

U-Ranking 2016

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 2016 edition (fourth 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.

We would also like to acknowledge the support of the Valencian public universities in the initial stages of the project and the suggestions made by members of different Spanish universities after the presentation of the first results in June 2013, which have been followed with interest by many people. From then until the end of February 2016, the U-Ranking website has received more than 420,000 hits, many of which have resulted in calculating personalized rankings (more than 100,000), as well as more than 24,300 downloads of the three editions of the report. In addition, the project is increasingly being followed with more interest from abroad: since the presentation of the 2015 edition in March, 31% of the visits to the website came from outside of Spain, the majority, 26%, from Latin America and the US. In addition, 3.1% of the visits were from major European countries such as United Kingdom, Germany, France, Italy and Portugal. These data provide a stimulus to maintain the continuity of

the project while making improvements which have been added in this fourth edition.

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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 Ivie team.

1. Introduction

This report presents the results of the research undertaken by the Ivie to develop the fourth 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 should not make us ignore that the impact on its 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' mission. 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 allow their performance to be assessed by answering 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?
- Are the positions of universities in the various general rankings sufficiently regular so as to classify them into homogeneous groups, or do their positions vary too much in some classifications to establish a typology? 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?

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 heterogeneity makes it difficult to assess. Thus, this assessment requires that the different specialization and changing characteristics of each

² Academic Ranking of World Universities (ARWU).

university are taken into account, as well as their real possibility of competing in different areas.

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, a further improvement to past editions is, precisely, the incorporation into the ranking system of 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, the fourth edition of U-Ranking incorporates, as we will see further on, thirteen private universities which meet these characteristics.

³ 32 out of 34 private universities have been active during the 2015-2016 academic year.

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 only thirteen Spanish universities (14.5% 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 favorable results, and 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) 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 preparing the rankings along with a comparison of the results obtained in the previous editions of U-Rankings are presented. Also, with help of rankings of different strategic groups formed by the universities analyzed, we discuss the results of the regional university systems and their performance. Finally, Chapter 5 summarizes the main features and results of the project.

New developments in the fourth edition of U-Ranking

This fourth edition of the ISSUE project corresponding to 2016 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:

Firstly, as a further improvement of the previous edition, in which 11 **private universities** were incorporated for the first time, and given the importance that these institutions are acquiring within the Spanish university system, the present edition increases the number of private universities to 13. Three of these universities are analyzed for the first time in U-Ranking, while following our strict methodological criteria, there is one university that was included in the 2015 edition but has been excluded from the 2016 analysis as not enough information was provided for the reliable calculation of the indices.

The 2016 edition also introduces important **improvements in the information** used to calculate the rankings. On the one hand, data corresponding to 23 of the 25 indicators have

been updated. Worth mentioning are the innovation and technological development indicators as three of them, thanks to the update of the Research and Knowledge Transfer Survey conducted by RedOTRI (Spanish Knowledge Transfer Network), include two more years, thus the reference period being 2008-2013 instead of 2006-2011.

On the other hand, thanks to the collaboration with the Spanish Ministry of Education, Culture and Sports, the ISSUE project has from now on 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 has enabled us:

- To improve the information on the degrees offered by each university as well as in which universities they are taught.
- To gather more detailed information on the percentage of foreign students. In previous editions information was only available for the total of each university whereas in this edition there is also data for each degree offered.
- To have more homogeneous information on the success, assessment and drop-out rates for a greater number of universities and for each area of learning.⁴

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 us 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, in this year's edition the www.u-

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.

ranking.es website offers a **panel of indicators**⁵ for each University, which is a sheet 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 sheet 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, ownership, number of students, teachers and degrees, amongst other data.

The fact that this fourth edition of U-Ranking provides sufficient data over a certain period brings about the natural question of what has been the **evolution of the results of the Spanish university system** in the period 2013-2016. To answer this question, this report links all the indices, on the basis of year 2013, which allow performing two analyses. First, we analyze the performance of the system as a whole: if it has improved or not during the years covered, both generally and in each of the analyzed dimensions (teaching, research and knowledge transfer). Second, we will assess if there has been a convergence process which has reduced the differences among universities that make up the system or if, on the contrary, the system is increasingly more heterogeneous in terms of results. For each university it is examined if, in 2016, it has come closer or further from the average of the system.

Also, for the 2016 edition this information allows us to make an in-depth **analysis of the regional university systems** evaluating each one of them, if they have improved or not their performance in the analyzed period, and if it has been carried out more or less intensely than the average of the Spanish universities.

One of the constraints that most frequently is discussed regarding rankings is that they do not take into account the different resource endowments, the geographical context, the organizational structures and the historical origin of universities. Although in our opinion this heterogeneity does not, in the end, hide the results of the institutions, if they are better off than others, which are reflected in the ranking, indeed, it raises the question whether certain starting points can facilitate or hinder an institution's possibilities of reaching the upper positions of rankings. For this reason, the fourth edition of U-Ranking carries out an analysis in which universities are previously divided into homogeneous groups based on the characteristics of teaching staff, students, size, organizational structure, financial resources and environment. Then, the **strategic groups of universities** are identified in order to establish whether some of these groups systematically appear in high or low positions of the U-Ranking.⁷

⁵ See in appendix 3 the panels of indicators of the 61 universities analyzed.

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

⁷ This analysis is based on the results of the study by Aldás et al. (2016) carried out under the ISSUE project.

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 fourth 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 institutions 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.

As in the last edition and taking in mind this is already the fourth edition, clarifications on the issues to be considered in the design of a good ranking and their inclusion in the ISSUE project are not necessary as they were already explained in the previous editions, however some aspects considered should be summarized:

- 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 greatly⁸, 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 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

⁸ See Pérez and Serrano (dirs.) (2012, ch. 1 and 4).

those included in the 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 ISSUE 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.⁹ 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 ISSUE.

⁹ 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 with PhD 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 marks 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 completed 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 |
| | | |
| | Innovation and Technological Development | Resources |
| Income from consultancy contracts per 100 faculty members with PhD | | |
| Income from CPD ³ courses per faculty member with PhD | | |
| Production | | Number of patents per 100 faculty members with PhD |
| | | CPD hours 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 |
| | | 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.

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 teaching and research staff per student, with special attention paid to faculty members with PhD
- 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 will end briefly, but there are also other causes for data deficiencies in certain areas¹⁰. 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 following three editions incorporated 25 of the 31 indicators defined in table 1. Also, this edition has richer

¹⁰ 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.

information on the percentage of foreign students, data now being available for each degree.

Table 2. Indicators and level of disaggregation of U-Ranking 2013-2016

| | 2013 Ranking | 2014 and 2015 Rankings | 2016 Ranking |
|----------------------------------|--------------|------------------------|--------------|
| Defined indicators | 31 | 31 | 31 |
| Used indicators | 23 | 25 | 25 |
| Degree level¹ | 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 2700 degrees offered by Spanish public universities into 142 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 (2009-2014) and the RedOtri (2008-2013), 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 and 2014*; and by SIIU which, depending on the variable, has also supplied information for the academic years 2008-2009 and 2009-2010.

Table 3 shows the updating in terms of years and time series registered by the indicators used in the ranking for 2016. 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 2008 to 2013, completing a series of 6 years. However, as in the previous edition, the indicator *European or international research funds per faculty member with PhD* within the Internationalization Area of the Research dimension has not been updated, since it has not been included in the last two CRUE Reports.

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 2016 rankings

| Dimension | Area | Indicator | 2016 Ranking |
|--|----------------------|--|---------------------------------------|
| Teaching | Resources | Faculty member with PhD per 100 students | 2008-09, 2010-11, 2012-13 and 2013-14 |
| | | Budget / Student | 2008, 2010, 2012 and 2013 |
| | | Faculty member with PhD / University teachers | 2008-09, 2010-11, 2012-13 y 2013-14 |
| | Production | Success rate | 2009-10 to 2013-14* |
| | | Evaluation rate | 2009-10 to 2013-14* |
| | | Drop-out rate | 2009-10 to 2013-14* |
| | Quality | Attractiveness index | - |
| | | Percentage of postgraduate students | 2008-09 to 2014-15 |
| | | Cut-off marks | 2015-16 |
| | Internacionalization | Percentage of foreign students | 2009-10 to 2013-14 |
| Percentage of students in exchanges programmes | | 2008-09, 2010-11, 2012-13 and 2013-14 | |
| Percentage of students registered in programmes imparted in non-official languages | | - | |
| Research | Resources | Competitive public resources per faculty member with PhD | 2009-2014 |
| | | 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 | 2009-2014 |
| | | Total <i>sexenios</i> over possible <i>sexenios</i> | 2012 y 2013 |
| | | Doctoral theses completed per 100 faculty members with PhD | 2008-2013 |
| | Quality | Mean impact factor | 2009-2014 |
| | | Percentage of publications in the first quartile | 2009-2014 |
| | | Citations per document | 2009-2014 |
| | Internacionalization | European or international research funds per faculty member with PhD | 2008 and 2010 |
| Percentage of publications with international co-authorship | | 2009-2014 | |
| Innovation and Technological Development | Resources | Income from licenses per 100 faculty members with PhD | 2008-2013 |
| | | Income from consultancy contracts per 100 faculty members with PhD | 2008-2013 |
| | | Income from CPD courses per faculty member with PhD | 2008, 2010, 2012 and 2013 |
| | Production | Number of patents per 100 faculty members with PhD | 2009-2014 |
| | | Hours of CPD per faculty member with PhD | - |
| | Quality | Number of contracts by faculty member with PhD | - |
| | | Commercialized patents per faculty member with PhD | - |
| | Internacionalization | Triadic patents per 100 faculty members with PhD | 2008-2013 |
| 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 2008-09, 2010-11, 2012-13 and 2013-14 which is offered by areas of study and university.

Source: Own elaboration.

2.6. CRITERIA FOR THE CONSTRUCTION OF INDICATORS

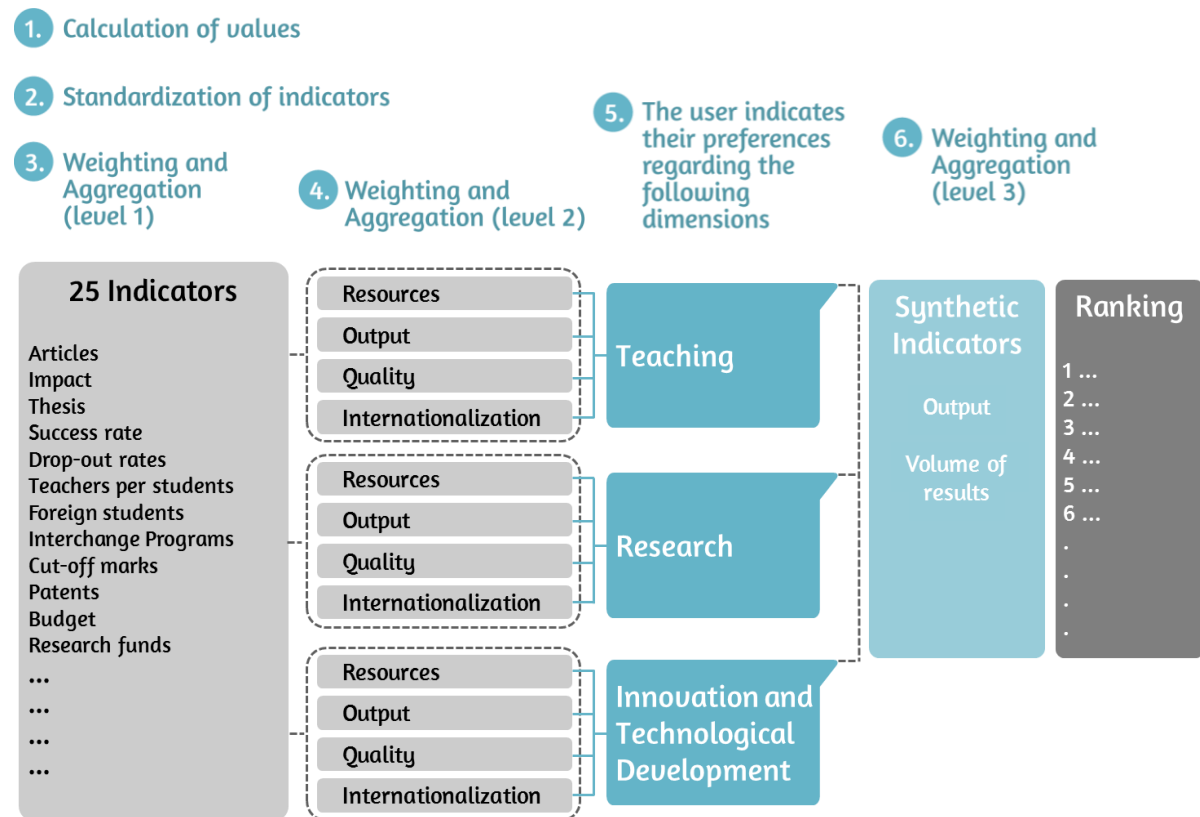
Key to being able to trust the meaning of the rankings is that the processes on which they are based should be transparent and respect the foundations established by statistical publications for the construction of indicators. In this regard, the project team contacted specialists in the subject and 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 correlations¹¹ 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

¹¹ 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, we decided to carry 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 consulted¹².

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 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.

¹² 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 Ranking 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 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.

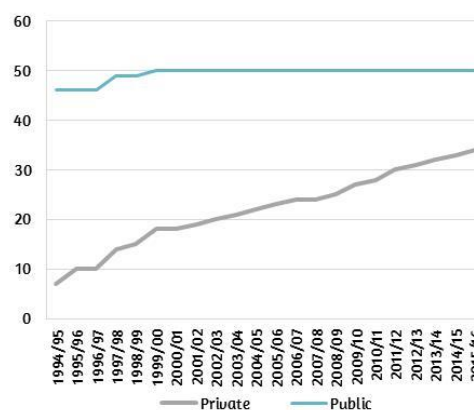
So this solution is unsatisfactory, and we have explored other alternatives for introducing size. The option chosen consists of calculating the total volume of results of each university by multiplying the performance index by a measure of size. We have considered three indicators of the size of a university: 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

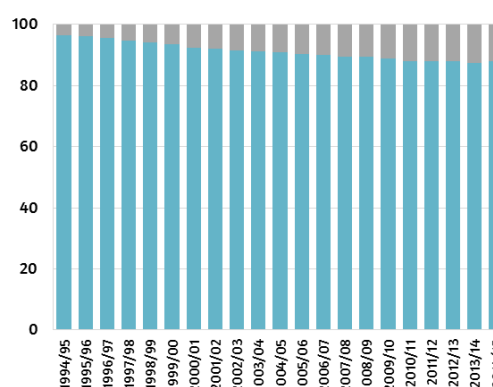
As we pointed out in the 2015 report, private universities are an important part of the Spanish university system. As shown in figure 1, they have experienced a large growth in the last twenty years, multiplying by four their number to 34 institutions out of 84 that make up the entire Spanish university system today (see panel a). Likewise, the amount of students has more than tripled in number, exceeding 177,000 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 12% in the 2014–2015 academic year.

Figure 1. Evolution of the number of private universities and students. 1994/95 to 2015/16 academic years

a) Number of public and private universities



b) Percentage distribution of Bachelor's degree students



Note: Information for the 2014–15 academic year students contains provisional data.

Source: Registro de Universidades Centros y Titulaciones (2015) 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 (Teach-

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

ing), are 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. 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, with rare exceptions¹⁴, private universities do not publish cut-off marks for their degrees.

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.¹⁵ Specifically, in

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 The cut-off marks for Vic University are published by the Spanish Ministry of Education, Culture and Sports in its Universities, Colleges and Degrees Survey. For the rest of the private universities, the cut-off mark for each degree is 5 since the prerequisite is to pass university admissions tests.

¹⁵ 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.

the fourth edition of U-Ranking the following private universities are analyzed:

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

Therefore, in the 2016 edition, three new private universities have met the criteria to be included and one university that was in the 2015 edition, the Universidad Cardenal Herrera-CEU, has not been included in this year's analysis since the information available on one of the indicators is more than 6 years old.

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.

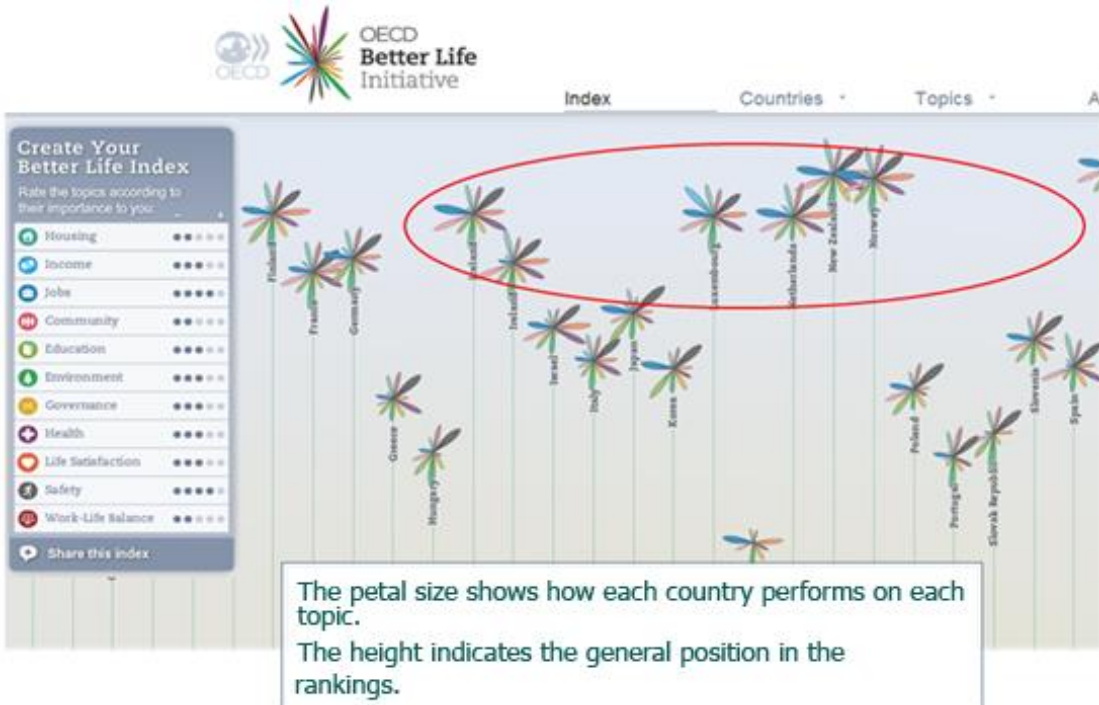
Given the high number of users that might value the universities' activity from this particular viewpoint, it makes sense to consider the possibility of drawing up personalized rankings, established taking into account the interest from which the user contemplates the universities. The ISSUE project 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.

CHE University Ranking 2011/12

Step into the ranking by using the *Quick Ranking* or the *Compact Ranking*!

[\[more information\]](#)

Use the complete features of the ranking for free!

[Register now...](#)



QUICK RANKING [?]

Three steps to *your* university

1. Which subject do you want to study?

Economics

2. Which kind of course?

Bachelor (Uni)

3. What is most important to you?

--

Academic studies and teaching

Equipment

International orientation

Job market and career-orientation

Overall opinions

Research

Town and University

[Start the Quick Ranking >](#)

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

This personalized rankings approach has been used in the ISSUE 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 ISSUE 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 2,700 different Bachelor's degrees offered by Spanish universities, the first selection window shows them grouped into 26 *areas of study*.

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 2,700 Bachelor's degrees have been reduced to 132, 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 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

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.

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

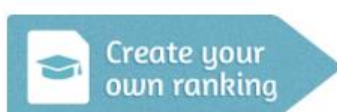
The second step is to choose the autonomous community or regions that are being considered as places in which to study. For this, the user must mark those chosen on the following table, one of the options being "Any region". The

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.



Remember you can return to any section to change your preferences



Economics Degrees



Andalusia
Madrid
Navarre
The Valencian Community



Teaching 56%
Research 34%
Innovation and Technological Development 10%



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.



Economics and Business
In the selected regions there are 36 options for the chosen degrees

To view the 372 options existing in Spain in this area of study, please download the PDF



| Ranking | Index | University | Degree | WWW | 2015/2016 (*) | | Environment |
|---------|-------|---------------------------------------|---|-----|---------------|-------|-------------|
| | | | | | Cut-off mark | Cost | |
| 1 | 1.6 | Universidad Carlos III | Grado en Filosofía, Política y Economía | WWW | 12.54 | 24.30 | ☰ ☀ 🏛️ 🚗 |
| 2 | 1.4 | Universidad Carlos III | Doble Grado en Derecho y Economía | WWW | 11.74 | + | ☰ ☀ 🏛️ 🚗 |
| 2 | 1.4 | Universidad de Navarra | Grado en Economía | WWW | + | + | ☰ ☀ 🏛️ 🚗 |
| 2 | 1.4 | Universidad de Navarra | Grado en Economía - Grado en Derecho | WWW | + | + | ☰ ☀ 🏛️ 🚗 |
| 3 | 1.3 | Universidad Carlos III | Grado en Economía | WWW | 9.74 | 24.30 | ☰ ☀ 🏛️ 🚗 |
| 4 | 1.2 | Universidad Rey Juan Carlos | Doble Grado en Economía e Historia | WWW | 9.64 | + | ☰ ☀ 🏛️ 🚗 |
| 4 | 1.2 | Universidad Autónoma de Madrid | Grado en Economía | WWW | 7.76 | 24.30 | ☰ ☀ 🏛️ 🚗 |
| 4 | 1.2 | Universidad Autónoma de Madrid | Grado en Economía y Finanzas | WWW | 11.00 | 24.30 | ☰ ☀ 🏛️ 🚗 |
| 4 | 1.2 | Universidad Autónoma de Madrid | Grado en Filosofía, Política y Economía | WWW | 12.06 | 24.30 | ☰ ☀ 🏛️ 🚗 |
| 5 | 1.1 | Universitat de València | Grado en Economía | WWW | 8.04 | 17.60 | ☰ ☀ 🏛️ 🚗 |
| 5 | 1.1 | Universidad Miguel Hernández de Elche | Grau en Negocios Internacionales / International Business | WWW | 7.30 | 17.60 | ☰ ☀ 🏛️ 🚗 |

3.3. COMPLEMENTARY INFORMATION ON THE UNIVERSITIES' ENVIRONMENTS

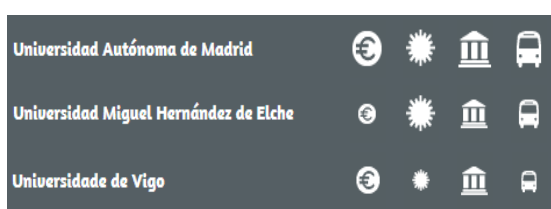
The geographical and social environment in which a university is situated influences the users' valuations of its services. In particular, the costs of accessing the services can condition decisions affecting their demand. This seems to be indicated by, for example, the distribution of foreign students 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 indicator¹⁶ has been calculated for each of them, based on the data available, which in general is by province. After arranging the universities in order of these indices, a large icon is assigned to those 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 2016 edition also includes the price per credit for over 2,700 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 center¹⁷ offering 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 2015-2016. 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. 2015-2016 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 and Leon | 15.81 | 12.13 | 18.87 |
| Castile-La-Mancha | 23.34 | 17.07 | 30.25 |
| Catalonia* | 33.52 | 25.27 | 39.53 |
| UOC (Oberta de Catalunya)* | 20.74 | 19.60 | 21.88 |
| The Valencian Community | 20.39 | 16.31 | 24.89 |
| Extremadura | 14.74 | 10.31 | 18.51 |
| Galicia | 11.89 | 9.85 | 13.93 |
| Madrid* | 27.30 | 24.30 | 29.70 |
| 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 | 16.35 | 13.00 | 22.16 |

* Tuition fees in Catalonia vary depending on the student's income and range from the set price to 50% of this price.

