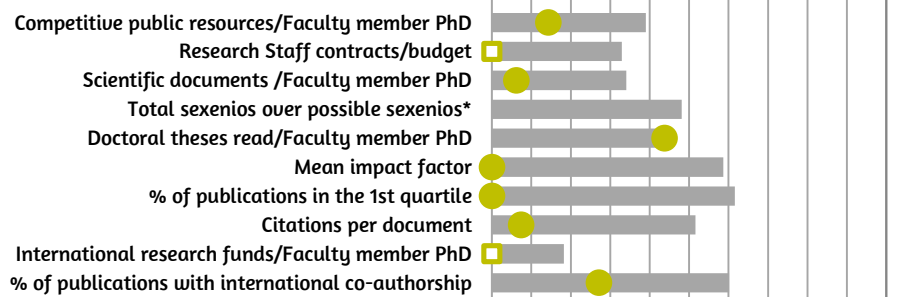
U-Ranking 2017 indicators

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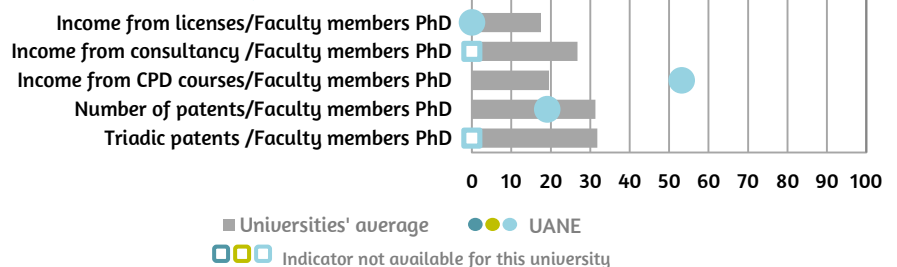
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

UNIVERSIDAD AUTÓNOMA DE MADRID



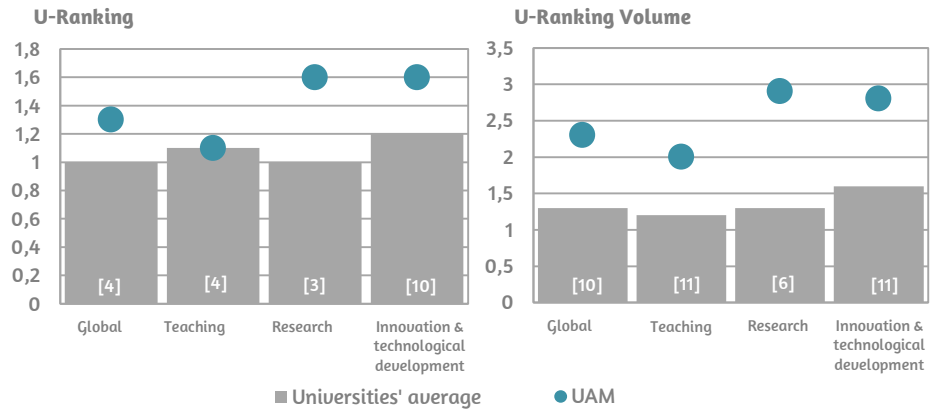
Year of foundation: 1.968
 Type of ownership: Public
 Bachelor's degree students¹: 23.282
 Master's degree students¹: 2.878
 Faculty members¹: 2.709
 Administration and service staff¹: 1.105
 Budget²: 219.898.269€
 Bachelor's degrees³: 42
 Master's degrees³: 79

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

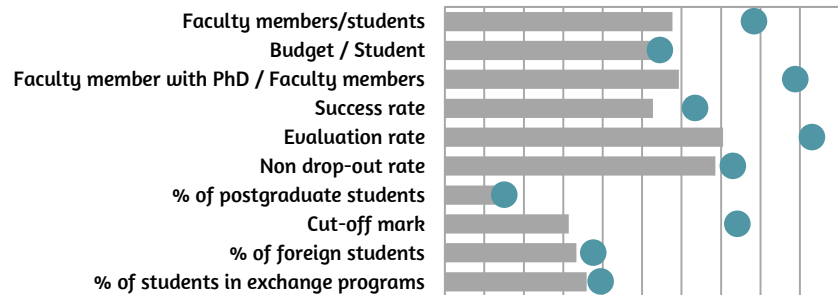
Index and position in the ranking between brackets



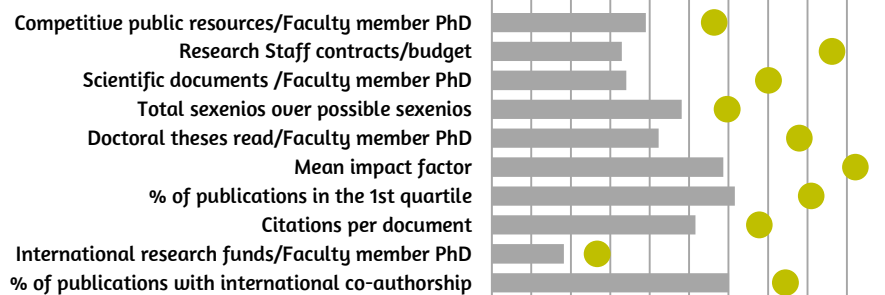
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

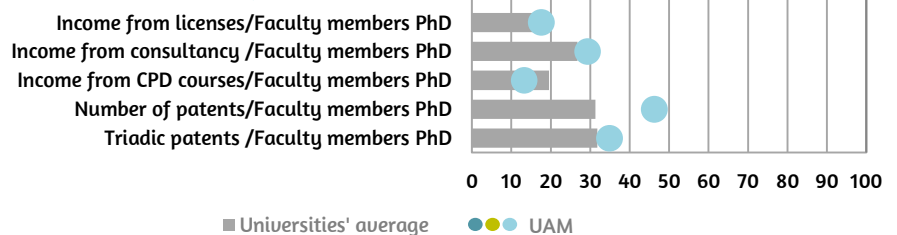
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.



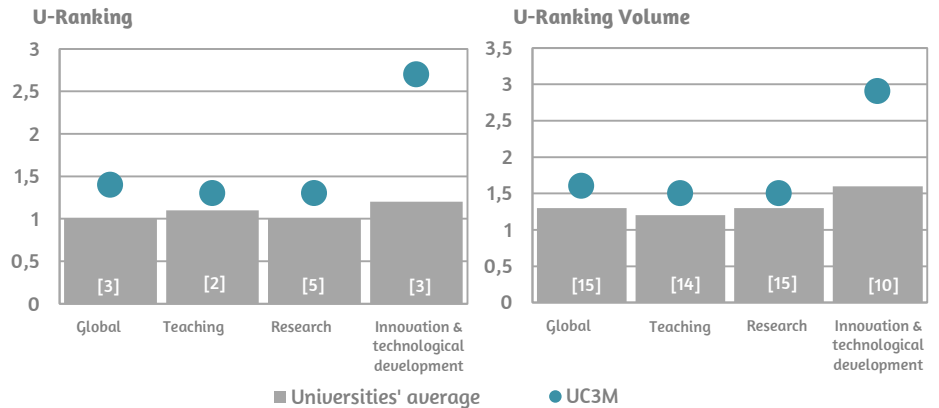
Year of foundation: 1.989
 Type of ownership: Public
 Bachelor's degree students¹: 15.038
 Master's degree students¹: 2.847
 Faculty members¹: 1.563
 Administration and service staff¹: 678
 Budget²: 150.750.955€
 Bachelor's degrees³: 28
 Master's degrees³: 64

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

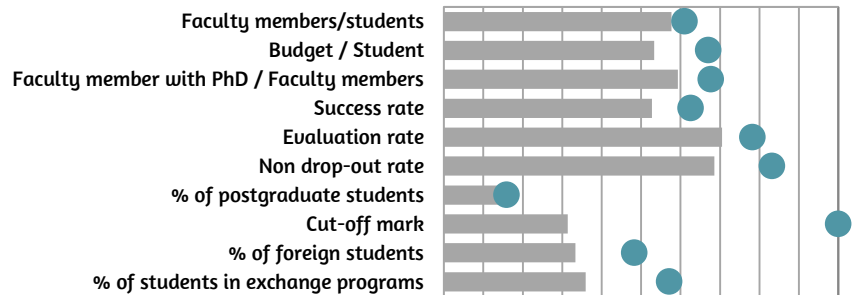
Index and position in the ranking between brackets



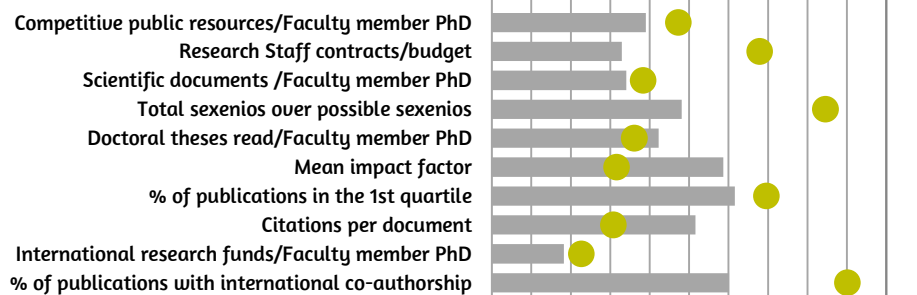
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

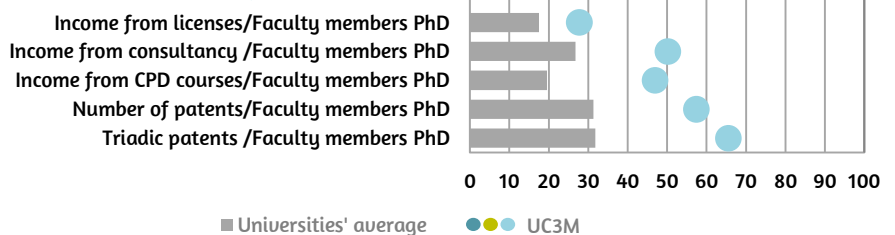
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

UNIVERSIDAD CATÓLICA DE VALENCIA SAN VICENTE



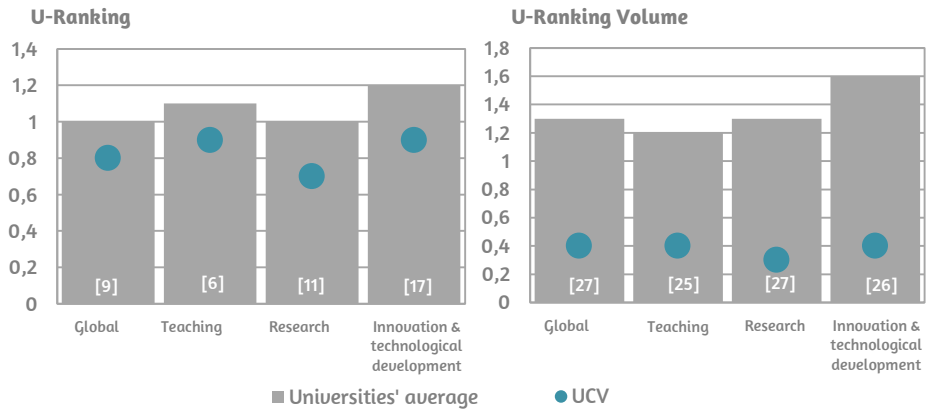
Year of foundation: 2.004
 Type of ownership: Private
 Bachelor's degree students¹: 9.238
 Master's degree students¹: 1.890
 Faculty members¹: 1.006
 Administration and service staff¹: 359
 Budget²: not available
 Bachelor's degrees³: 27
 Master's degrees³: 48

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

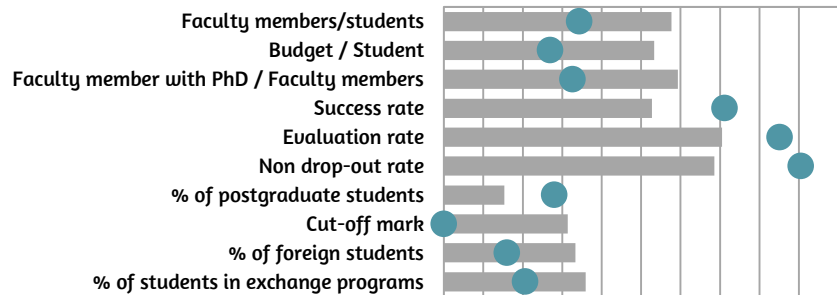
Index and position in the ranking between brackets



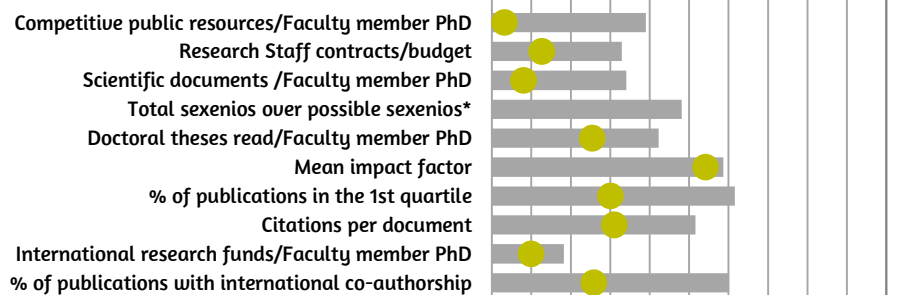
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

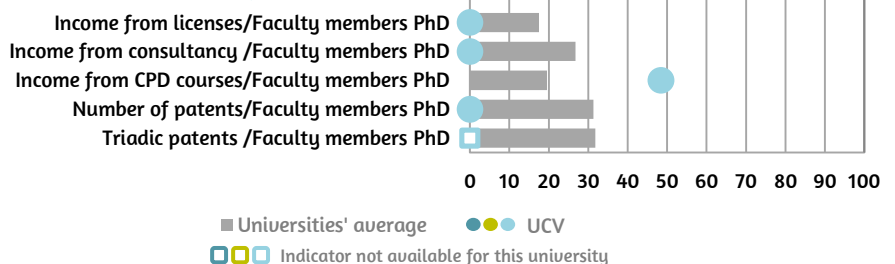
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

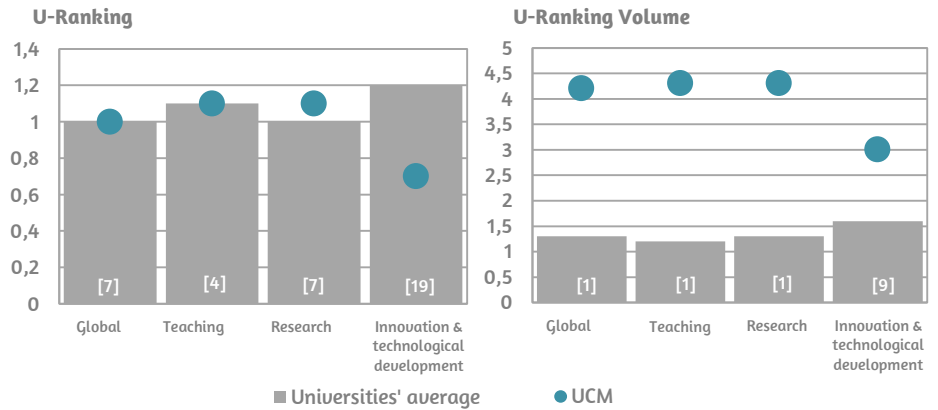
Year of foundation: 1.508
 Type of ownership: Public
 Bachelor's degree students¹: 61.135
 Master's degree students¹: 6.875
 Faculty members¹: 6.280
 Administration and service staff¹: 3.529
 Budget²: 504.423.674€
 Bachelor's degrees³: 71
 Master's degrees³: 161

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

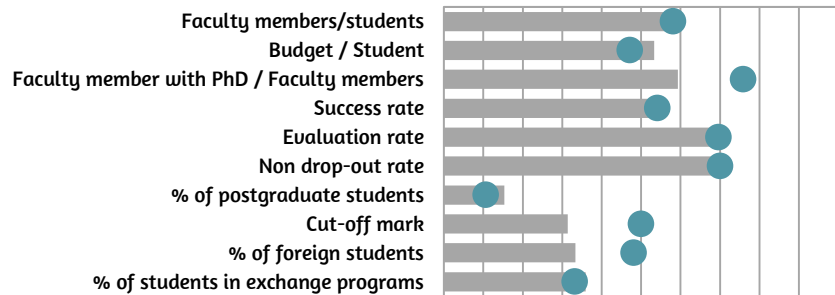
Index and position in the ranking between brackets



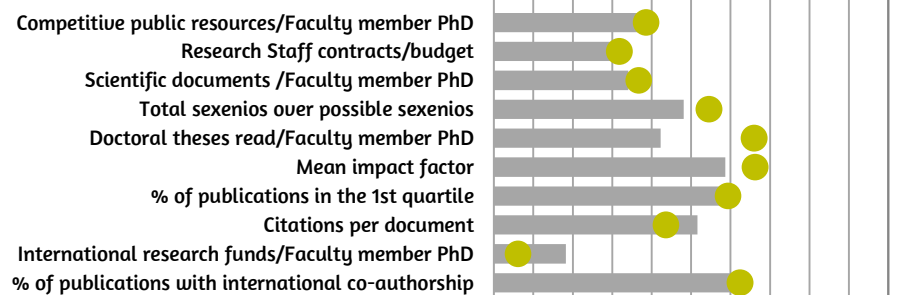
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

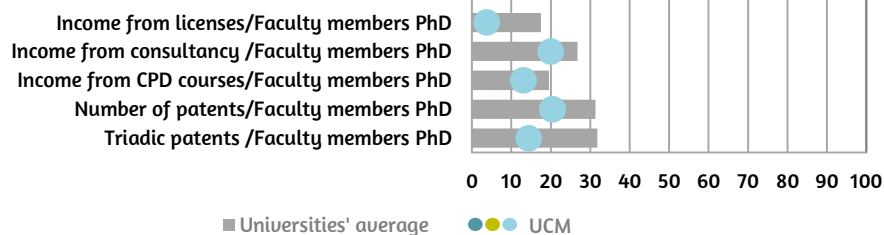
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD DE ALCALÁ DE HENARES



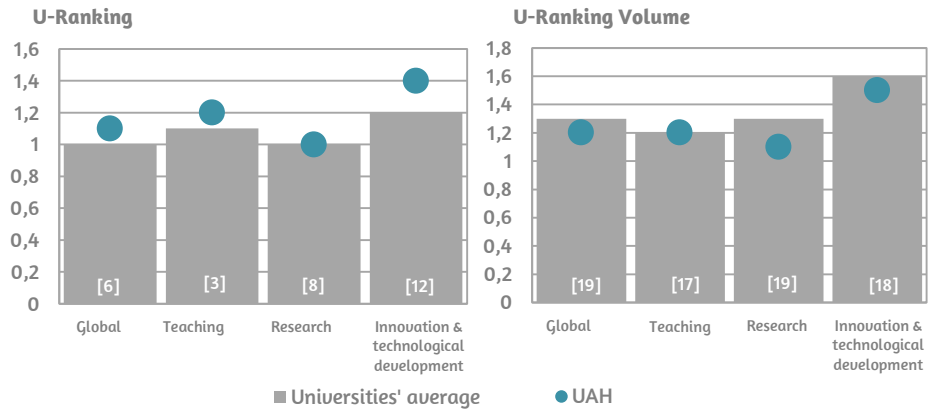
Year of foundation: 1.977
 Type of ownership: Public
 Bachelor's degree students¹: 14.723
 Master's degree students¹: 2.141
 Faculty members¹: 1.709
 Administration and service staff¹: 778
 Budget²: 138.916.040€
 Bachelor's degrees³: 36
 Master's degrees³: 43

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

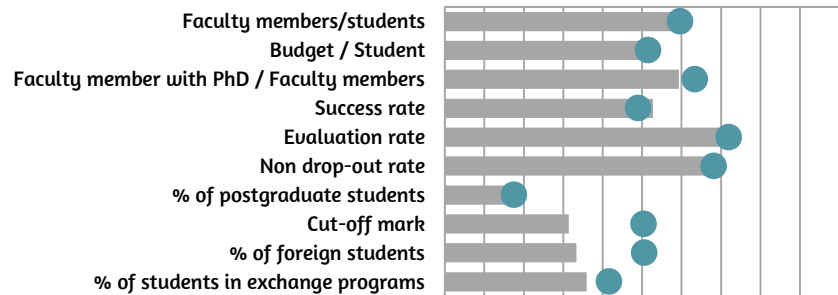
Index and position in the ranking between brackets



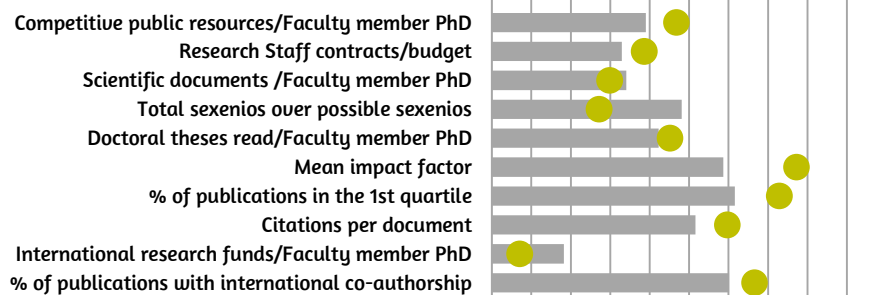
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

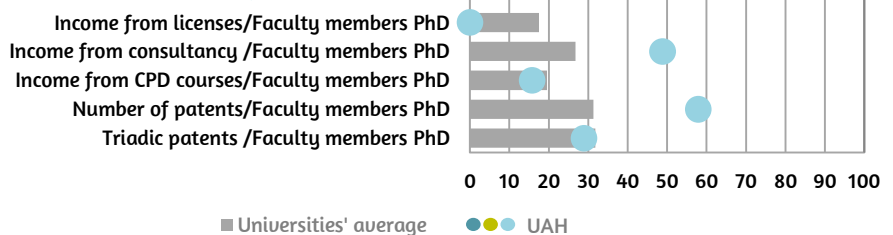
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

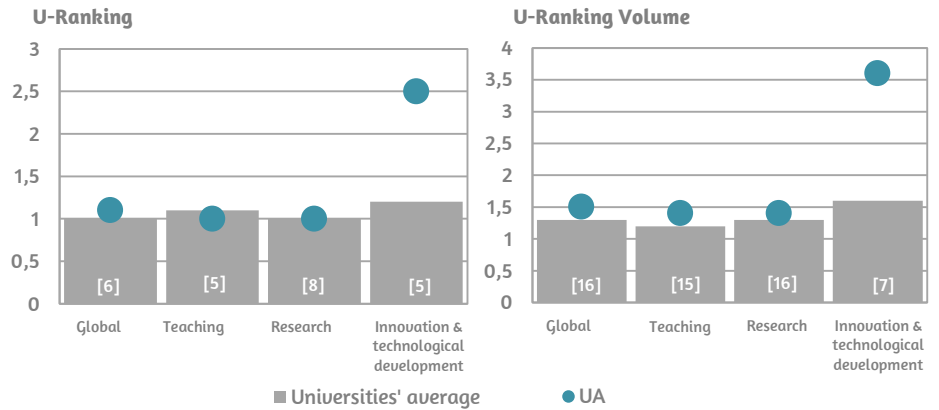
Year of foundation: 1.979
 Type of ownership: Public
 Bachelor's degree students¹: 22.898
 Master's degree students¹: 1.727
 Faculty members¹: 2.136
 Administration and service staff¹: 1.233
 Budget²: 177.941.309€
 Bachelor's degrees³: 41
 Master's degrees³: 58

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

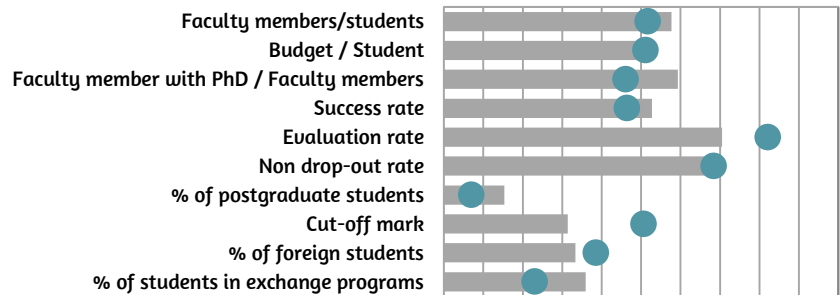
Index and position in the ranking between brackets



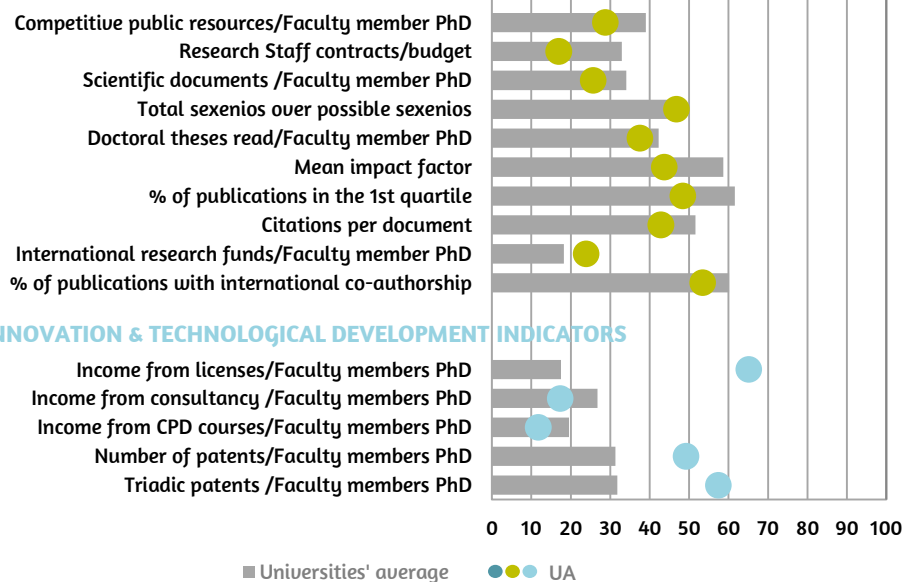
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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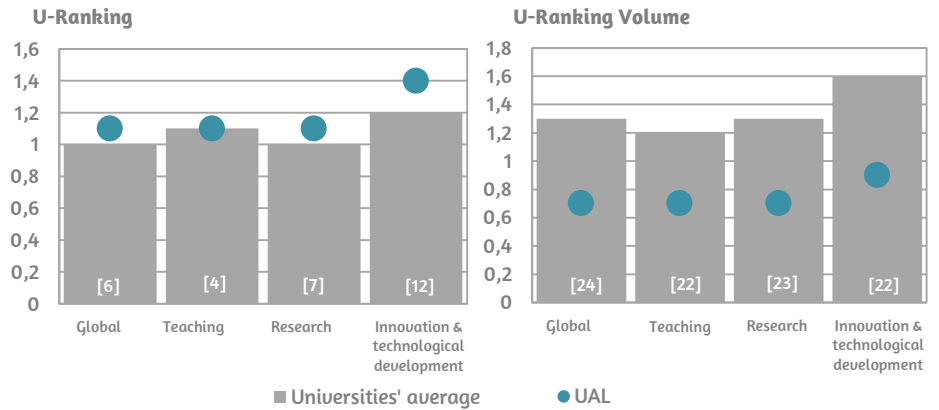
Year of foundation: 1.993
 Type of ownership: Public
 Bachelor's degree students¹: 11.429
 Master's degree students¹: 1.206
 Faculty members¹: 819
 Administration and service staff¹: 472
 Budget²: 81.015.320€
 Bachelor's degrees³: 30
 Master's degrees³: 41

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

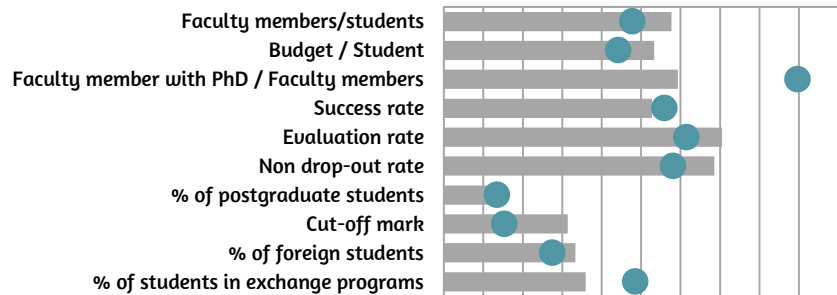
Index and position in the ranking between brackets



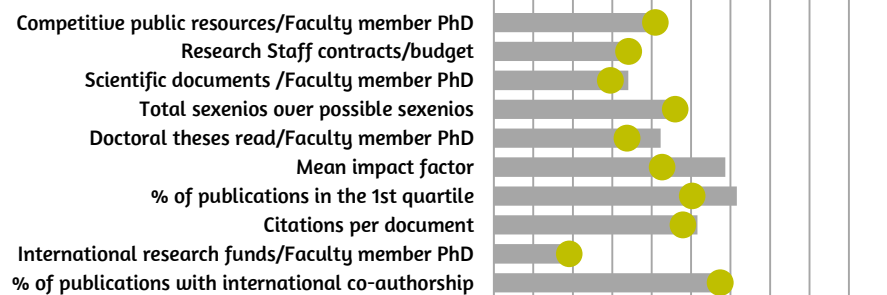
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