Source: Spanish Ministry of Education, Culture and Sport.

¹⁶ 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.

¹⁷ 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.

4. Main results

This chapter offers the principal results obtained in this fourth edition of U-Ranking, corresponding to 2016, 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 2016 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 2015 results with those of the 2016 edition; d) analyzing the differences in the performance of the various regional university systems; e) analyzing the evolution of the performance of the Spanish university system as a whole from 2013 to 2016; and f) analyzing the influence of the type of ownership (public or private), organizational structure and initial resources, as well as the environment in which universities work (strategic groups), on the performance of the institutions.

4.1. U-RANKING

Table 6 offers the ranking of 61 Spanish universities according to their indices of performance (U-Ranking). 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.

Table 6. U-Ranking of the Spanish Universities

| Ranking | Index | University |
|---------|-------|---|
| 1 | 1.6 | Universitat Pompeu Fabra |
| 2 | 1.4 | Universitat Autònoma de Barcelona |
| 2 | 1.4 | Universitat Politècnica de Catalunya |
| 2 | 1.4 | Universitat Politècnica de València |
| 3 | 1.3 | Universidad Autónoma de Madrid |
| 3 | 1.3 | Universidad Carlos III |
| 3 | 1.3 | Universidad de Navarra |
| 3 | 1.3 | Universitat de Barcelona |
| 4 | 1.2 | Universidad de Cantabria |
| 4 | 1.2 | Universidad Miguel Hernández de Elche |
| 4 | 1.2 | Universidad Politécnica de Madrid |
| 4 | 1.2 | Universitat de les Illes Balears |
| 4 | 1.2 | Universitat de València |
| 4 | 1.2 | Universitat Ramon Llull |
| 4 | 1.2 | Universitat Rovira i Virgili |
| 5 | 1.1 | Universidad de Alcalá de Henares |
| 5 | 1.1 | Universidad de Alicante |
| 5 | 1.1 | Universidad de Córdoba |
| 5 | 1.1 | Universidad de Zaragoza |
| 5 | 1.1 | Universidade de Santiago de Compostela |
| 5 | 1.1 | Universitat de Lleida |
| 5 | 1.1 | Universitat Internacional de Catalunya |
| 5 | 1.1 | Universitat Jaume I |
| 6 | 1.0 | Mondragon Unibertsitatea |
| 6 | 1.0 | Universidad Complutense |
| 6 | 1.0 | Universidad de Almería |
| 6 | 1.0 | Universidad de Deusto |
| 6 | 1.0 | Universidad de Granada |
| 6 | 1.0 | Universidad de Murcia |
| 6 | 1.0 | Universidad de Salamanca |
| 6 | 1.0 | Universidad de Sevilla |
| 6 | 1.0 | Universidad del País Vasco |
| 6 | 1.0 | Universidad Pablo de Olavide |
| 6 | 1.0 | Universidad Politécnica de Cartagena |
| 6 | 1.0 | Universidad Pública de Navarra |
| 6 | 1.0 | Universidade de Vigo |
| 6 | 1.0 | Universitat de Girona |
| 7 | 0.9 | Universidad de Cádiz |
| 7 | 0.9 | Universidad de Huelva |
| 7 | 0.9 | Universidad de Málaga |
| 7 | 0.9 | Universidad de Oviedo |
| 7 | 0.9 | Universidad de Valladolid |
| 7 | 0.9 | Universidad Europea Miguel de Cervantes |
| 7 | 0.9 | Universidad Pontificia Comillas |
| 7 | 0.9 | Universidad Rey Juan Carlos |
| 7 | 0.9 | Universidade da Coruña |
| 8 | 0.8 | Universidad de Burgos |
| 8 | 0.8 | Universidad de Castilla-La Mancha |
| 8 | 0.8 | Universidad de Extremadura |
| 8 | 0.8 | Universidad de Jaén |
| 8 | 0.8 | Universidad de La Laguna |
| 8 | 0.8 | Universidad de La Rioja |
| 8 | 0.8 | Universidad de Las Palmas de Gran Canaria |
| 8 | 0.8 | Universidad de León |
| 8 | 0.8 | Universidad Europea de Madrid |
| 9 | 0.7 | Universidad a distancia de Madrid |
| 9 | 0.7 | Universidad Católica de Valencia |
| 9 | 0.7 | Universitat de Vic |
| 9 | 0.7 | Universitat Oberta de Catalunya |
| 10 | 0.6 | UNED |
| 11 | 0.5 | Universidad San Jorge |

Note: Symbols reflect changes with respect to the 2015 edition:

▲ improves its position; ■ maintains its position; ▼ worsens its position

The Universities Europea Miguel de Cervantes, A Distancia de Madrid and San Jorge have been analyzed for the first time in this edition.

Universities are ordered from the highest to the lowest index value. Universities with the same index value are ordered alphabetically.

Source: BBVA Foundation-luie.

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.

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

In the U-ranking the leading group is formed by twenty-three universities occupying the first to the fifth positions and are above the average of the system. These universities are: Pompeu Fabra in first place, followed in second place by the group formed by: Autònoma de Barcelona, Politècnica de Barcelona and Politècnica de Valencia. The third place corresponds to the Autònoma de Madrid, Carlos III, Barcelona and to the first private university that appears in the ranking, Universidad de Navarra. The fourth place is occupied by the following universities: Cantabria, Miguel Hernández (Elche), Politècnica de Madrid, Valencia, Ramón Llull, which is the second private university appearing in the performance ranking, and Rovira i Virgili. The first twenty-three universities ranked by their results are completed by the group of universities which come in fifth place: Alcalá de Henares, Alicante, Córdoba, Zaragoza, Santiago de Compostela, Lleida, Internacional de Catalunya and Jaume I (Castellón).

Other groups of universities with similar levels of performance are found in the following positions: fourteen universities share the sixth position, nine others the seventh position, nine share the eighth, four share the ninth, and finally there is one in the tenth and one in the eleventh position.

If we take a look at the changes occurred in the ordering of the universities in the top five positions, these have never exceeded more than one position and correspond to the improvements of the Universities of Barcelona, Illes Balears, València, Ramon Llull and Zaragoza, whereas the Universities Carlos III, Internacional de Catalunya and Pública de Navarra have moved down a position.

The first conclusion that can arise from the inclusion of private universities in U-Ranking, is that in terms of performance, diversity among them is equivalent to that of public universities. Thus, table 6 shows that there are private universities at all levels of the ranking between the 2nd and 11th position. The second conclusion is that there are less private universities present in the first tertile (1st to 5th) compared with public, being the average performance of public universities superior.

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 obtained without correcting for 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).

Table 7 shows the universities ranked by the volume index.. Standing out in first place is the Universidad Complutense, with an index (4.5) half a point higher than the university in second place, that of Barcelona. In third position are the Universidad de Granada and the Universitat de València, in the fourth the Politècnica de Valencia

Table 7. U-Ranking Volume of the Spanish Universities

| Ranking | Index | University |
|---------|-------|---|
| 1 | 4.5 | Universidad Complutense |
| 2 | 4 | Universitat de Barcelona |
| 3 | 3.3 | Universidad de Granada |
| 3 | 3.3 | Universitat de València |
| 4 | 3.2 | Universitat Politècnica de València |
| 5 | 3.1 | Universidad de Sevilla |
| 6 | 3 | Universidad del País Vasco |
| 6 | 3 | Universidad Politécnica de Madrid |
| 7 | 2.9 | Universitat Autònoma de Barcelona |
| 8 | 2.7 | Universitat Politècnica de Catalunya |
| 9 | 2.5 | Universidad Autónoma de Madrid |
| 10 | 2.3 | UNED |
| 11 | 2.2 | Universidad de Zaragoza |
| 12 | 2.1 | Universidade de Santiago de Compostela |
| 13 | 1.9 | Universidad de Málaga |
| 14 | 1.7 | Universidad de Salamanca |
| 15 | 1.6 | Universidad de Alicante |
| 15 | 1.6 | Universidad de Murcia |
| 16 | 1.5 | Universidad Carlos III |
| 16 | 1.5 | Universidad de Oviedo |
| 17 | 1.4 | Universidad de Valladolid |
| 18 | 1.3 | Universidad de Castilla-La Mancha |
| 19 | 1.2 | Universidad de Alcalá de Henares |
| 19 | 1.2 | Universidad de Córdoba |
| 20 | 1.1 | Universidad de La Laguna |
| 20 | 1.1 | Universidad Rey Juan Carlos |
| 20 | 1.1 | Universidade de Vigo |
| 20 | 1.1 | Universitat Pompeu Fabra |
| 21 | 1.0 | Universidad de Cádiz |
| 21 | 1.0 | Universidad de Extremadura |
| 22 | 0.9 | Universidad de Cantabria |
| 22 | 0.9 | Universidad de Las Palmas de Gran Canaria |
| 22 | 0.9 | Universidad Miguel Hernández de Elche |
| 22 | 0.9 | Universidade da Coruña |
| 22 | 0.9 | Universitat de les Illes Balears |
| 22 | 0.9 | Universitat Jaume I |
| 22 | 0.9 | Universitat Ramon Llull |
| 22 | 0.9 | Universitat Rovira i Virgili |
| 23 | 0.8 | Universidad de Navarra |
| 23 | 0.8 | Universitat Oberta de Catalunya |
| 24 | 0.7 | Universidad de Almería |
| 24 | 0.7 | Universidad de Jaén |
| 24 | 0.7 | Universitat de Girona |
| 25 | 0.6 | Universidad de Huelva |
| 25 | 0.6 | Universidad de León |
| 25 | 0.6 | Universidad Pablo de Olavide |
| 25 | 0.6 | Universidad Pública de Navarra |
| 25 | 0.6 | Universitat de Lleida |
| 26 | 0.5 | Universidad de Deusto |
| 26 | 0.5 | Universidad Europea de Madrid |
| 27 | 0.4 | Universidad Politécnica de Cartagena |
| 27 | 0.4 | Universidad Pontificia Comillas |
| 28 | 0.3 | Universidad Católica de Valencia |
| 28 | 0.3 | Universidad de Burgos |
| 29 | 0.2 | Mondragon Unibertsitatea |
| 29 | 0.2 | Universidad de La Rioja |
| 29 | 0.2 | Universitat de Vic |
| 29 | 0.2 | Universitat Internacional de Catalunya |
| 30 | 0.1 | Universidad a distancia de Madrid |
| 30 | 0.1 | Universidad Europea Miguel de Cervantes |
| 31 | < 0.1 | Universidad San Jorge |

Note: Symbols reflect changes with respect to the 2015 edition:
 ▲ improves its position; ■ maintains its position; ▼ worsens its position
 The Universities Europea Miguel de Cervantes, A Distancia de Madrid and San Jorge have been analyzed for the first time in this edition.
 Universities are ordered from the highest to the lowest index value. Universities with the same index value are ordered alphabetically.
 Source: BBVA Foundation-Iuie.

and in fifth the Universidad de Sevilla. The rest of the top ten places are completed by the Universidad del País Vasco, Politécnica de Madrid (6), Autònoma de Barcelona (7), Politécnica de Catalunya (8), Autónoma de Madrid (9) and UNED (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 inclusion of private universities in U-Ranking highlights the fact that private universities have a lower size than public universities. Thus, in table 7 we see 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 Llull (22), Universidad de Navarra (23) and Oberta de Catalunya (23).

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 4.5 to 0.1, very much wider than for the indicator of performance, which goes from 1.6 to 0.5.

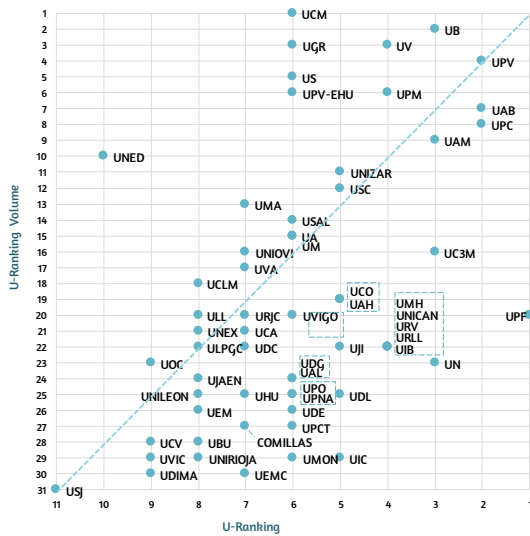
Figure 2 combines the two types of rankings and facilitates the comparison of the position of each university in both. The results of U-Ranking Volume, which depend on the size, are shown on the vertical axis, while on the horizontal axis the results of U-Ranking, which measures the performance and corrects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

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.

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

Position in each ranking



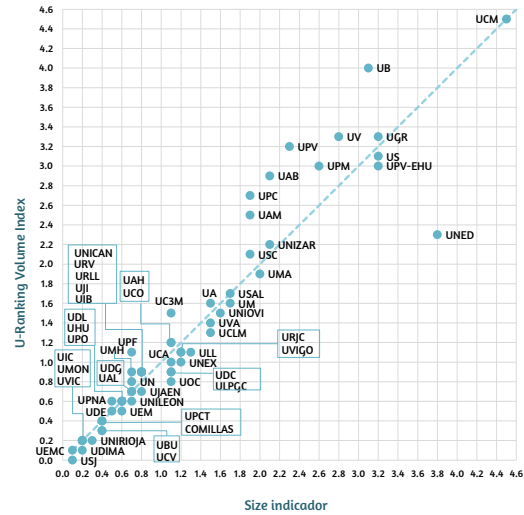
See appendix 2 for a list of the University abbreviations used.
Source: BBVA Foundation-luie.

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 y UNED.

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 10 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 Universidad de Navarra.

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-luie.

In fact, examples of higher or lower performance can be found among universities of very different sizes.¹⁸ 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' productivity. There are institutions of large size like the Universities of Barcelona, the Universitat de València, the Polytechnics of Madrid, Valencia 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, Valencia

¹⁸ 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.

and Catalonia 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 13 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

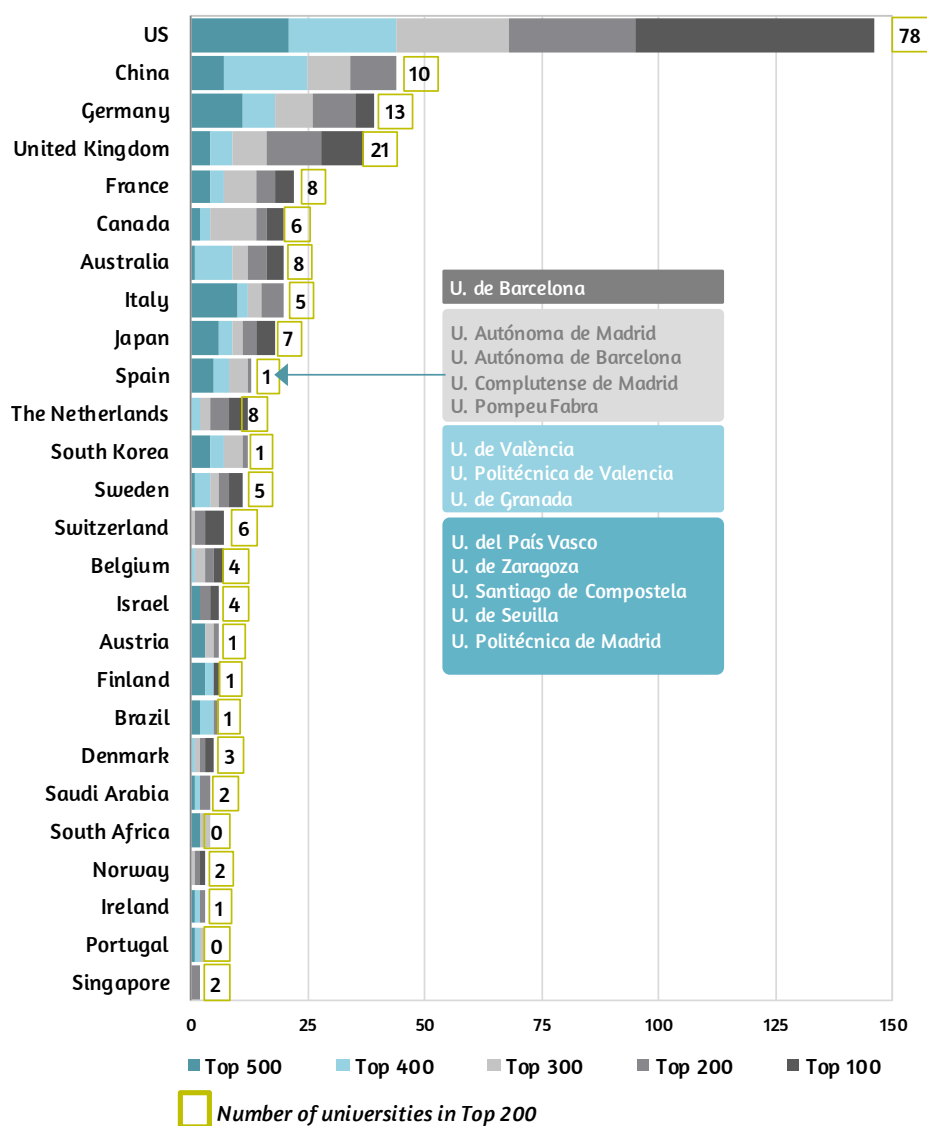
Shanghai Ranking. Regardless of the different number of levels that each ranking sets, both offer a fairly similar order, and therefore the universities are mostly grouped around area I and III of the figure.

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 the U-Ranking Volume than in that of Shanghai. 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.

In the figure 4 we have highlighted with dark squares the universities that are expressly mentioned among the top 500 of the Shanghai Ranking—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, Universidad de Zaragoza and Universitat Politècnica de Catalunya. The remaining one is the Universitat Pompeu Fabra, situated around the center of U-Ranking Volume.

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).

Figure 4. Spanish universities in the 2015 Shanghai Ranking



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

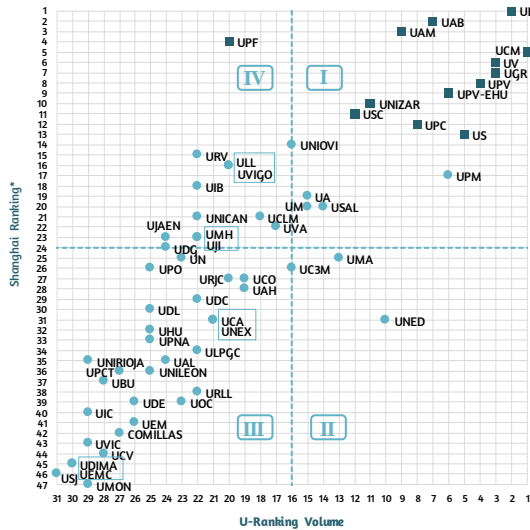
Source: Academic Ranking of World Universities (CWCU 2015).

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 tertile 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.¹⁹

¹⁹ 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.

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



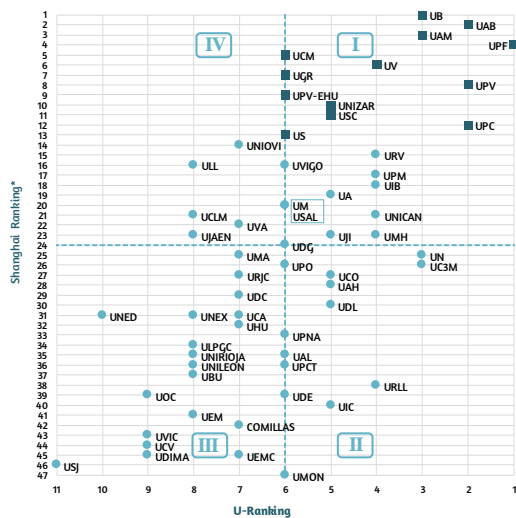
(*) Results correspond to our adaptation of the Shanghai Ranking by Docampo (2015) for Spanish universities ('Shanghai Ranking expanded'). 13 private universities that appear in Docampo's ranking have been excluded and are not analyzed in U-Ranking. The numbers assigned in Docampo's ranking have been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

■ Universities in the Shanghai Ranking Top 500.

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

Source: BBVA Foundation-luie and Docampo (2014).

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



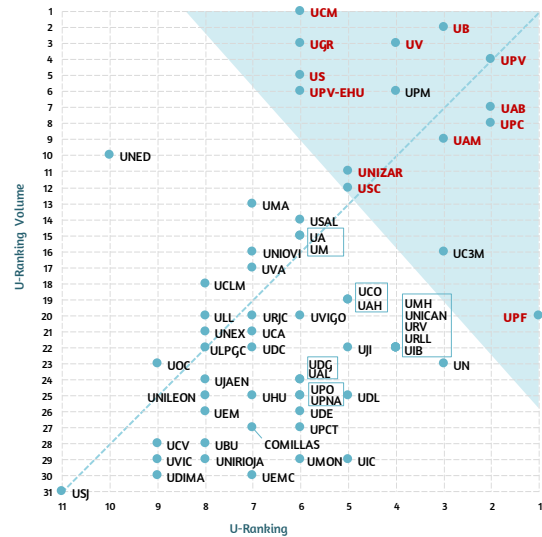
(*) Results correspond to our adaptation of the Shanghai Ranking by Docampo (2015) for Spanish universities. 13 private universities that appear in Docampo's ranking have been excluded and are not analyzed in U-Ranking. The numbers assigned in Docampo's ranking have been changed to facilitate the comparison.

■ Universities in the Shanghai Ranking Top 500.

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

Source: BBVA Foundation-luie and Docampo (2014).

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



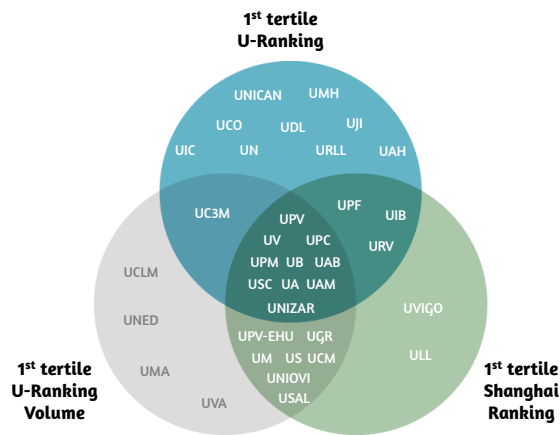
Spanish universities in the Top 500 of the Shanghai Ranking are marked in red. See appendix 2 for a list of the University abbreviations used.

Source: BBVA Foundation-luie and ARWU (CWCU 2015).

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 fifteen 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 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 two 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, but none of the Spanish universities among the top Shanghai positions are placed outside the efficient frontier determined by U-Ranking.

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 tertile in each of the classifications and the intersections among the three.

Figure 8. U-Rankings vs. Shanghai Ranking



The first 22 Spanish universities in the Shanghai Ranking and in U-Ranking Volume are included, together with the first 23 in U-Ranking. See appendix 2 for a list of the University abbreviations used.

Source: BBVA Foundation-luie and Docampo (2015).

In the center of the diagram (figure 8) appear the ten universities situated in the first tertile in the three rankings. They are Universitat de Barcelona, Universitat de València, Universitat Autònoma de Barcelona, Universidad Autónoma de Madrid, Polytechnics of València, Catalunya, and Madrid, Universidad de Alicante, Universidad de Zaragoza and Universidad de Santiago de Compostela. Eleven other universities are in the first tertile of two of the rankings: Universitat Pompeu Fabra, Illes Balears and Rovira I Virgili in Shanghai and U-Ranking (performance); Universidad Carlos III U-Ranking Volume and U-Ranking (performance); and Universidad del País Vasco, Universidad de Granada, Complutense de Madrid, Oviedo, Murcia, Salamanca and Sevilla, in Shanghai and U-Ranking Volume. Finally, fifteen universities stand out by only one of the three criteria considered.

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 thirteen universities that the Shanghai Ranking not Docampo's adaptation) places in its Top 500, eight also appear in the first tertile of our two rankings, in the intersection of the three circles of the diagram; another, Universitat Pompeu

Fabra, heads our ranking of performance, and four more belong to the first tertile of the U-Ranking Volume, Universidad de País Vasco, Complutense de Madrid, Universidad de Granada and Universidad de Sevilla.

In brief, it can be said that, of the thirteen Spanish universities included in the Top 500 of the Shanghai Ranking, twelve are to be found in our tertile 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.

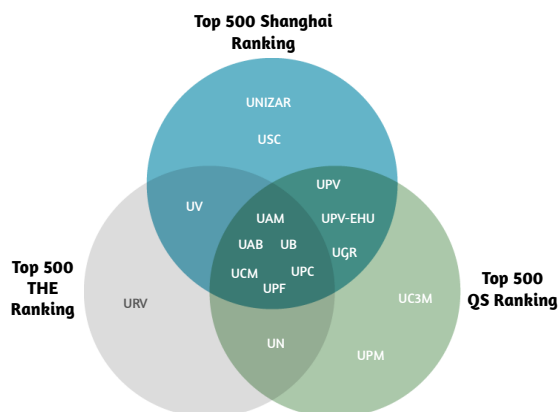
4.5. COMPARISON OF RESULTS OF OTHER INTERNATIONAL RANKINGS

Although the Shanghai ranking is consolidating its influence as the most cited international indicator, there exist other initiatives of high international reputation, 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 six universities (UAB, UB, UPF, UCM, UPC and UPV) 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 (private) 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 on the border established by U-Ranking.

Figure 9. Comparison of the results of three international rankings. 2015-2016



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

Source: ARWU (CWCU 2015), THE (2015) and QS (2015).

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.

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.²⁰ 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

²⁰ 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%.

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.²¹

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:

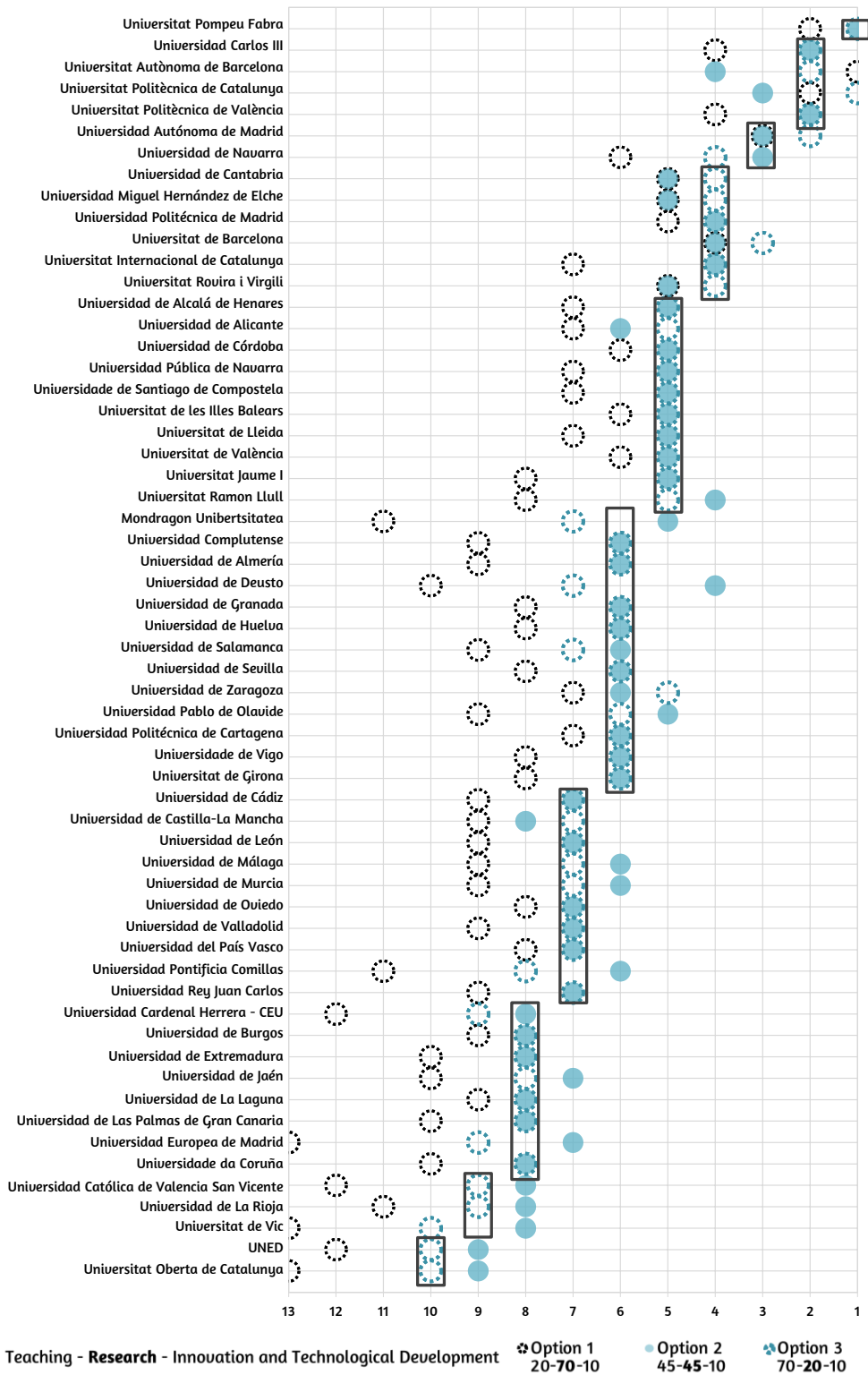
- The drops and moderate rises in the weight of research (option 2 and 3) barely involve changes in the ranking with respect to the U-Ranking (performance).
- If the weight of research drops to 20% (option 3), variations are minor with no University being affected in more than one position, one way or the other. The only exception is the Universidad San Jorge, which is very sensitive to any changes in the weights.
- When the weight of research rises moderately up to 45% (option 2), the ranking still remains stable. There are only four cases that drop two places and which correspond to private universities highly specialized in teaching: Universidad de Navarra, Deusto, Pontificia de Comillas and Europea de Madrid.

When significant changes occur in the ranking, the weight of research doubles from its starting position (from 34% to 70% of option 1); however, these are not radical changes, most are just variations of two 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 five cases appear: Deusto, Miguel de Cervantes, Pontificia de Comillas, Europea de Madrid and UDIMA.

- 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. In fact, looking only at those universities that recede two positions, we see only two public universities in this situation: Pablo de Olavide and Universidad Complutense.

²¹ Furthermore, significantly increasing the weight of the activities relating to technological development and innovation 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.

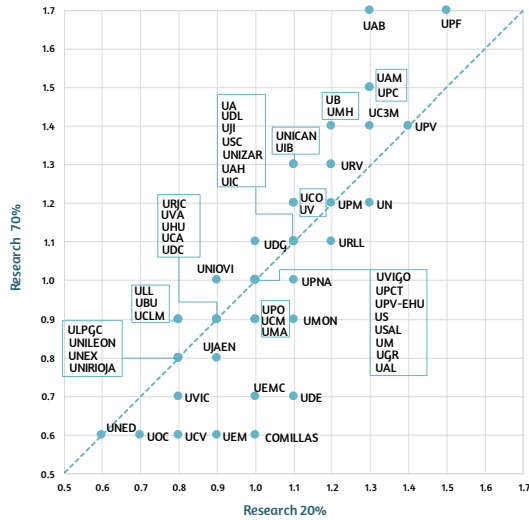
Figure 10. Evolution of U- Ranking according to variations in the weight of research



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

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

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



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

Source: BBVA Foundation-luie.

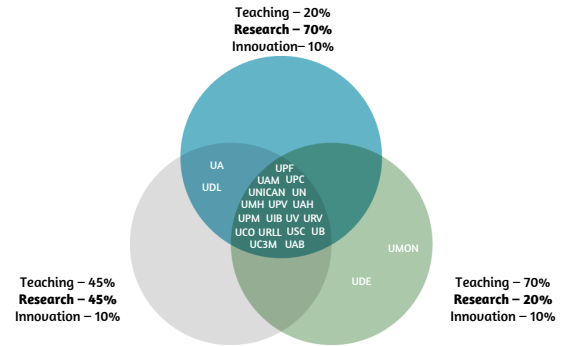
Thus, the rankings are sensitive to changes in the weights given to teaching and to research, especially if we compare weightings as different as those corresponding to our options 1 and 3. When these weights change less, variations are minor and, definitely, alterations never occur for this reason in 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

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.

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 the Autònoma de Barcelona and Politècnica de Catalunya, improving their index. On the contrary, only some private universities such as Católica de Valencia, Europea de Madrid, Pontificia de Comillas, Miguel de Cervantes and Deusto 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 first 20 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 two private universities, Mondragon and Deusto, are incorporated to the top 20. On the other hand, if more weight is given to research these two private universities would leave the first positions, and Universidad de Alicante and Universitat de Lleida would then also appear among the top places.

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. In this edition, due to the important differences in specialization of the private universities, each ranking (performance and volume) is broken down into three panels: one with the total number of universities, one for public universities and one for private institutions.

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.
- 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 1.7 and that of innovation and technological development 3.2. 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, with greater intensity between teaching and research, the strongest correlation in private universities occurs between research and technological innovation and is very low among the rest of dimensions.

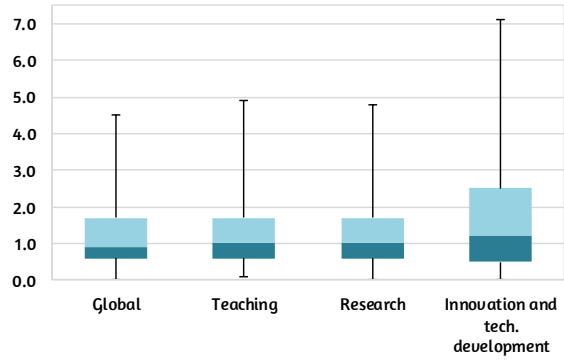
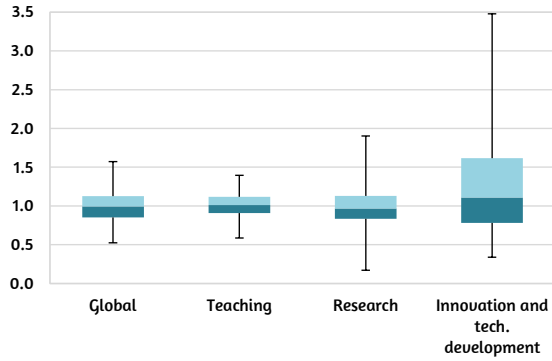
Figure 13. U-Ranking. Distribution of the indices obtained in each dimension

a) U-Ranking (performance)

b) U-Ranking Volume

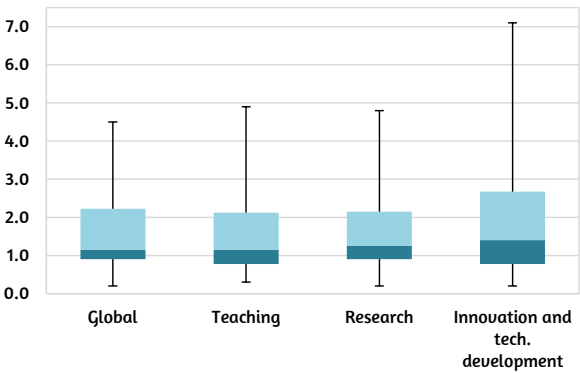
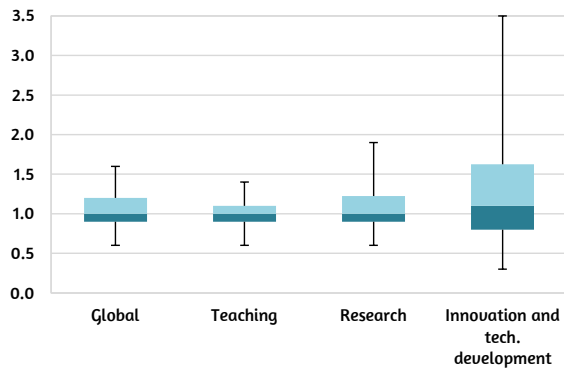
a1. Total universities

b1. Total universities



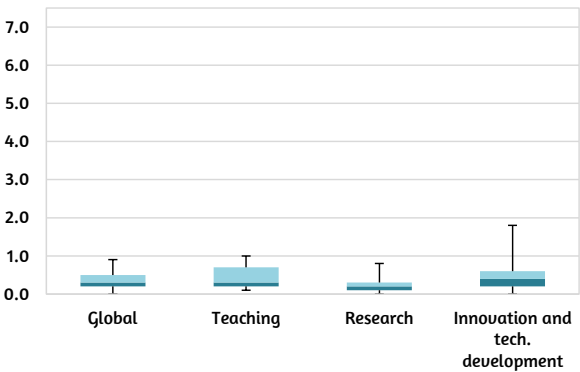
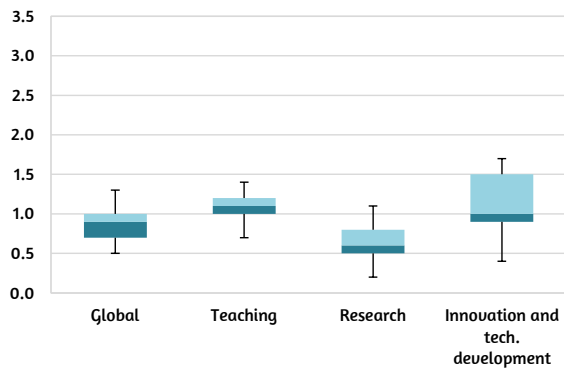
a2. Public universities

b2. Public universities



a3. Private universities

b3. Private universities



Source: BBVA Foundation-Iuie.

| Table 8. Correlation coefficients of the indices and U-rankings by dimension | | | |
|--|-------|-----------|------------|
| a) Index | | | |
| | Total | Public U. | Private U. |
| Teaching - Research | 0.31 | 0.71 | 0.33 |
| Teaching - Innovation and Technological Development | 0.40 | 0.57 | 0.05 |
| Research - Innovation and Technological Development | 0.53 | 0.58 | 0.64 |
| b) Ranking | | | |
| | Total | Public U. | Private U. |
| Teaching - Research | 0.33 | 0.68 | 0.29 |
| Teaching - Innovation and Technological Development | 0.40 | 0.54 | 0.09 |
| Research - Innovation and Technological Development | 0.47 | 0.54 | 0.64 |

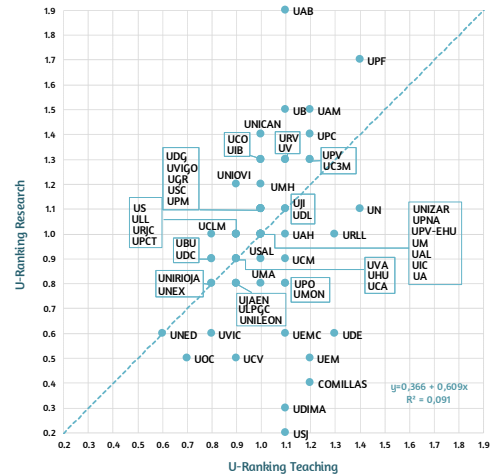
Note: The ranking values are calculated by means of a Spearman correlation coefficient and the index values by means of a Pearson correlation coefficient..
Source: BBVA Foundation-luie.

H.Yg' fYg' hg' gi [[Ygh h.Uh Vda d'Ya YbhUf]mYI]grg' Ua cb['h.Y XZZYfYbh UMM]]hYg' Vi h]g' ja]hXZ YgdY! V]U'm k]h' fYZfYbW' hc' hYUW]b[' UoX']bbcj U]cbz k \YfY' VeffY U]cb']g' ck' Ua cb[' h.Y di V]M]bgh]i ! h]cbg' Vi hz' gdYV]U' nã Ua cb[gh h.Y df]j UH' i b]j Yfg] h]Yg' 'gi h Uvcj Y' U' z' h.Ymk Ufb' h.Uh]Z h.Y Uja ']g' hc' UbU'my' h.Y' i b]j Yfg]m gng]Ya ' Ug' U' k \c'Yz' h.Y' YI]ghYbW' cZ [fci dg' k]h' XZZYfYbh VUfUW]f]gh]Vg' h.Uh fYg' h Z'ca ' h.Y' VãYI]ghYbW' cZ df]j UH' UoX' di V]M]bgh]i h]cbg' V]bbch VY'] [bcfYX' " =Z k Y' X]Xz']i Vã' X' YUX' hc' V]UgYg']b' h.Y' UbU'ng]g' cZ h.Y' fYU']mcZ h.Y' i b]j Yfg]m gng]Ya "

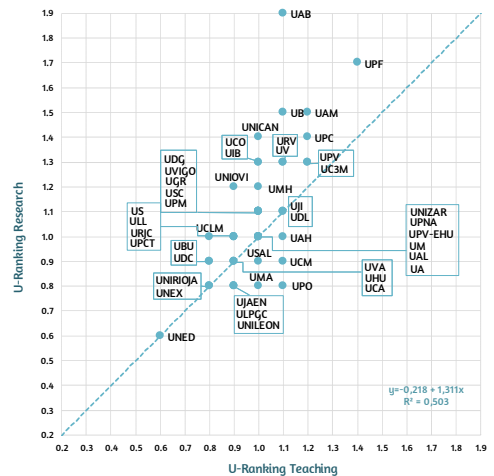
5'j U]XU]cb' cZ h.Yg' XZZYfYbWg' V]b' VY' cV]U]bYX' Vm WYUW]b[]Z h.Y' \mãch Yg]g' h.Uh fYgYUfW' fYg' hg' V]b' dfYX]M] VãffYV]m h]cbg' cZ hYUW]b[']g' h'i Y' cf' bchz' h.]g' VY]b[' h.Y' VUg]WUgg] a dh]cb' cZ a Ubm fUb]b[g' h.Uh VãbWbhUfU' YI W' g]j Y'm cb' h.Y' fYgYUfW' X] a Ybg]cb' " h.YfYzcfYz' h.Y' fU]hg' cZ dYfZfa UbW']b' fYgYUfW' UfY' fYdfYgYbhYX' U[U]bgh' h.Y' fU]hg' cZ dYf! Z'ca UbW']b' hYUW]b[' fZ] [i fY' % " Ue" K Y' W]b' gY' h.Uh h.]g' fY U]cbg']d']g' dfU]M]m i bXYhV]UW' Yz' g]bW' h.Y' VãYZ]M]b]h' cZ XYhYfa]bU]cb' cZ h.Y' fY [fYg]cb']bY' VUfY'mYI WYXg' - i "

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

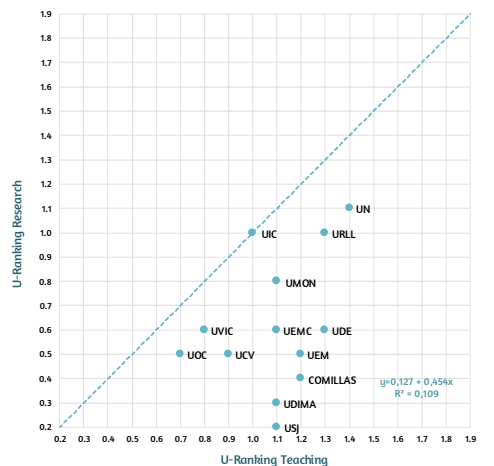
a) Public and private universities



b) Public universities



c) Private universities



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

Source: BBVA Foundation-luie.