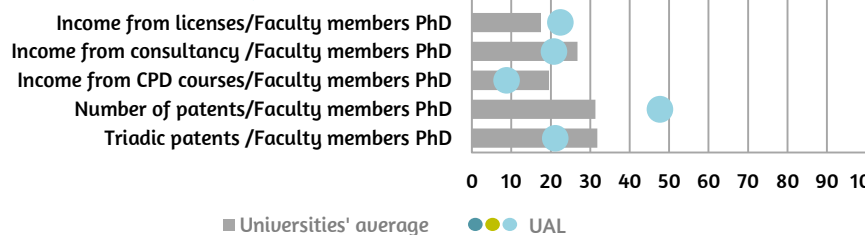
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

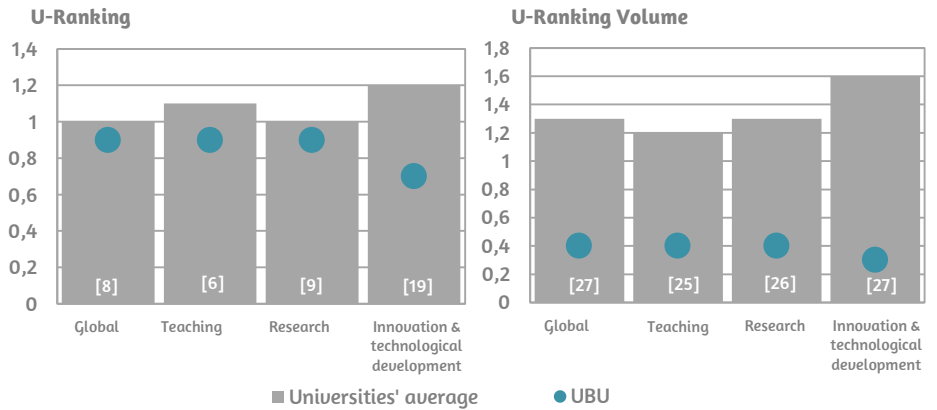
Year of foundation: 1.994
 Type of ownership: Public
 Bachelor's degree students¹: 6.617
 Master's degree students¹: 476
 Faculty members¹: 776
 Administration and service staff¹: 349
 Budget²: 50.573.903€
 Bachelor's degrees³: 25
 Master's degrees³: 18

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

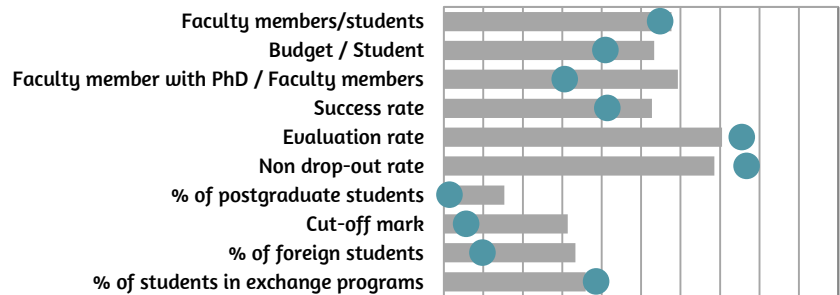
Index and position in the ranking between brackets



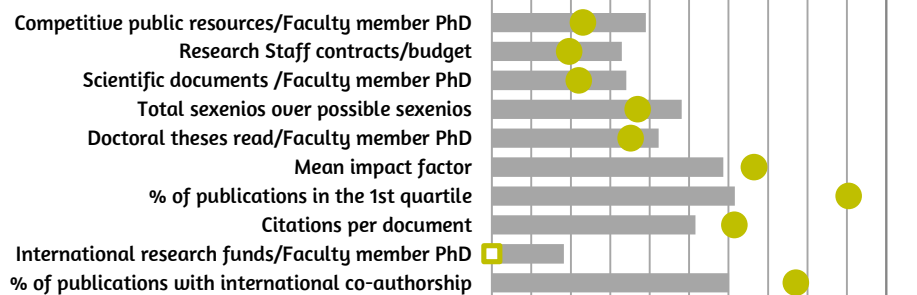
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

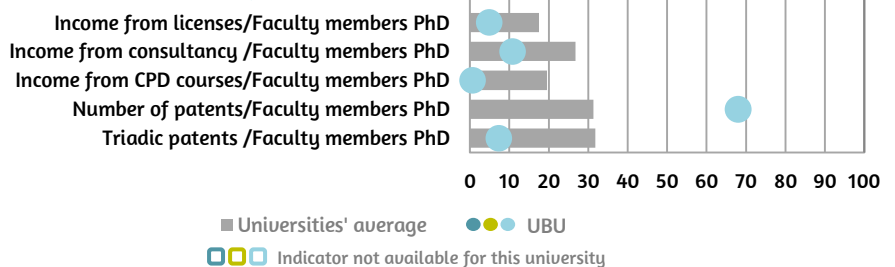
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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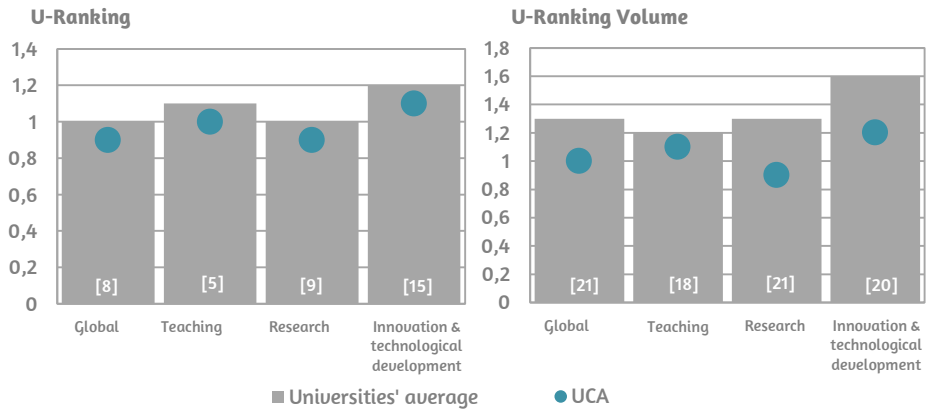
Year of foundation: 1.979
 Type of ownership: Public
 Bachelor's degree students¹: 18.914
 Master's degree students¹: 1.290
 Faculty members¹: 1.687
 Administration and service staff¹: 725
 Budget²: 130.130.652€
 Bachelor's degrees³: 44
 Master's degrees³: 50

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

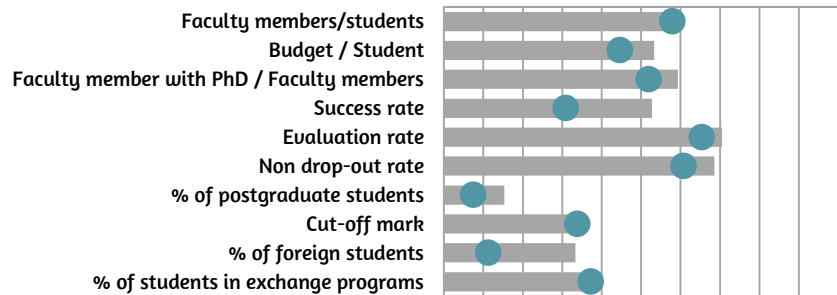
Index and position in the ranking between brackets



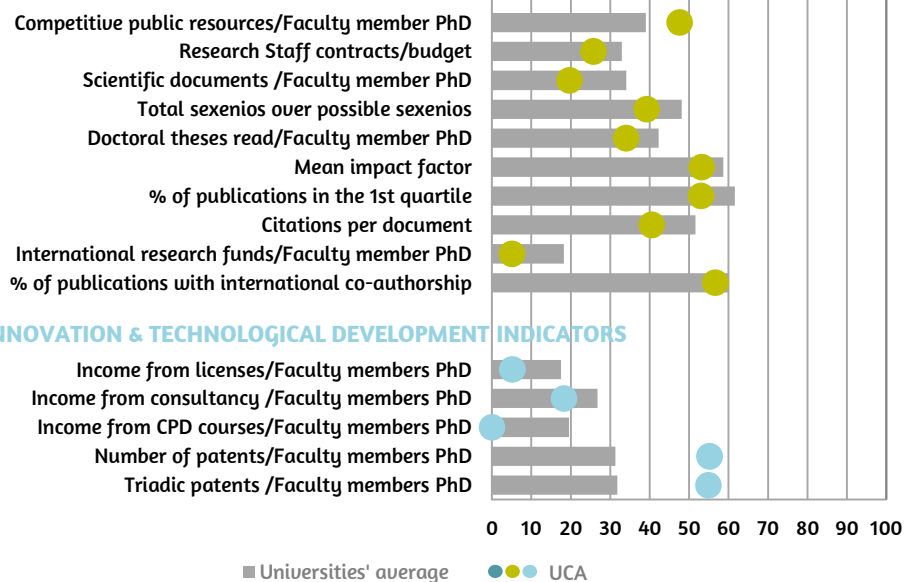
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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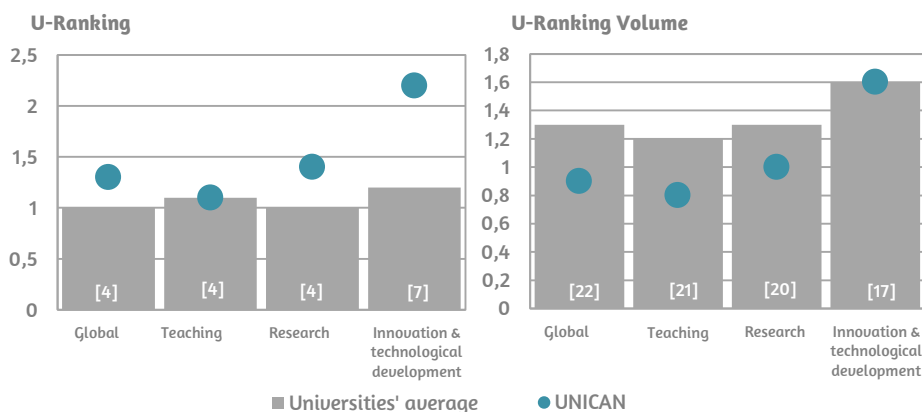
Year of foundation: 1.972
 Type of ownership: Public
 Bachelor's degree students¹: 9.331
 Master's degree students¹: 992
 Faculty members¹: 1.390
 Administration and service staff¹: 612
 Budget²: 97.333.805€
 Bachelor's degrees³: 30
 Master's degrees³: 49

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

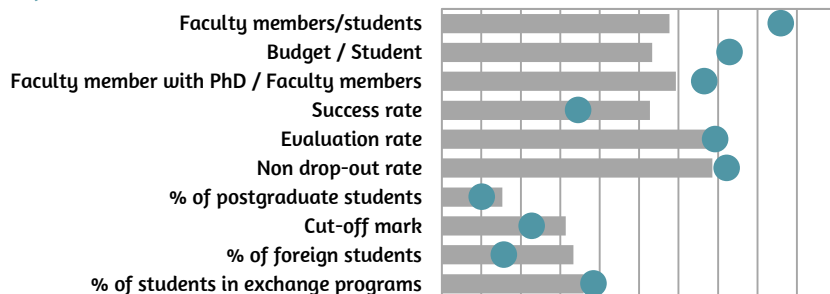
Index and position in the ranking between brackets



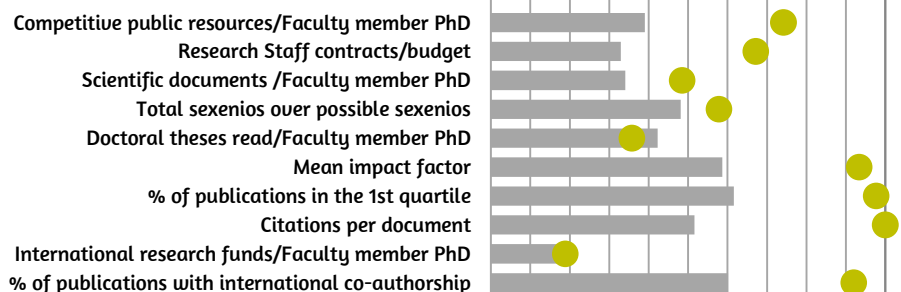
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

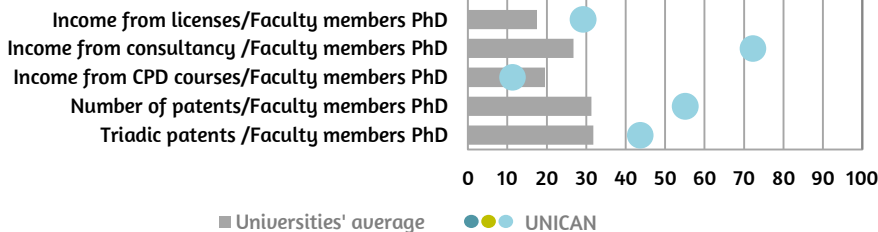
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD DE CASTILLA-LA MANCHA



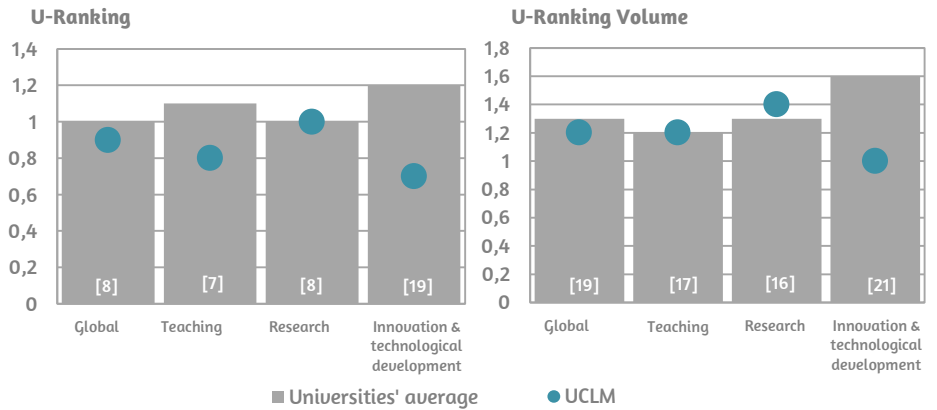
Year of foundation: 1.982
 Type of ownership: Public
 Bachelor's degree students¹: 23.115
 Master's degree students¹: 1.434
 Faculty members¹: 2.321
 Administration and service staff¹: 1.079
 Budget²: 164.525.427€
 Bachelor's degrees³: 48
 Master's degrees³: 36

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

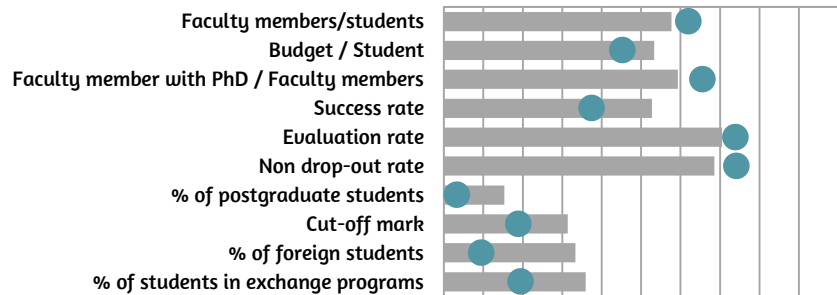
Index and position in the ranking between brackets



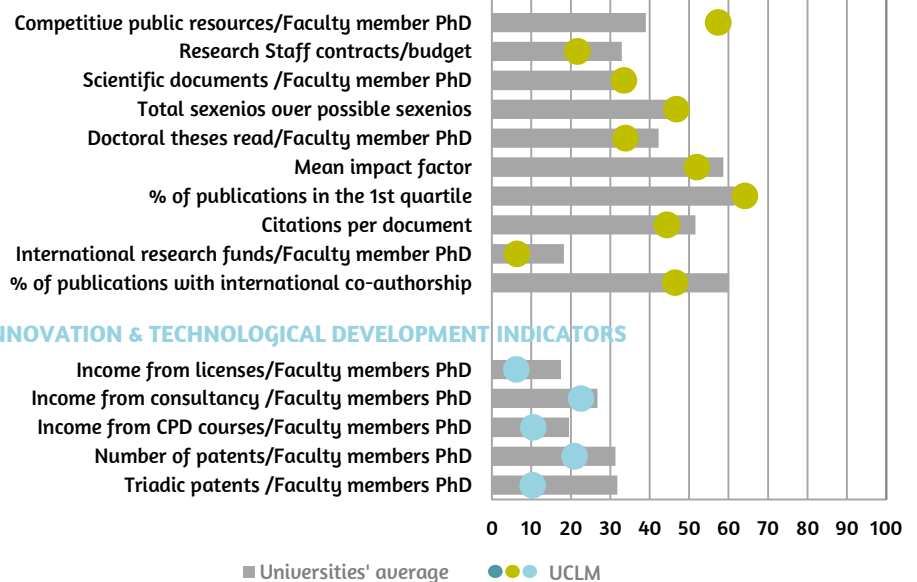
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

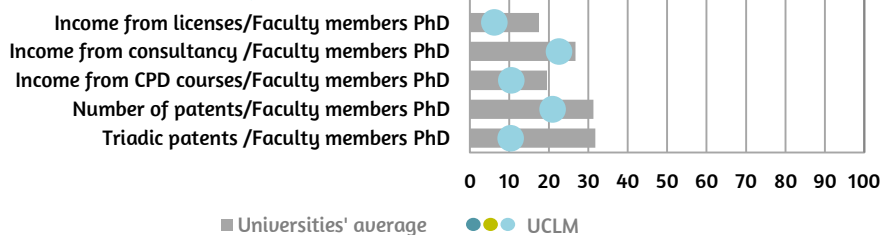
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

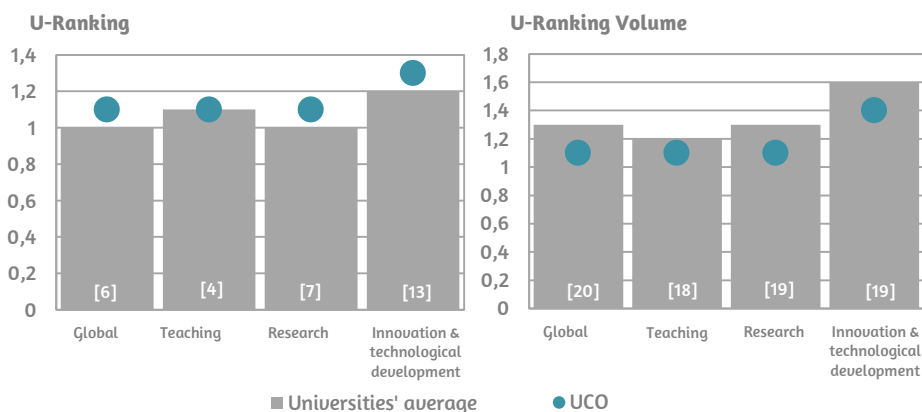
Year of foundation: 1.972
 Type of ownership: Public
 Bachelor's degree students¹: 15.784
 Master's degree students¹: 1.591
 Faculty members¹: 1.400
 Administration and service staff¹: 748
 Budget²: 144.493.223€
 Bachelor's degrees³: 32
 Master's degrees³: 53

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

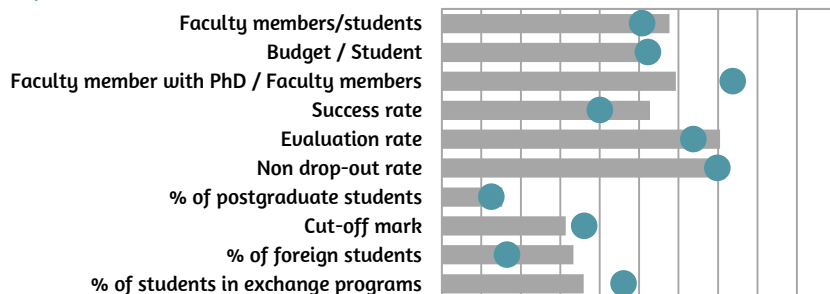
Index and position in the ranking between brackets



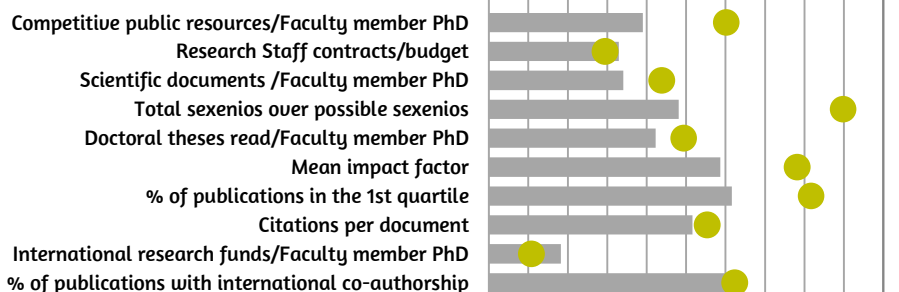
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

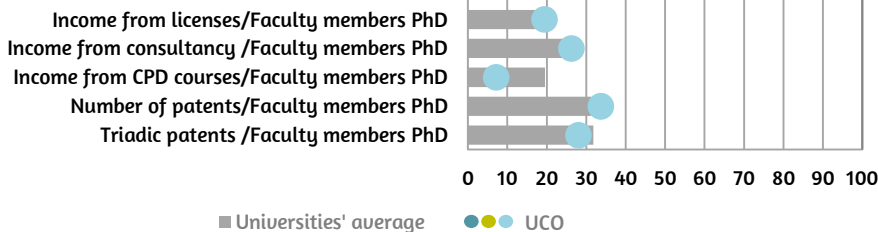
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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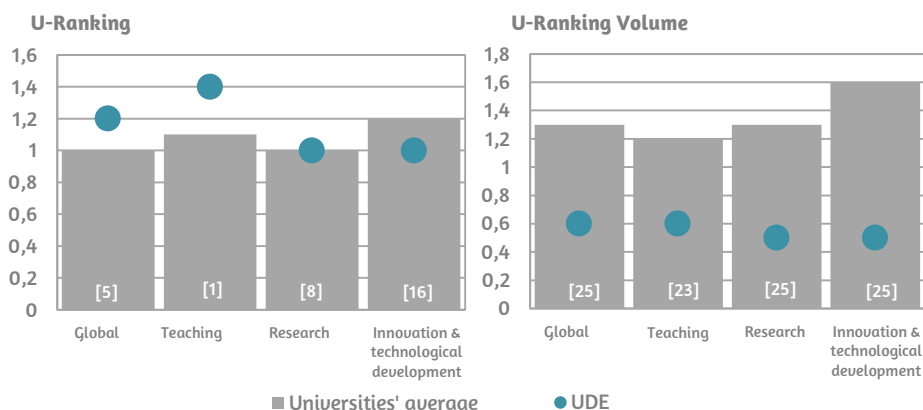
Year of foundation: 1.886
 Type of ownership: Private
 Bachelor's degree students¹: 7.216
 Master's degree students¹: 1.506
 Faculty members¹: 580
 Administration and service staff¹: 472
 Budget²: not available
 Bachelor's degrees³: 27
 Master's degrees³: 38

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

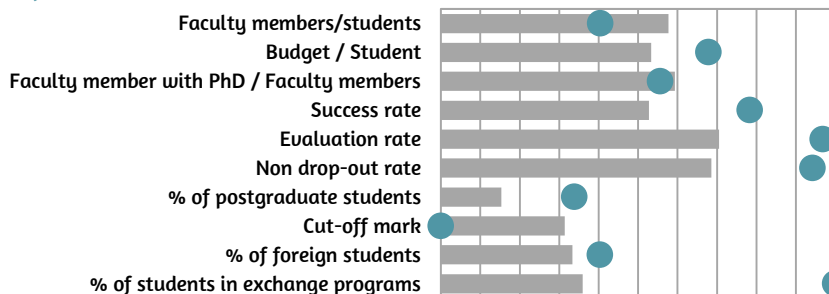
Index and position in the ranking between brackets



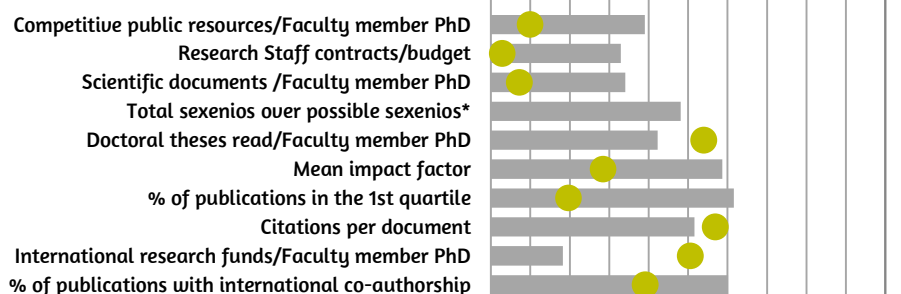
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

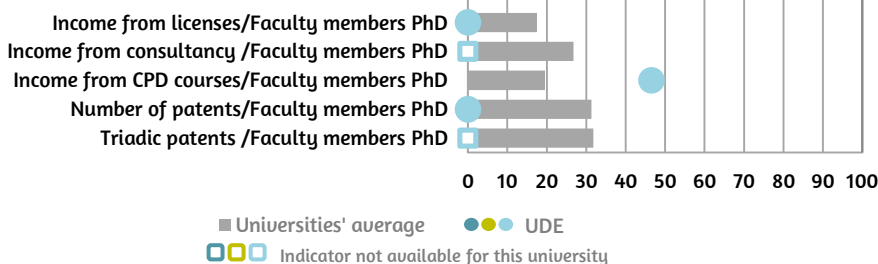
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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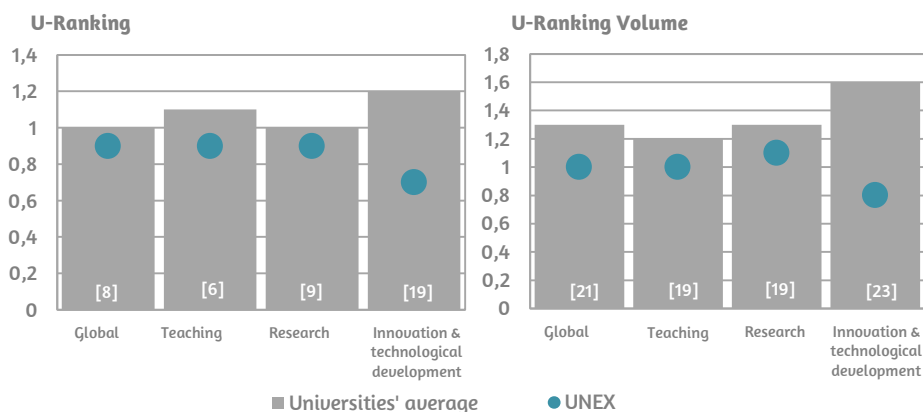
Year of foundation: 1.973
 Type of ownership: Public
 Bachelor's degree students¹: 19.703
 Master's degree students¹: 1.512
 Faculty members¹: 1.897
 Administration and service staff¹: 872
 Budget²: 142.087.240€
 Bachelor's degrees³: 59
 Master's degrees³: 48

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

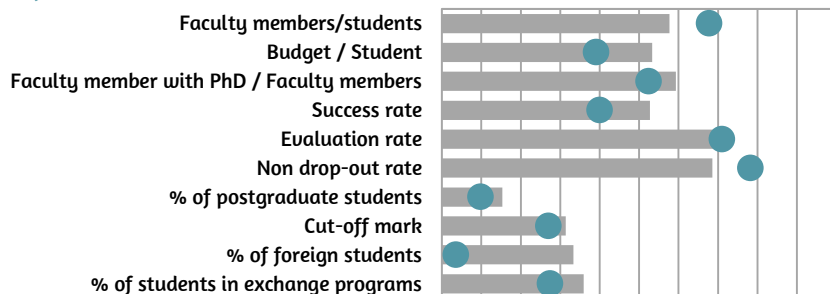
Index and position in the ranking between brackets



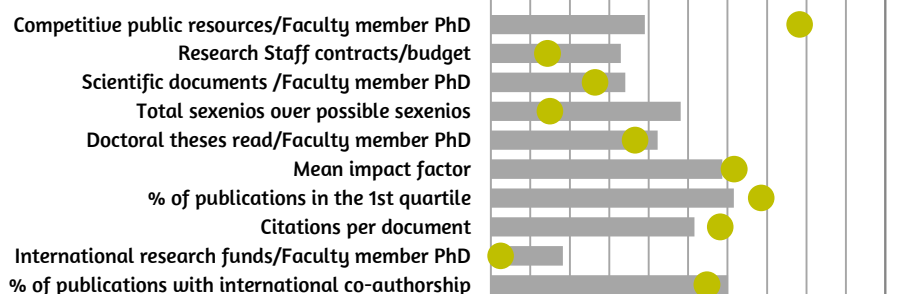
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