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 0.50, giving evidence of stronger relationship than in the private system but, in any case, limited. In the subset of private universities, the relationship is as small as 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 you can see a well-defined pattern of teaching specialization of private universities: 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: 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 Internacional de Catalunya which has the same indices). In the case of the public universities, on the other hand, the opposite happens in the majority of cases.

| University | Global | | Teaching | | Research | | Innovation and Tech. Development | |
|---|--------|-------|----------|-------|----------|-------|----------------------------------|-------|
| | Rank. | Index | Rank. | Index | Rank. | Index | Rank. | Index |
| Universitat Pompeu Fabra | 1 | 1.6 | 1 | 1.4 | 2 | 1.7 | 4 | 2.7 |
| Universitat Autònoma de Barcelona | 2 | 1.4 | 4 | 1.1 | 1 | 1.9 | 9 | 1.8 |
| Universitat Politècnica de Catalunya | 2 | 1.4 | 3 | 1.2 | 4 | 1.4 | 1 | 3.5 |
| Universitat Politècnica de València | 2 | 1.4 | 3 | 1.2 | 5 | 1.3 | 2 | 3.1 |
| Universidad Autónoma de Madrid | 3 | 1.3 | 3 | 1.2 | 3 | 1.5 | 11 | 1.6 |
| Universidad Carlos III | 3 | 1.3 | 3 | 1.2 | 5 | 1.3 | 5 | 2.5 |
| Universidad de Navarra | 3 | 1.3 | 1 | 1.4 | 7 | 1.1 | 15 | 1.2 |
| Universitat de Barcelona | 3 | 1.3 | 4 | 1.1 | 3 | 1.5 | 15 | 1.2 |
| Universidad de Cantabria | 4 | 1.2 | 5 | 1 | 4 | 1.4 | 8 | 2 |
| Universidad Miguel Hernández de Elche | 4 | 1.2 | 5 | 1 | 6 | 1.2 | 6 | 2.2 |
| Universidad Politécnica de Madrid | 4 | 1.2 | 5 | 1 | 7 | 1.1 | 3 | 2.8 |
| Universitat de les Illes Balears | 4 | 1.2 | 5 | 1 | 5 | 1.3 | 12 | 1.5 |
| Universitat de València | 4 | 1.2 | 4 | 1.1 | 5 | 1.3 | 18 | 0.9 |
| Universitat Ramón Llull | 4 | 1.2 | 2 | 1.3 | 8 | 1 | 10 | 1.7 |
| Universitat Rovira i Virgili | 4 | 1.2 | 4 | 1.1 | 5 | 1.3 | 9 | 1.8 |
| Universidad de Alcalá de Henares | 5 | 1.1 | 4 | 1.1 | 8 | 1 | 14 | 1.3 |
| Universidad de Alicante | 5 | 1.1 | 5 | 1 | 8 | 1 | 7 | 2.1 |
| Universidad de Córdoba | 5 | 1.1 | 5 | 1 | 5 | 1.3 | 15 | 1.2 |
| Universidad de Zaragoza | 5 | 1.1 | 5 | 1 | 8 | 1 | 9 | 1.8 |
| Universidade de Santiago de Compostela | 5 | 1.1 | 5 | 1 | 7 | 1.1 | 13 | 1.4 |
| Universitat de Lleida | 5 | 1.1 | 4 | 1.1 | 7 | 1.1 | 19 | 0.8 |
| Universitat Internacional de Catalunya | 5 | 1.1 | 5 | 1 | 8 | 1 | 12 | 1.5 |
| Universitat Jaume I | 5 | 1.1 | 4 | 1.1 | 7 | 1.1 | 20 | 0.7 |
| Mondragon Unibertsitatea | 6 | 1 | 4 | 1.1 | 10 | 0.8 | 10 | 1.7 |
| Universidad Complutense | 6 | 1 | 4 | 1.1 | 9 | 0.9 | 20 | 0.7 |
| Universidad de Almería | 6 | 1 | 5 | 1 | 8 | 1 | 16 | 1.1 |
| Universidad de Deusto | 6 | 1 | 2 | 1.3 | 11 | 0.6 | 14 | 1.3 |
| Universidad de Granada | 6 | 1 | 5 | 1 | 7 | 1.1 | 19 | 0.8 |
| Universidad de Murcia | 6 | 1 | 5 | 1 | 8 | 1 | 17 | 1 |
| Universidad de Salamanca | 6 | 1 | 5 | 1 | 9 | 0.9 | 16 | 1.1 |
| Universidad de Sevilla | 6 | 1 | 6 | 0.9 | 8 | 1 | 10 | 1.7 |
| Universidad del País Vasco | 6 | 1 | 5 | 1 | 8 | 1 | 19 | 0.8 |
| Universidad Pablo de Olavide | 6 | 1 | 4 | 1.1 | 10 | 0.8 | 15 | 1.2 |
| Universidad Politécnica de Cartagena | 6 | 1 | 6 | 0.9 | 8 | 1 | 14 | 1.3 |
| Universidad Pública de Navarra | 6 | 1 | 5 | 1 | 8 | 1 | 11 | 1.6 |
| Universidade de Vigo | 6 | 1 | 5 | 1 | 7 | 1.1 | 19 | 0.8 |
| Universitat de Girona | 6 | 1 | 5 | 1 | 7 | 1.1 | 21 | 0.6 |
| Universidad de Cádiz | 7 | 0.9 | 6 | 0.9 | 9 | 0.9 | 15 | 1.2 |
| Universidad de Huelva | 7 | 0.9 | 6 | 0.9 | 9 | 0.9 | 18 | 0.9 |
| Universidad de Málaga | 7 | 0.9 | 5 | 1 | 10 | 0.8 | 14 | 1.3 |
| Universidad de Oviedo | 7 | 0.9 | 6 | 0.9 | 6 | 1.2 | 20 | 0.7 |
| Universidad de Valladolid | 7 | 0.9 | 6 | 0.9 | 9 | 0.9 | 17 | 1 |
| Universidad Europea Miguel de Cervantes | 7 | 0.9 | 4 | 1.1 | 11 | 0.6 | 17 | 1 |
| Universidad Pontificia Comillas | 7 | 0.9 | 3 | 1.2 | 13 | 0.4 | 17 | 1 |
| Universidad Rey Juan Carlos | 7 | 0.9 | 6 | 0.9 | 8 | 1 | 19 | 0.8 |
| Universidade da Coruña | 7 | 0.9 | 7 | 0.8 | 9 | 0.9 | 18 | 0.9 |
| Universidad de Burgos | 8 | 0.8 | 7 | 0.8 | 9 | 0.9 | 20 | 0.7 |
| Universidad de Castilla-La Mancha | 8 | 0.8 | 7 | 0.8 | 8 | 1 | 19 | 0.8 |
| Universidad de Extremadura | 8 | 0.8 | 7 | 0.8 | 10 | 0.8 | 21 | 0.6 |
| Universidad de Jaén | 8 | 0.8 | 6 | 0.9 | 10 | 0.8 | 19 | 0.8 |
| Universidad de La Laguna | 8 | 0.8 | 6 | 0.9 | 8 | 1 | 24 | 0.3 |
| Universidad de La Rioja | 8 | 0.8 | 7 | 0.8 | 10 | 0.8 | 20 | 0.7 |
| U. de Las Palmas de Gran Canaria | 8 | 0.8 | 6 | 0.9 | 10 | 0.8 | 23 | 0.4 |
| Universidad de León | 8 | 0.8 | 6 | 0.9 | 10 | 0.8 | 22 | 0.5 |
| Universidad Europea de Madrid | 8 | 0.8 | 3 | 1.2 | 12 | 0.5 | 23 | 0.4 |
| Universidad a distancia de Madrid | 9 | 0.7 | 4 | 1.1 | 14 | 0.3 | 18 | 0.9 |
| U.Católica de Valencia San Vicente Mártir | 9 | 0.7 | 6 | 0.9 | 12 | 0.5 | 17 | 1 |
| Universitat de Vic | 9 | 0.7 | 7 | 0.8 | 11 | 0.6 | 20 | 0.7 |
| Universitat Oberta de Catalunya | 9 | 0.7 | 8 | 0.7 | 12 | 0.5 | 11 | 1.6 |
| UNED | 10 | 0.6 | 9 | 0.6 | 11 | 0.6 | 19 | 0.8 |
| Universidad San Jorge | 11 | 0.5 | 4 | 1.1 | 15 | 0.2 | 23 | 0.4 |

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-Iuie.

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

| University | Global | | Teaching | | Research | | Innovation and Tech. Development | |
|---|--------|-------|----------|-------|----------|-------|----------------------------------|-------|
| | Rank. | Index | Rank. | Index | Rank. | Index | Rank. | Index |
| Universidad Complutense | 1 | 4.5 | 1 | 4.9 | 2 | 4.3 | 7 | 3.2 |
| Universitat de Barcelona | 2 | 4 | 2 | 3.6 | 1 | 4.8 | 6 | 3.7 |
| Universidad de Granada | 3 | 3.3 | 3 | 3.3 | 5 | 3.5 | 12 | 2.5 |
| Universitat de València | 3 | 3.3 | 4 | 3.1 | 4 | 3.7 | 11 | 2.6 |
| Universitat Politècnica de València | 4 | 3.2 | 5 | 2.9 | 7 | 3 | 2 | 7 |
| Universidad de Sevilla | 5 | 3.1 | 5 | 2.9 | 6 | 3.1 | 4 | 5.6 |
| Universidad del País Vasco | 6 | 3 | 4 | 3.1 | 6 | 3.1 | 12 | 2.5 |
| Universidad Politécnica de Madrid | 6 | 3 | 6 | 2.7 | 8 | 2.9 | 1 | 7.1 |
| Universitat Autònoma de Barcelona | 7 | 2.9 | 7 | 2.3 | 3 | 4 | 5 | 3.8 |
| Universitat Politècnica de Catalunya | 8 | 2.7 | 8 | 2.2 | 9 | 2.8 | 3 | 6.7 |
| Universidad Autónoma de Madrid | 9 | 2.5 | 8 | 2.2 | 9 | 2.8 | 8 | 3.1 |
| UNED | 10 | 2.3 | 8 | 2.2 | 10 | 2.3 | 9 | 3 |
| Universidad de Zaragoza | 11 | 2.2 | 9 | 2.1 | 11 | 2.1 | 6 | 3.7 |
| U. de Santiago de Compostela | 12 | 2.1 | 10 | 2 | 11 | 2.1 | 12 | 2.5 |
| Universidad de Málaga | 13 | 1.9 | 11 | 1.9 | 13 | 1.7 | 11 | 2.6 |
| Universidad de Salamanca | 14 | 1.7 | 12 | 1.7 | 14 | 1.6 | 13 | 1.9 |
| Universidad de Alicante | 15 | 1.6 | 14 | 1.4 | 15 | 1.5 | 8 | 3.1 |
| Universidad de Murcia | 15 | 1.6 | 13 | 1.6 | 14 | 1.6 | 15 | 1.6 |
| Universidad Carlos III | 16 | 1.5 | 14 | 1.4 | 15 | 1.5 | 10 | 2.9 |
| Universidad de Oviedo | 16 | 1.5 | 14 | 1.4 | 12 | 1.8 | 20 | 1 |
| Universidad de Valladolid | 17 | 1.4 | 14 | 1.4 | 16 | 1.3 | 17 | 1.4 |
| Universidad de Castilla-La Mancha | 18 | 1.3 | 16 | 1.2 | 15 | 1.5 | 19 | 1.2 |
| Universidad de Alcalá de Henares | 19 | 1.2 | 15 | 1.3 | 18 | 1.1 | 17 | 1.4 |
| Universidad de Córdoba | 19 | 1.2 | 17 | 1.1 | 16 | 1.3 | 18 | 1.3 |
| Universidad de La Laguna | 20 | 1.1 | 16 | 1.2 | 16 | 1.3 | 26 | 0.4 |
| Universidad Rey Juan Carlos | 20 | 1.1 | 17 | 1.1 | 17 | 1.2 | 21 | 0.9 |
| Universidade de Vigo | 20 | 1.1 | 17 | 1.1 | 17 | 1.2 | 21 | 0.9 |
| Universitat Pompeu Fabra | 20 | 1.1 | 18 | 1 | 17 | 1.2 | 13 | 1.9 |
| Universidad de Cádiz | 21 | 1 | 18 | 1 | 19 | 1 | 18 | 1.3 |
| Universidad de Extremadura | 21 | 1 | 17 | 1.1 | 19 | 1 | 22 | 0.8 |
| Universidad de Cantabria | 22 | 0.9 | 20 | 0.8 | 18 | 1.1 | 16 | 1.5 |
| U. de Las Palmas de Gran Canaria | 22 | 0.9 | 18 | 1 | 20 | 0.9 | 25 | 0.5 |
| U. Miguel Hernández de Elche | 22 | 0.9 | 20 | 0.8 | 20 | 0.9 | 15 | 1.6 |
| Universidade da Coruña | 22 | 0.9 | 19 | 0.9 | 19 | 1 | 20 | 1 |
| Universitat de les Illes Balears | 22 | 0.9 | 21 | 0.7 | 19 | 1 | 19 | 1.2 |
| Universitat Jaume I | 22 | 0.9 | 19 | 0.9 | 20 | 0.9 | 24 | 0.6 |
| Universitat Ramon Llull | 22 | 0.9 | 18 | 1 | 21 | 0.8 | 18 | 1.3 |
| Universitat Rovira i Virgili | 22 | 0.9 | 20 | 0.8 | 19 | 1 | 17 | 1.4 |
| Universidad de Navarra | 23 | 0.8 | 19 | 0.9 | 22 | 0.7 | 22 | 0.8 |
| Universitat Oberta de Catalunya | 23 | 0.8 | 20 | 0.8 | 23 | 0.6 | 14 | 1.8 |
| Universidad de Almería | 24 | 0.7 | 21 | 0.7 | 22 | 0.7 | 22 | 0.8 |
| Universidad de Jaén | 24 | 0.7 | 21 | 0.7 | 22 | 0.7 | 23 | 0.7 |
| Universitat de Girona | 24 | 0.7 | 21 | 0.7 | 21 | 0.8 | 26 | 0.4 |
| Universidad de Huelva | 25 | 0.6 | 22 | 0.6 | 23 | 0.6 | 24 | 0.6 |
| Universidad de León | 25 | 0.6 | 22 | 0.6 | 23 | 0.6 | 26 | 0.4 |
| Universidad Pablo de Olavide | 25 | 0.6 | 21 | 0.7 | 24 | 0.5 | 23 | 0.7 |
| Universidad Pública de Navarra | 25 | 0.6 | 23 | 0.5 | 24 | 0.5 | 21 | 0.9 |
| Universitat de Lleida | 25 | 0.6 | 22 | 0.6 | 23 | 0.6 | 26 | 0.4 |
| Universidad de Deusto | 26 | 0.5 | 22 | 0.6 | 26 | 0.3 | 24 | 0.6 |
| Universidad Europea de Madrid | 26 | 0.5 | 21 | 0.7 | 26 | 0.3 | 28 | 0.2 |
| Universidad Politécnica de Cartagena | 27 | 0.4 | 24 | 0.4 | 25 | 0.4 | 25 | 0.5 |
| Universidad Pontificia Comillas | 27 | 0.4 | 22 | 0.6 | 27 | 0.2 | 26 | 0.4 |
| U. Católica de Valencia S. Vte. Mártir | 28 | 0.3 | 25 | 0.3 | 27 | 0.2 | 26 | 0.4 |
| Universidad de Burgos | 28 | 0.3 | 25 | 0.3 | 25 | 0.4 | 27 | 0.3 |
| Mondragon Unibertsitatea | 29 | 0.2 | 26 | 0.2 | 27 | 0.2 | 26 | 0.4 |
| Universidad de La Rioja | 29 | 0.2 | 25 | 0.3 | 27 | 0.2 | 28 | 0.2 |
| Universitat de Vic | 29 | 0.2 | 26 | 0.2 | 28 | 0.1 | 28 | 0.2 |
| Universitat Internacional de Catalunya | 29 | 0.2 | 26 | 0.2 | 27 | 0.2 | 27 | 0.3 |
| Universidad a distancia de Madrid | 30 | 0.1 | 26 | 0.2 | 29 | <0.1 | 29 | 0.1 |
| Universidad Europea Miguel de Cervantes | 30 | 0.1 | 27 | 0.1 | 29 | <0.1 | 29 | 0.1 |
| Universidad San Jorge | 31 | <0.1 | 27 | 0.1 | 29 | <0.1 | 30 | <0.1 |

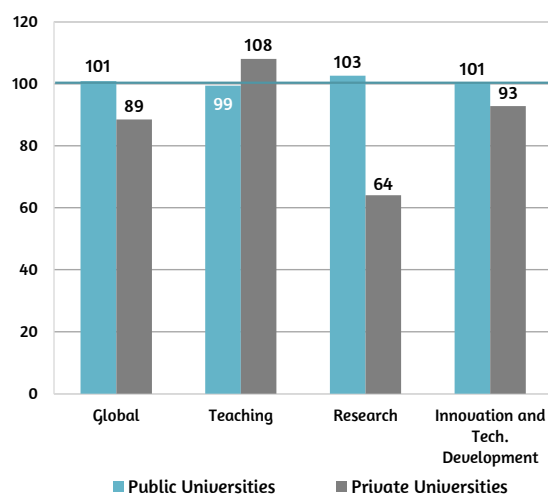
Note: Universities are ordered from the highest to the lowest global index value. Universities with the same index value are ordered alphabetically.
Source: BBVA Foundation-IUIE.

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. Average performance of the Spanish public and private universities

Total of universities = 100



Source: BBVA Foundation-luie.

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 12 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 thirty-six points lower) and only slightly below in innovation and technological development.

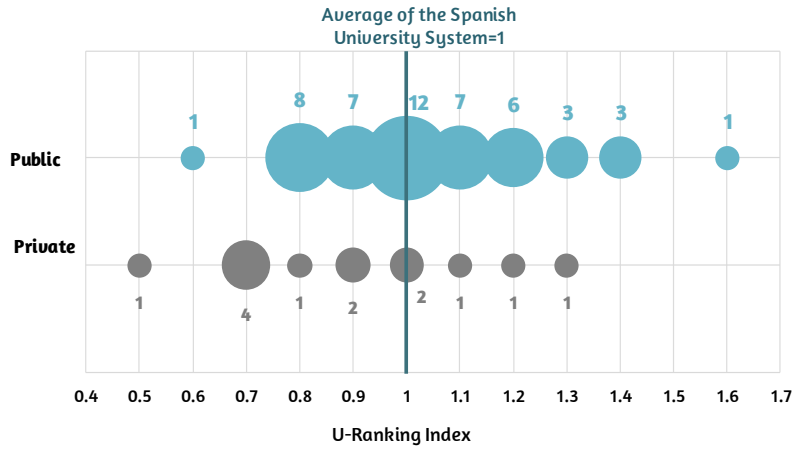
Averages may always hide a more complex reality. An average value can be caused by consistent values in all universities or by a great heterogeneity of results. This heterogeneity, which is shared by the private and public systems, is clearly visible in Figure 16. In all the panels (global, teaching 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.

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 (16) are below average whilst almost two-thirds of the private ones (8) 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 29% of the public universities. Panel *c* shows that research is dominated by public universities, as only one private university exceeds the average of the system.

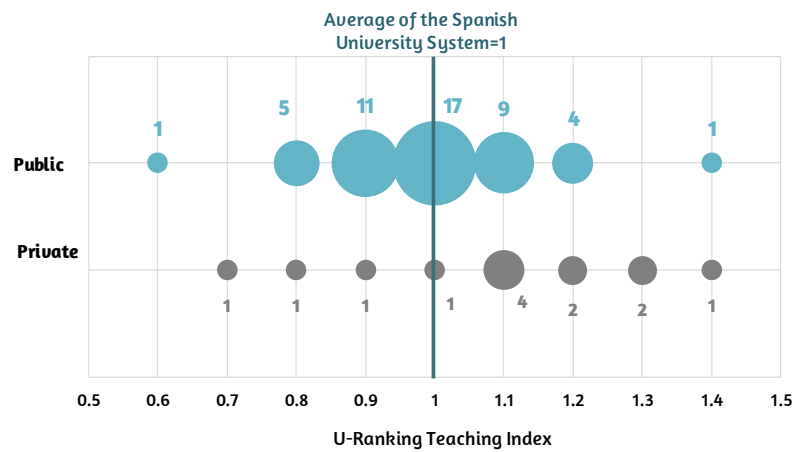
In short, the public and private systems are both heterogeneous with respect to the performance of the institutions that comprise them, there being a great diversity in the overall, teaching and research results. However, the public system stands out with respect to private universities in their research achievements and to a lesser extent in their knowledge transfer 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, 2016
 Index and number of universities with the same index

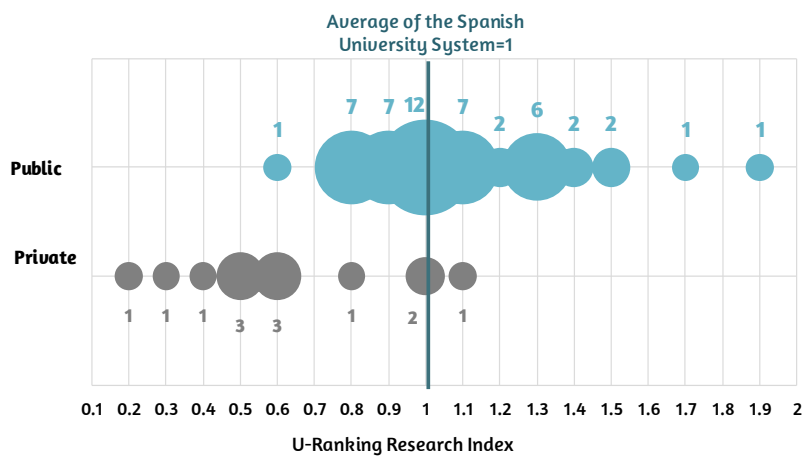
a) Global



b) Teaching



c) Research



Source: BBVA Foundation-Iuie.

4.9. U-RANKING 2015 AND 2016 OF THE PUBLIC UNIVERSITIES

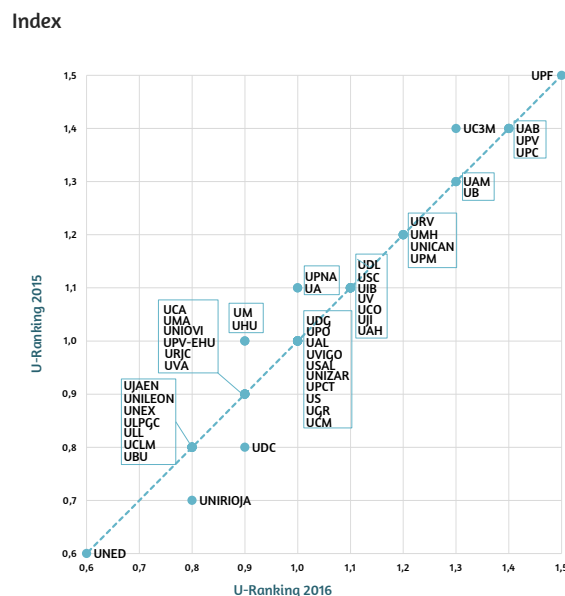
The direct comparison of the 2015 and 2016 U-Rankings has an inherent difficulty to the inclusion of new private universities. Since the number of institutions is not the same, the level of correlation between both editions should be confined to public universities, which number remains constant in both years. To make this comparison, the indices of performance and volume have been recalculated, eliminating the private universities in order to precisely analyze the level of temporal consistency of the results of the ranking. 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 2016 are highly correlated with those presented in the 2015 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 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.

| | Performance | | Volume | |
|---|-------------|-------|---------|-------|
| | Ranking | Index | Ranking | Index |
| Global | 0.98 | 0.99 | 1.00 | 1.00 |
| Teaching | 0.96 | 0.99 | 1.00 | 1.00 |
| Research | 0.97 | 0.97 | 0.99 | 1.00 |
| Innovation and Technological Development | 0.95 | 0.96 | 0.98 | 0.98 |

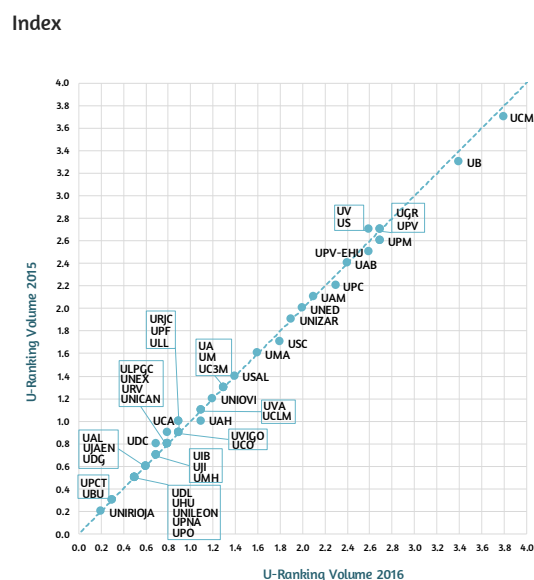
Note: The ranking values are calculated by means of a Spearman correlation coefficient and the index values by means of a Pearson correlation coefficient.
Source: BBVA Foundation-luie.

Figure 17. U-Ranking (performance) of the Spanish public universities. 2015 and 2016



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

Figure 18. U-Ranking Volume of the Spanish public universities. 2015 and 2016



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

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 2016 and on the vertical axis the results for 2015, both for U-Ranking (figure 17) and for U-Ranking Volume (figure 18). In the case of the measurement of the performance by U-Ranking, the number of universities above the diagonal (5) is slightly larger than those below it (2), which points out a very slight decrease in the performance of the whole system. In the case of U-Ranking Volume, the number of universities above and below the diagonal is the same (7).

4.10. 2013-2016 EVOLUTION OF THE PUBLIC UNIVERSITIES

With the data series of this year's edition of U-Ranking, we can address new issues of interest.

The first one refers to what has happened with the performance of the system, whether the 2016 results are better than those of 2013. The question has no obvious answer, because these four years have been a time of uncertainty for the Spanish universities as a consequence of the economic crisis and the resulting expenditure constraints imposed. Therefore, it is important to assess whether these measures have had a negative impact on the performance of the system or if, on the contrary, the restructuring processes or reforms may have improved their efficiency.

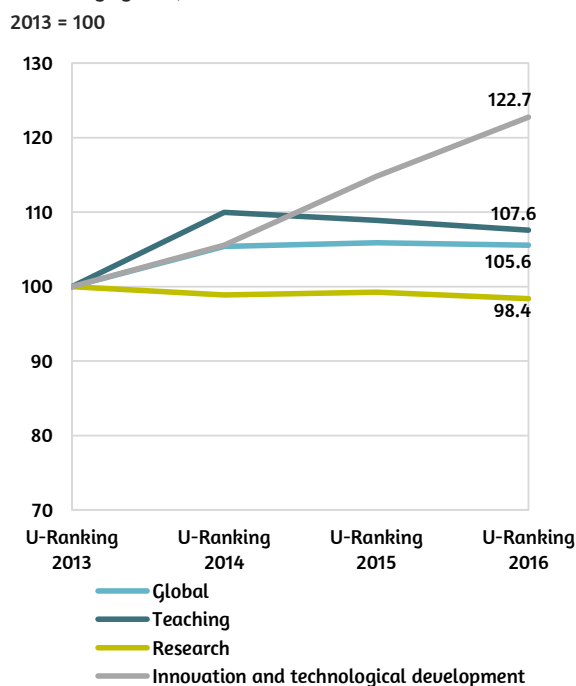
Also, bearing in mind it is a system that has been repeatedly proved to be heterogeneous, the second of the issues focuses on analyzing the evolution of this heterogeneity throughout the period. The question in this case is whether the universities are more alike in their performance (sigma convergence) or if, on the contrary, differences among them have increased during these years. It is also of interest to assess whether universities with low performance levels have been able to improve more than those starting from higher levels of results (beta convergence).

Since U-Ranking did not include private universities in the 2013 and 2014 editions, the following analyses are carried out for the public universities as a whole.

Evolution of the public university system

First, being accurate, we must point out that the time axis 2013-2016 responds to the U-Ranking editions and that the following analysis will not strictly examine what has happened with the universities over that period of time, insofar as the data of each edition uses the moving averages of six academic years. For example, in this year's edition, most data regarding teaching corresponds to the academic year 2013-2014. Therefore, we should be cautious when analyzing the results.

Figure 19. Evolution of the performance of the public university system, 2013-2016



Source: BBVA Foundation-Iuie.

If we look at the whole period of the four editions (figure 19), we see that the public university system suffers from stagnation in its teaching and research performance (since the 2014 edition), and has achieved a substantial improvement in innovation and knowledge transfer, as a result of the strong growth in the

number of patents. Only with a longer time horizon, we shall be able know to what extent these trends are due to this period's complex economic situation and whether or not they are the result of the financial constraint measures, especially when we can observe the reaction of the index to changes in the economic context when they occur. This will be touchstone to assess how much is due to structural changes and how much to cyclical trends.

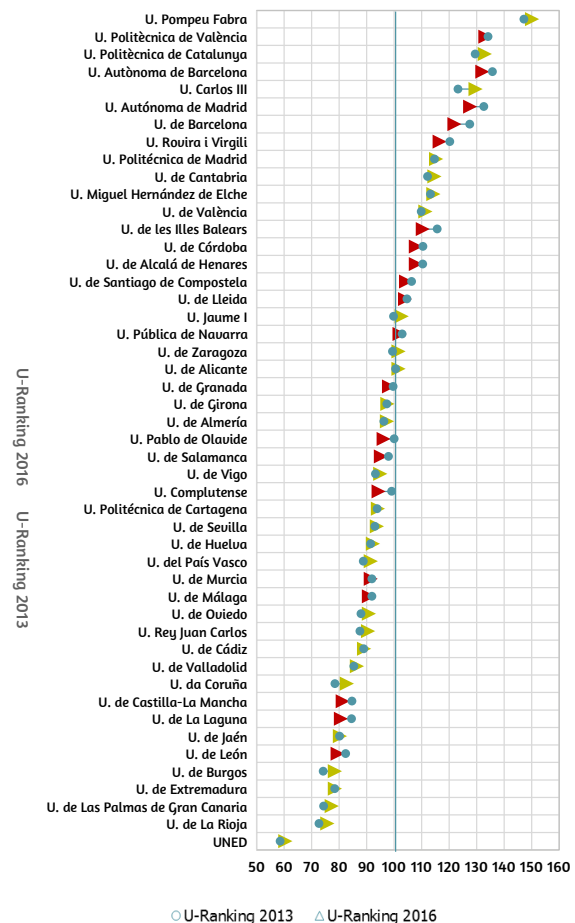
Convergence in the performance of the universities

In the previous section, we found that the public university system shows signs of stagnation in its performance over the last three editions of U-Ranking. This standstill in the results of the universities may or may not be accompanied by a convergence process, if those universities with worse results in 2013 have improved more than those with better results in that year: it may be possible that differences have been reduced and we have a more compact public university system regarding performance. In order to make a comparison, the 2013 data has been homogenized, using all available sources of data used in the 2016 ranking, together with the improvements carried out during these four years. Figure 20 shows the public universities ranked according to the results of the 2016 U-Ranking edition: the distance from the average of the system in 2013 is marked with a circle and that of the average in 2016 with a triangle. The triangle is red when the university has a worse position with respect to the average (when it was above the average in 2013, it is now closer to it, and if it was below, in 2016 it is even more) and it is green when its situation has improved (if it was above, it is now even more, and if it was below it has come nearer to the average).

At a first glance, results are not evident as the number of universities that have improved is practically the same as that of the universities which have worsened. Thus, among the top five universities of the ranking, three of them have increased their distance from the average of the system (Pompeu Fabra, Politècnica de Catalunya and Carlos III) while two have shortened the distance (Politècnica de València and Autònoma de Barcelona). In any case, figure 20 clearly shows that changes are very small and that the

Spanish university system is very stable, despite being a heterogeneous system.

Figure 20. Evolution of the performance of the Spanish public universities in 2013 and 2016 U-Rankings
Average of the public universities = 100

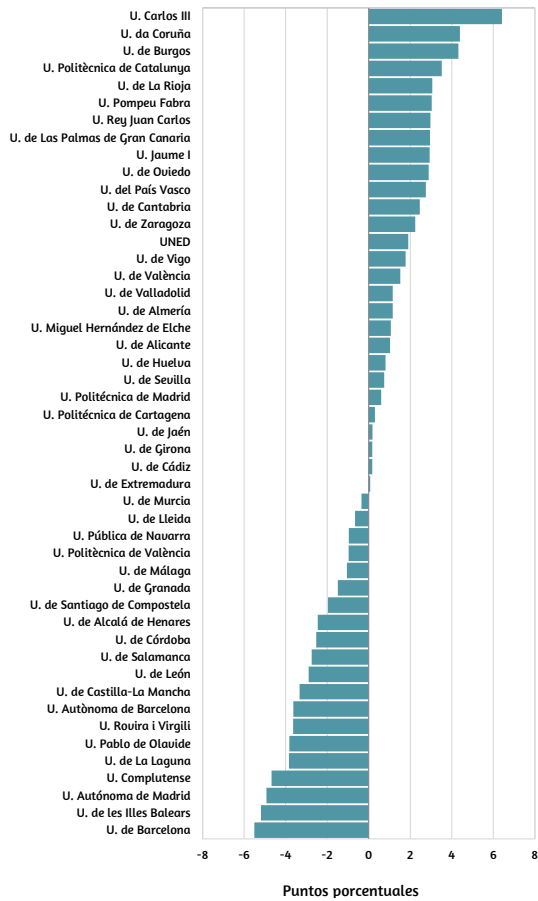


Source: BBVA Foundation-Iuie.

To better view which universities have experienced major improvements with respect to the system, graph 21 ranks universities according to the absolute value of the improvement achieved in the analyzed period. The first reading confirms our earlier impression: there is no variation greater than seven percentage points, i.e., no university has distanced itself from the average of the system or has come nearer to it by more than those seven points during the four U-Ranking editions.

Figure 21. Size of the relative variations of the Spanish public universities. 2013 and 2016 U-Rankings

Average of the public universities = 100



Source: BBVA Foundation-luie.

We see that there is no clear pattern that explains which universities improve (draw away from the average if their performance was already high, or come closer to it if it was low) and which worsen. However, relative improvements seem to occur more often in medium-sized universities (Carlos III, Coruña, Burgos) and relative downturns happen among bigger universities (Barcelona, Autònoma de Madrid, Complutense), this being a conclusion without relevant exceptions, such as the relative improvement of the UNED or the relative worsening of small universities such as Illes Balears.

Consequently, not being clear from the graphs above, if the system, as a whole, is more or less homogeneous, we have calculated two indicators to analyze this issue. Firstly, the dispersion of the logarithms of the 2013 and 2016 indices has been calculated. If the dispersion has grown, the system will be more diverse and if it has decreased, it will be more homogeneous (sigma convergence).

Taking the ends of the period, table 12 shows how the standard deviation of the indices has dropped slightly confirming that the differences in the performance of the public universities are becoming slowly smaller.

Table 12. Results of the sigma and beta convergence analysis

| Sigma convergence | |
|-------------------|-----------------|
| Year | σ |
| 2013 | 0.191 |
| 2016 | 0.188 |
| Beta convergence | |
| Parameter | Estimations |
| $\beta_0(t)$ | 0.010* (2.425) |
| $\beta_1(t)$ | -0.051*(-2.399) |
| F(1,46) | 5.756* |
| R ² | 0.11 |
| N | 48.00 |

*p<0,05 (statistic t in parenthesis)

Source: BBVA Foundation-luie.

A question that our data can help answer is if the speed of the improvements in performance has been higher among those universities with worse results in 2013, i.e., whether this relative delay has spurred improvements or, on the contrary, has hindered them. In order to analyze this issue, the rate of change in the results index between 2016 and 2013 has been regressed for each university i on its value in 2013:

$$\ln I_{i,2016} - \ln I_{i,2013} = \beta_0 + \beta_1 \ln I_{i,2013} + \epsilon_i$$

If the β_1 slope is negative and significant, it would indicate that universities with lower values of the index in 2013 have had positive variation rates in the period, which confirms the positive effect of the relative delay (beta convergence). This is proved in table 12, which shows a

significant and negative regression coefficient. However, the value of the coefficient of determination (R^2) of this regression is not very high, which shows that most of the differences in the growth rates of the performance of each university are explained by other variables and, also, the 5% significance level reinforces the low intensity of this convergent process.

4.11. REGIONAL UNIVERSITY SYSTEMS

Universities undertake their teaching and research activities in a certain geographic context that influences each university in a different way. 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*.

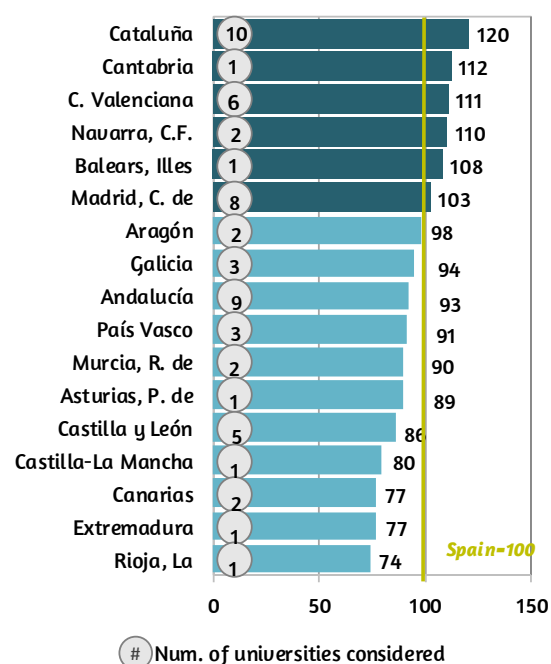
Figure 22 shows the averages of the 2016 U-Ranking index of all universities, both public and private, of each autonomous community. The three distance-learning universities have been removed from this analysis because, given their teaching method, it would be difficult to assign their scope of action to a particular region.

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 20% higher than the average. It is closely followed by Cantabria, which only has one university (12% above the average). Next are the Valencian Community (11%), Navarre (10%), Balearic Islands (8%) and Madrid (3%).

Among the regional university systems below the average, we can distinguish several levels: some are not too far from the average —Aragon, Galicia, Andalusia— but other communities are more than 20% below, as in the cases of Extremadura, Canary Islands and La Rioja.

Figure 22. Performance of the regional university systems. U-Ranking 2016
Spain = 100



Source: BBVA Foundation-Iuie.

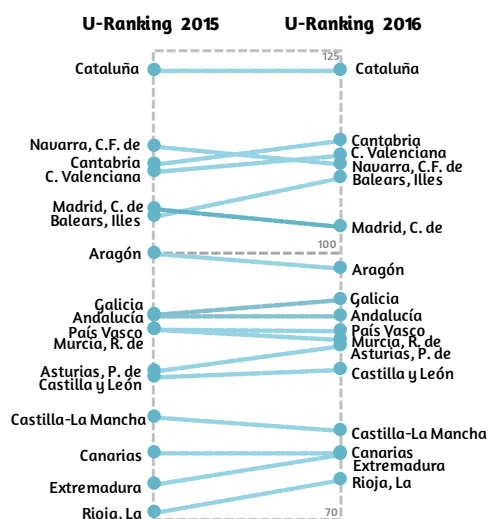
For some regions, we must take into account that private universities, which on average have a lower performance, tend to be concentrated, as we already have seen, in regions with high levels of income and large potential markets.

Figure 23 compares the results obtained by the autonomous communities in the 2015 edition with the results from the present edition. First of all, we can highlight the stability of the results. In general, in 2016 all regional systems maintain their position in the performance ranking. There are two exceptions: Navarre, which due to its lower relative performance, moves from the second position to the fourth, and Madrid, which in 2016 is behind the Balearic Islands. As in 2015, six autonomous communities have higher performance rates than Spain’s average. In this edition, Aragon stands below but yet quite near to the average. Finally, amongst the communities

with lower performance, Extremadura and La Rioja show a positive and rapid growth of their performance, which confirms the convergence process we already mentioned in section 4.10.

Figure 23. Evolution of the regional university systems. 2015 and 2016

Spain = 100



Source: BBVA Foundation-Iuie.

4.12. STRATEGIC GROUPS

The suitability of the hierarchization of universities through rankings has been repeatedly questioned with the argument that universities that have different financial resources, compete in geographical environments with different levels of income, have dissimilar historical origins and heterogeneous organizational structures, are not comparable among themselves and, therefore, should not be ordered in a same ranking.

This argument is questionable because universities are not being compared by their resources, but by the results they obtain and their performance *is* homogeneous and comparable.²² However, it is nonetheless true

²² For example, let's think of any sports competition where teams have very different budgets. Having different starting situations does not imply

that it is interesting to analyze to what extent belonging to a group of universities with certain characteristics may condition their position in the rankings.

Following this line of thought, in the 2016 U-Ranking edition we have made a further analysis based on the classification of universities into homogeneous groups that has been carried out by Aldás et al. (2016) in a study developed under the ISSUE project. The groups were built according to the financial resources they have assigned, the nature of the environment in which they carry out their activities (market size, wealth, level of competence), the characteristics of their faculty (seniority, research qualifications, international networks) and of their students (quality of new entrants, foreign students) and their organizational structure (size, courses offered). Using these indicators, we carry out a cluster analysis which classifies universities into strategic groups so that a) universities within the same group are as similar as possible according to the indicators used and b) each group is as different from the others as possible.

This analysis results in 7 homogeneous groups that are named in the following manner in the aforementioned study (see figure 24 for information on the universities which comprise each group):

- 1) **Highly specialized universities**, such as the Polytechnic universities, the Carlos III or the Pompeu Fabra. They are medium-sized institutions, with greater financial resources, offering courses focused on certain branches of knowledge, acting in high income per capita environments and big potential markets.
- 2) **Large metropolitan universities** as the Universidad Complutense, Universitat de Barcelona or Universitat de València. These are big-sized universities, both in terms of students and number of degrees, which are of general interest and widely distributed

that the ranking at the end of the competition according to the points achieved does not adequately reflect their performance in the competition.

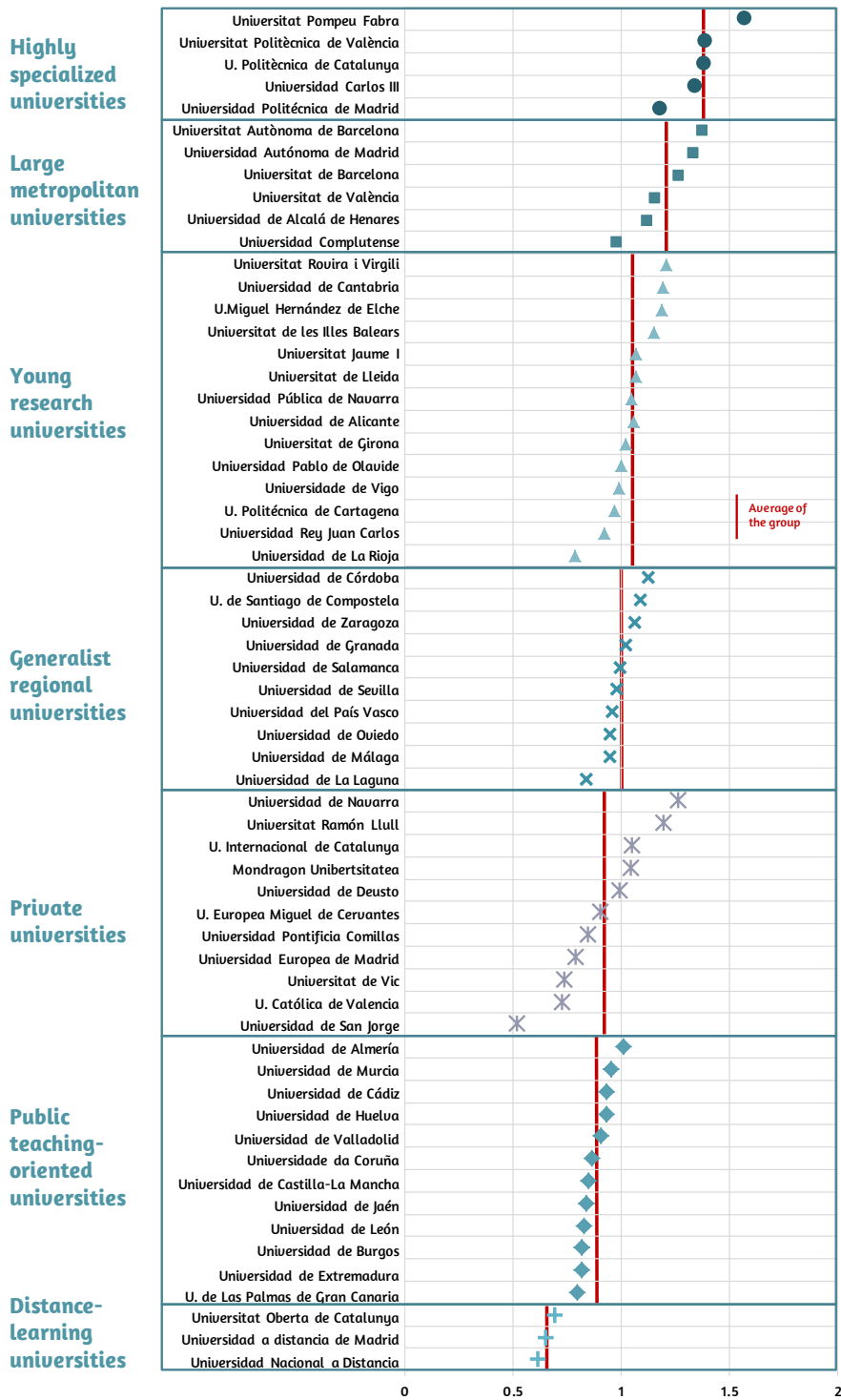
- among different branches of knowledge. Their financial resources are high, although lower than those of the universities of the former group, and, like them, they move in strong competition environments with large potential markets.
- 3) **Young research universities**, such as the Rovira i Virgili, Jaume I or Illes Balears. Born mostly in the 1990s, these institutions are highly focused on certain branches of knowledge and are on a lower level of financial resources than the two previous groups. They are located in a less intense competitive environment because, by having a high potential market, they are always the only higher education institution in the province.
 - 4) **Generalist regional universities** such as those of Seville, Santiago de Compostela and Salamanca. Mostly located in provinces with modest GDP per capita rates, their long historical tradition gives them a generalist nature and, therefore, offer a wide range of courses in all branches of knowledge. They have a high number of students and a lower endowment of resources than the previous groups. Their potential market is small, but the competitive pressure is not intense, as nearly always they are the only public university in the province, or even the only one in the autonomous community.
 - 5) **Private universities**. In addition to their type of ownership (private), they are different from the rest because of their high budgets per teacher and student, their concentration in high income level provinces and very high specialization in certain branches of knowledge.
 - 6) **Public teaching-oriented universities**, such as the Cádiz, Castilla-La Mancha or Extremadura. They are situated in autonomous communities with low average GDP per capita, which means limited budgets for students and teachers. Competitive pressure is not high because they tend to be the only university in the province. They are small to medium-sized and their specialization level of the offered courses is intermediate.