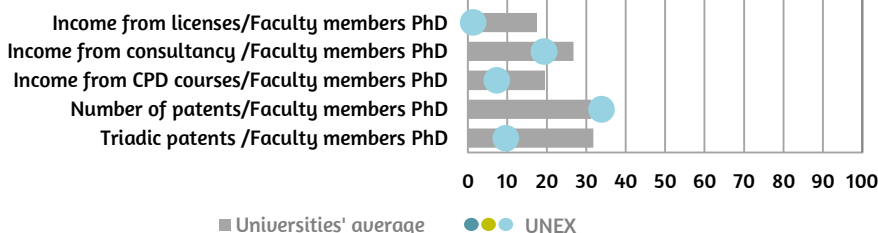
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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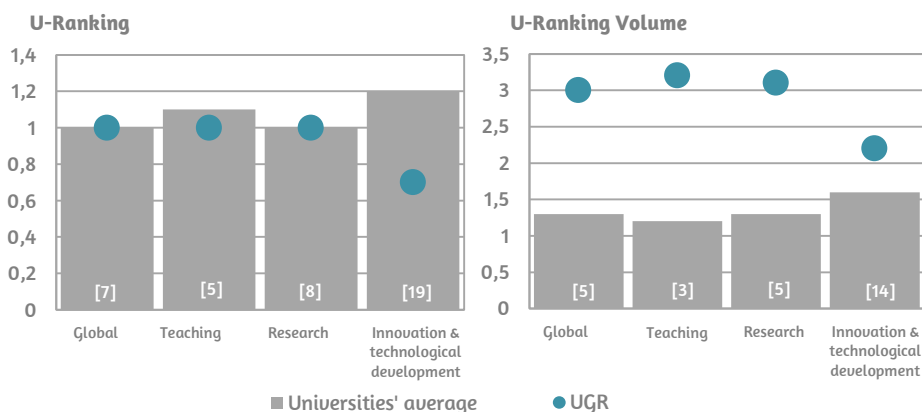
Year of foundation: 1.531
 Type of ownership: Public
 Bachelor's degree students¹: 46.578
 Master's degree students¹: 4.283
 Faculty members¹: 3.538
 Administration and service staff¹: 2.225
 Budget²: 416.769.113€
 Bachelor's degrees³: 63
 Master's degrees³: 118

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

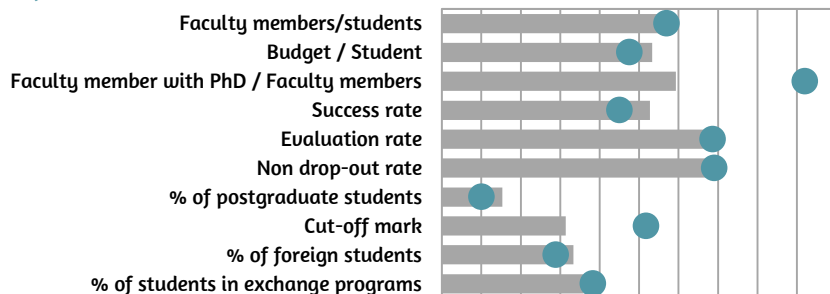
Index and position in the ranking between brackets



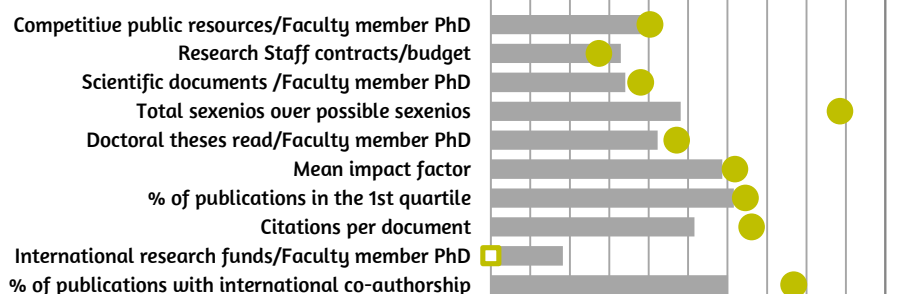
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

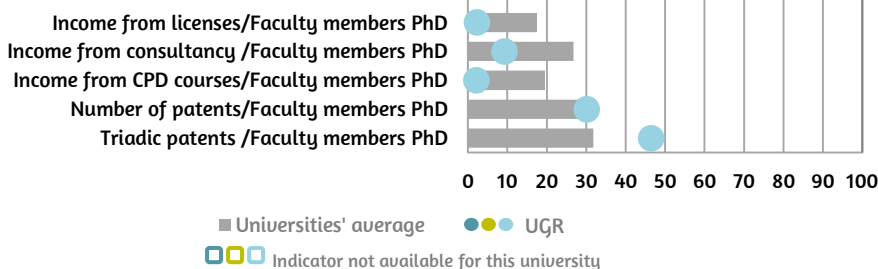
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



■ Universities' average ● UGR
 □ □ □ Indicator not available for this university

Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

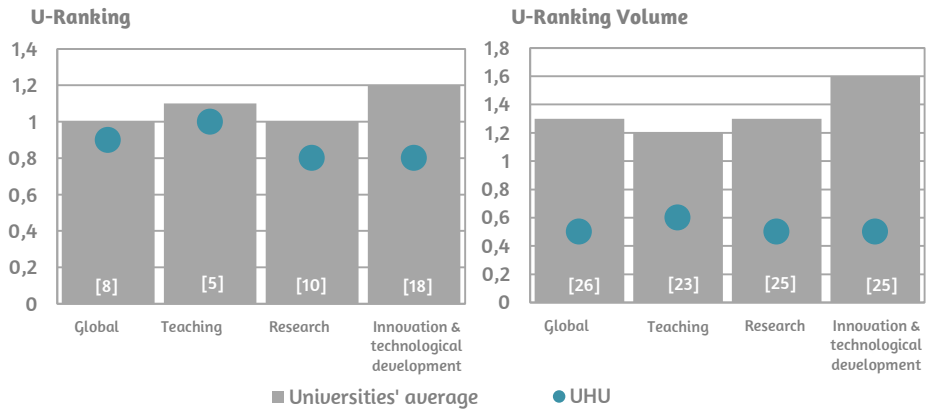
Year of foundation: 1.993
 Type of ownership: Public
 Bachelor's degree students¹: 10.275
 Master's degree students¹: 851
 Faculty members¹: 840
 Administration and service staff¹: 435
 Budget²: 67.484.630€
 Bachelor's degrees³: 29
 Master's degrees³: 39

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

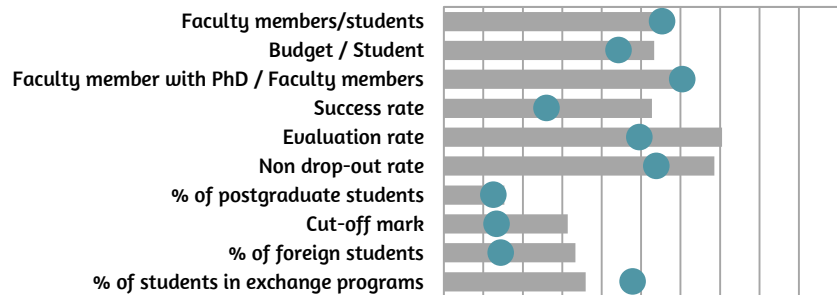
Index and position in the ranking between brackets



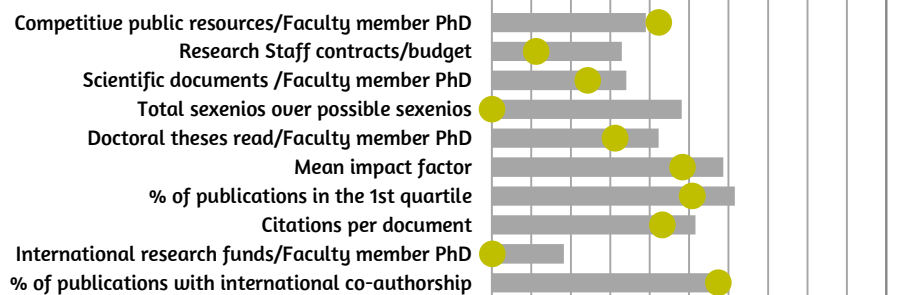
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

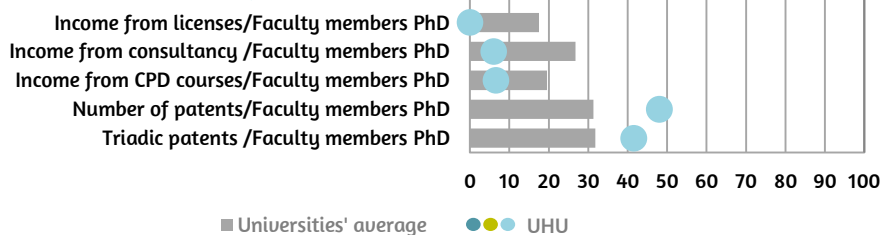
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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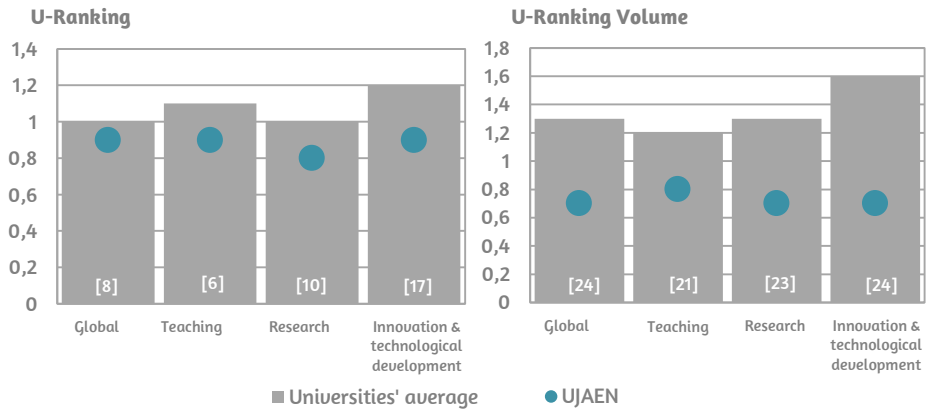
Year of foundation: 1.993
 Type of ownership: Public
 Bachelor's degree students¹: 13.239
 Master's degree students¹: 1.336
 Faculty members¹: 935
 Administration and service staff¹: 507
 Budget²: 96.977.449€
 Bachelor's degrees³: 34
 Master's degrees³: 42

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

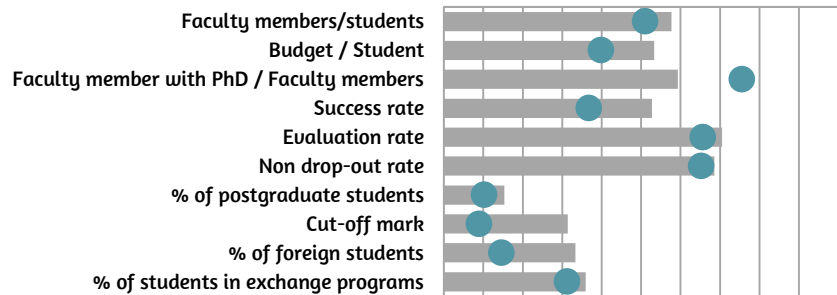
Index and position in the ranking between brackets



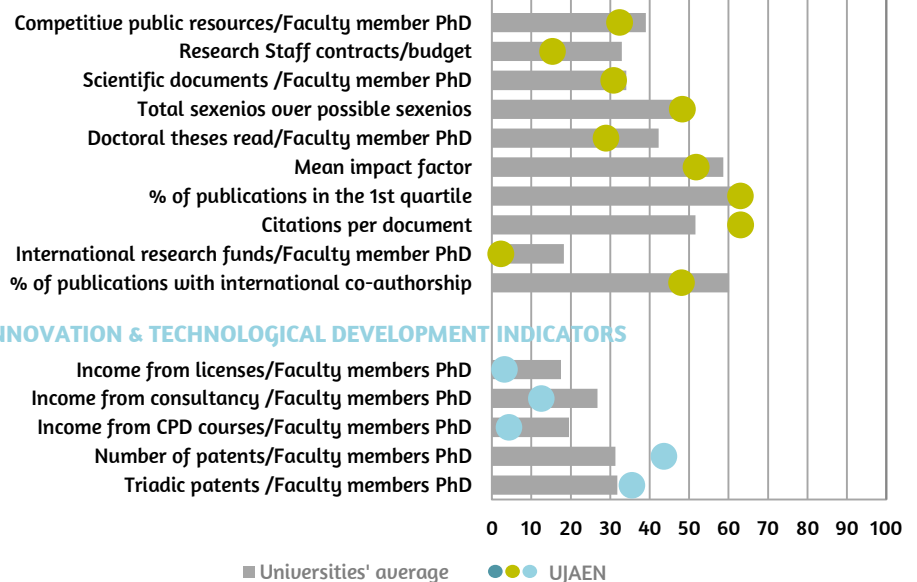
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

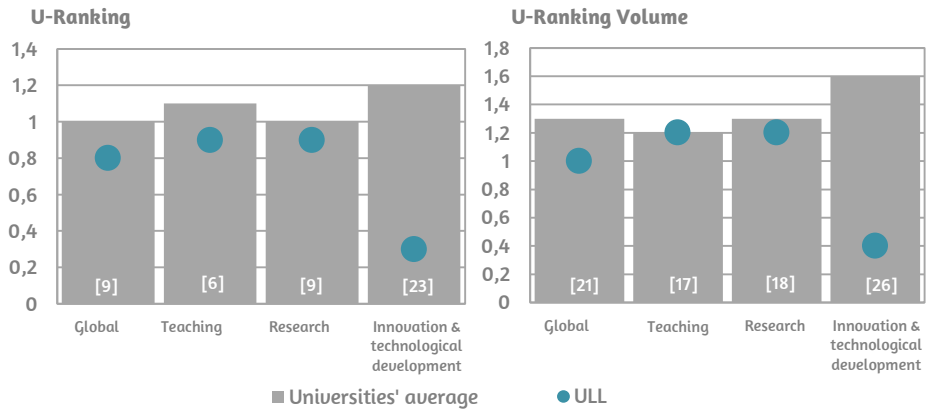
Year of foundation: 1.701
 Type of ownership: Public
 Bachelor's degree students¹: 18.343
 Master's degree students¹: 964
 Faculty members¹: 1.674
 Administration and service staff¹: 844
 Budget²: 149.450.214€
 Bachelor's degrees³: 45
 Master's degrees³: 42

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

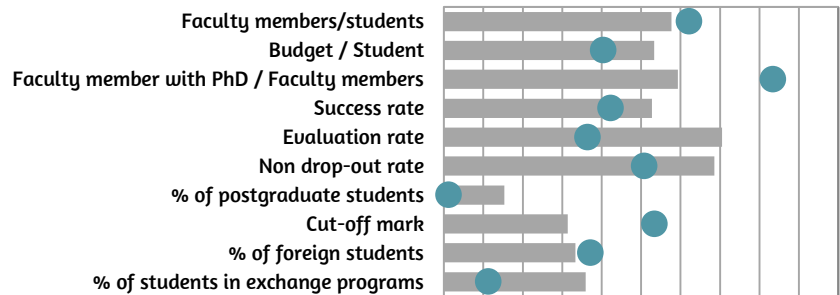
Index and position in the ranking between brackets



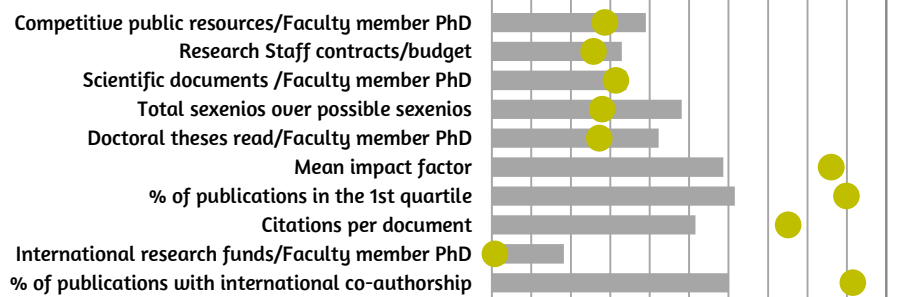
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

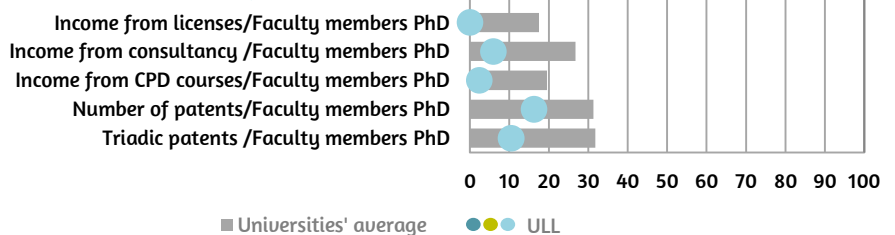
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

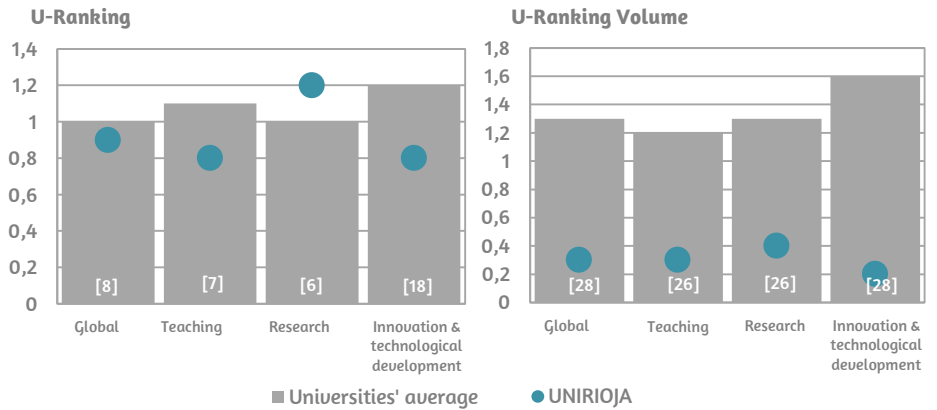
Year of foundation: 1.992
 Type of ownership: Public
 Bachelor's degree students¹: 3.824
 Master's degree students¹: 361
 Faculty members¹: 429
 Administration and service staff¹: 253
 Budget²: 42.093.808€
 Bachelor's degrees³: 19
 Master's degrees³: 18

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

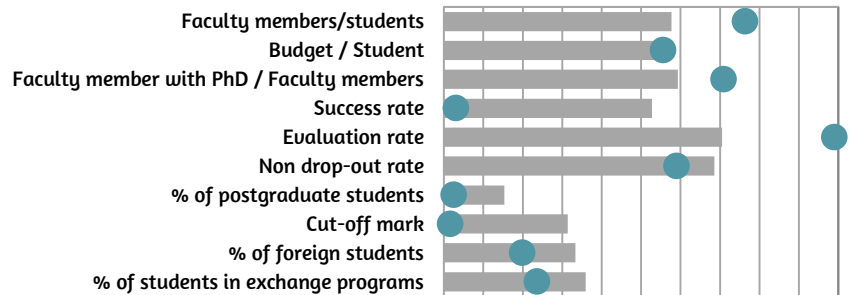
Index and position in the ranking between brackets



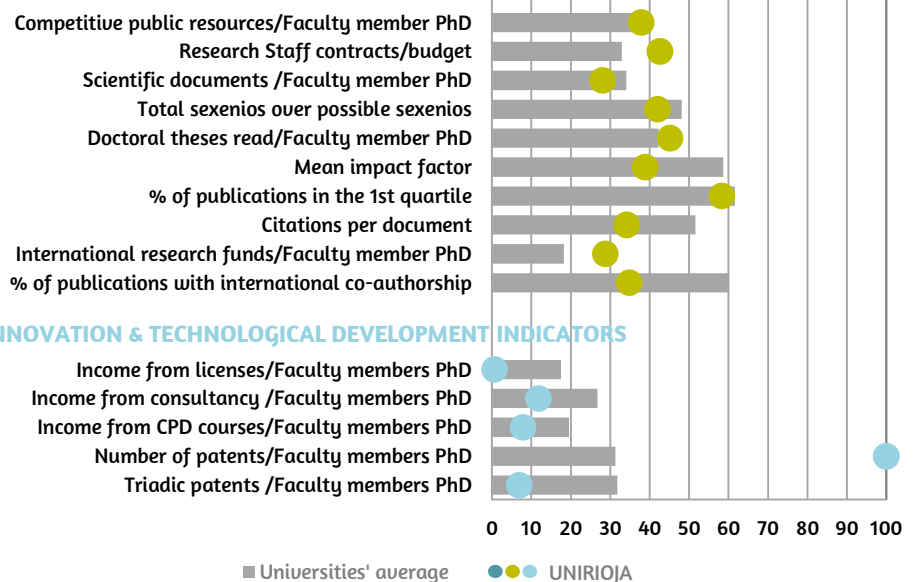
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD DE LAS PALMAS DE GRAN CANARIA



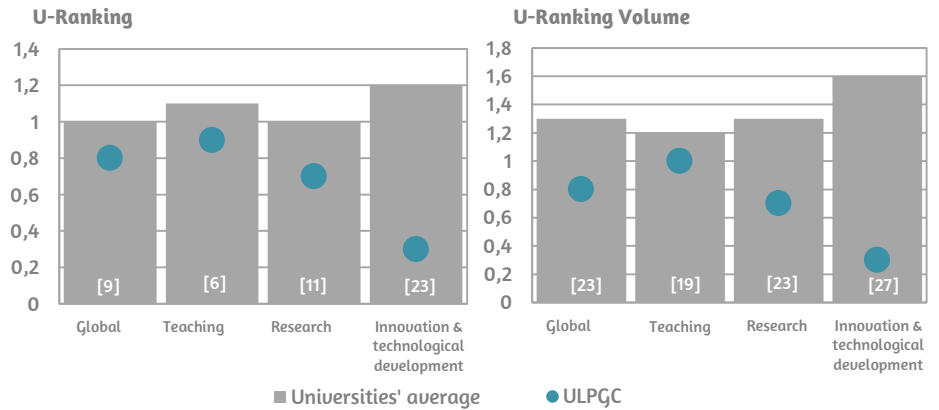
Year of foundation: 1.979
 Type of ownership: Public
 Bachelor's degree students¹: 17.486
 Master's degree students¹: 946
 Faculty members¹: 1.590
 Administration and service staff¹: 774
 Budget²: 132.235.624€
 Bachelor's degrees³: 36
 Master's degrees³: 39

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

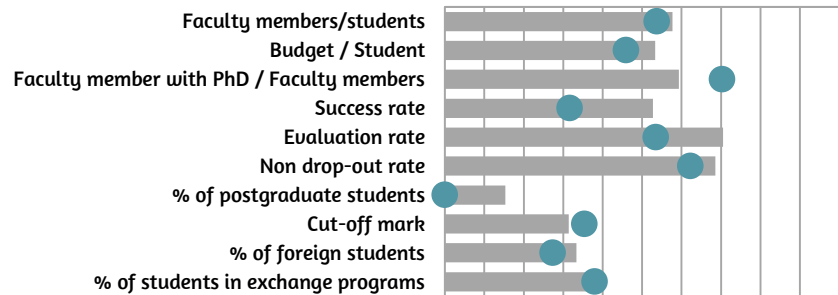
Index and position in the ranking between brackets



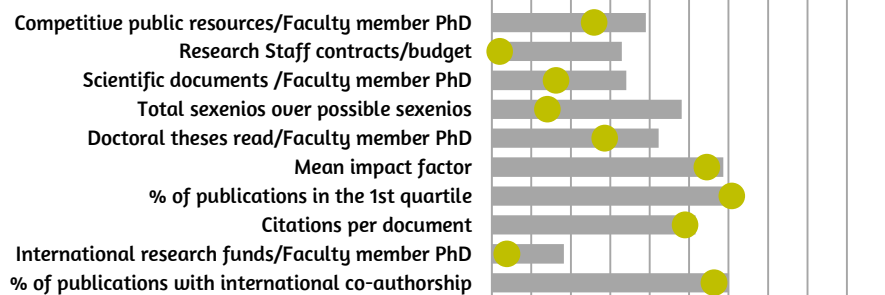
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

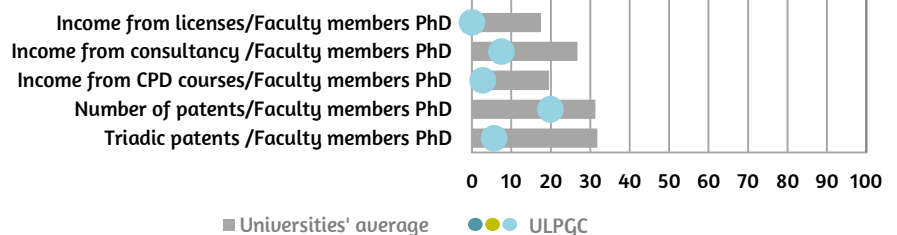
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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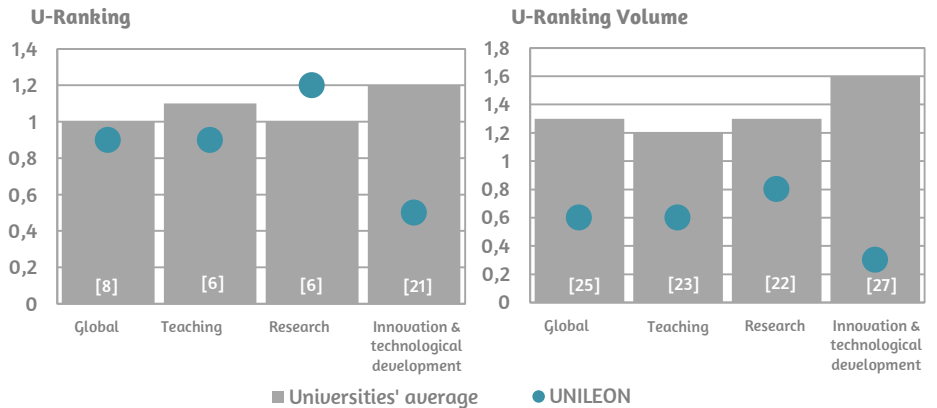
Year of foundation: 1.979
 Type of ownership: Public
 Bachelor's degree students¹: 10.744
 Master's degree students¹: 906
 Faculty members¹: 900
 Administration and service staff¹: 468
 Budget²: 82.304.834€
 Bachelor's degrees³: 39
 Master's degrees³: 38

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

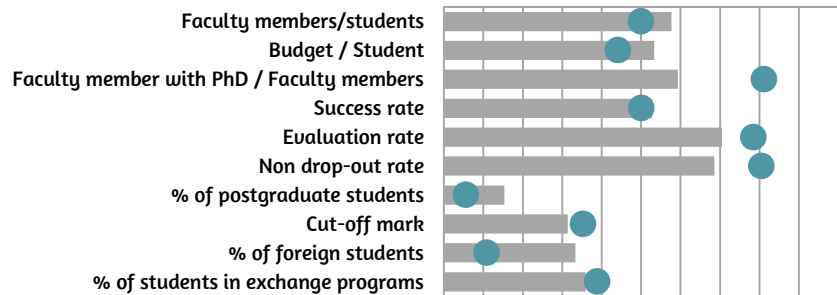
Index and position in the ranking between brackets



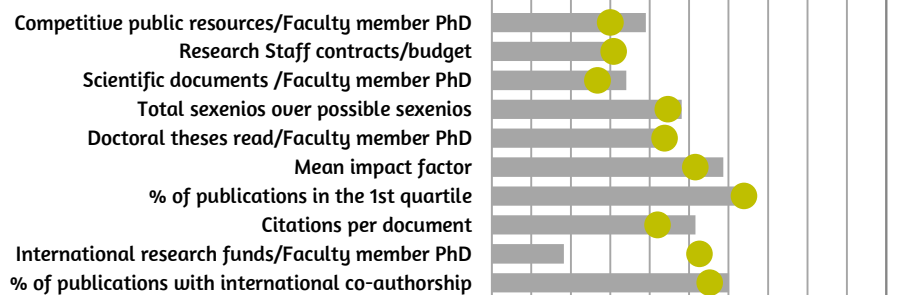
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

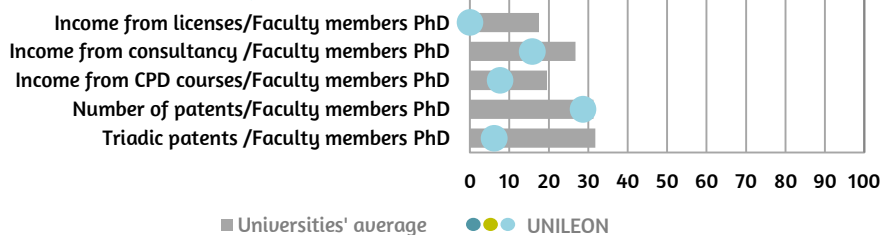
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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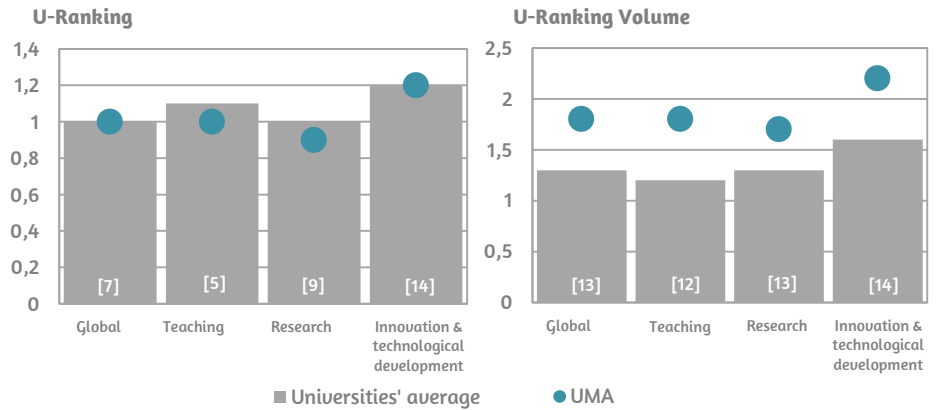
Year of foundation: 1.972
 Type of ownership: Public
 Bachelor's degree students¹: 33.372
 Master's degree students¹: 2.594
 Faculty members¹: 2.397
 Administration and service staff¹: 1.257
 Budget²: 230.139.601€
 Bachelor's degrees³: 58
 Master's degrees³: 72