- 7) **Distance-learning universities**. Because of their learning system, budgets by teacher and student are reduced, given the large number of students that can be attended by each teacher via distance learning. They act in a national competitive environment. Their size, especially in the case of the UNED, is big.

Figure 24 answers the question of whether the resource endowment of a university and its characteristics influence the institution's results in U-Ranking. The first thing we appreciate is a natural ranking of the results of the index: distance-learning universities, teaching-oriented public universities and private universities have on average lower performance indices than other groups. Performance levels get higher until they reach the highest values among the big metropolitan universities and the highly specialized universities.

Therefore, it does seem that the characteristics of the universities and their environment affect the results. But this does not mean that their conditions determine their results. Whereas in groups such as 6 and 7 (at the lower levels of the ranking) all their components behave homogeneously, in others such as the private universities (group 5) there is a high dispersion and there are some universities with a performance equivalent to those of better positioned groups (1 or 2). The same happens when we analyze the average performance of the first two groups (1 and 2), which have very different characteristics: the performance level of many of the institutions of both groups is the same. In conclusion, starting positions matter, but, within a same group, to perform better management practices or not, can make universities obtain different results. Therefore, even taking into account the diverse situations, rankings do make sense as they capture the part of the performance that depends on the management; and they remind us that long-term management of the institutions and proper strategic planning may change the starting position of many universities.

Figure 24. Situation of the strategic groups in U-Ranking 2016



Source: BBVA Foundation-Iuie.

5. Conclusions

The aim of the ISSUE (Synthetic Indicators of the Spanish University System) project is to generate classifications of 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 does not correct 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 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 U-Rankings 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 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 novelties of the 2016 edition, apart from improvements in the information available and the increase in the number of private universities included, consist of an analysis of the evolution of the system with the help of the accumulation of data of the four editions of U-Ranking and, considering the seven homogeneous strategic university groups based upon the rankings, the evaluation of the impact that the initial endowments of resources, the organizational structures and the environment of the universities have on the performance.

The main results derived from the analysis of the 2016 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, particularly in the research and innovation and technological development dimensions. More specifically, three Catalan universities lead the research (Autónoma de Barcelona), innovation and technological development (Polytècnica de Catalunya) and teaching rankings (Pompeu Fabra together with the Universidad de Navarra). The Universitat Pompeu Fabra also leads the overall ranking of performance.
4. There is a group of universities formed 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.
5. With regard to the private universities, we confirm their high specialization in and remarkable performance in teaching: their average performance in teaching exceeds by 8% the Spanish average. Five 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, according to the available variables.
6. The specialization in teaching of the private universities has its counterpart in a worse position with respect to the public system regarding research performance: 36% less on average than the university system and none of the universities with best performance in research is private. Public universities also present higher levels of performance in innovation and technological development activities than private ones, although here the distance is significantly smaller, the private universities being 8% below the public ones.
7. 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 specialists but considering indicators of the activities of our 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.
8. Differences in the results of the universities are also seen at regional level. Catalonia, Cantabria, the Valencian Community, Navarre, the Balearic Islands 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.

9. The evolution of the results of the university system with respect to the 2015 edition shows a standstill in the performance of the Spanish university system, which is explained by slight declines in the teaching (-1,2%) and research (-0.8%) performances, which is not compensated by the improvement in the results of innovation and technological development (+6.9%).
10. The broader perspective given by the four editions of U-Ranking allows us to confirm that the standstill detected in research and teaching has taken place during the last three editions and has been accompanied by a convergent process of the university system: universities are, slowly, showing less differences in their performance. This convergence in performance is mainly due to the more intense improvements of those universities that initially had worse levels of performance in 2013.
11. We can distinguish 7 strategic groups of universities that share similar levels of resources and organizational structures and which operate in environments with similar socio-economic characteristics and levels of competition. The results obtained when each group's performance is analyzed show that their characteristics affect the performance of the groups. Some of the groups, such as the highly specialized universities and the big metropolitan universities show a higher performance than the private universities, the distance-learning or the public teaching-oriented universities. However, this influence of the environment and resource endowments does not determine the results since the heterogeneity within the groups is high and some universities of the groups with lower performance exceed the average performance of higher performing groups.

The case in which the attention of the user of the rankings focuses most clearly on teaching is when students want to consult them in order to choose a university to study for their degrees. 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 three 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 relevant to various objectives: to evaluate the universities' results; to selectively guide their strategies for improvement and university policies; 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 2016

| Dimension | Area | Indicator and definition | Source | Period | Disaggregation |
|--|---|--|---------------------------------------|---------------------------------------|---------------------|
| Teaching | Resources | Faculty member with PhD per 100 students: Faculty member with PhD equivalent to full-time per each 100 students registered in studies of 1st and 2nd cycle (former Spanish degree structure) and in Bachelor's degrees in centers belonging to the University, Master's degrees and Doctoral degrees (Bologna's degree structure) | CRUE | 2008-09, 2010-11, 2012-13 and 2013-14 | Branch of knowledge |
| | | Budget / Student: Effective income of the University by number of students registered in studies of 1st and 2nd cycle and Bachelor's degree (in centers belonging to the University), Master's degrees and Doctoral degrees | CRUE | 2008, 2010, 2012 and 2013 | University |
| | | Faculty member with PhD / Faculty members: Faculty member with PhD equivalent to full-time over total teaching and research staff equivalent to full-time | CRUE | 2008-09, 2010-11, 2012-13 and 2013-14 | University |
| | Output | Success rate: Number of credits passed (excluding transfer, validated and recognized credits) over total credits evaluated | SIIU* | 2009-10 to 2013-14 | Branch of knowledge |
| | | Evaluation rate: Number of credits evaluated over total credits registered CRUE | SIIU* | 2009-10 to 2013-14 | Branch of knowledge |
| | | Drop-out rate: 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 2013-14 | Branch of knowledge |
| | Quality | Attractiveness index | - | - | - |
| | | Percentage of postgraduate students: Students registered in Master's degrees over the total number of students of 1st and 2nd cycle, Bachelor's degrees and Master's degrees | SIIU | 2008-09 to 2014-15 | Branch of knowledge |
| | Internationalization | Cut-off mark: Mark of the last <i>general group</i> ¹ student that gained admission to a degree with limited places | SIIU | 2015-16 | Bachelor's degree |
| | | Percentage of foreign students: Non-Spanish students of 1 st and 2 nd cycle, Bachelor's degrees and Master's degrees over the total number of students of 1 st and 2 nd cycle, Bachelor's degrees and Master's degrees | SIIU | 2009-10 to 2013-14 | 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 | 2008-09, 2010-11, 2012-13 and 2013-14 | 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 PhD equivalent to full-time | DGICT CRUE | 2009-2014 | Branch of knowledge |
| | | Contracts with PhDs, research grants and technical support over total budget: Competitive resources obtained for research staff training, Juan de la Cierva, Ramón y Cajal and support technicians over total effective income | DGICT CRUE | 2009-2014 | Branch of knowledge |
| | Output | Citable documents with ISI reference per faculty member with PhD: Documents with ISI reference published per 100 faculty members with PhD equivalent to full-time | IUNE (Thomson Reuters) CRUE | 2009-2014 | Branch of knowledge |
| | | Total sexenios² over possible sexenios: Sexenios obtained over the total possible sexenios for the universities' tenured research staff | CRUE | 2012 and 2013 | Branch of knowledge |
| | | Doctoral theses read per 100 faculty members with PhD: Doctoral theses read per 100 faculty members with PhD equivalent to full-time | MEyCD CRUE | 2008-2013 | 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) | 2009-2014 | 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) | 2009-2014 | Bachelor's degree group |
| | | Citations per document: Citations received by each document from the date of publication to the date of data gathering | IUNE (Thomson Reuters) | 2009-2014 | Bachelor's degree group |
| | Internationalization | European or international research funds per faculty member with PhD: Effective income from abroad due to applied research per faculty member with PhD equivalent to full-time | CRUE | 2008 and 2010 | 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) | 2009-2014 | 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 PhD¹: Income generated by the use and exploitation of licenses of the university for each 100 faculty members with PhD | IUNE (OTRIs) | 2008-2013 | University |
| | | Income from consultancy contracts per 100 faculty members with PhD²: Income from R&D and consultancy contracts and from provision of services per 100 faculty members with PhD | IUNE (OTRIs) | 2008-2013 | University |
| | | Income from continuing professional development (CPD) courses per faculty member with PhD³: Fees received from registration both for CPD and for the university's own postgraduate programs (master, specialist and expert) per faculty member with PhD | CRUE IUNE (INE) | 2008, 2010, 2012 and 2013 | University |
| | Output | Number of patents per 100 faculty members with PhD³: Number of national patents granted to each Spanish university by the Spanish Patents and Trade Marks Office per 100 faculty members with PhD | IUNE (OTRIs) | 2009-2014 | University |
| | | CPD hours per faculty member with PhD | - | - | - |
| | | Number of contracts per faculty member with PhD | - | - | - |
| | Quality | Patents commercialized per faculty member with PhD | - | - | - |
| Internationalization | Triadic patents per 100 faculty members with PhD: Number of simultaneous protections of inventions in different countries obtained through an international patent application, per 100 faculty members with PhD | IUNE (OTRIs) | 2008-2013 | University | |
| | 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 2008-09, 2010-11, 2012-13 and 2013-14 which is offered by areas of study and university.

¹General group: students finishing high school or students graduated in Advanced Vocational Training or foreign students.

² Monetary compensation received for research activity based on the last six years.

³ 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 |
| 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 |
| UEM | Universidad Europea de Madrid | Private |
| 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 |
| UJAEN | 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 de San Jorge | Private |
| UV | Universitat de València | Public |
| UVA | Universidad de Valladolid | Public |
| UVIC | Universitat de Vic | Private |
| UVIÇO | Universidade de Vigo | Public |

Appendix 3: Universities' Panel of Indicators

1. Mondragon Unibertsitatea
2. Universidad a distancia de Madrid
3. Universidad Autónoma de Madrid
4. Universidad Carlos III
5. U. Católica de Valencia S. Vte. Mártir
6. Universidad Complutense
7. Universidad de Alcalá de Henares
8. Universidad de Alicante
9. Universidad de Almería
10. Universidad de Burgos
11. Universidad de Cádiz
12. Universidad de Cantabria
13. Universidad de Castilla-La Mancha
14. Universidad de Córdoba
15. Universidad de Deusto
16. Universidad de Extremadura
17. Universidad de Granada
18. Universidad de Huelva
19. Universidad de Jaén
20. Universidad de La Laguna
21. Universidad de La Rioja
22. U. de Las Palmas de Gran Canaria
23. Universidad de León
24. Universidad de Málaga
25. Universidad de Murcia
26. Universidad de Navarra
27. Universidad de Oviedo
28. Universidad de Salamanca
29. Universidad de San Jorge
30. Universidad de Sevilla
31. Universidad de Valladolid
32. Universidad de Zaragoza
33. Universidad del País Vasco
34. Universidad Europea de Madrid
35. U. Europea Miguel de Cervantes
36. U. Miguel Hernández de Elche
37. U. Nacional de Educación a Distancia
38. Universidad Pablo de Olavide
39. Universidad Politécnica de Cartagena
40. Universidad Politécnica de Madrid
41. Universidad Pontificia Comillas
42. Universidad Pública de Navarra
43. Universidad Rey Juan Carlos
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 Ramón Llull
61. Universitat Rovira i Virgili

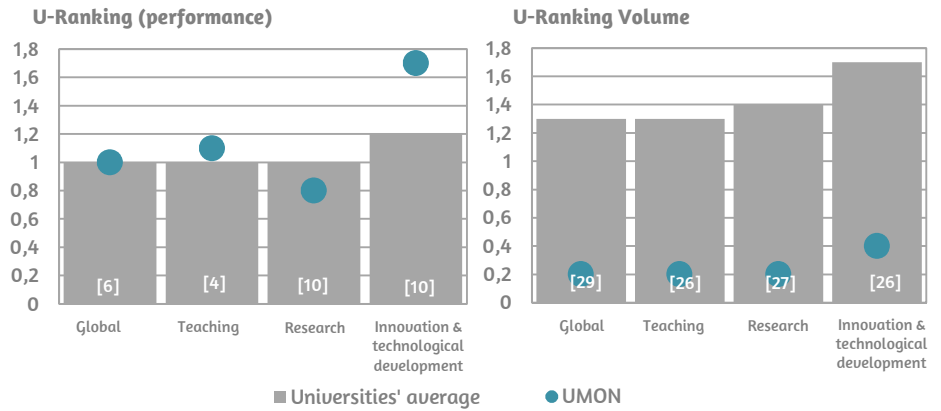
Year of foundation: 1.997
 Type of ownership: Private
 Bachelor's degree students³: 3.489
 Master's degree students²: 613
 Faculty members²: 367
 Administration and service staff: 112
 Budget²: not available
 Bachelor's degrees¹: 15
 Master's degrees¹: 15

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

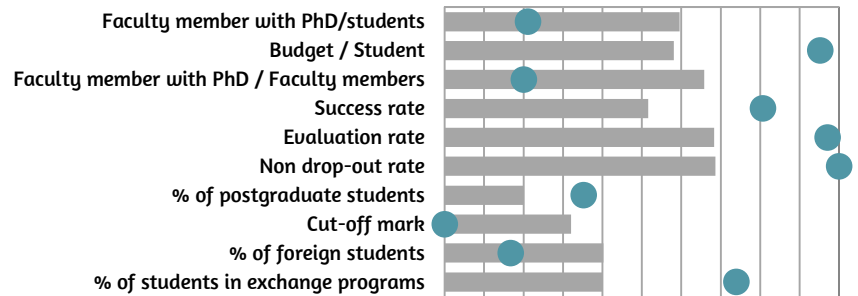
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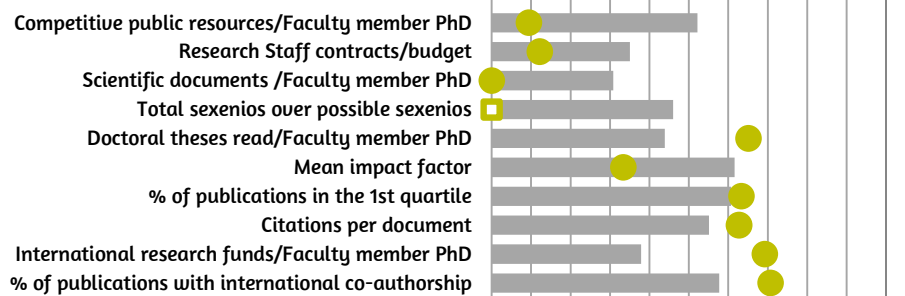
U-Ranking 2016 indicators

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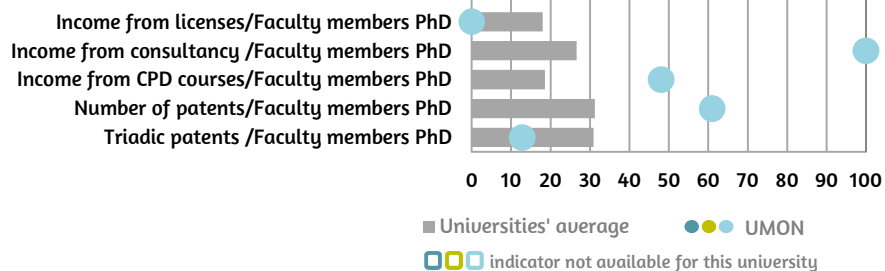
TEACHING INDICATORS



RESEARCH 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



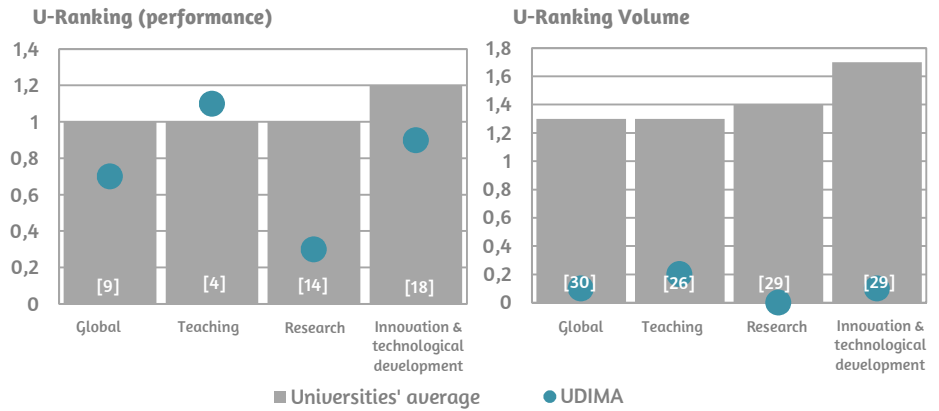
Year of foundation: 2.008
 Type of ownership: Private
 Bachelor's degree students³: 3.206
 Master's degree students²: 3.892
 Faculty members²: 172
 Administration and service staff: 50
 Budget²: not available
 Bachelor's degrees¹: 26
 Master's degrees¹: 33

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

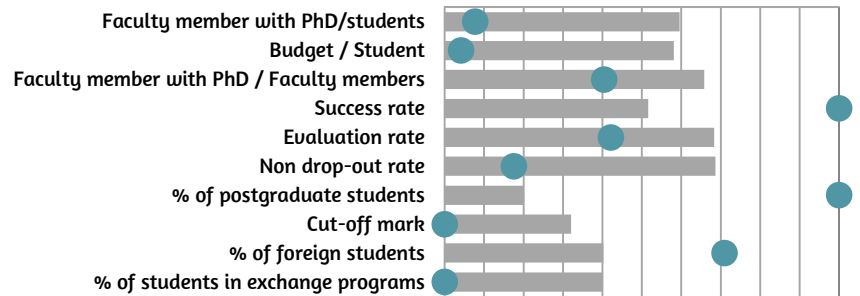
Index and position in the ranking between brackets



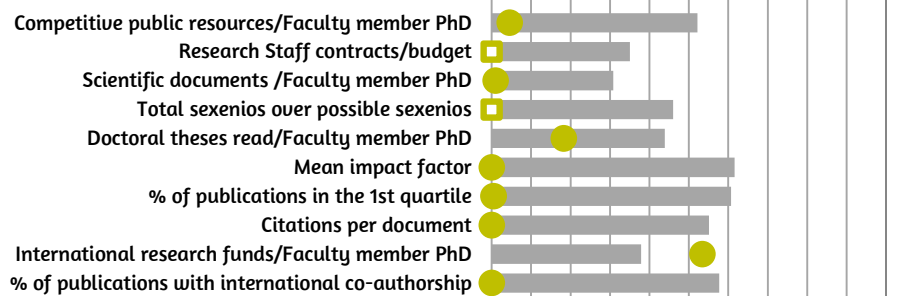
U-Ranking 2016 indicators

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

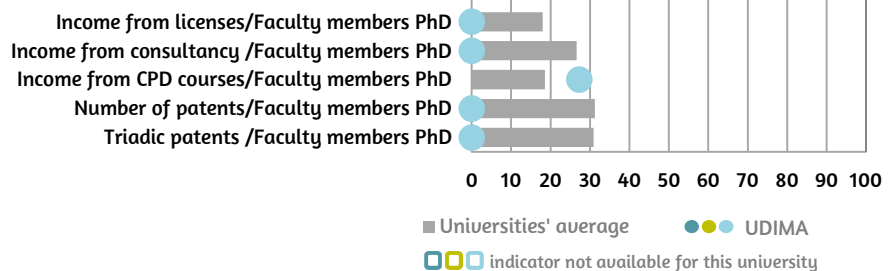
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD AUTÓNOMA DE MADRID



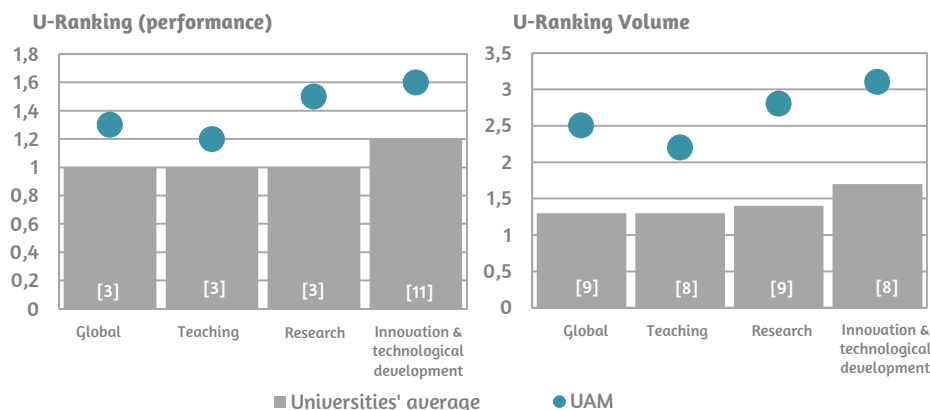
Year of foundation: 1.968
 Type of ownership: Public
 Bachelor's degree students³: 23.582
 Master's degree students²: 2.569
 Faculty members²: 2.674
 Administration and service staff: 1.065
 Budget¹: 219.323.161€
 Bachelor's degrees¹: 42
 Master's degrees¹: 76

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

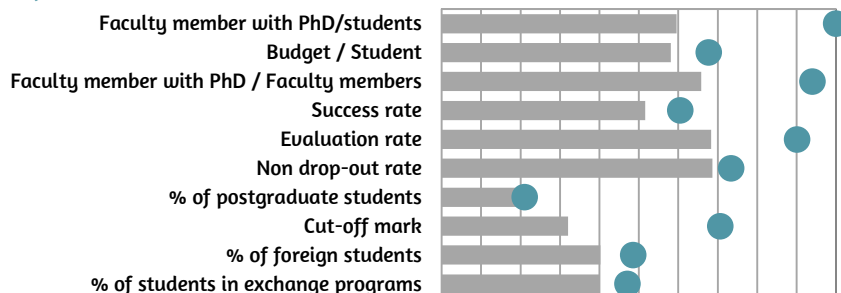
Index and position in the ranking between brackets