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

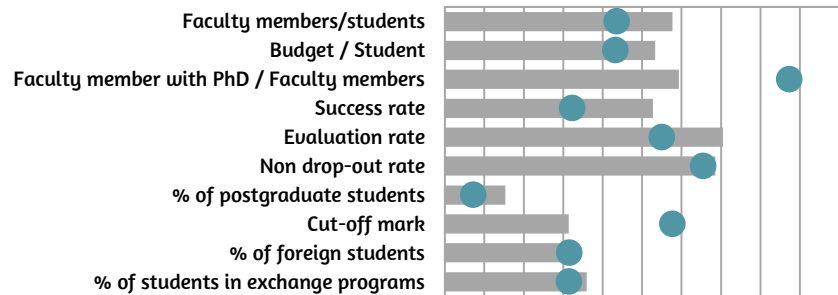
Index and position in the ranking between brackets



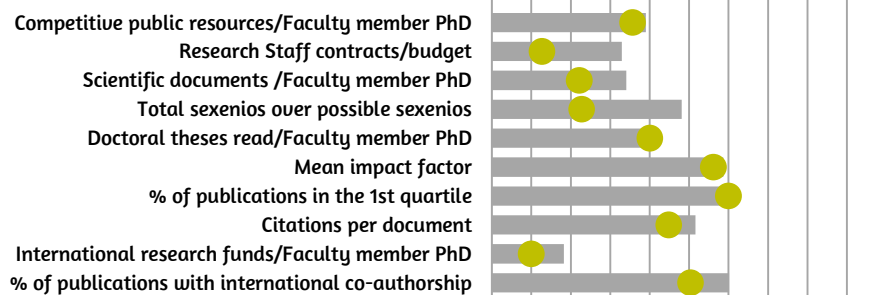
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

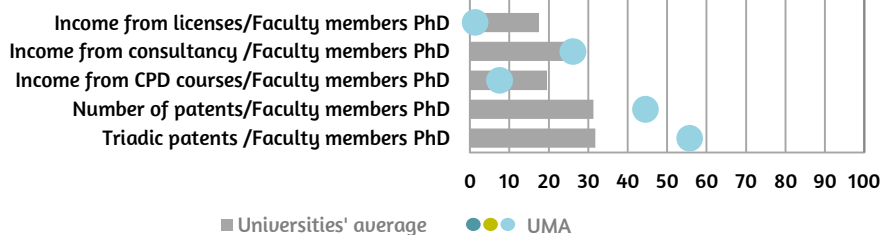
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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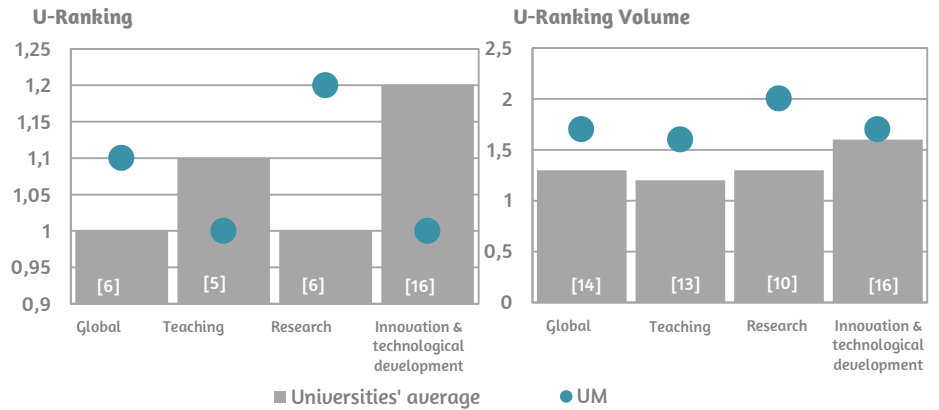
Year of foundation: 1.915
 Type of ownership: Public
 Bachelor's degree students¹: 27.855
 Master's degree students¹: 2.347
 Faculty members¹: 2.649
 Administration and service staff¹: 1.172
 Budget²: 187.204.707€
 Bachelor's degrees³: 48
 Master's degrees³: 81

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

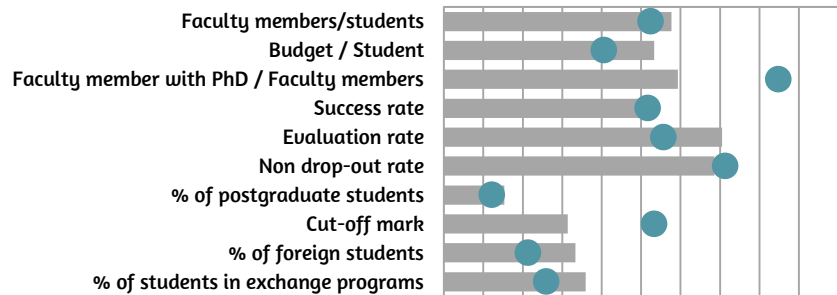
Index and position in the ranking between brackets



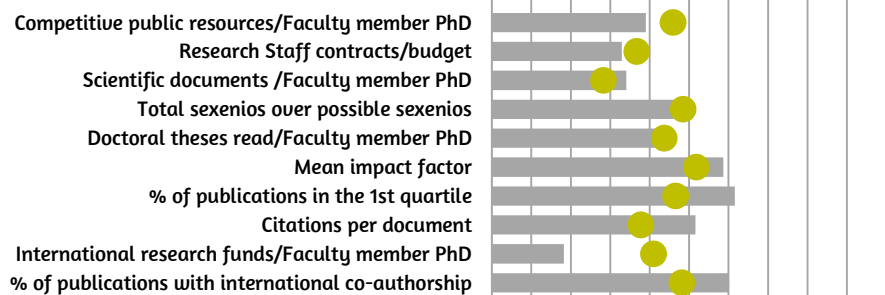
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

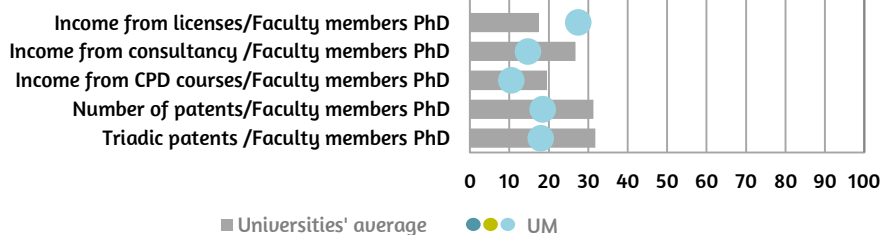
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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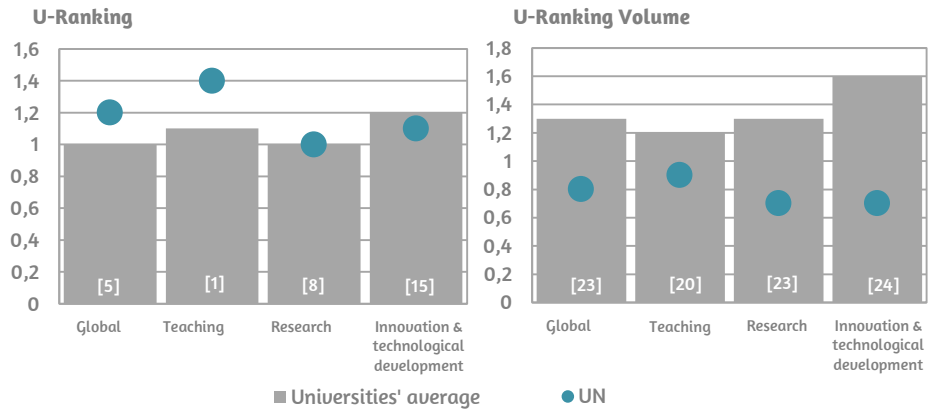
Year of foundation: 1.952
 Type of ownership: Private
 Bachelor's degree students¹: 7.710
 Master's degree students¹: 2.042
 Faculty members¹: 1.334
 Administration and service staff¹: 1.368
 Budget²: not available
 Bachelor's degrees³: 40
 Master's degrees³: 34

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

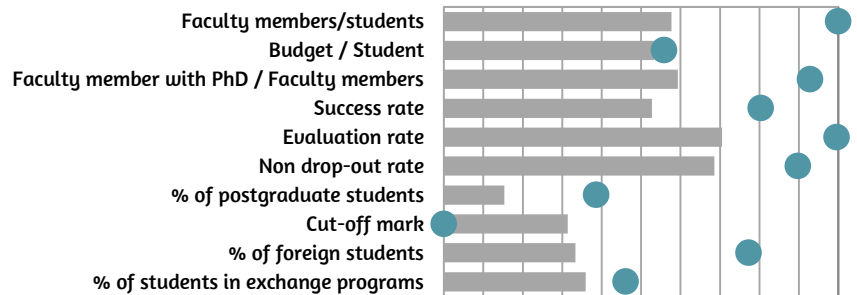
Index and position in the ranking between brackets



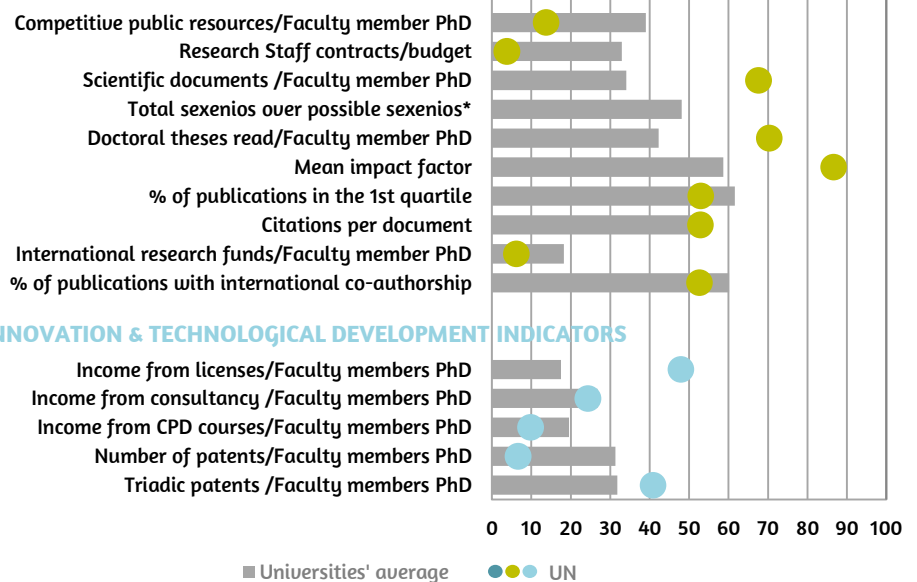
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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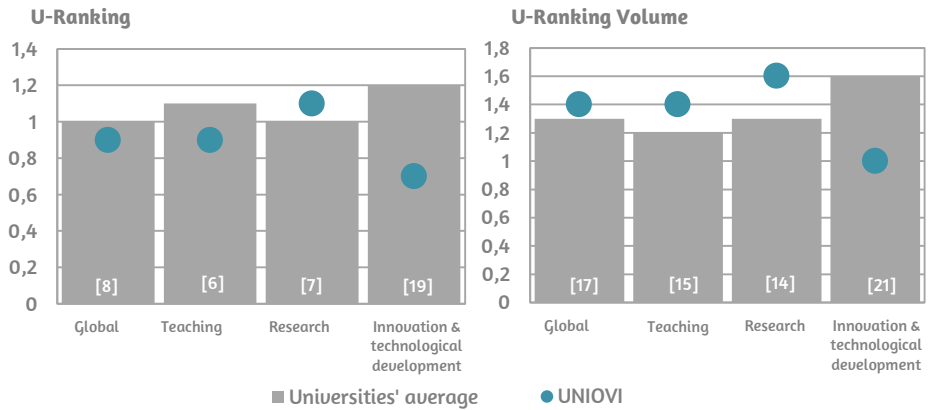
Year of foundation: 1.604
 Type of ownership: Public
 Bachelor's degree students¹: 19.268
 Master's degree students¹: 1.710
 Faculty members¹: 2.039
 Administration and service staff¹: 950
 Budget²: 179.405.282€
 Bachelor's degrees³: 53
 Master's degrees³: 60

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

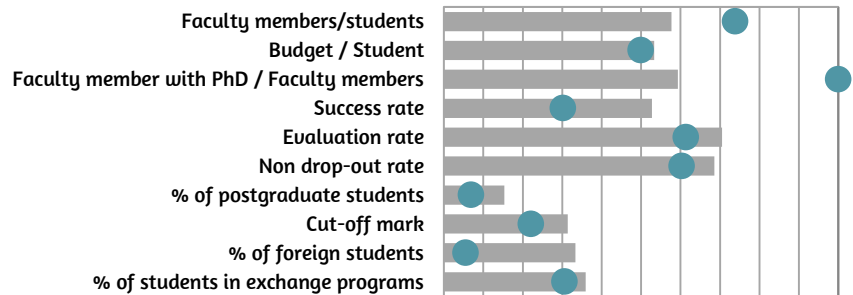
Index and position in the ranking between brackets



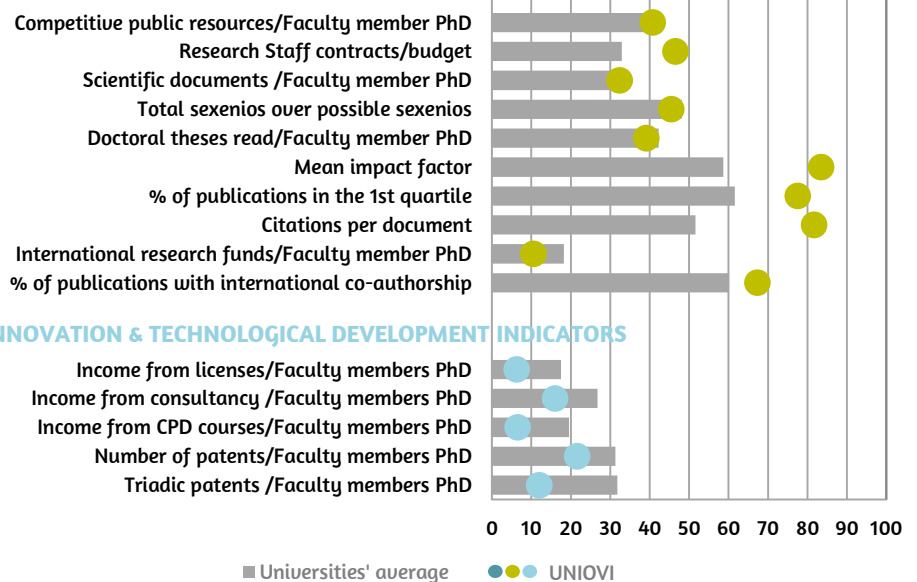
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD DE SALAMANCA



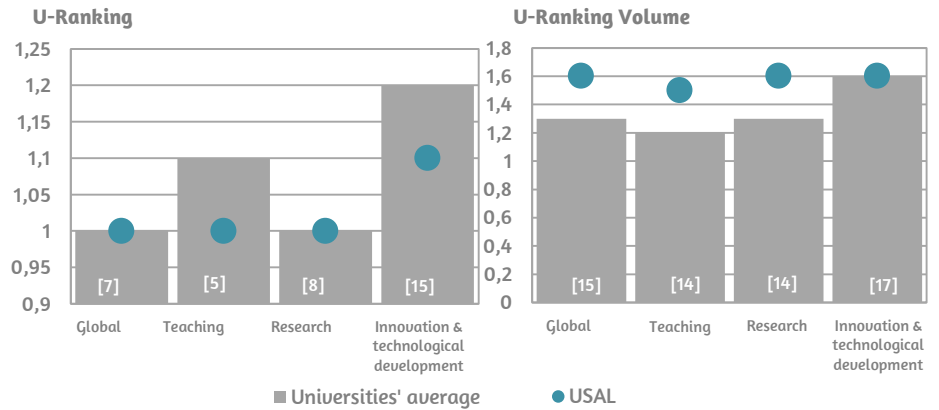
Year of foundation: 1.218
 Type of ownership: Public
 Bachelor's degree students¹: 21.473
 Master's degree students¹: 1.507
 Faculty members¹: 2.301
 Administration and service staff¹: 1.132
 Budget²: 194.109.182€
 Bachelor's degrees³: 67
 Master's degrees³: 71

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

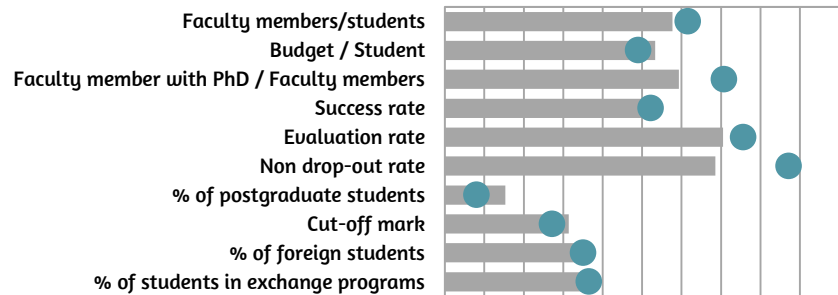
Index and position in the ranking between brackets



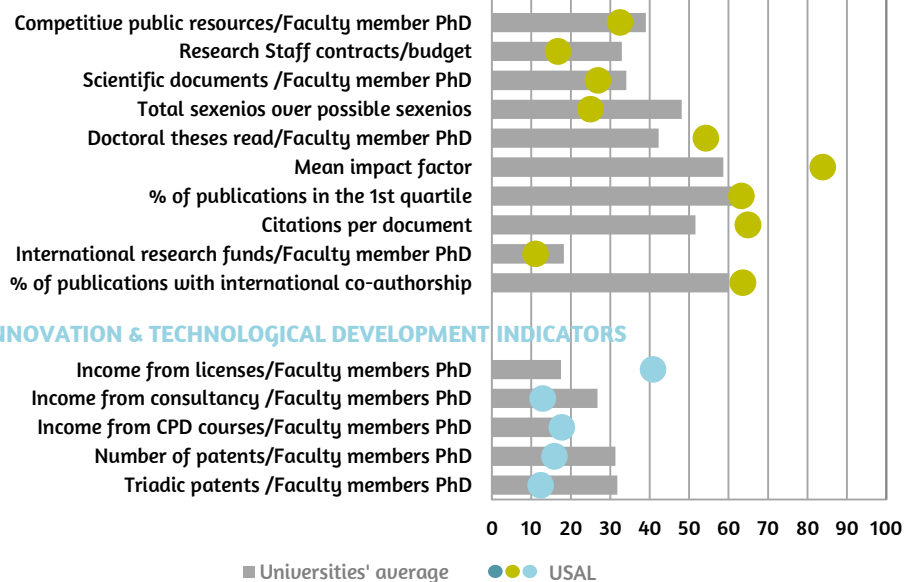
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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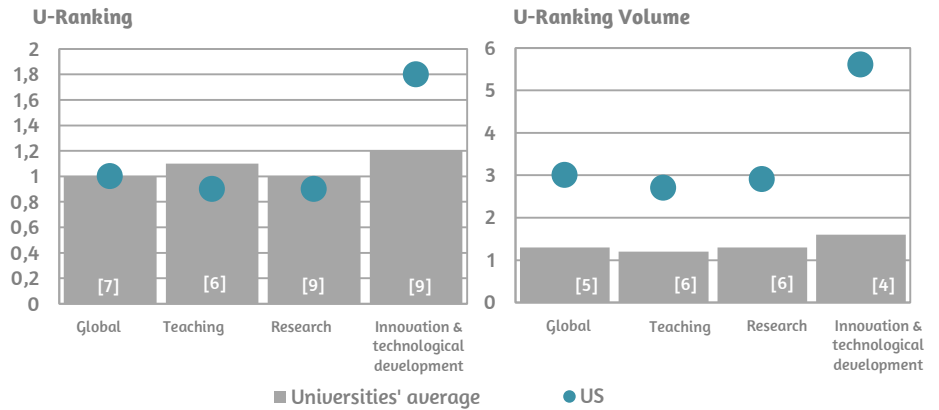
Year of foundation: 1.505
 Type of ownership: Public
 Bachelor's degree students¹: 55.110
 Master's degree students¹: 4.038
 Faculty members¹: 4.383
 Administration and service staff¹: 2.591
 Budget²: 388.581.547€
 Bachelor's degrees³: 69
 Master's degrees³: 115

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

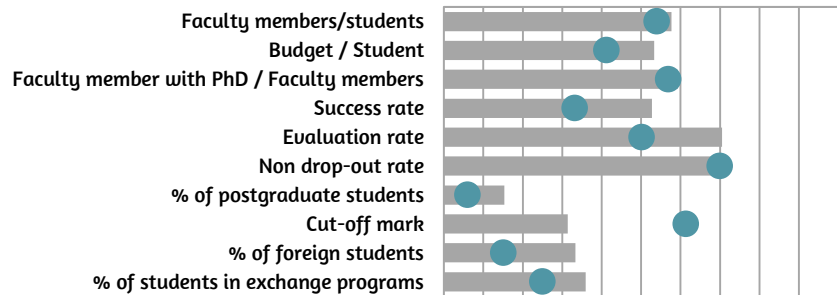
Index and position in the ranking between brackets



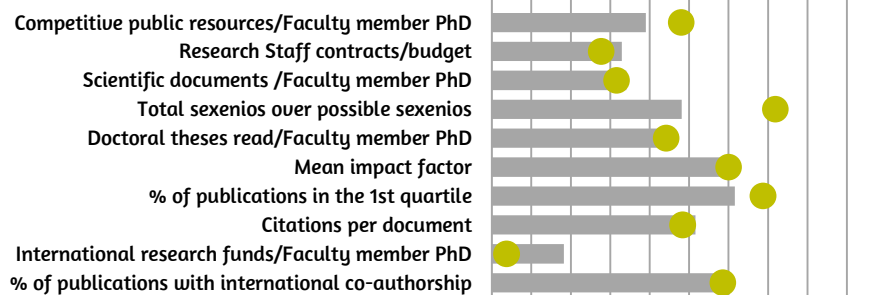
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

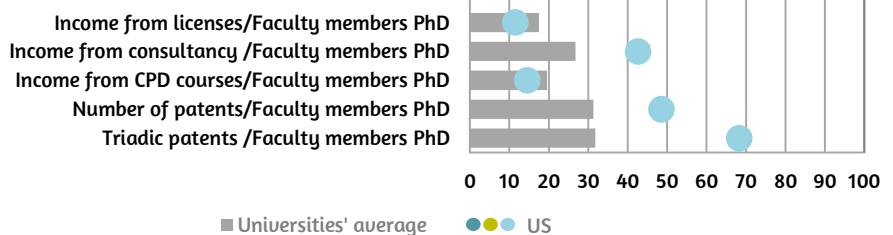
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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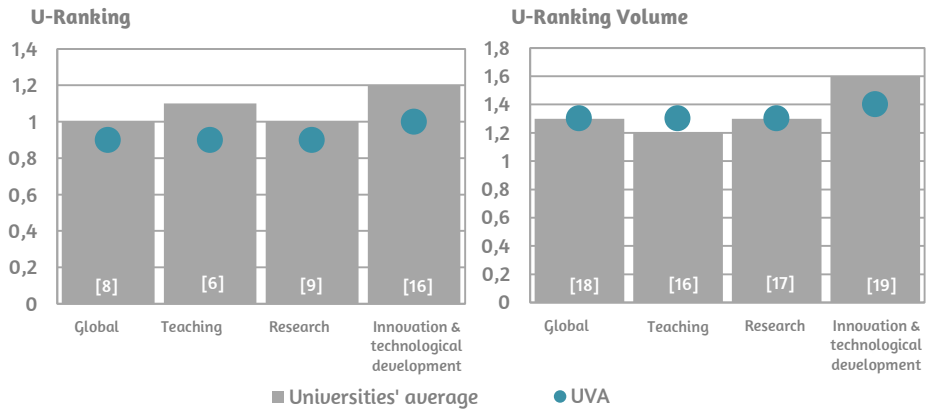
Year of foundation: 1.346
 Type of ownership: Public
 Bachelor's degree students¹: 20.626
 Master's degree students¹: 1.075
 Faculty members¹: 2.319
 Administration and service staff¹: 1.027
 Budget²: 179.742.820€
 Bachelor's degrees³: 54
 Master's degrees³: 61

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

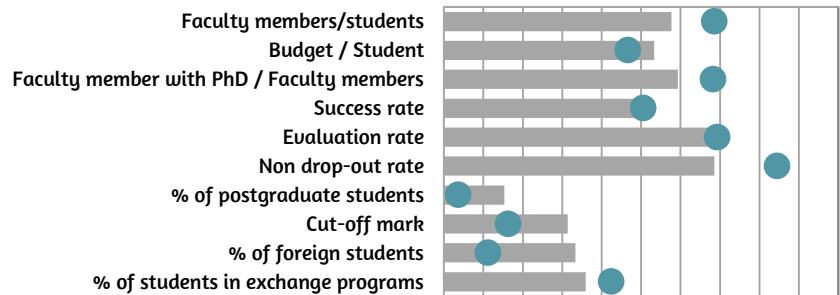
Index and position in the ranking between brackets



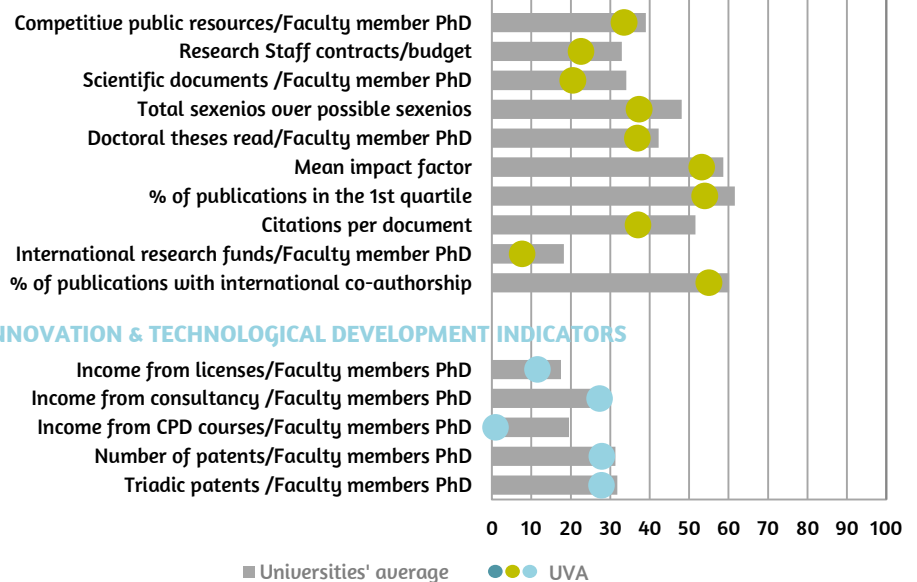
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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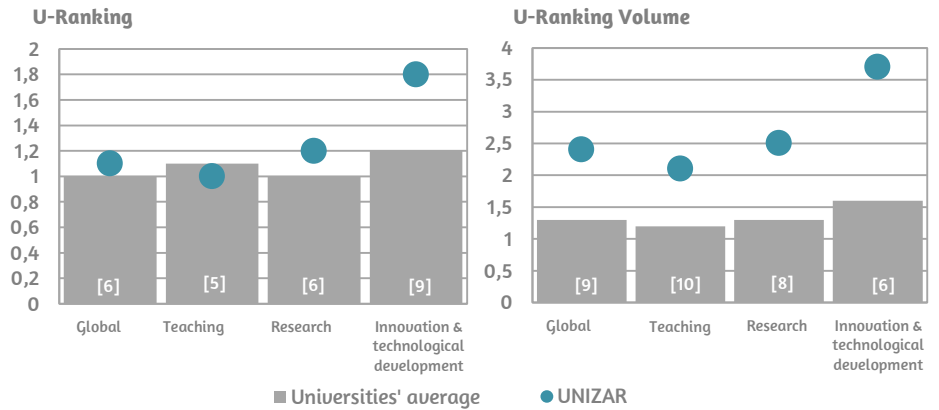
Year of foundation: 1.474
 Type of ownership: Public
 Bachelor's degree students¹: 27.592
 Master's degree students¹: 1.935
 Faculty members¹: 3.735
 Administration and service staff¹: 1.542
 Budget²: 253.002.686€
 Bachelor's degrees³: 53
 Master's degrees³: 55

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

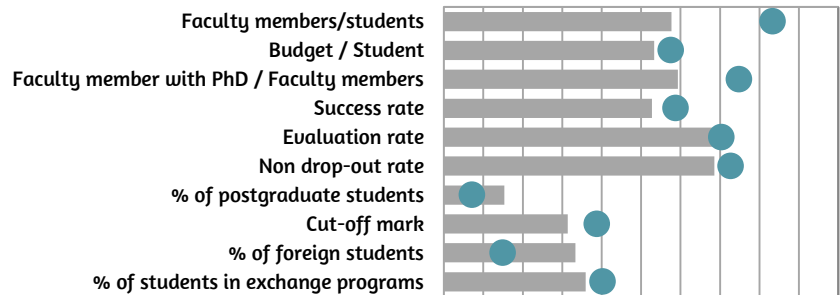
Index and position in the ranking between brackets