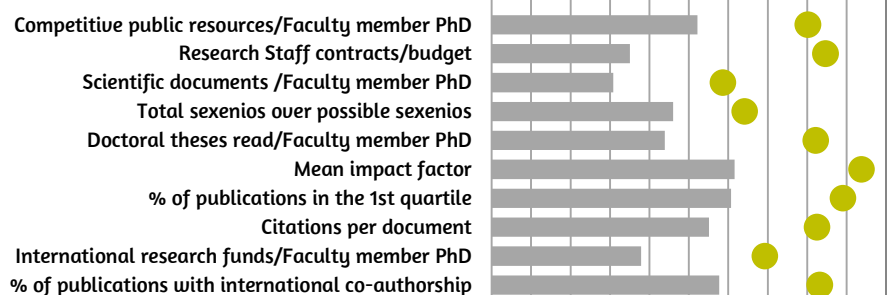
U-Ranking 2016 indicators

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

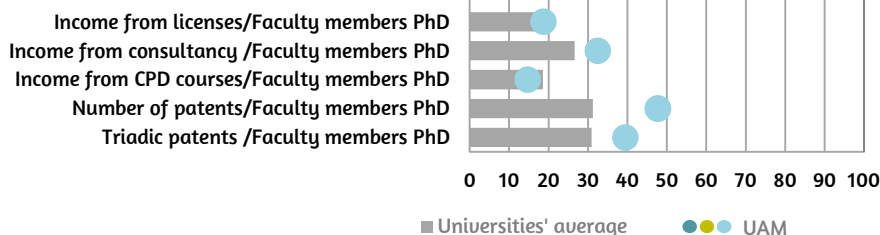
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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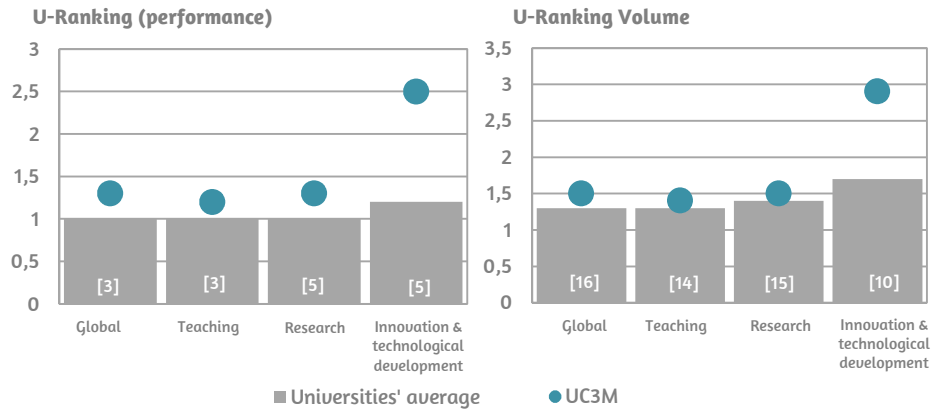
Year of foundation: 1.989
 Type of ownership: Public
 Bachelor's degree students³: 14.826
 Master's degree students²: 2.345
 Faculty members²: 1.503
 Administration and service staff: 675
 Budget²: 153.704.282€
 Bachelor's degrees¹: 28
 Master's degrees¹: 61

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

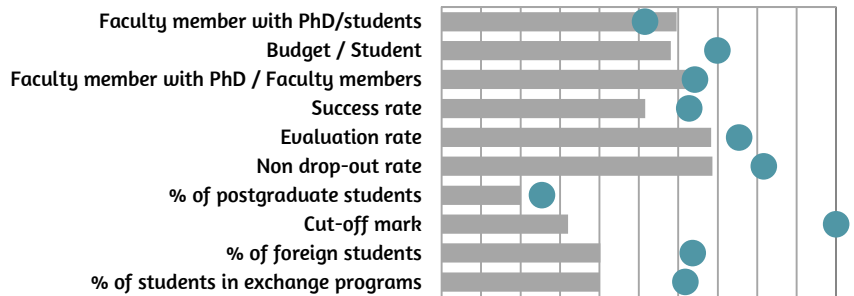
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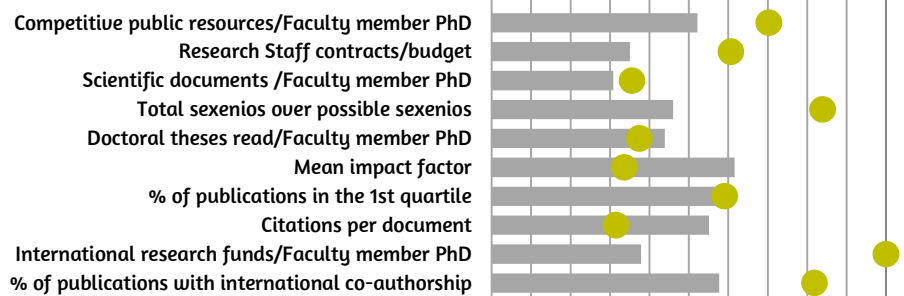
U-Ranking 2016 indicators

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

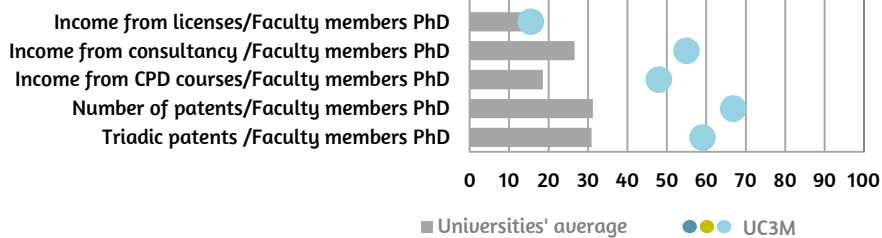
TEACHING INDICATORS



RESEARCH 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



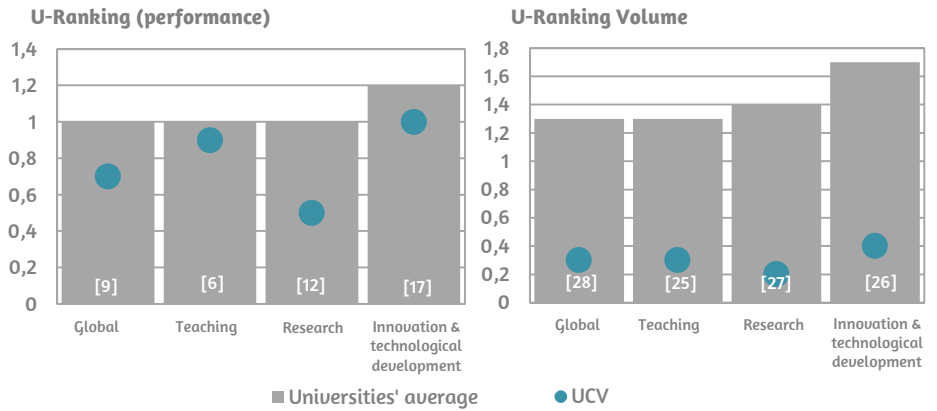
Year of foundation: 2.004
 Type of ownership: Private
 Bachelor's degree students³: 9.413
 Master's degree students²: 1.651
 Faculty members²: 915
 Administration and service staff: 285
 Budget²: not available
 Bachelor's degrees¹: 27
 Master's degrees¹: 41

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

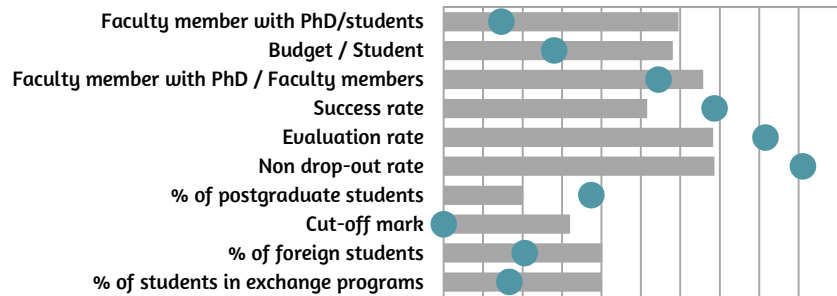
Index and position in the ranking between brackets



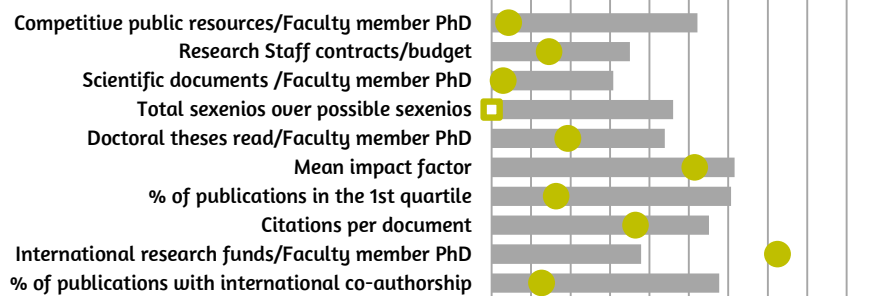
U-Ranking 2016 indicators

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

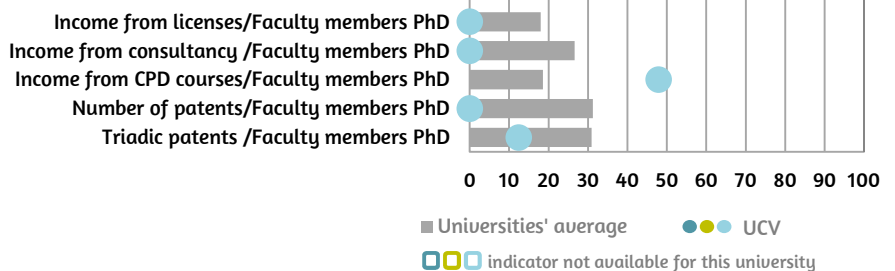
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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

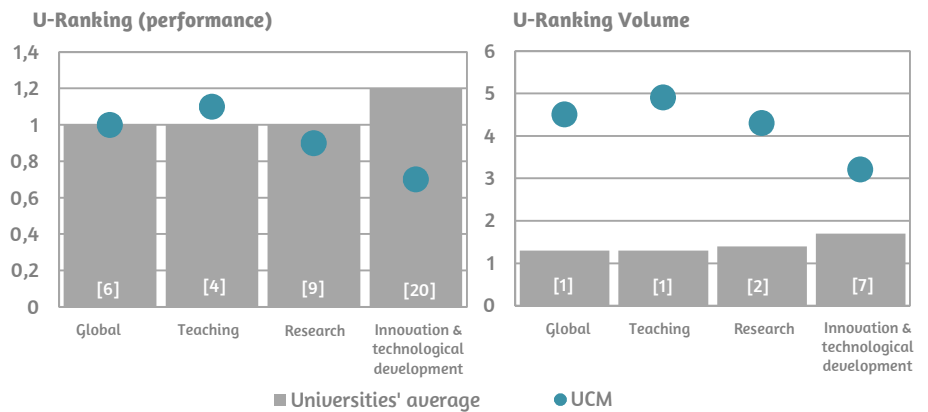
Year of foundation: 1.508
 Type of ownership: Public
 Bachelor's degree students³: 64.492
 Master's degree students²: 5.486
 Faculty members²: 6.273
 Administration and service staff: 3.600
 Budget¹: 603.439.184€
 Bachelor's degrees¹: 71
 Master's degrees¹: 163

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

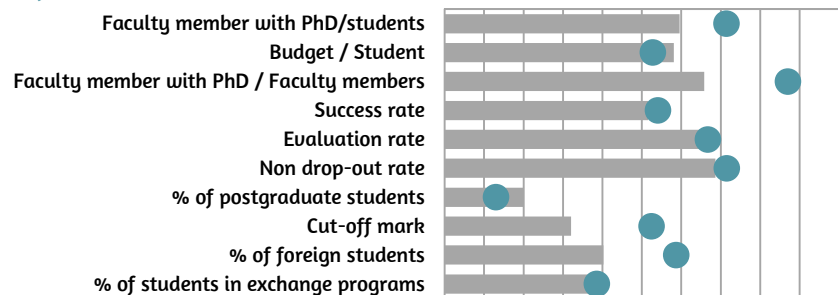
Index and position in the ranking between brackets



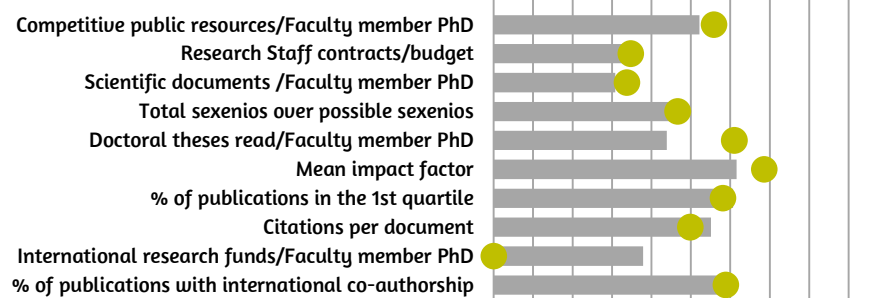
U-Ranking 2016 indicators

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

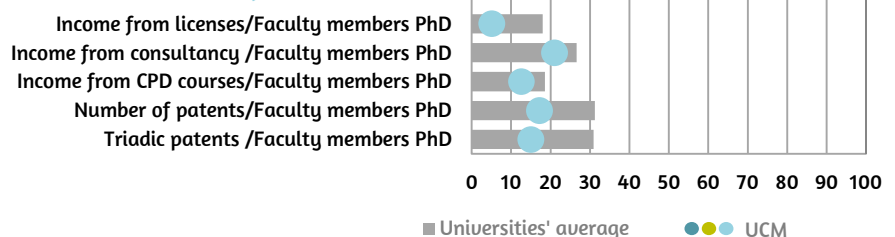
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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

UNIVERSIDAD DE ALCALÁ DE HENARES



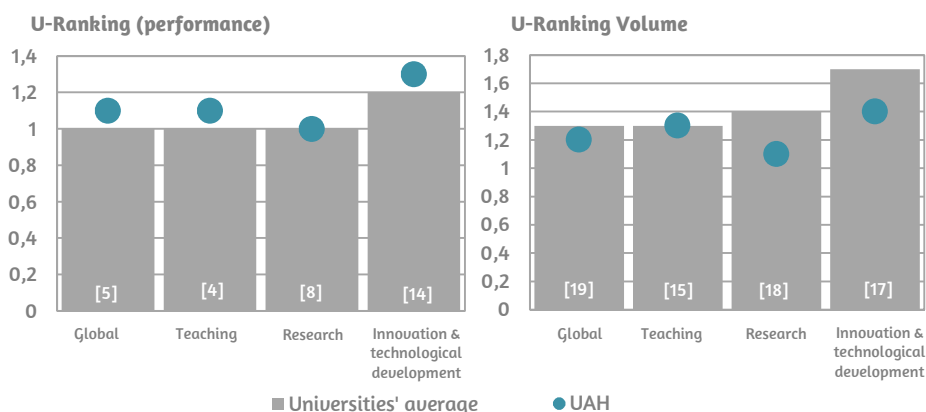
Year of foundation: 1.977
 Type of ownership: Public
 Bachelor's degree students³: 15.096
 Master's degree students²: 1.842
 Faculty members²: 1.717
 Administration and service staff: 777
 Budget³: 156.012.116€
 Bachelor's degrees¹: 36
 Master's degrees¹: 53

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

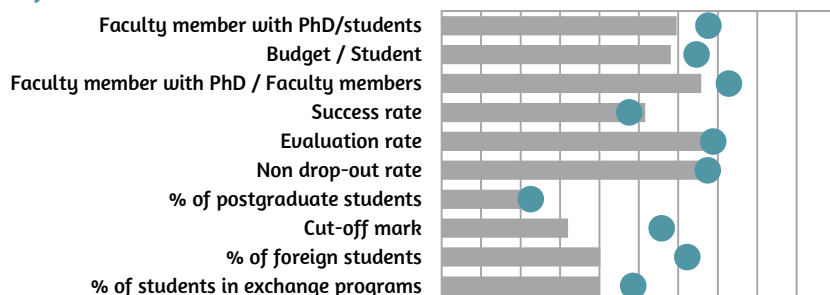
Index and position in the ranking between brackets



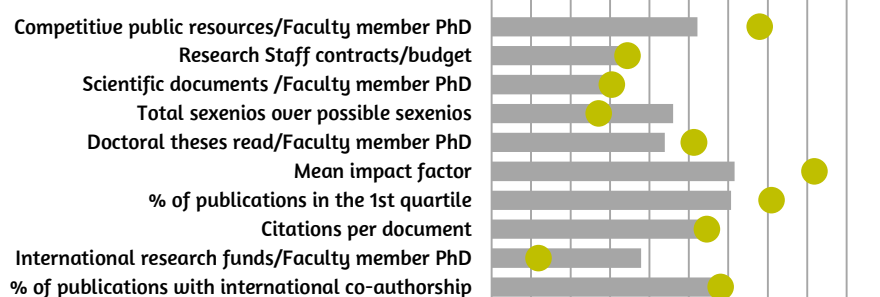
U-Ranking 2016 indicators

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

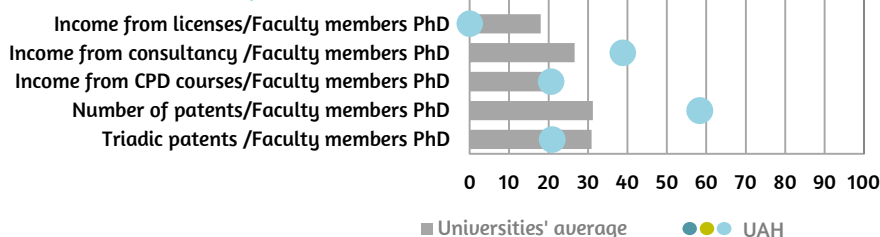
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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

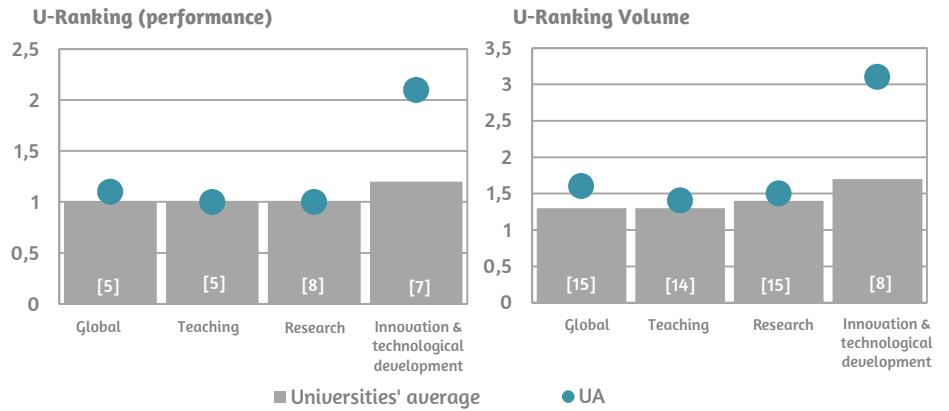
Year of foundation: 1.979
 Type of ownership: Public
 Bachelor's degree students³: 24.815
 Master's degree students²: 1.651
 Faculty members²: 2.129
 Administration and service staff: 1.234
 Budget²: 206.003.893€
 Bachelor's degrees¹: 40
 Master's degrees¹: 56

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

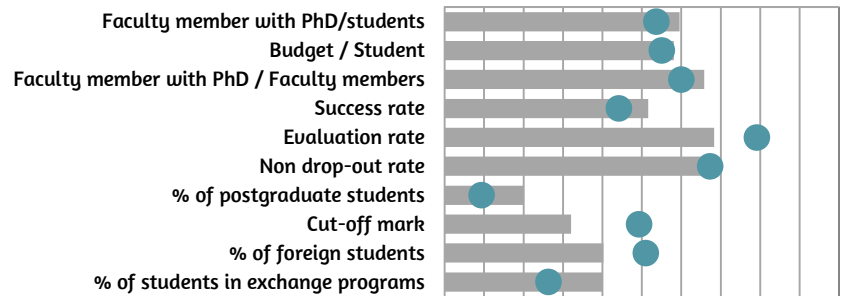
Index and position in the ranking between brackets



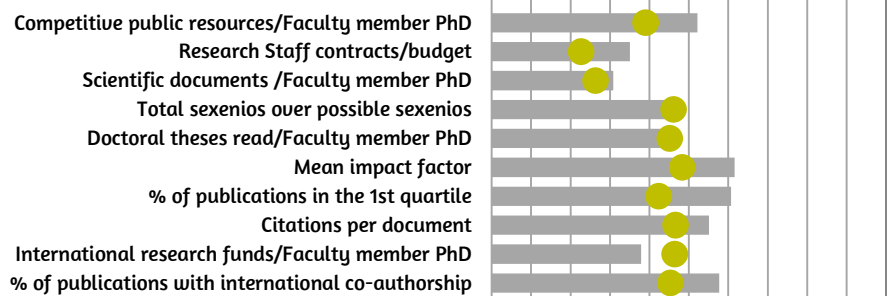
U-Ranking 2016 indicators

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

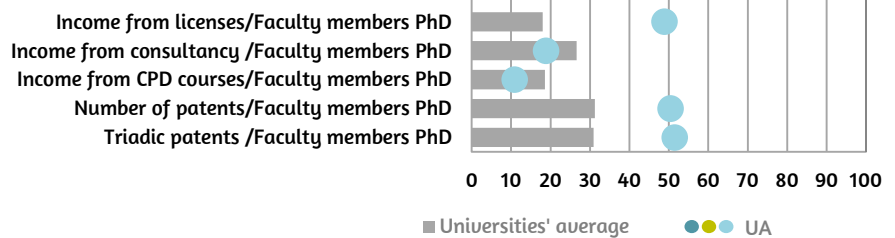
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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



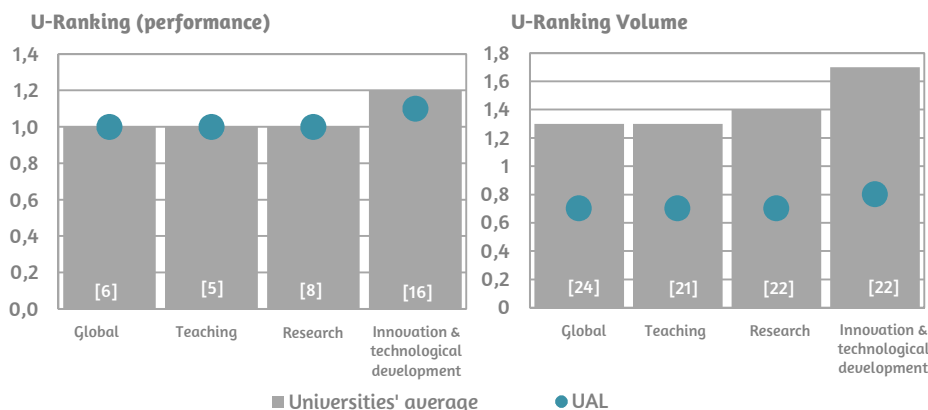
Year of foundation: 1.993
 Type of ownership: Public
 Bachelor's degree students³: 11.768
 Master's degree students²: 960
 Faculty members²: 780
 Administration and service staff: 479
 Budget²: 86.763.931€
 Bachelor's degrees¹: 30
 Master's degrees¹: 42