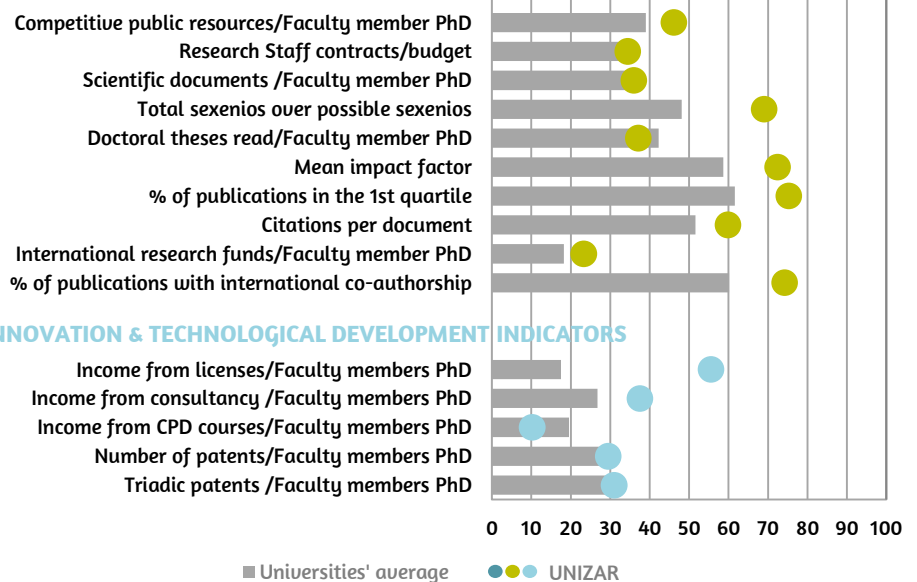
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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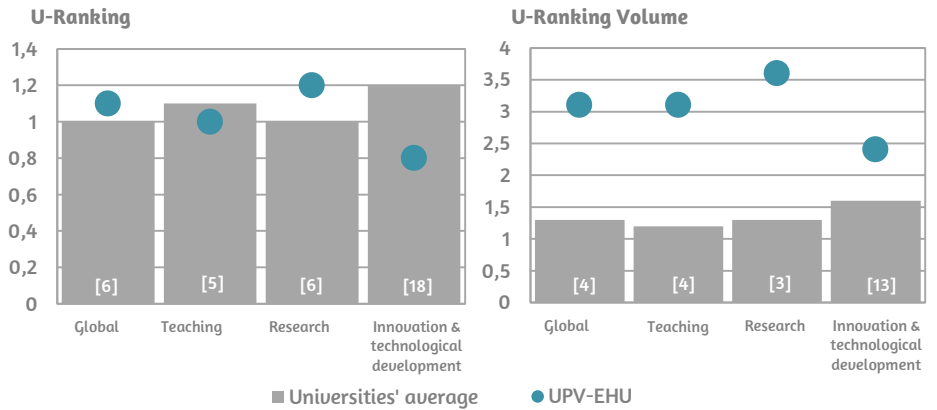
Year of foundation: 1.968
 Type of ownership: Public
 Bachelor's degree students¹: 38.037
 Master's degree students¹: 3.097
 Faculty members¹: 4.475
 Administration and service staff¹: 1.897
 Budget²: 417.358.884€
 Bachelor's degrees³: 70
 Master's degrees³: 113

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

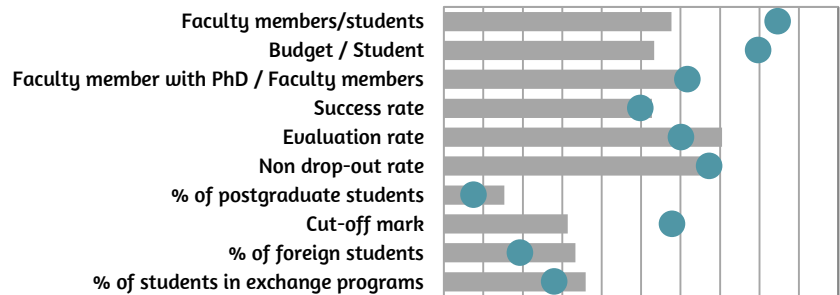
Index and position in the ranking between brackets



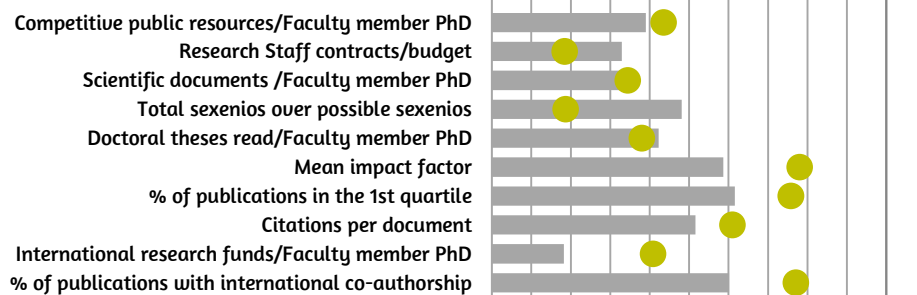
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

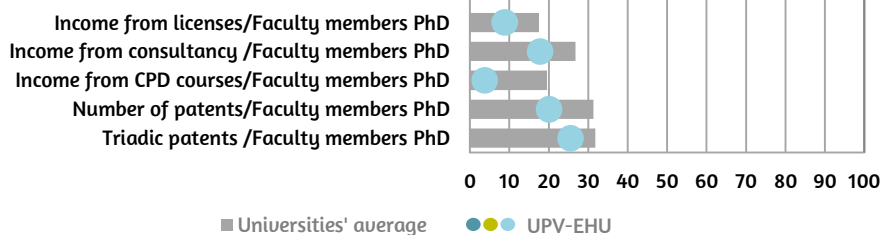
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD EUROPEA MIQUEL DE CERVANTES



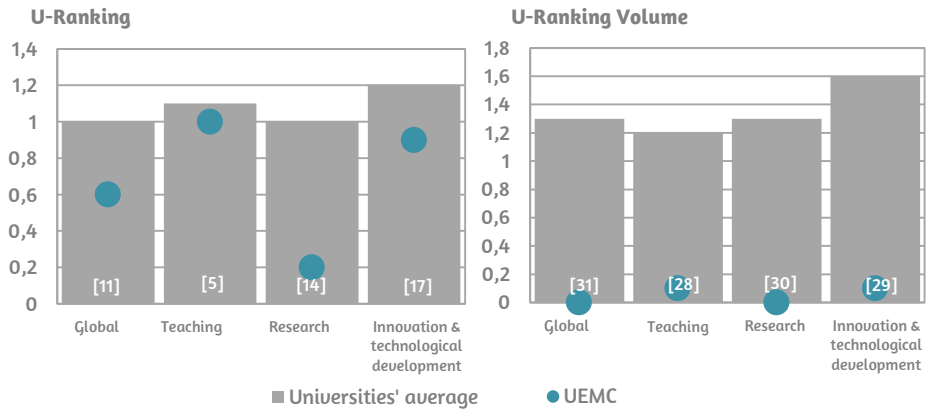
Year of foundation: 2.002
 Type of ownership: Private
 Bachelor's degree students¹: 1.157
 Master's degree students¹: 100
 Faculty members¹: 164
 Administration and service staff¹: 74
 Budget²: not available
 Bachelor's degrees³: 14
 Master's degrees³: 5

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

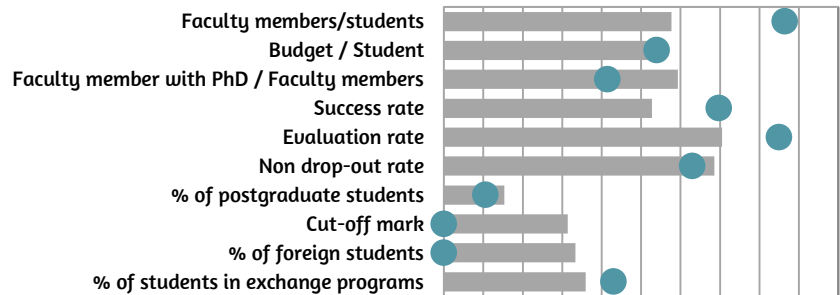
Index and position in the ranking between brackets



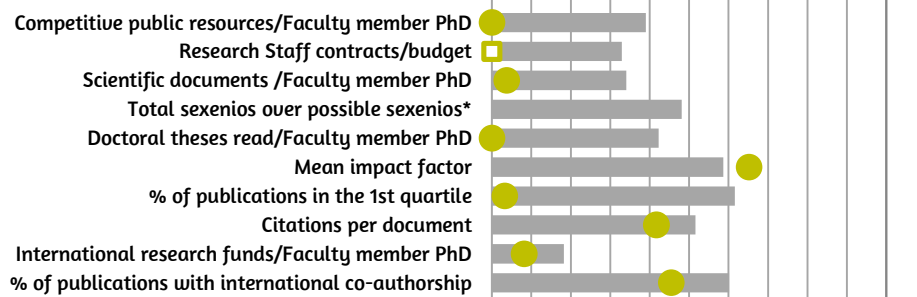
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

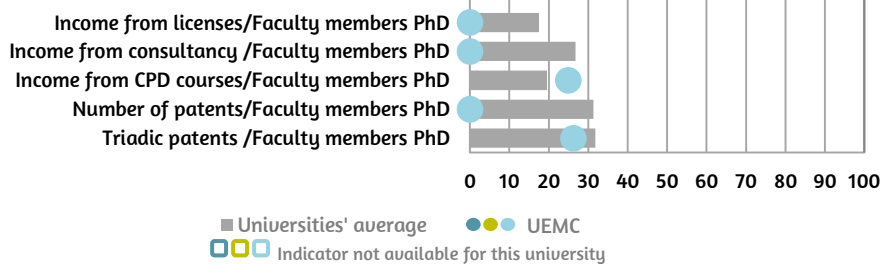
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD MIGUEL HERNÁNDEZ DE ELCHE



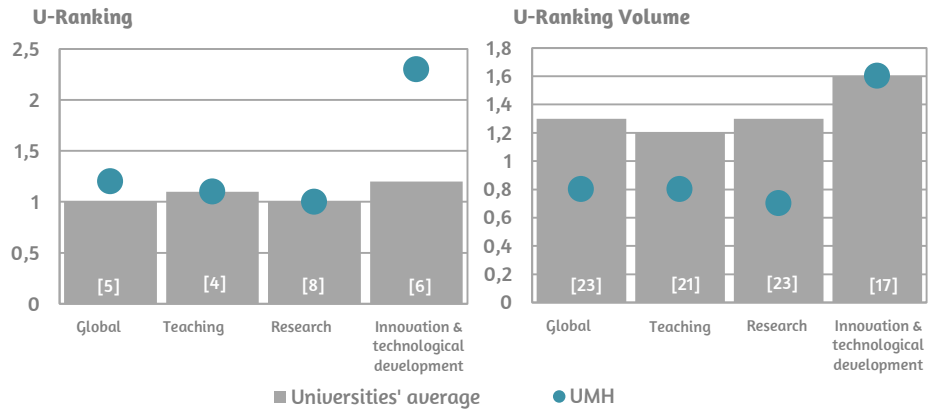
Year of foundation: 1.997
 Type of ownership: Public
 Bachelor's degree students¹: 10.542
 Master's degree students¹: 2.077
 Faculty members¹: 1.159
 Administration and service staff¹: 453
 Budget²: 98.736.146€
 Bachelor's degrees³: 28
 Master's degrees³: 49

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

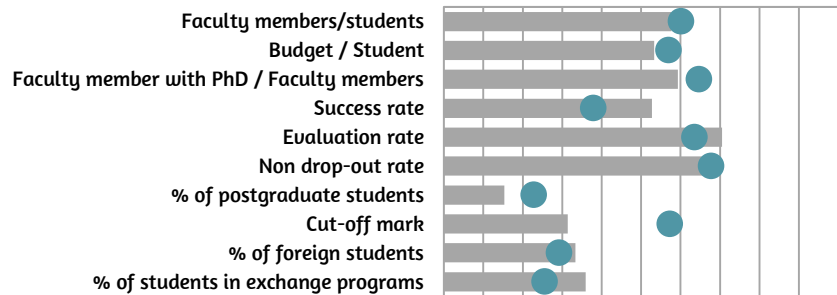
Index and position in the ranking between brackets



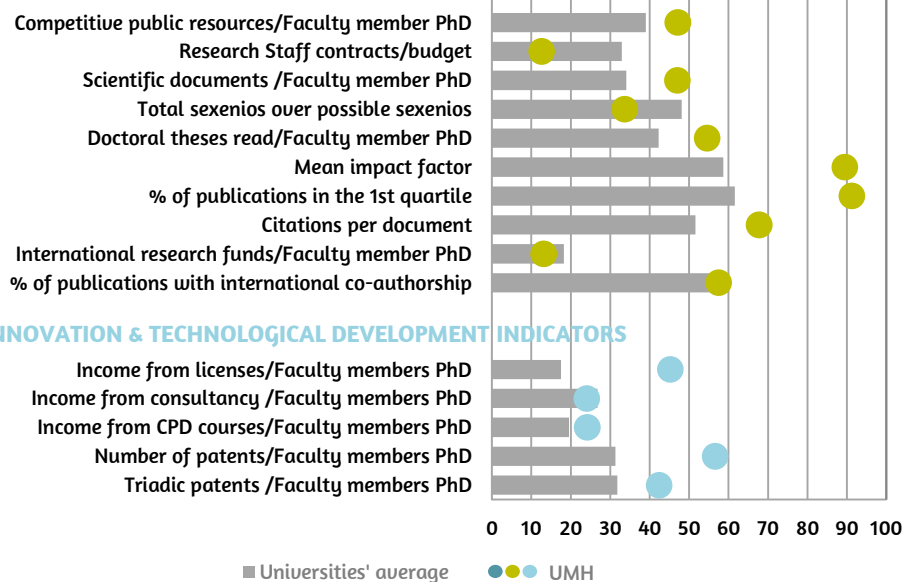
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD NACIONAL DE EDUCACIÓN A DISTANCIA



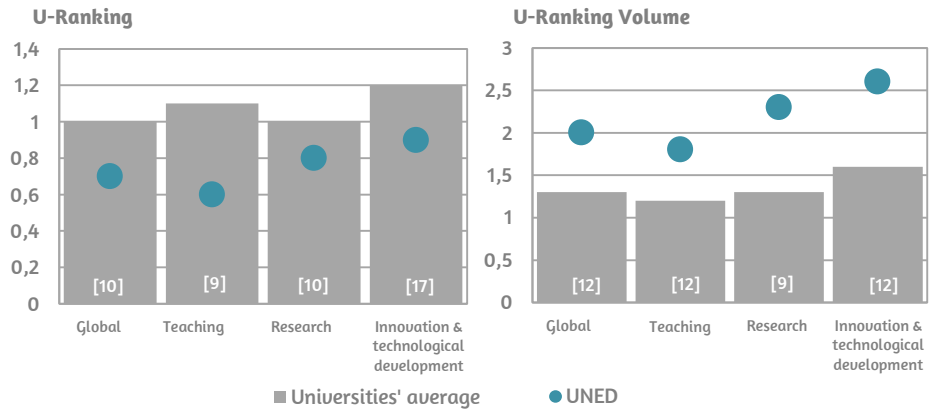
Year of foundation: 1.972
 Type of ownership: Public
 Bachelor's degree students¹: 145.385
 Master's degree students¹: 9.334
 Faculty members¹: 1.249
 Administration and service staff¹: 1.306
 Budget²: 198.188.774€
 Bachelor's degrees³: 27
 Master's degrees³: 75

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

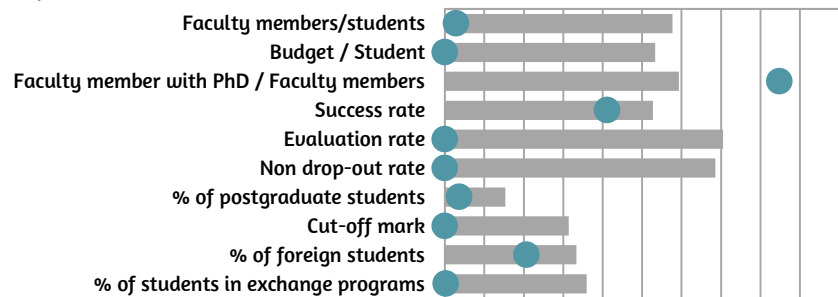
Index and position in the ranking between brackets



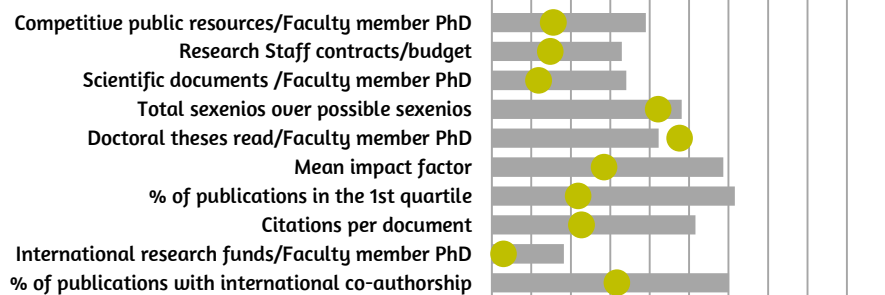
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

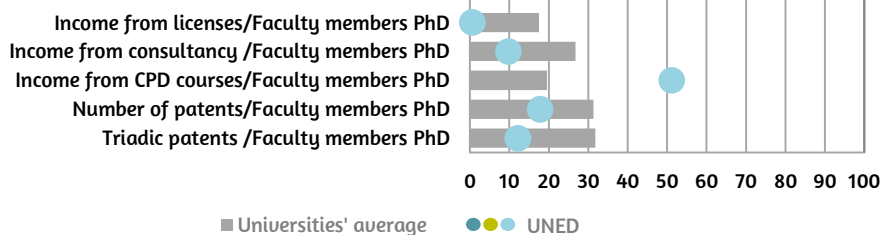
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

UNIVERSIDAD PABLO DE OLAVIDE



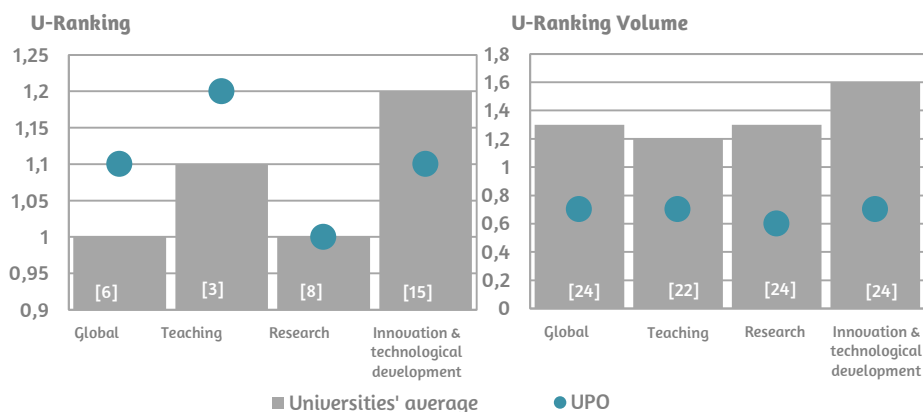
Year of foundation: 1.997
 Type of ownership: Public
 Bachelor's degree students¹: 9.088
 Master's degree students¹: 1.422
 Faculty members¹: 969
 Administration and service staff¹: 350
 Budget²: 73.080.694€
 Bachelor's degrees³: 20
 Master's degrees³: 44

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

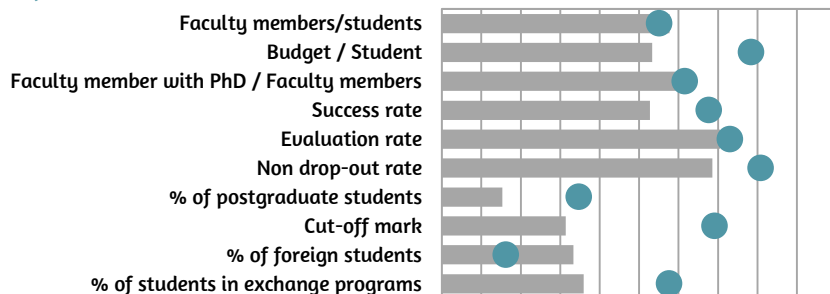
Index and position in the ranking between brackets



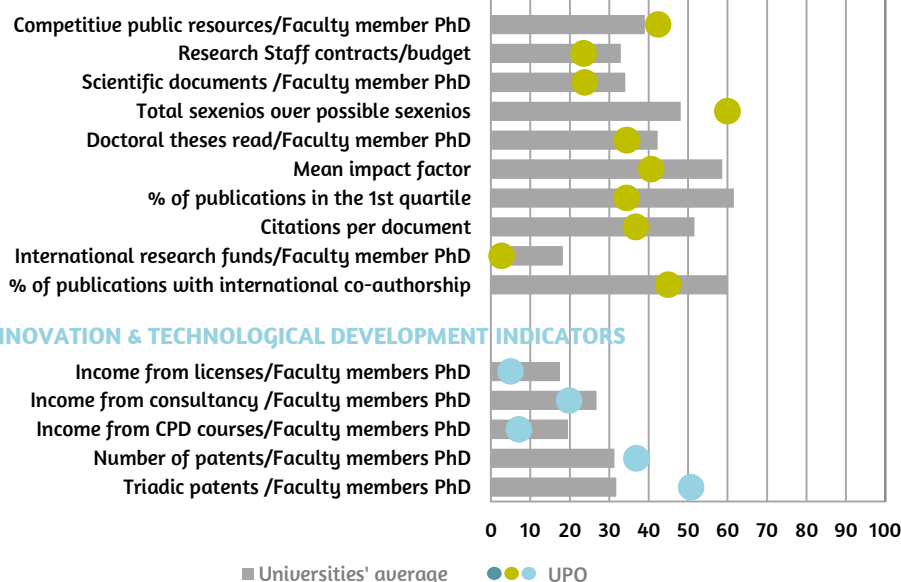
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

UNIVERSIDAD POLITÉCNICA DE CARTAGENA



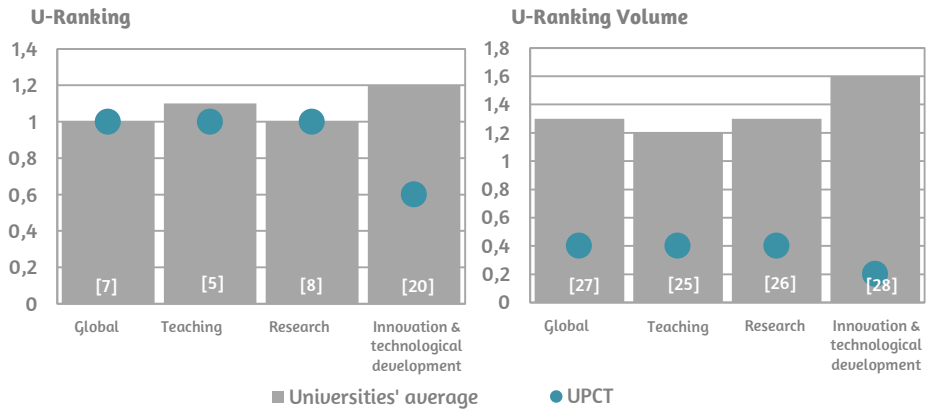
Year of foundation: 1.999
 Type of ownership: Public
 Bachelor's degree students¹: 5.159
 Master's degree students¹: 387
 Faculty members¹: 619
 Administration and service staff¹: 366
 Budget²: 59.153.622€
 Bachelor's degrees³: 19
 Master's degrees³: 20

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

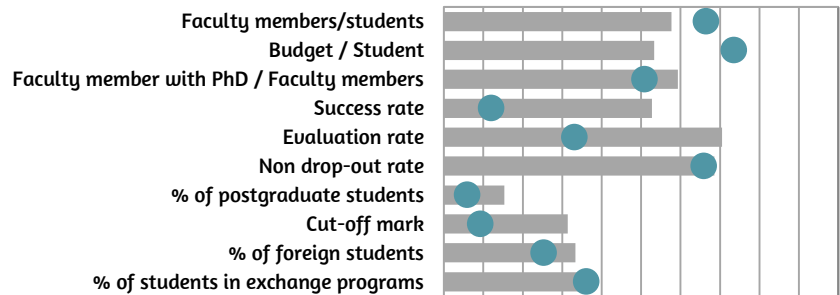
Index and position in the ranking between brackets



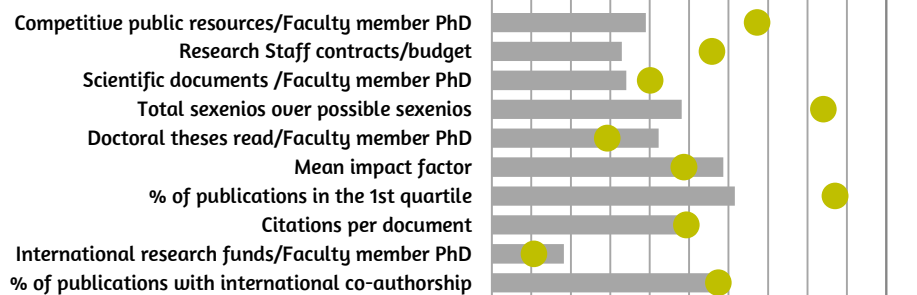
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

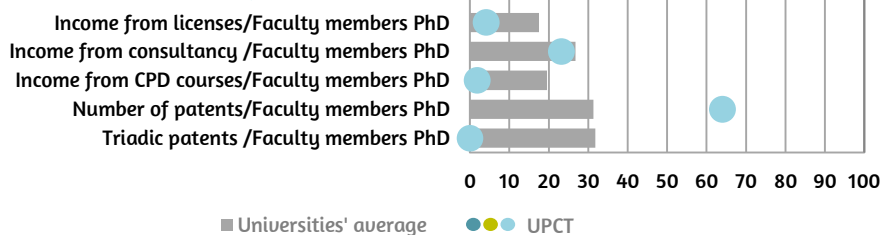
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

UNIVERSIDAD POLITÉCNICA DE MADRID



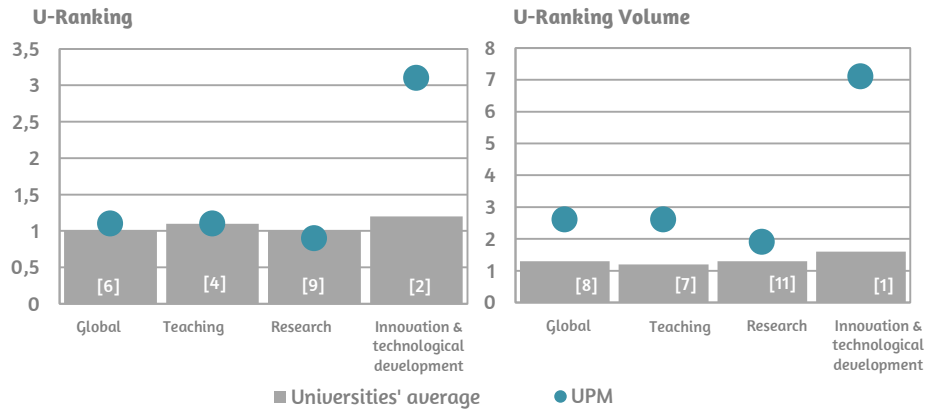
Year of foundation: 1.971
 Type of ownership: Public
 Bachelor's degree students¹: 31.225
 Master's degree students¹: 3.819
 Faculty members¹: 2.931
 Administration and service staff¹: 1.892
 Budget²: 302.915.873€
 Bachelor's degrees³: 46
 Master's degrees³: 76

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

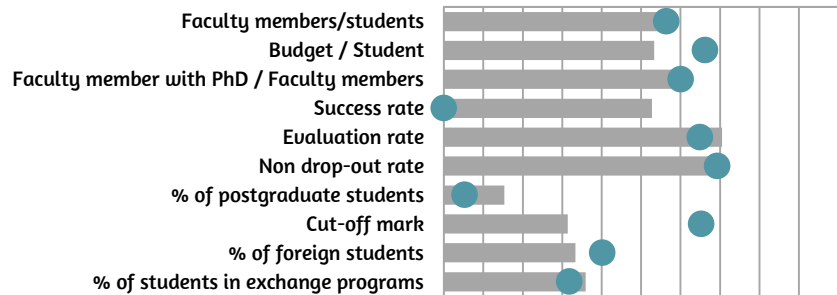
Index and position in the ranking between brackets



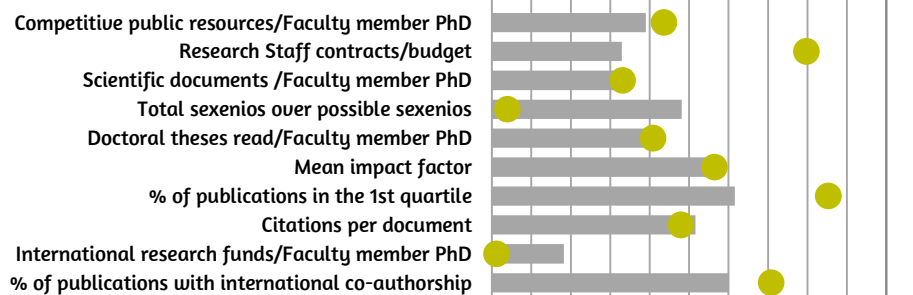
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

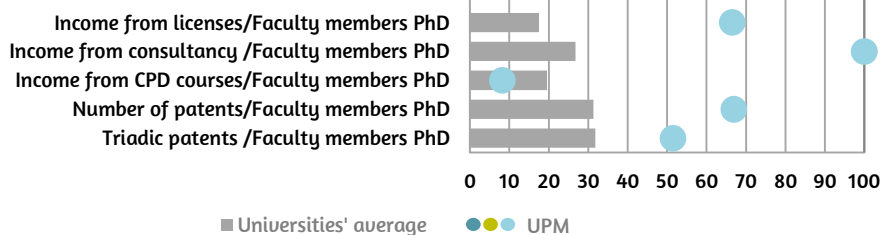
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

UNIVERSIDAD PONTIFICIA COMILLAS



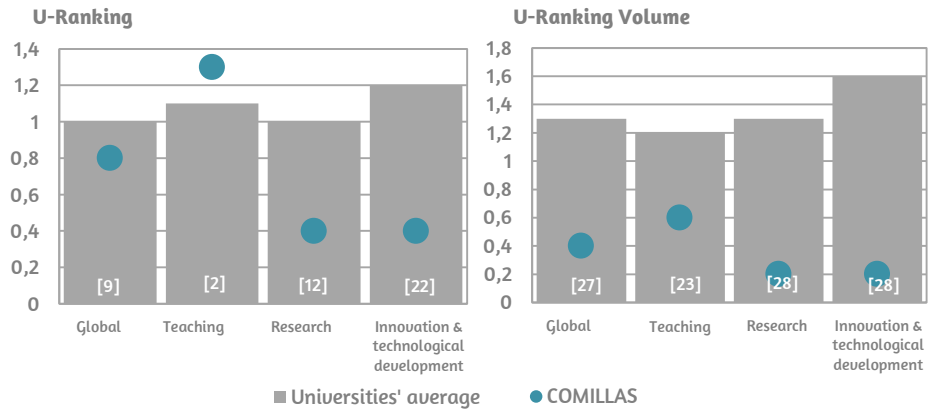
Year of foundation: 1.935
 Type of ownership: Private
 Bachelor's degree students¹: 6.537
 Master's degree students¹: 1.952
 Faculty members¹: 1.090
 Administration and service staff¹: 335
 Budget²: not available
 Bachelor's degrees³: 24
 Master's degrees³: 28

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

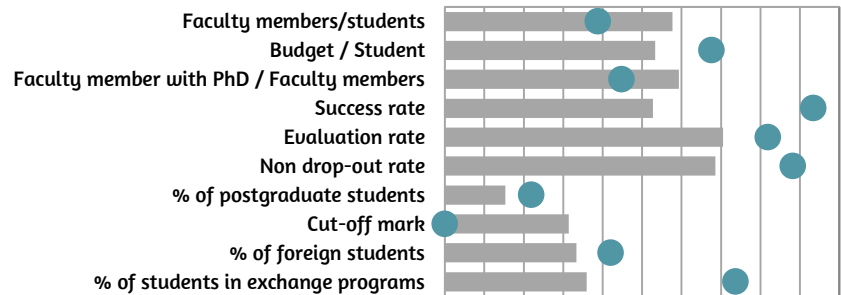
Index and position in the ranking between brackets



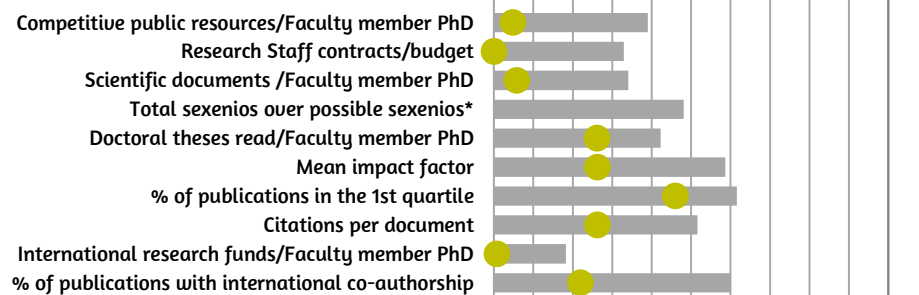
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

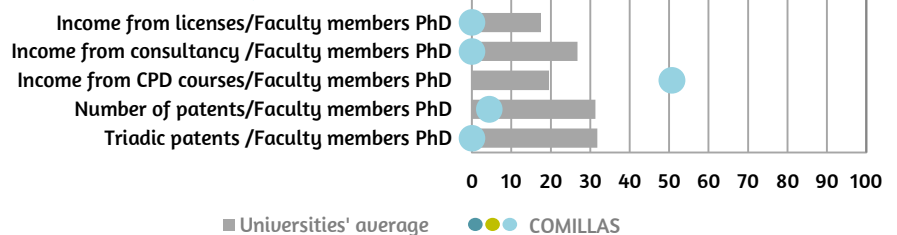
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

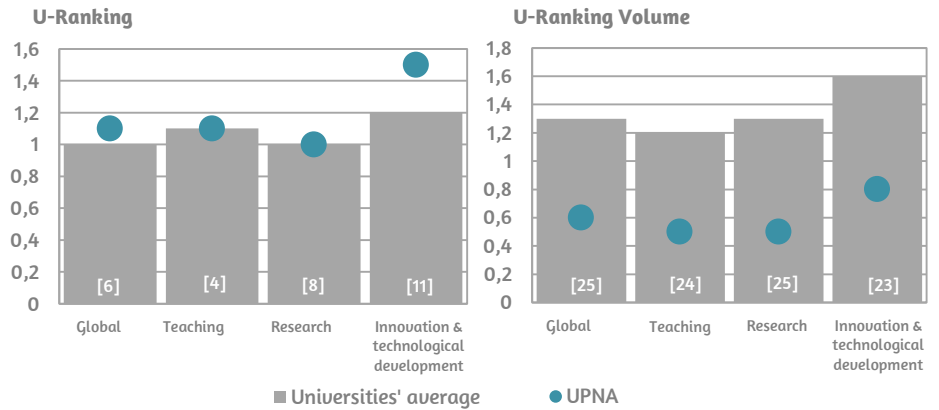
Year of foundation: 1.987
 Type of ownership: Public
 Bachelor's degree students¹: 7.050
 Master's degree students¹: 794
 Faculty members¹: 863
 Administration and service staff¹: 458
 Budget²: 71.743.233€
 Bachelor's degrees³: 18
 Master's degrees³: 31

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

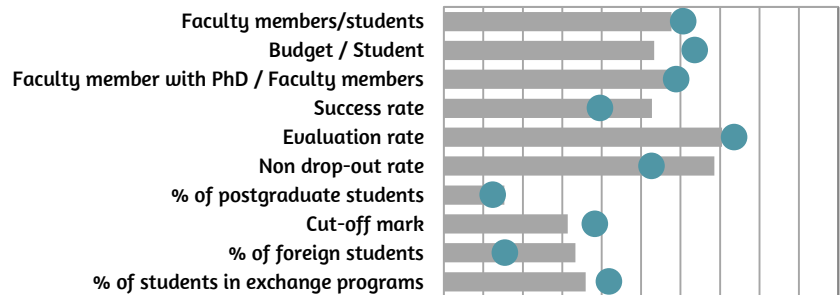
Index and position in the ranking between brackets



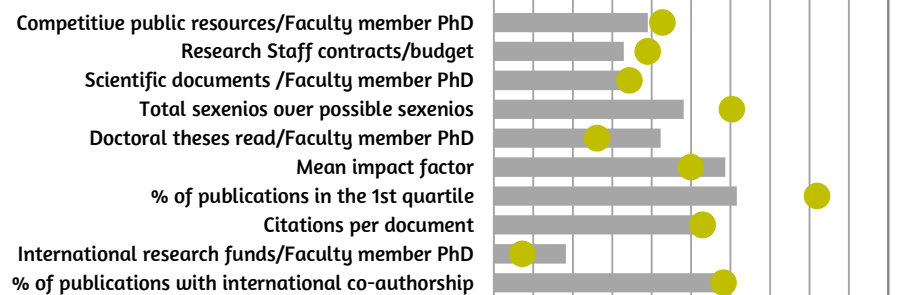
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

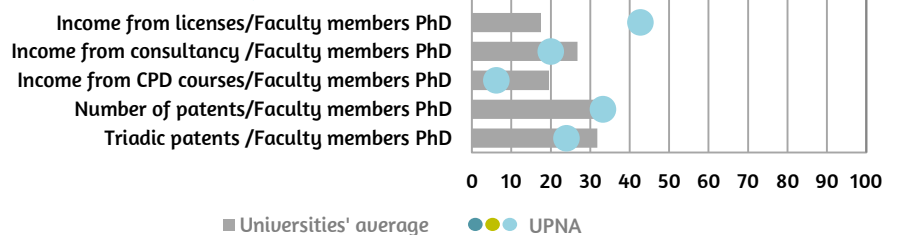
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD REY JUAN CARLOS



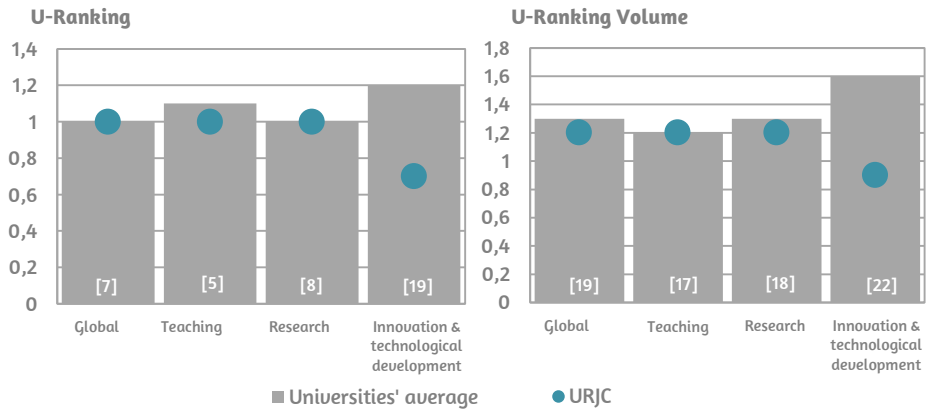
Year of foundation: 1.997
 Type of ownership: Public
 Bachelor's degree students¹: 38.038
 Master's degree students¹: 4.584
 Faculty members¹: 1.543
 Administration and service staff¹: 689
 Budget²: 141.425.483€
 Bachelor's degrees³: 64
 Master's degrees³: 80

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

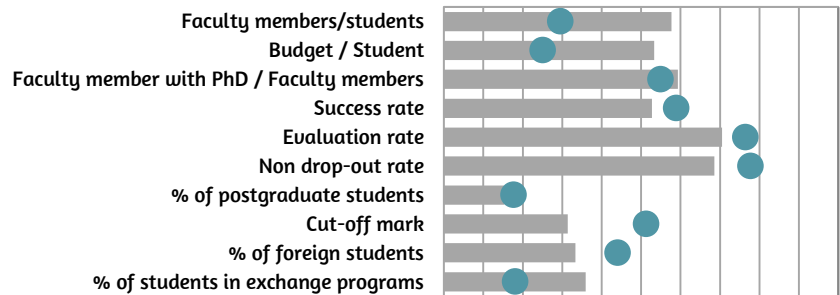
Index and position in the ranking between brackets



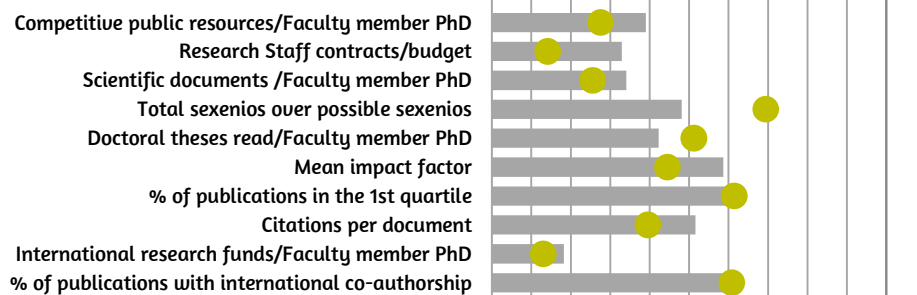
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

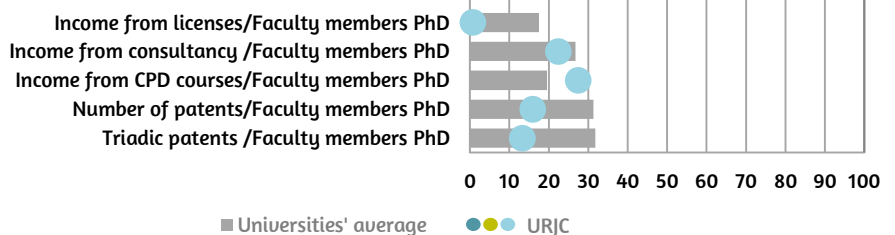
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD SAN JORGE



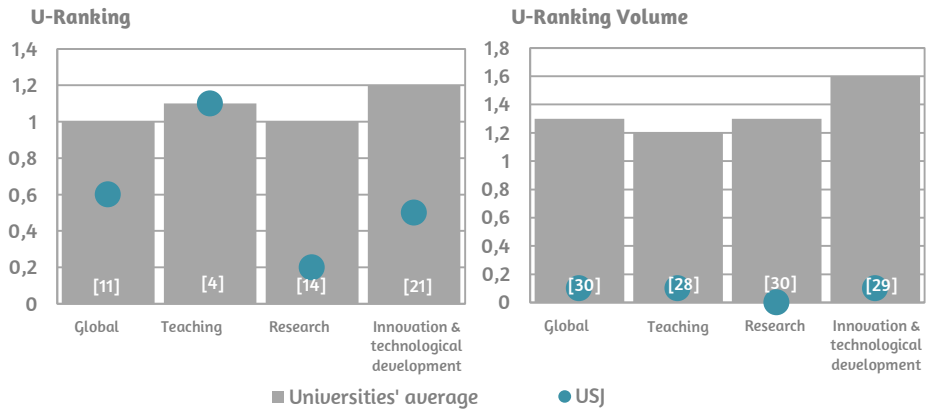
Year of foundation: 2.005
 Type of ownership: Private
 Bachelor's degree students¹: 2.081
 Master's degree students¹: 123
 Faculty members¹: 283
 Administration and service staff¹: 123
 Budget²: not available
 Bachelor's degrees³: 16
 Master's degrees³: 3

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

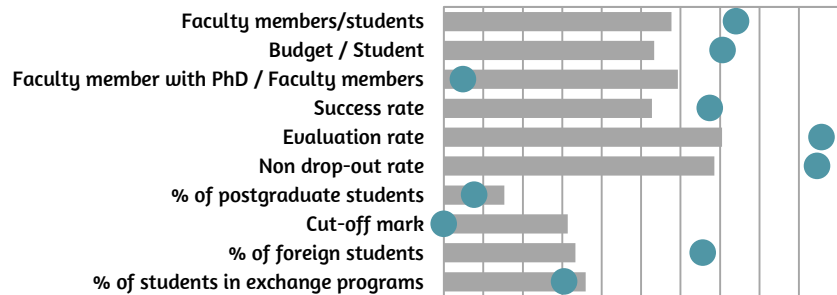
Index and position in the ranking between brackets



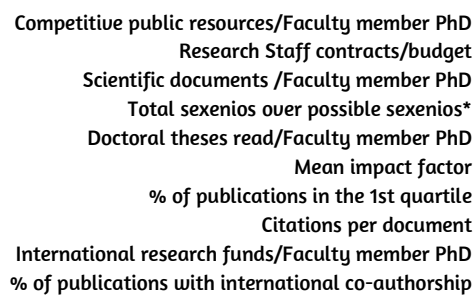
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

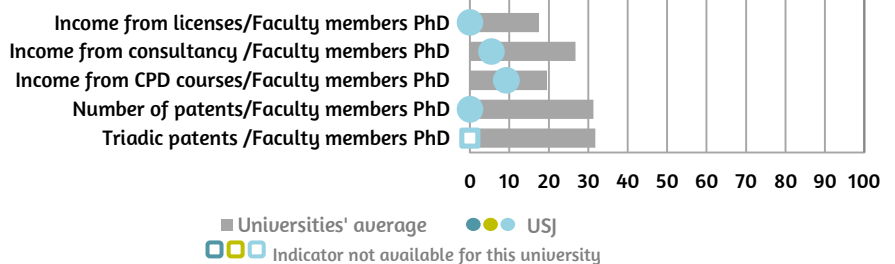
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDADE DA CORUÑA



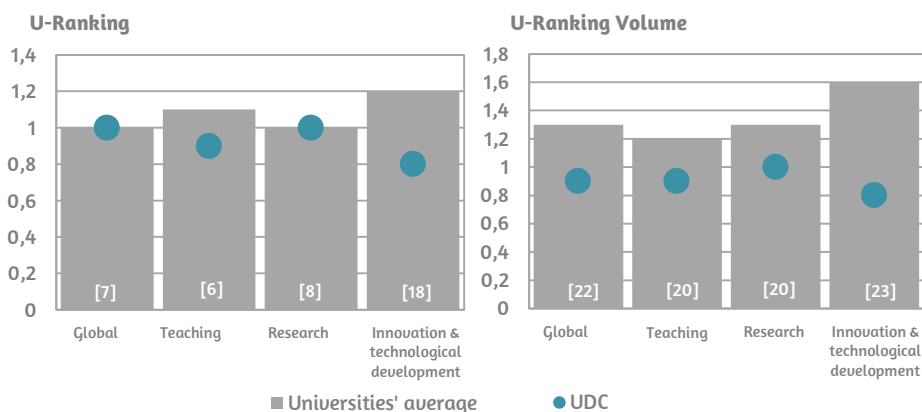
Year of foundation: 1.989
 Type of ownership: Public
 Bachelor's degree students¹: 15.501
 Master's degree students¹: 1.610
 Faculty members¹: 1.501
 Administration and service staff¹: 773
 Budget²: 123.425.654€
 Bachelor's degrees³: 40
 Master's degrees³: 59

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

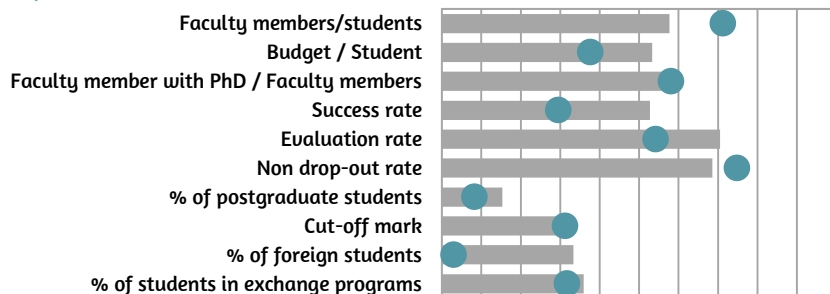
Index and position in the ranking between brackets



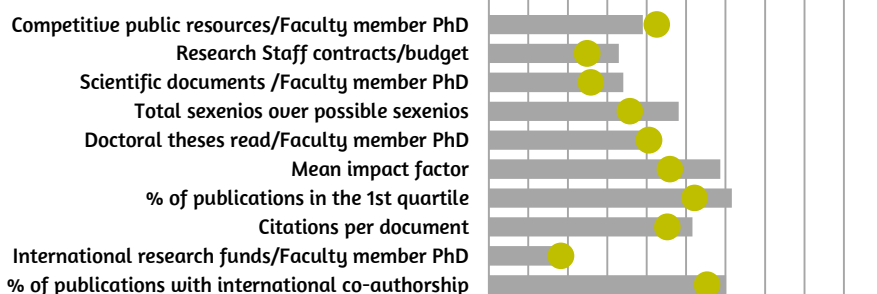
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

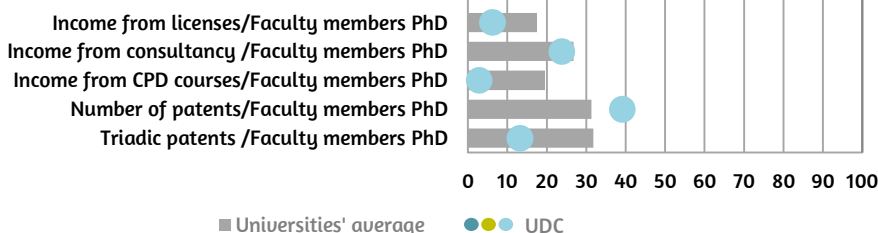
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDADE DE SANTIAGO DE COMPOSTELA



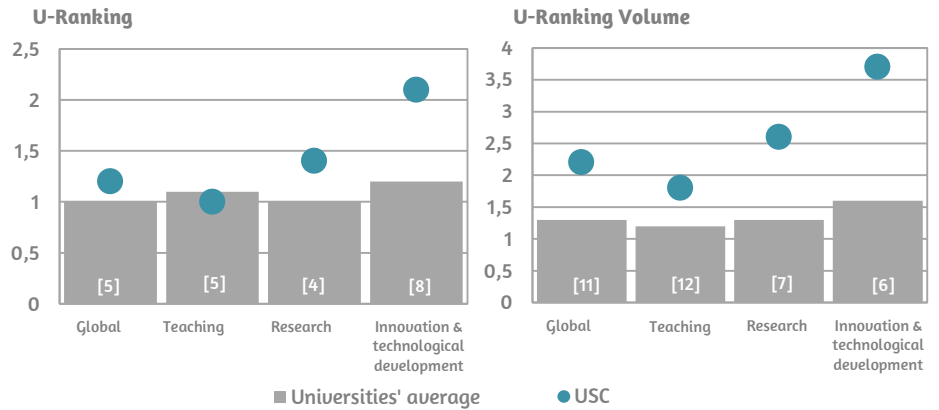
Year of foundation: 1.495
 Type of ownership: Public
 Bachelor's degree students¹: 20.835
 Master's degree students¹: 1.942
 Faculty members¹: 2.109
 Administration and service staff¹: 1.239
 Budget²: 226.210.274€
 Bachelor's degrees³: 44
 Master's degrees³: 71

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

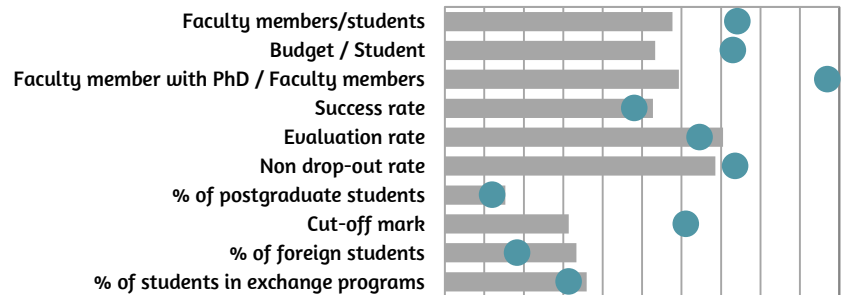
Index and position in the ranking between brackets



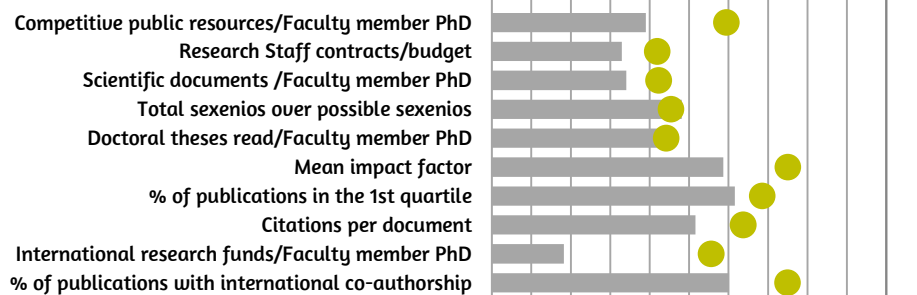
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

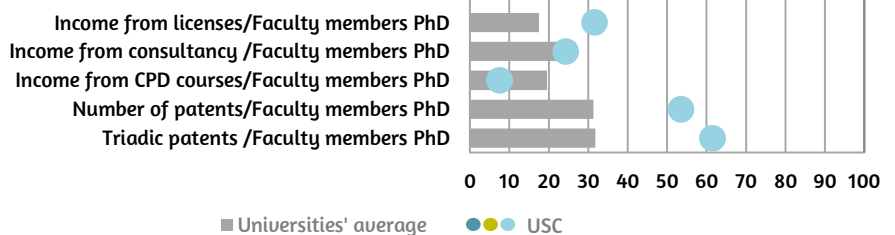
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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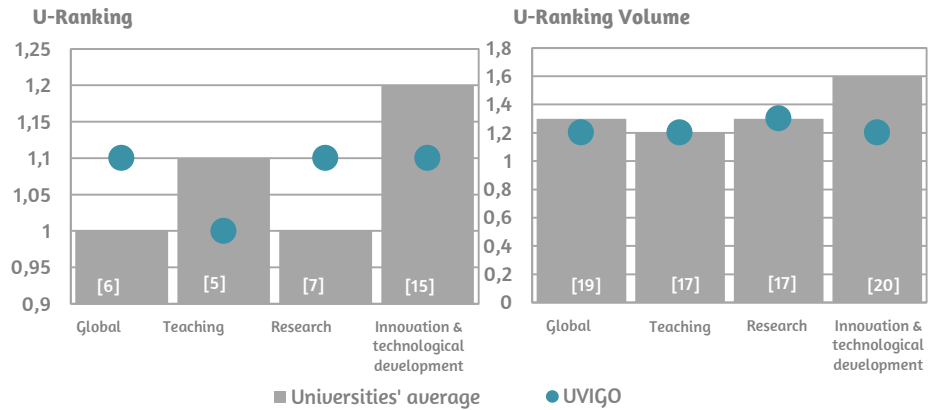
Year of foundation: 1.989
 Type of ownership: Public
 Bachelor's degree students¹: 17.374
 Master's degree students¹: 2.098
 Faculty members¹: 1.572
 Administration and service staff¹: 741
 Budget²: 146.593.087€
 Bachelor's degrees³: 41
 Master's degrees³: 56

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

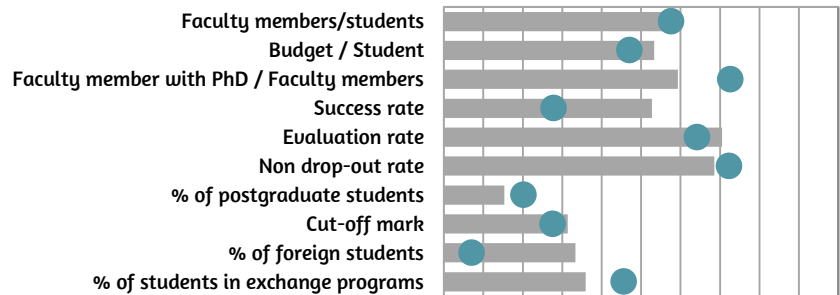
Index and position in the ranking between brackets



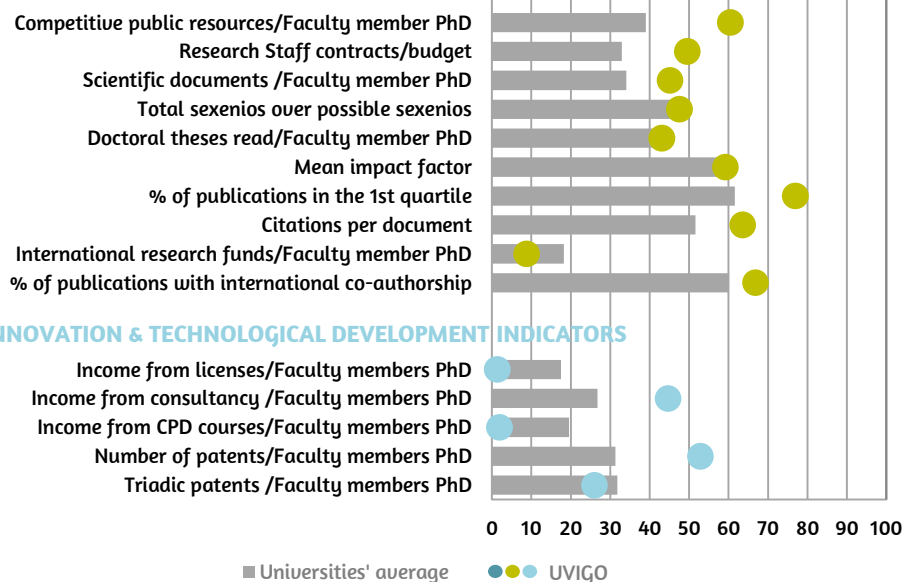
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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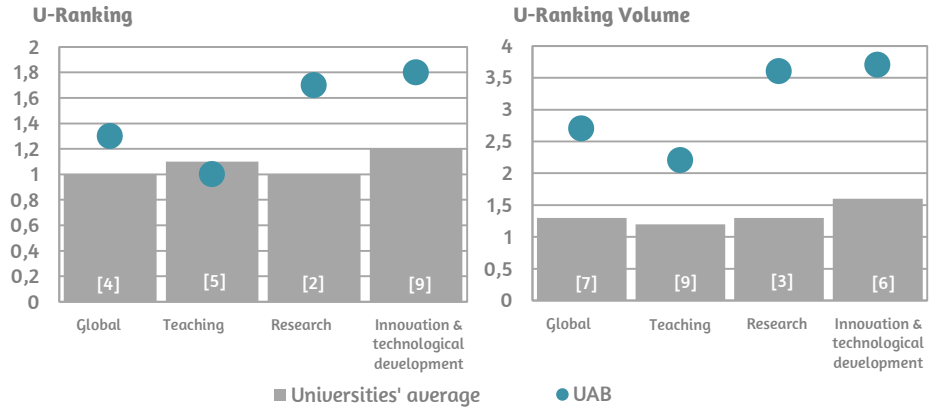
Year of foundation: 1.968
 Type of ownership: Public
 Bachelor's degree students¹: 32.497
 Master's degree students¹: 3.588
 Faculty members¹: 4.301
 Administration and service staff¹: 1.957
 Budget²: 298.976.277€
 Bachelor's degrees³: 81
 Master's degrees³: 211

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

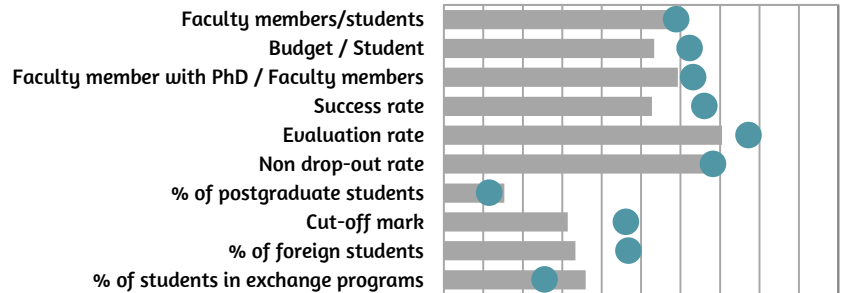
Index and position in the ranking between brackets



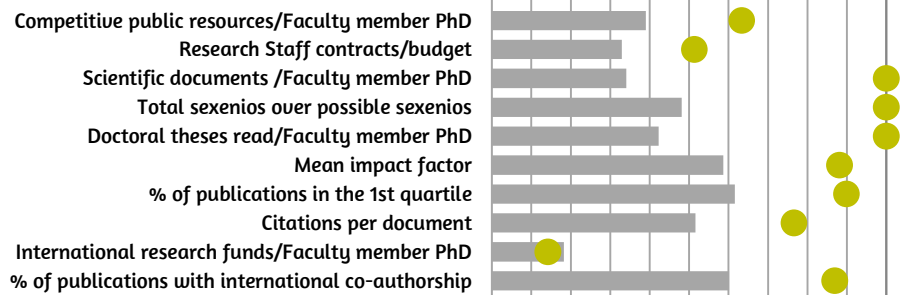
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

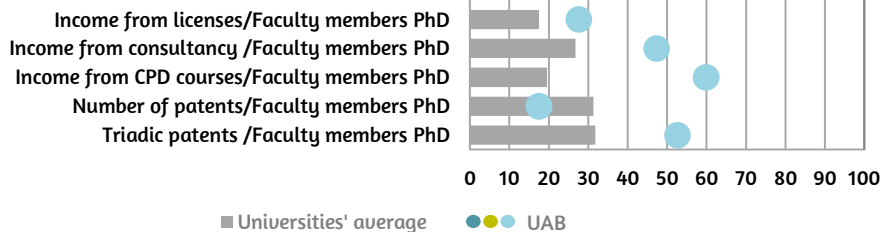
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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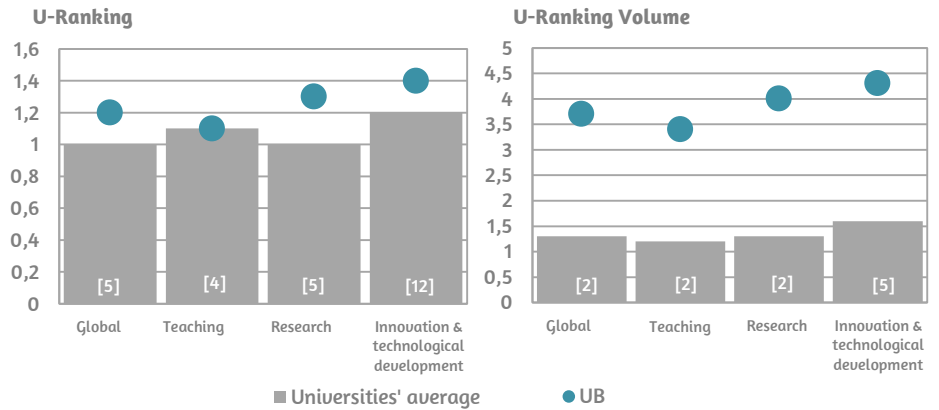
Year of foundation: 1.430
 Type of ownership: Public
 Bachelor's degree students¹: 45.294
 Master's degree students¹: 7.203
 Faculty members¹: 5.468
 Administration and service staff¹: 2.412
 Budget²: 382.008.609€
 Bachelor's degrees³: 72
 Master's degrees³: 279

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

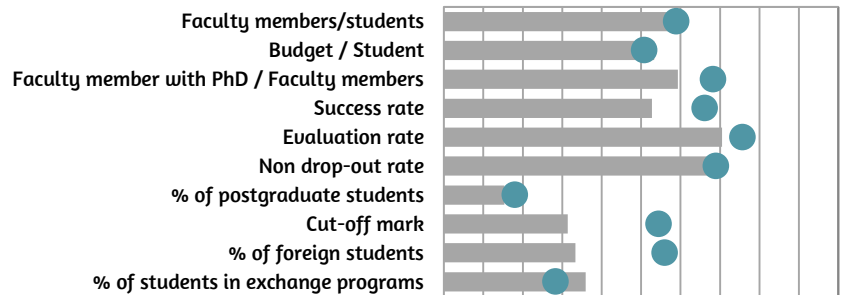
Index and position in the ranking between brackets



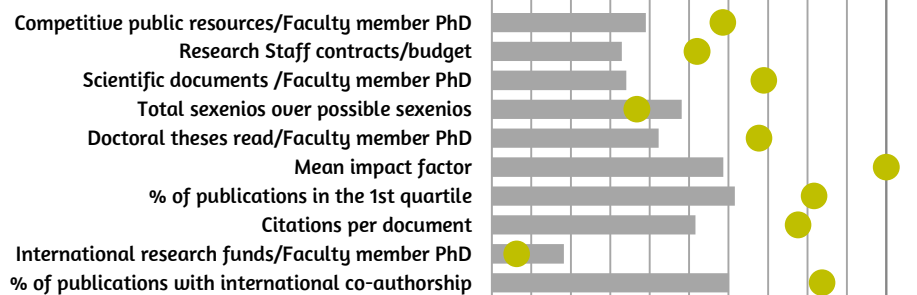
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

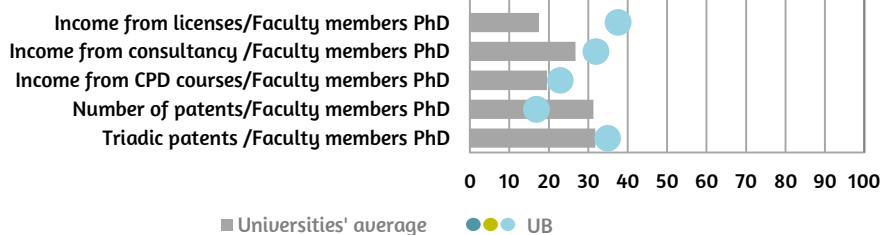
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

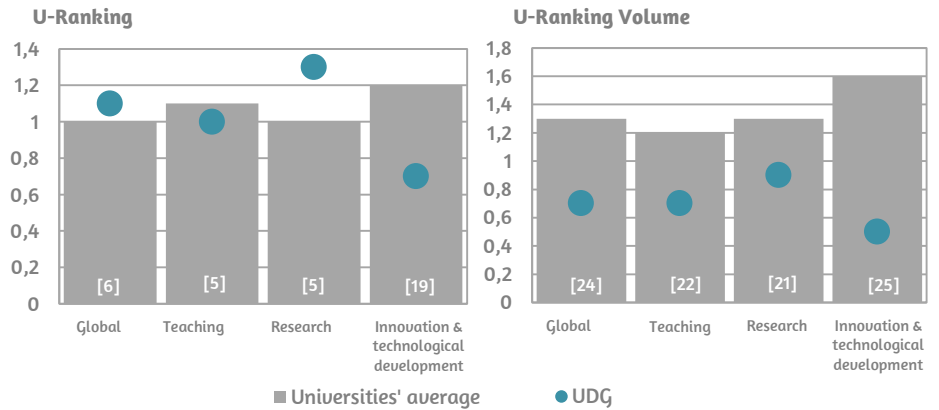
Year of foundation: 1.992
 Type of ownership: Public
 Bachelor's degree students¹: 13.616
 Master's degree students¹: 925
 Faculty members¹: 1.463
 Administration and service staff¹: 628
 Budget²: 93.386.313€
 Bachelor's degrees³: 49
 Master's degrees³: 39

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

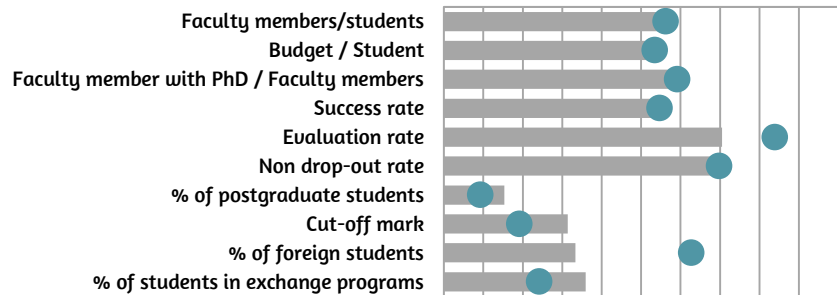
Index and position in the ranking between brackets



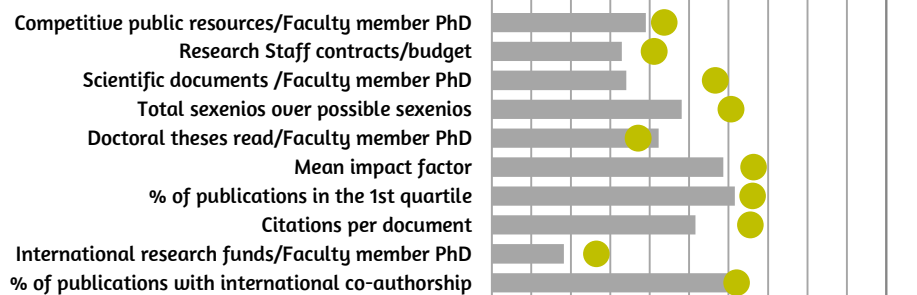
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

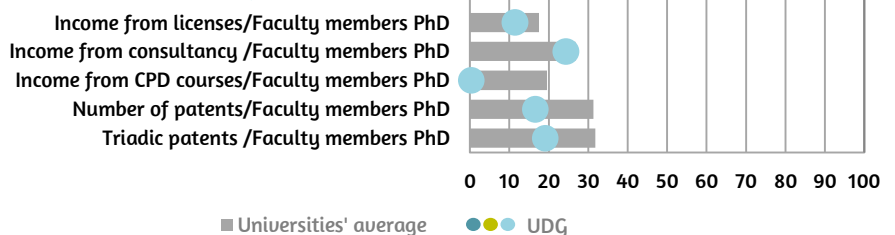
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

UNIVERSITAT DE LES ILLES BALEARS



Universitat de les Illes Balears

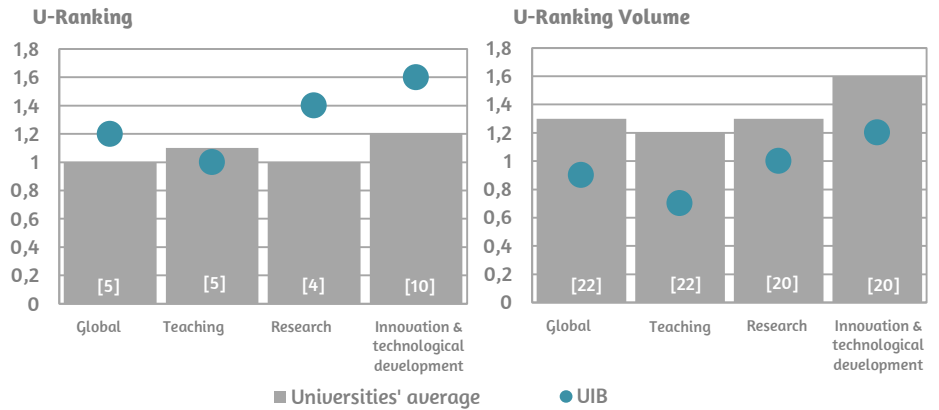
Year of foundation: 1.978
 Type of ownership: Public
 Bachelor's degree students¹: 11.782
 Master's degree students¹: 1.328
 Faculty members¹: 1.373
 Administration and service staff¹: 566
 Budget²: 80.333.215€
 Bachelor's degrees³: 34
 Master's degrees³: 33

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

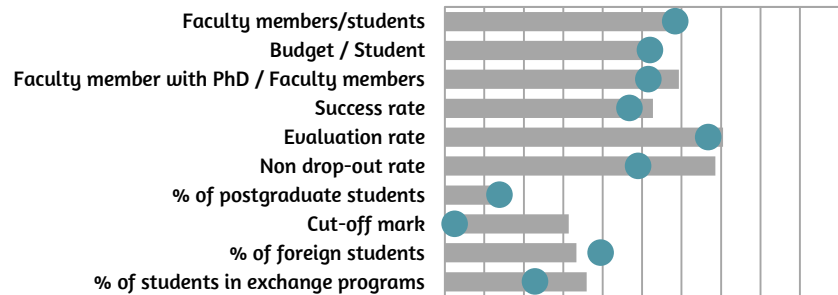
Index and position in the ranking between brackets



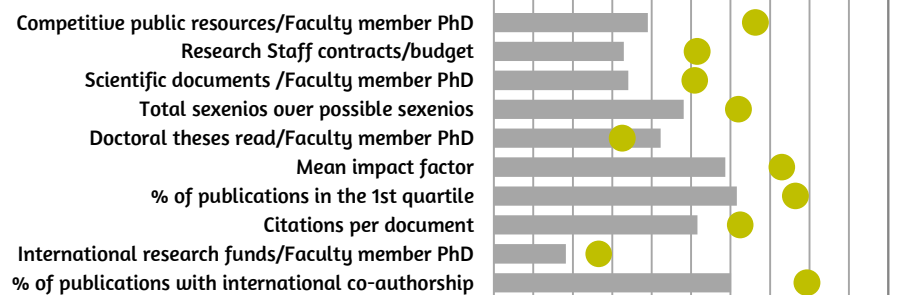
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

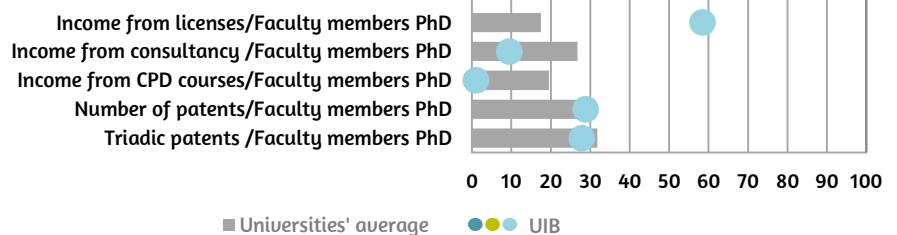
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

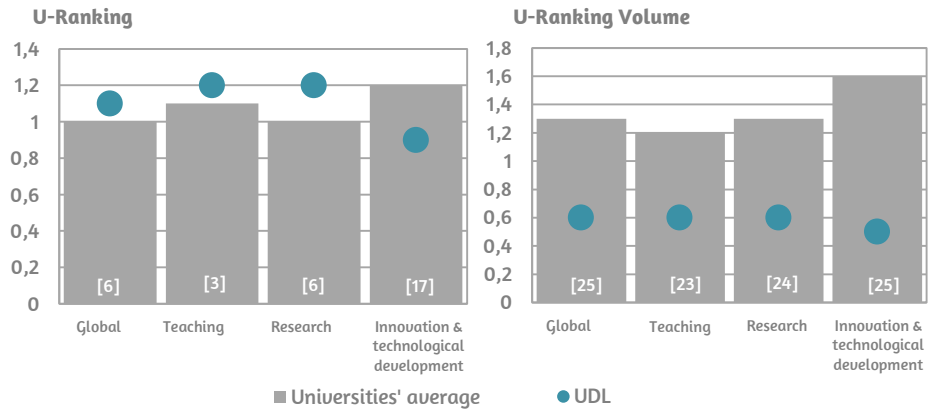
Year of foundation: 1.992
 Type of ownership: Public
 Bachelor's degree students¹: 8.260
 Master's degree students¹: 889
 Faculty members¹: 1.128
 Administration and service staff¹: 581
 Budget²: 74.579.970€
 Bachelor's degrees³: 43
 Master's degrees³: 54

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

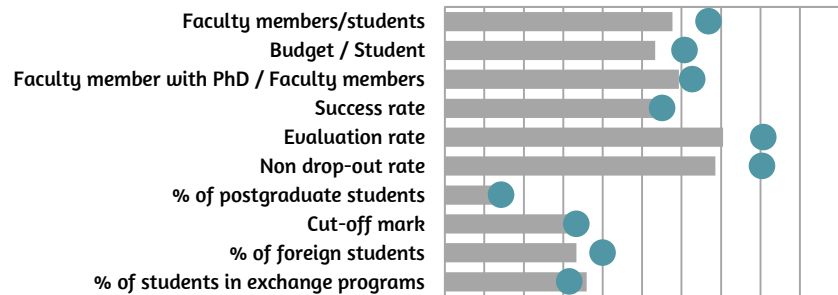
Index and position in the ranking between brackets



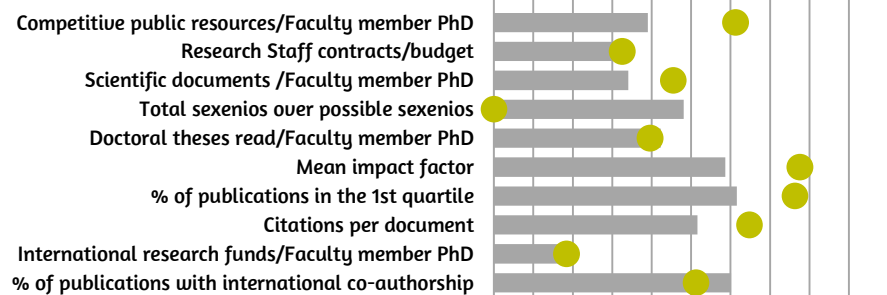
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

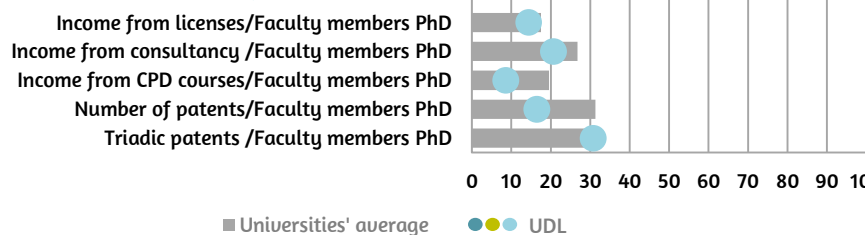
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

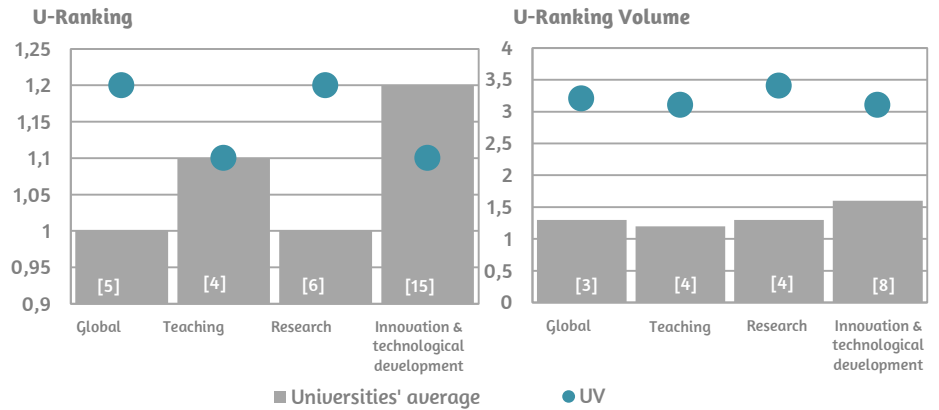
Year of foundation: 1.500
 Type of ownership: Public
 Bachelor's degree students¹: 39.461
 Master's degree students¹: 5.208
 Faculty members¹: 4.229
 Administration and service staff¹: 1.854
 Budget²: 365.387.907€
 Bachelor's degrees³: 54
 Master's degrees³: 113

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

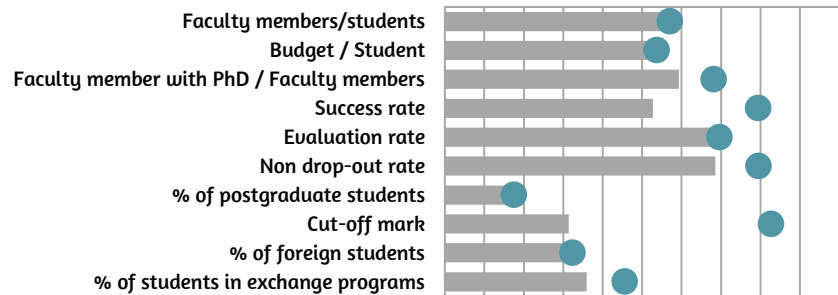
Index and position in the ranking between brackets



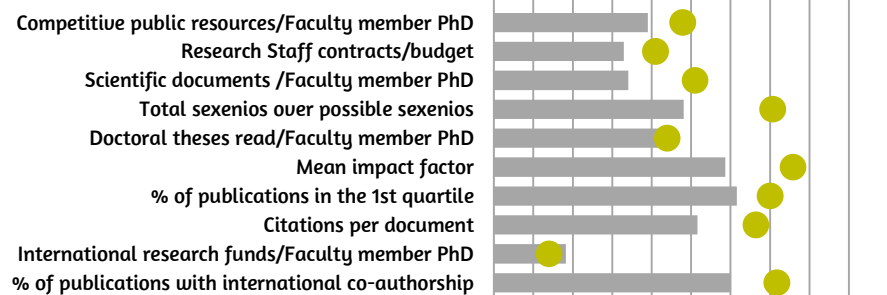
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

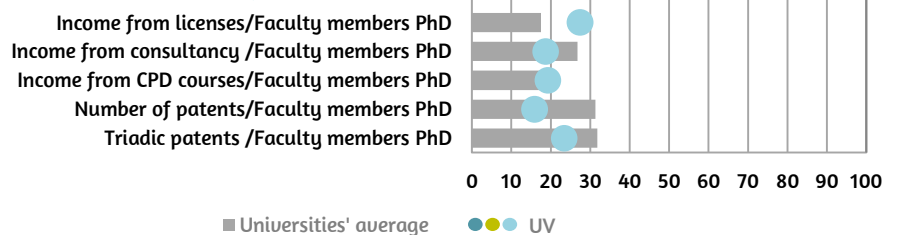
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

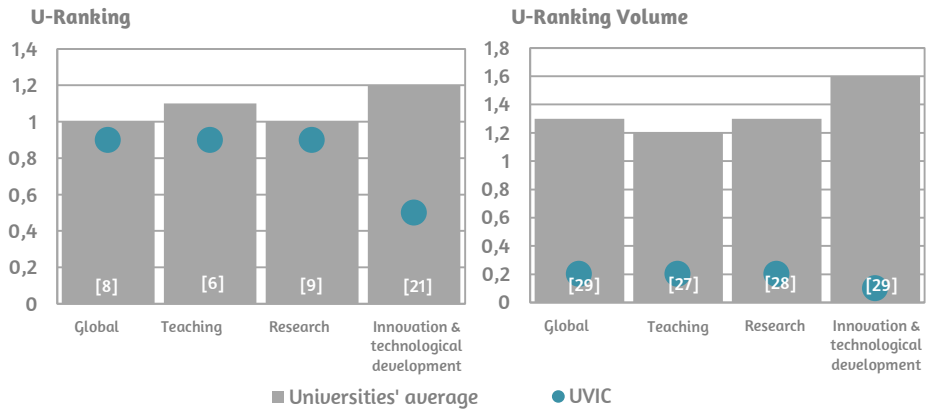
Year of foundation: 1.997
 Type of ownership: Private
 Bachelor's degree students¹: 5.519
 Master's degree students¹: 607
 Faculty members¹: 607
 Administration and service staff¹: 246
 Budget²: not available
 Bachelor's degrees³: 40
 Master's degrees³:

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

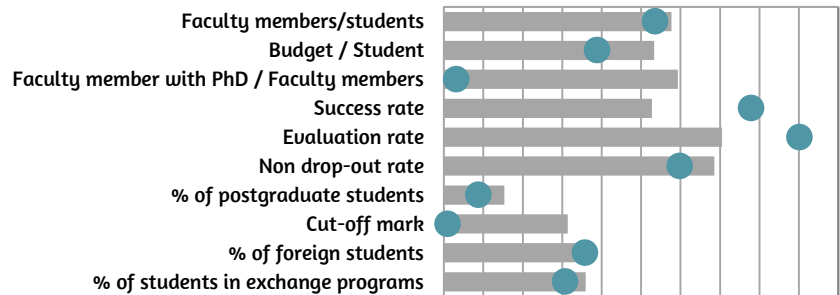
Index and position in the ranking between brackets



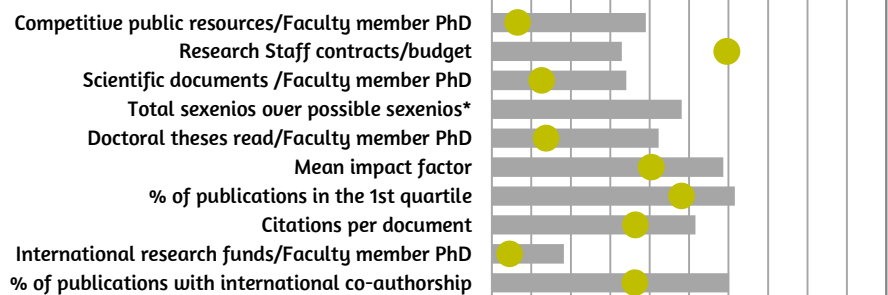
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

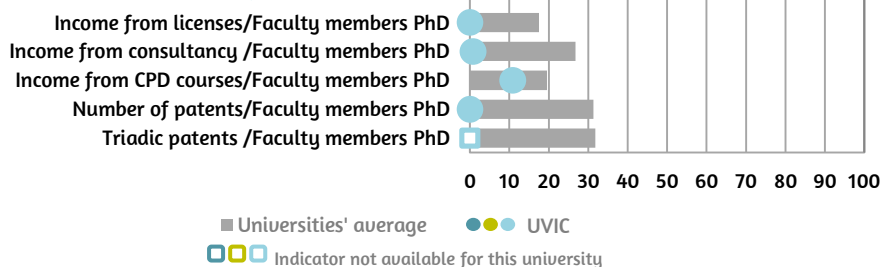
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

UNIVERSITAT INTERNACIONAL DE CATALUNYA

uicbarcelona

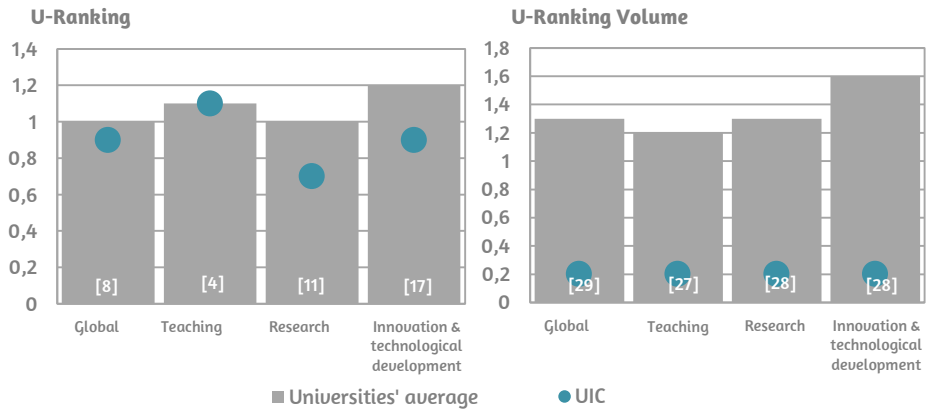
Year of foundation: 1.997
 Type of ownership: Private
 Bachelor's degree students¹: 3.116
 Master's degree students²: 296
 Faculty members³: 512
 Administration and service staff¹: 251
 Budget³: not available
 Bachelor's degrees⁴: 14
 Master's degrees⁴: 19

¹Course 2015-16; ²Course 2014-15; ³2014; ⁴Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

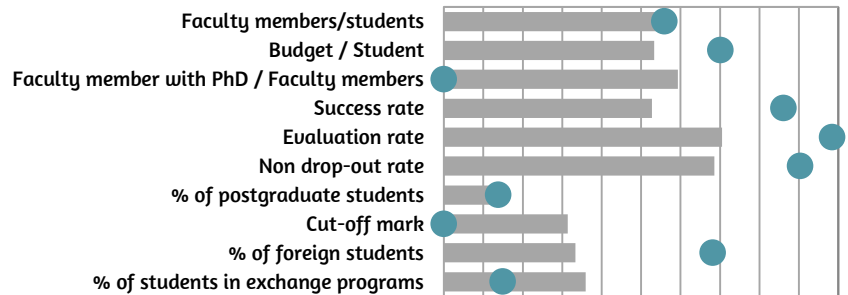
Index and position in the ranking between brackets



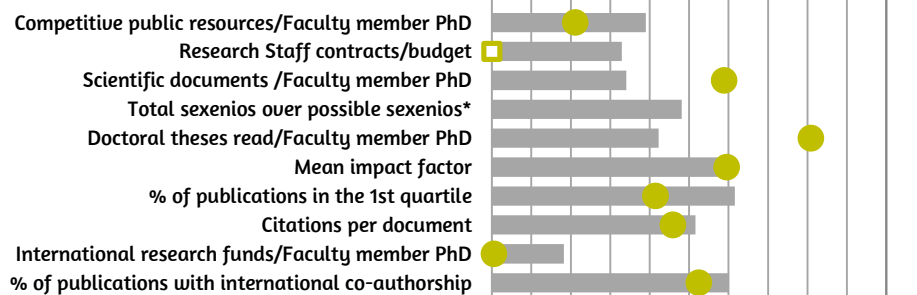
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

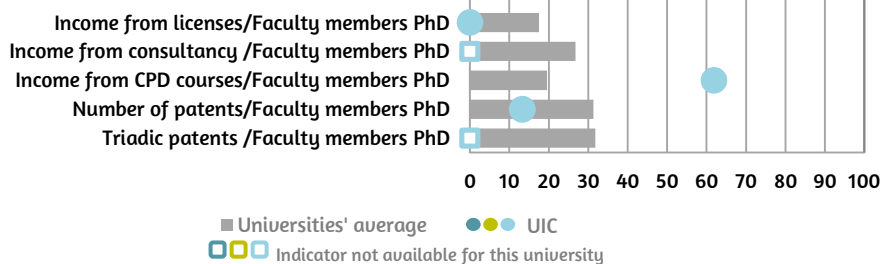
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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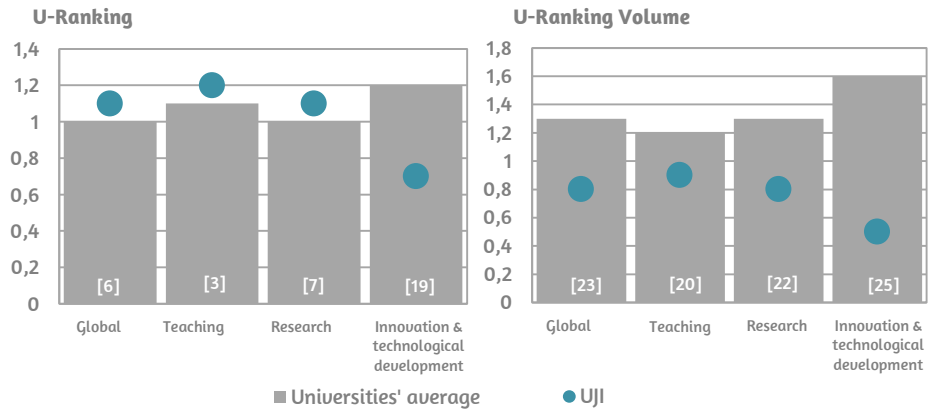
Year of foundation: 1.991
 Type of ownership: Public
 Bachelor's degree students¹: 11.990
 Master's degree students¹: 1.364
 Faculty members¹: 1.221
 Administration and service staff¹: 614
 Budget²: 102.885.379€
 Bachelor's degrees³: 31
 Master's degrees³: 49

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

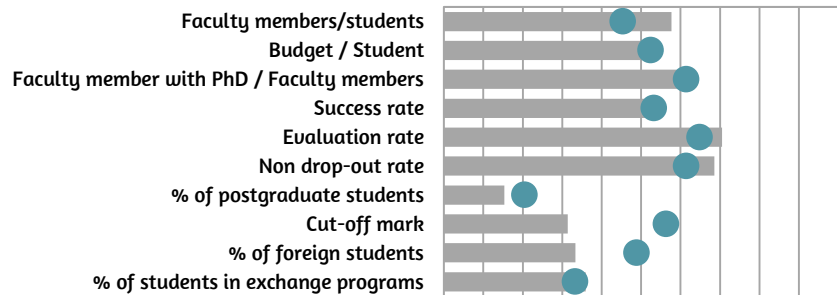
Index and position in the ranking between brackets



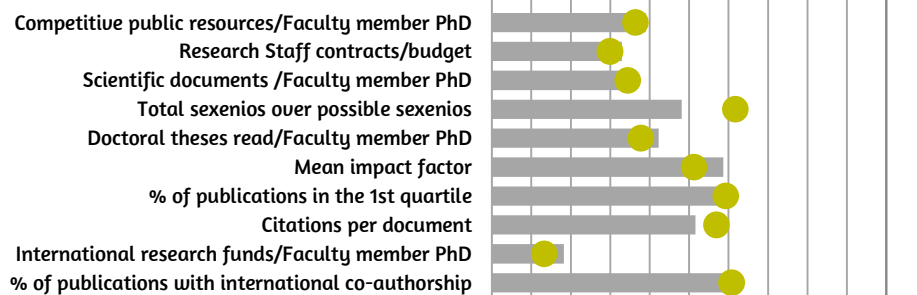
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

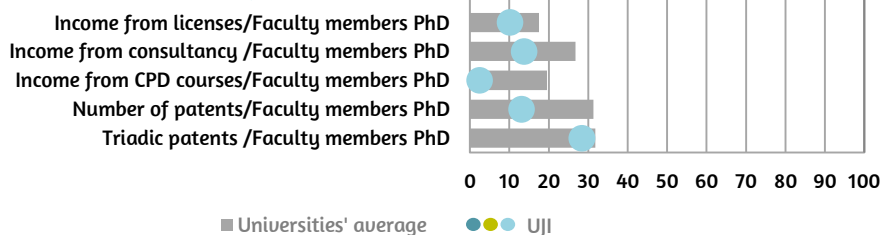
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

UNIVERSITAT OBERTA DE CATALUNYA



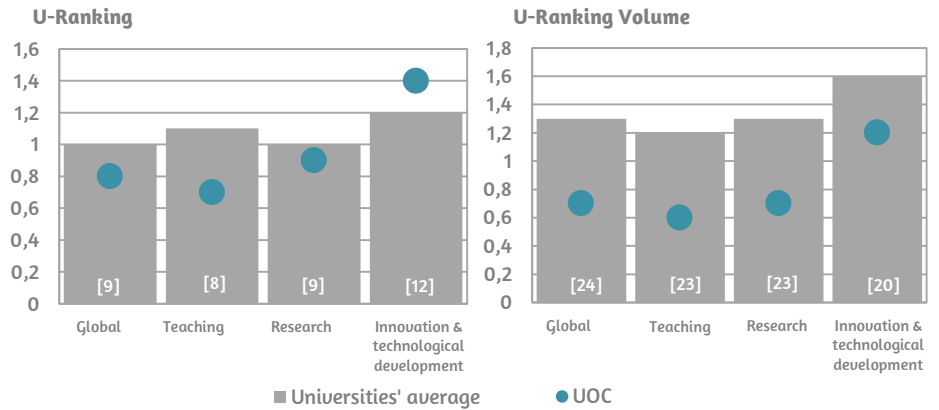
Year of foundation: 1.995
 Type of ownership: Private
 Bachelor's degree students¹: 34.031
 Master's degree students¹: 8.739
 Faculty members¹: 265
 Administration and service staff¹: 545
 Budget²: not available
 Bachelor's degrees³: 22
 Master's degrees³: 40

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

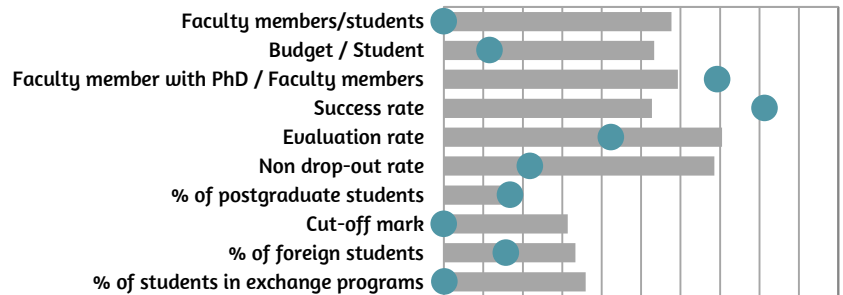
Index and position in the ranking between brackets



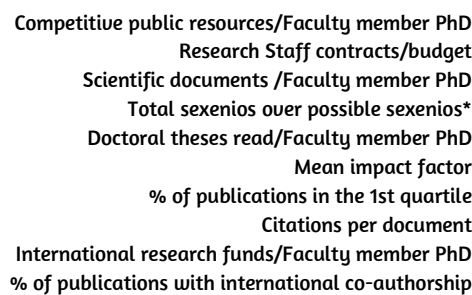
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

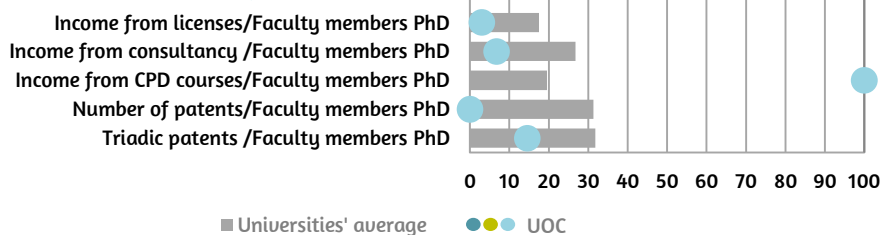
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

UNIVERSITAT POLITÈCNICA DE CATALUNYA



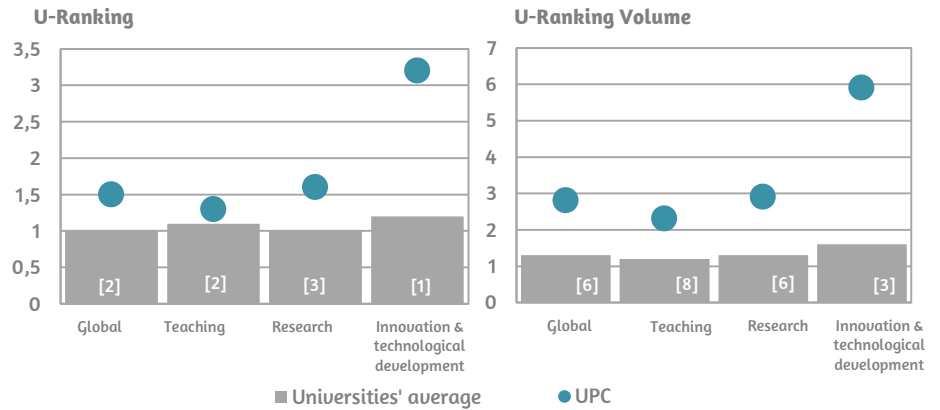
Year of foundation: 1.971
 Type of ownership: Public
 Bachelor's degree students¹: 25.932
 Master's degree students¹: 4.290
 Faculty members¹: 2.690
 Administration and service staff¹: 1.535
 Budget²: 325.658.817€
 Bachelor's degrees³: 53
 Master's degrees³: 126

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

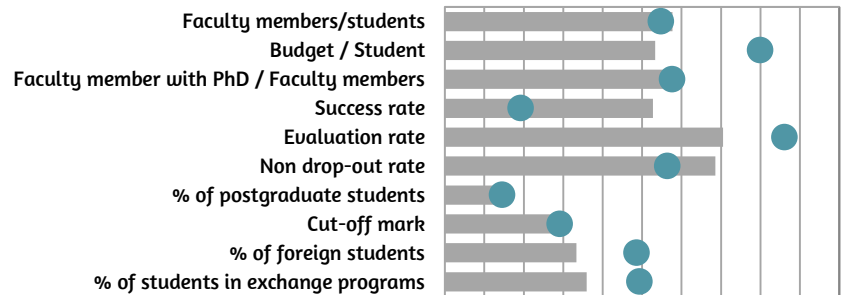
Index and position in the ranking between brackets



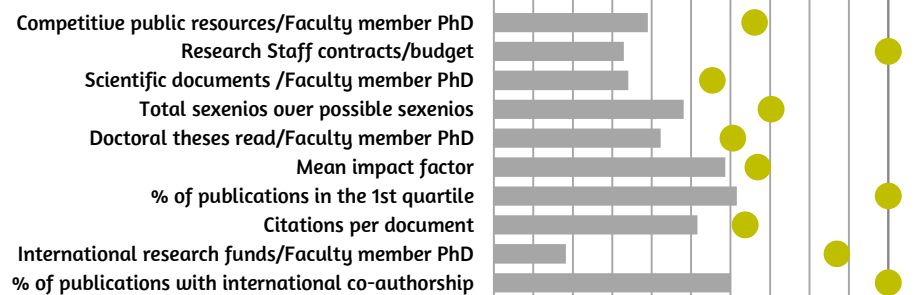
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

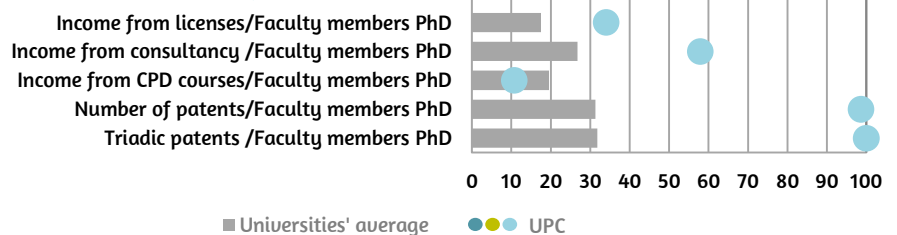
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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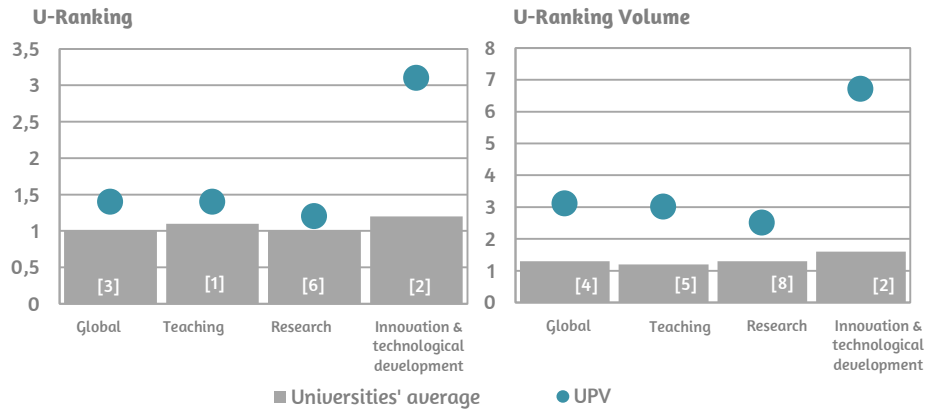
Year of foundation: 1.971
 Type of ownership: Public
 Bachelor's degree students¹: 22.211
 Master's degree students¹: 3.744
 Faculty members¹: 2.650
 Administration and service staff¹: 1.510
 Budget²: 318.841.182€
 Bachelor's degrees³: 32
 Master's degrees³: 80

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

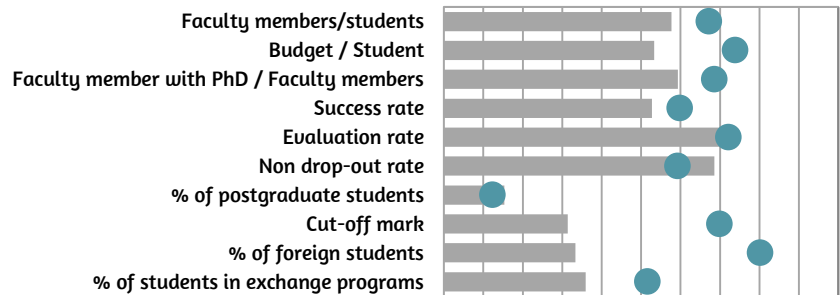
Index and position in the ranking between brackets



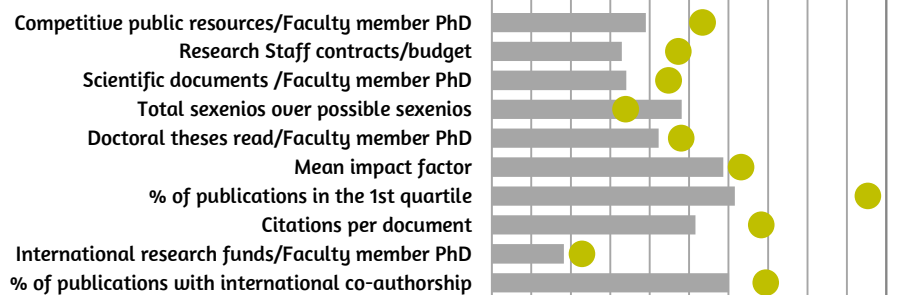
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

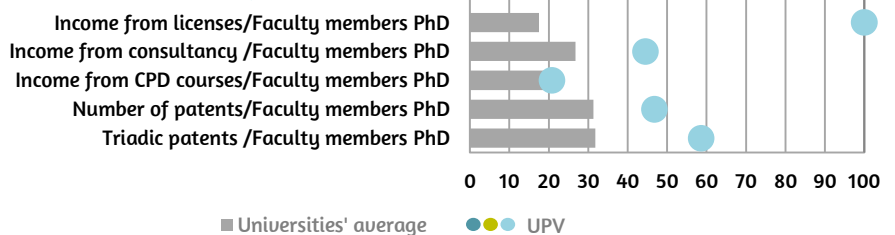
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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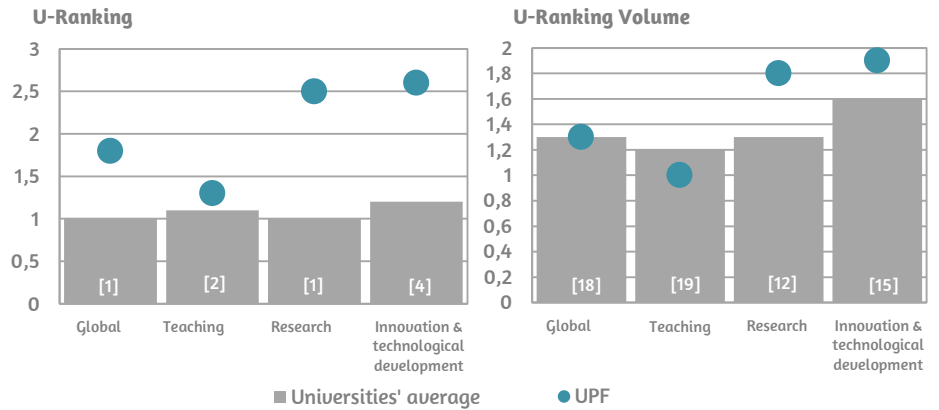
Year of foundation: 1.990
 Type of ownership: Public
 Bachelor's degree students¹: 14.391
 Master's degree students¹: 3.134
 Faculty members¹: 1.360
 Administration and service staff¹: 910
 Budget²: 122.282.240€
 Bachelor's degrees³: 42
 Master's degrees³: 118

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

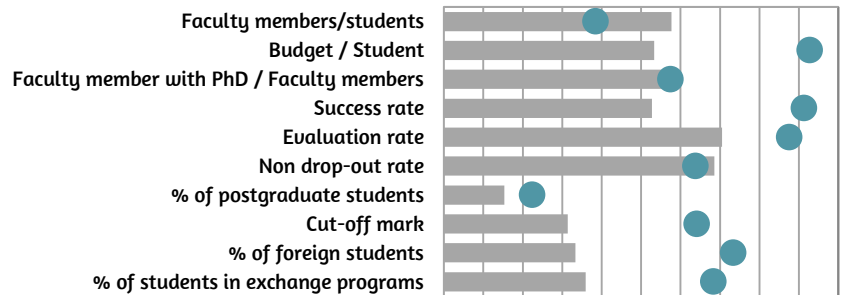
Index and position in the ranking between brackets



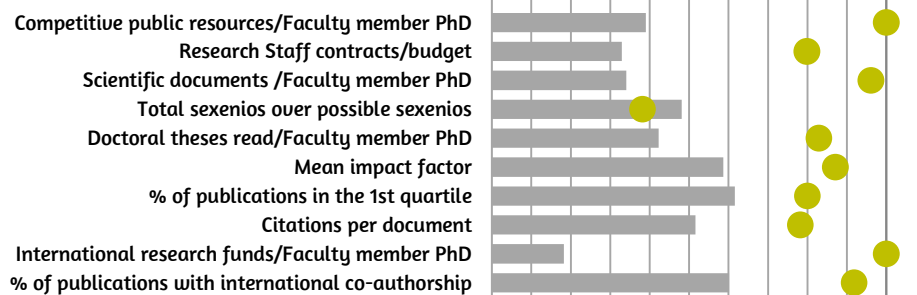
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

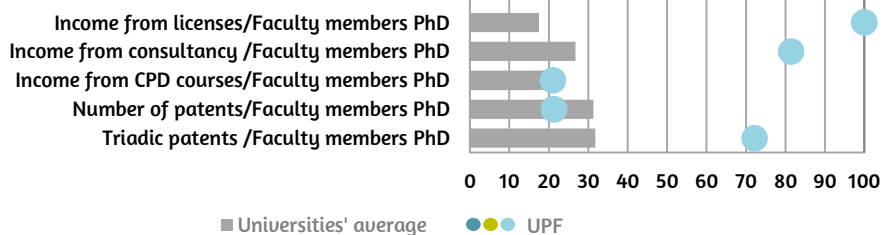
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

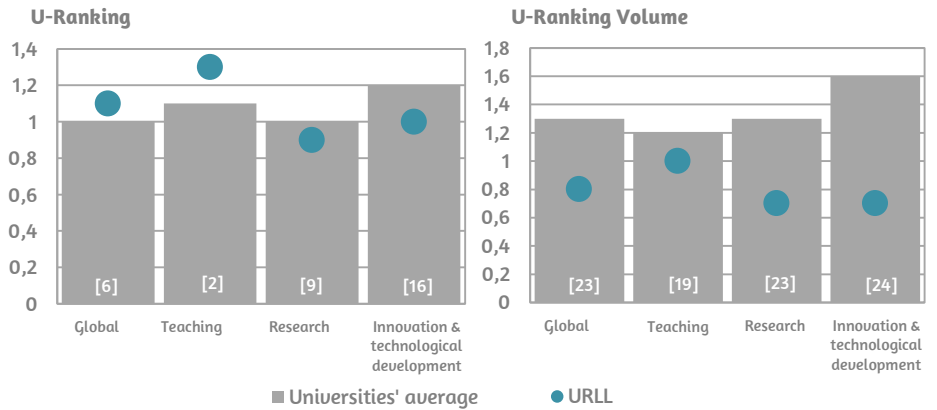
Year of foundation: 1.991
 Type of ownership: Private
 Bachelor's degree students¹: 12.130
 Master's degree students¹: 3.027
 Faculty members¹: 1.033
 Administration and service staff¹: 722
 Budget²: not available
 Bachelor's degrees³: 41
 Master's degrees³: 102

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

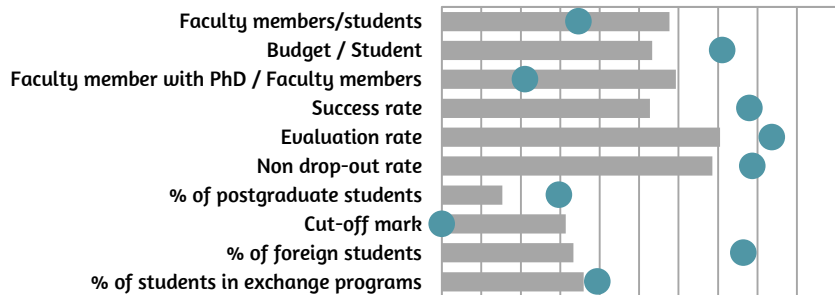
Index and position in the ranking between brackets



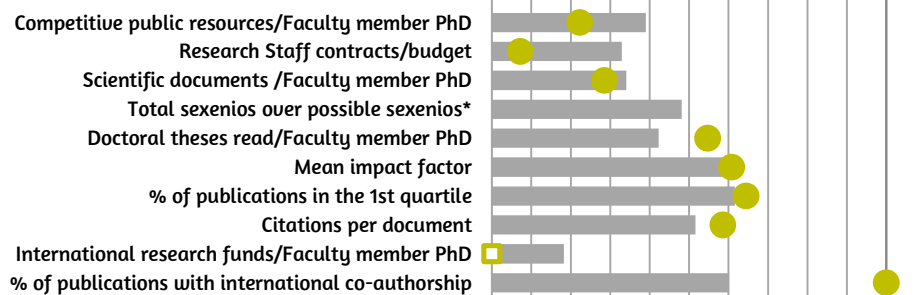
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

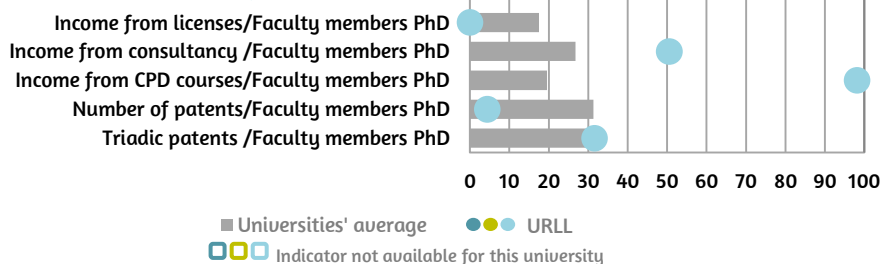
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



■ Universities' average ● URLL
 □ □ □ Indicator not available for this university

Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

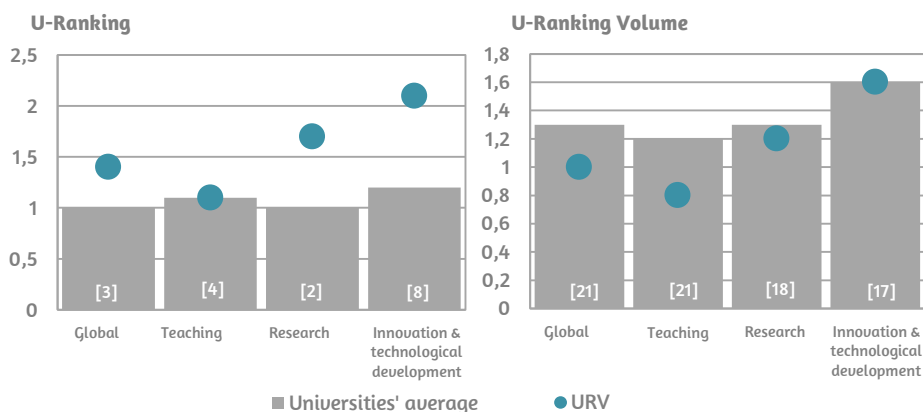
Year of foundation: 1.992
 Type of ownership: Public
 Bachelor's degree students¹: 11.801
 Master's degree students¹: 1.220
 Faculty members¹: 1.731
 Administration and service staff¹: 700
 Budget²: 102.641.328€
 Bachelor's degrees³: 43
 Master's degrees³: 68

¹Course 2015-16; ²2014; ³Course 2016-17.
 Source: Ministry of Education, Culture and Sport



U-Ranking 2017 performance and volume indices

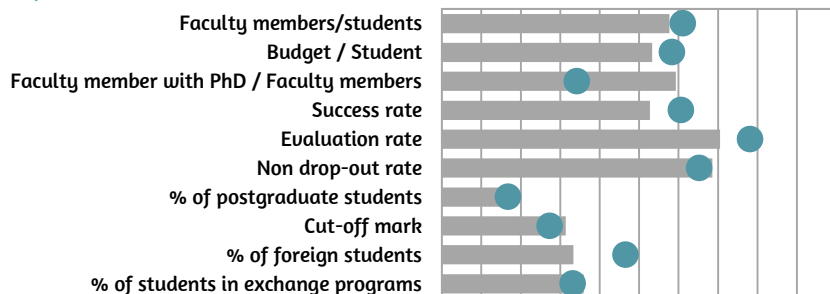
Index and position in the ranking between brackets



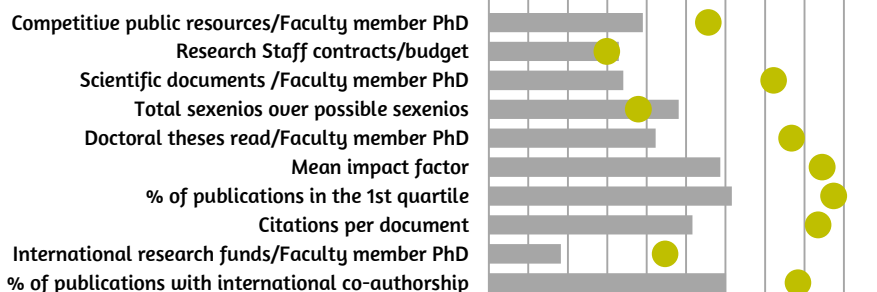
U-Ranking 2017 indicators

University with the minimum value=0; University with the maximum value=100

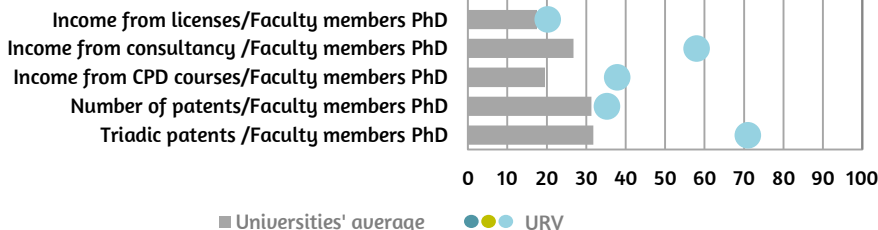
TEACHING INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



Please see www.u-ranking.es for methodological details on definition and calculation of the indicators and indices.

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