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

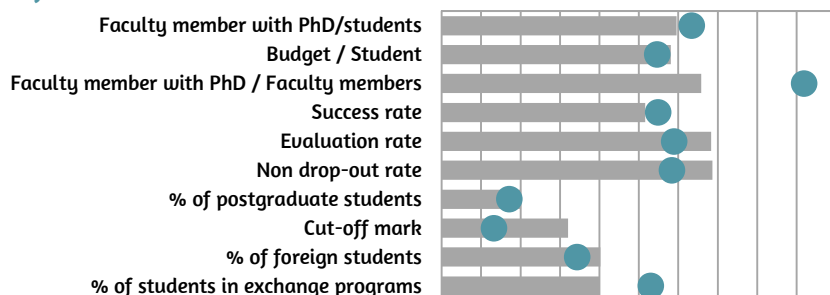
Index and position in the ranking between brackets



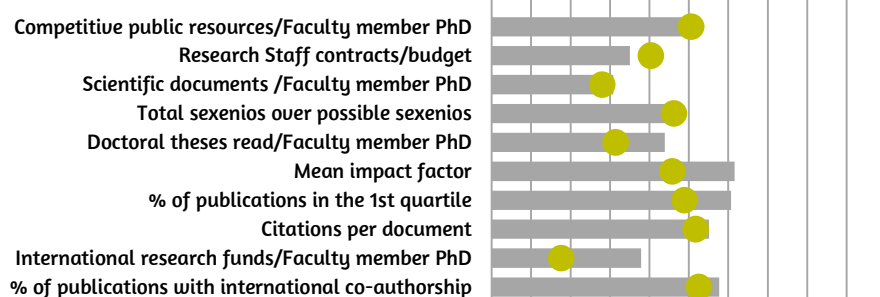
U-Ranking 2016 indicators

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

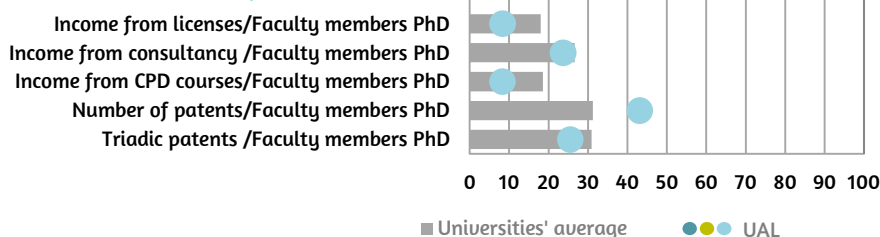
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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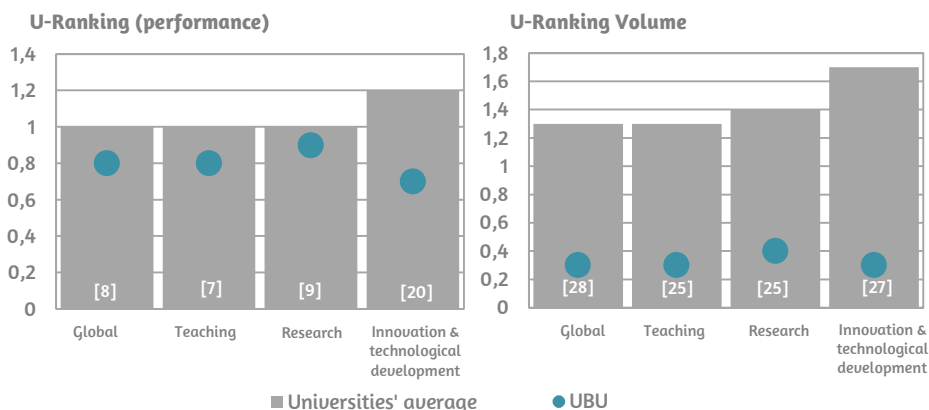
Year of foundation: 1.994
 Type of ownership: Public
 Bachelor's degree students³: 7.194
 Master's degree students²: 478
 Faculty members²: 777
 Administration and service staff: 357
 Budget¹: 51.405.900€
 Bachelor's degrees¹: 25
 Master's degrees¹: 18

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

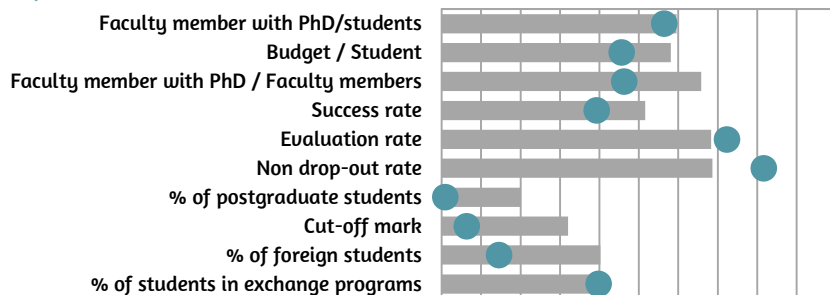
Index and position in the ranking between brackets



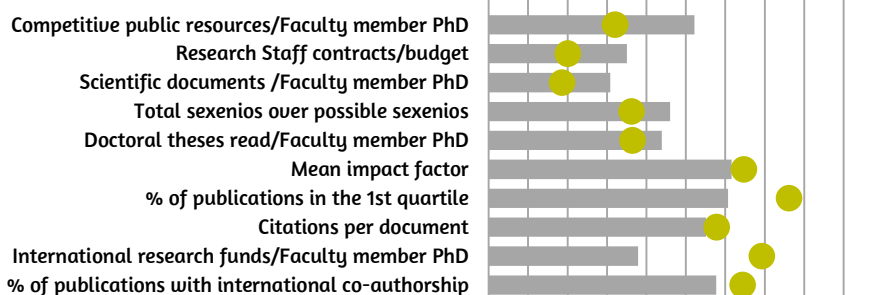
U-Ranking 2016 indicators

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

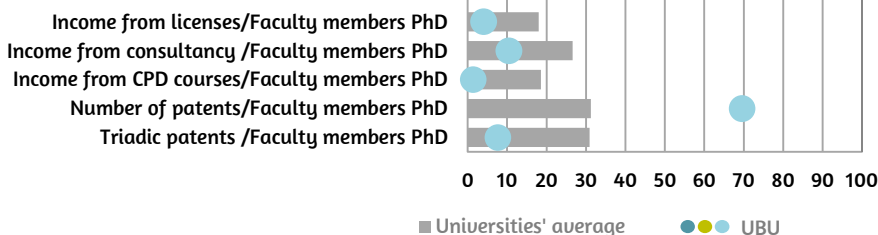
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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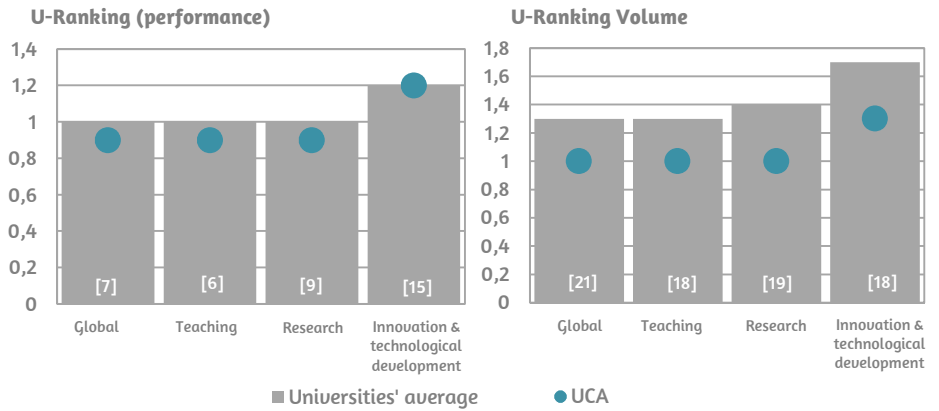
Year of foundation: 1.979
 Type of ownership: Public
 Bachelor's degree students³: 19.306
 Master's degree students²: 1.070
 Faculty members²: 1.658
 Administration and service staff: 717
 Budget¹: 165.703.268€
 Bachelor's degrees¹: 44
 Master's degrees¹: 44

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

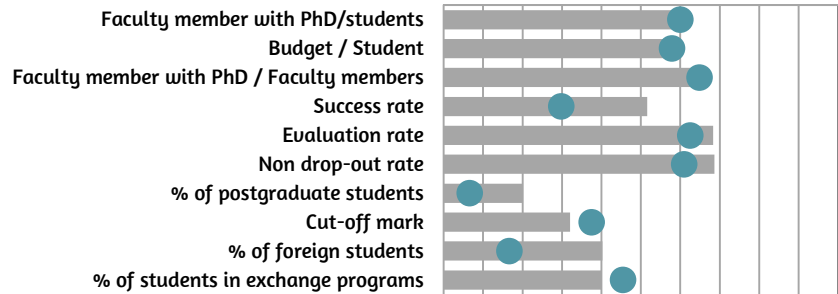
Index and position in the ranking between brackets



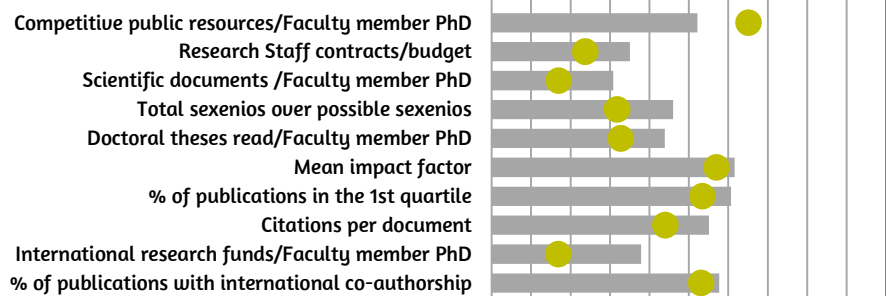
U-Ranking 2016 indicators

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

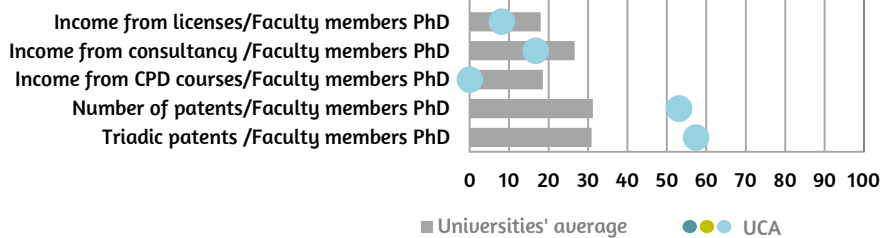
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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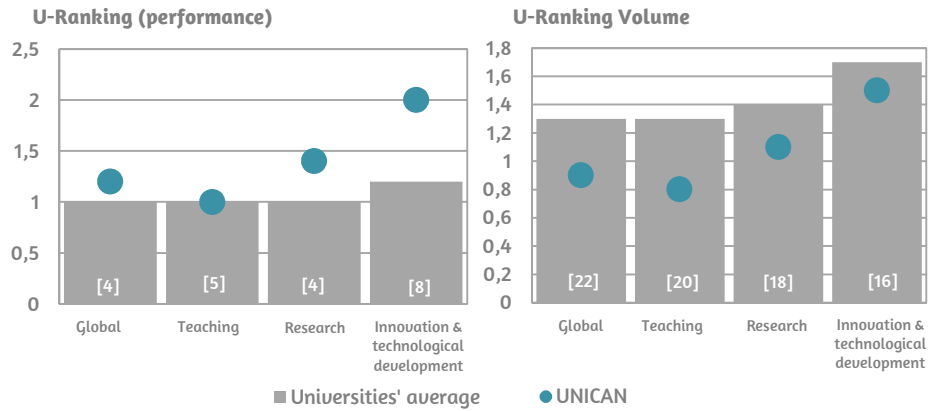
Year of foundation: 1.972
 Type of ownership: Public
 Bachelor's degree students³: 9.669
 Master's degree students²: 842
 Faculty members²: 1.333
 Administration and service staff: 606
 Budget²: 97.473.251€
 Bachelor's degrees¹: 29
 Master's degrees¹: 52

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

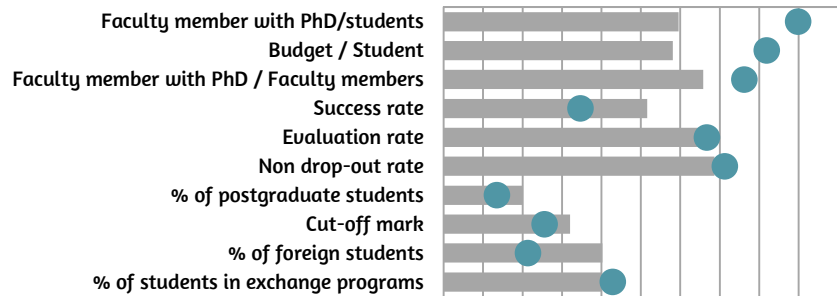
Index and position in the ranking between brackets



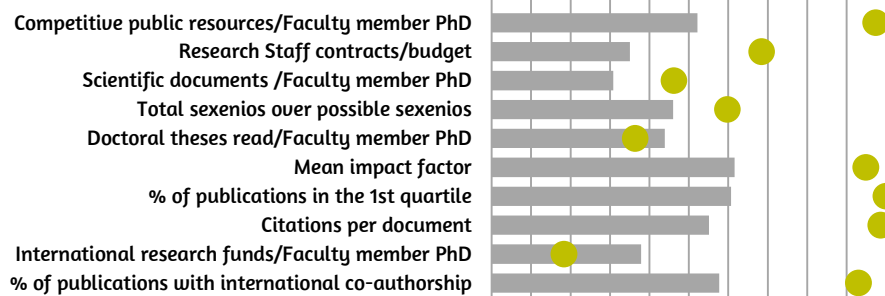
U-Ranking 2016 indicators

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

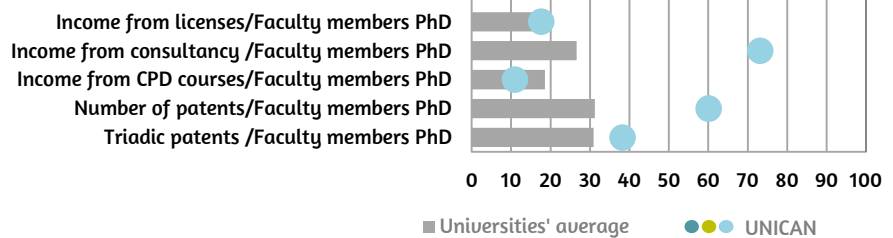
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD DE CASTILLA-LA MANCHA



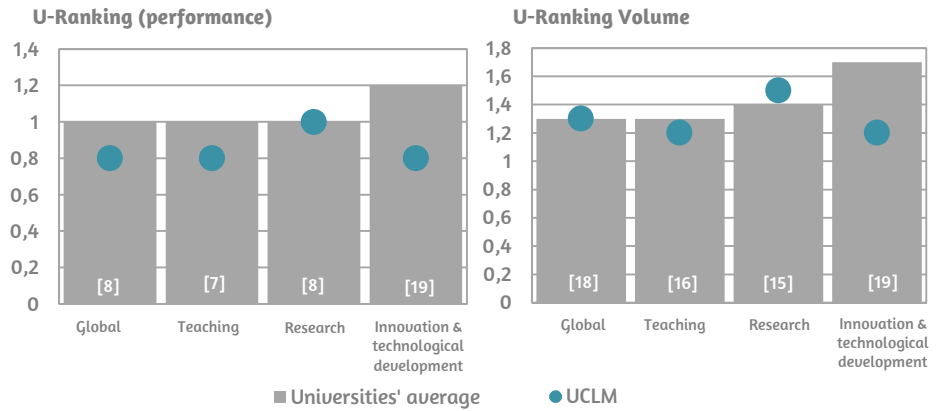
Year of foundation: 1.982
 Type of ownership: Public
 Bachelor's degree students³: 24.629
 Master's degree students²: 1.238
 Faculty members²: 2.230
 Administration and service staff: 1.054
 Budget¹: 166.751.304€
 Bachelor's degrees¹: 46
 Master's degrees¹: 36

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

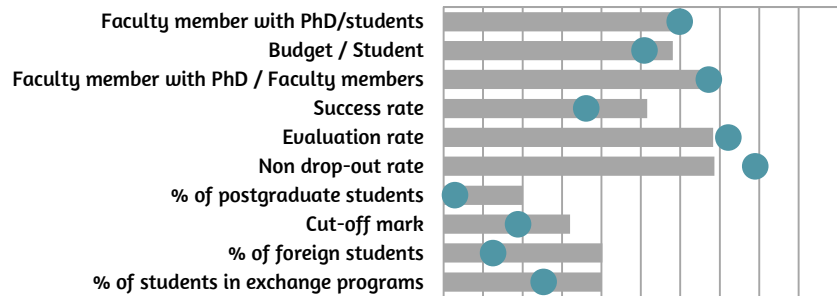
Index and position in the ranking between brackets



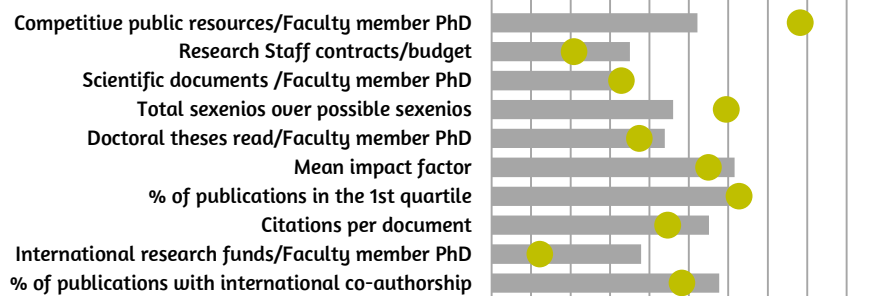
U-Ranking 2016 indicators

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

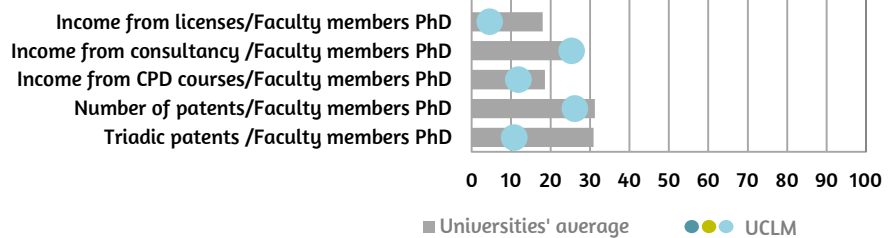
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD DE CÓRDOBA



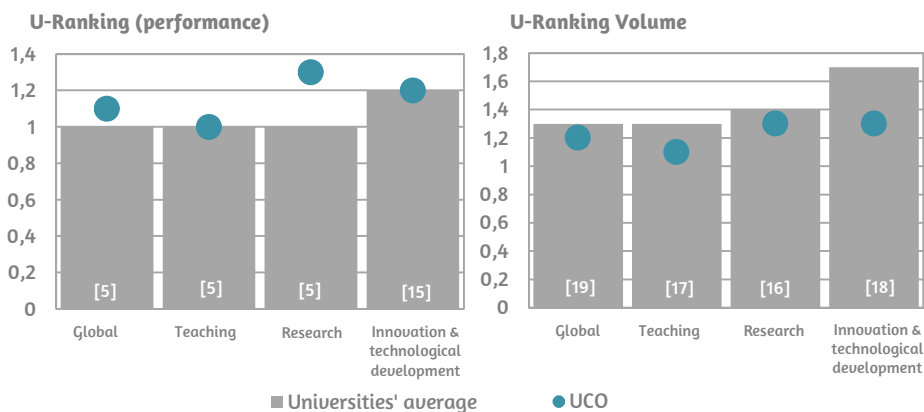
Year of foundation: 1.972
 Type of ownership: Public
 Bachelor's degree students³: 16.927
 Master's degree students²: 1.355
 Faculty members²: 1.413
 Administration and service staff: 744
 Budget¹: 149.315.347€
 Bachelor's degrees¹: 32
 Master's degrees¹: 52

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

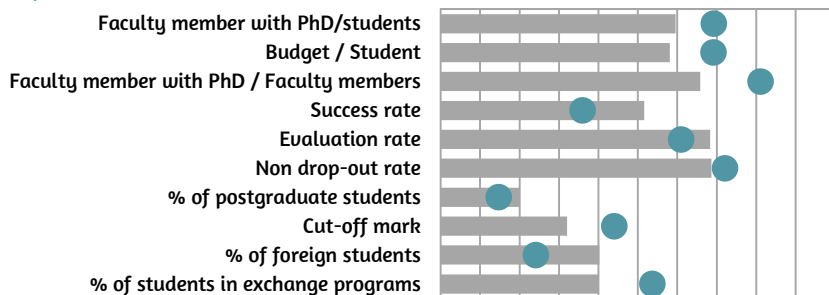
Index and position in the ranking between brackets



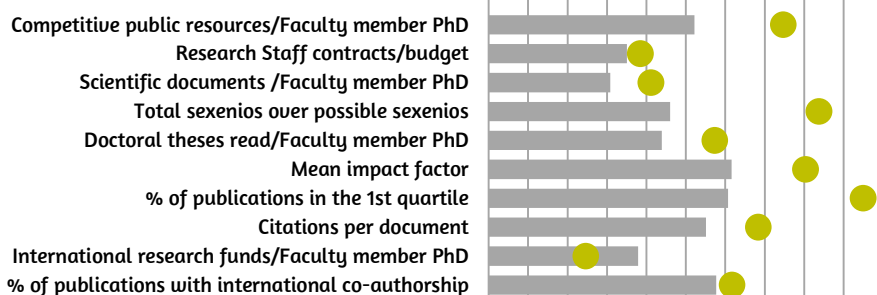
U-Ranking 2016 indicators

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

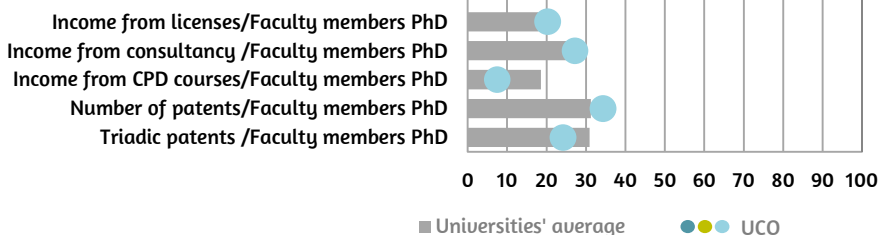
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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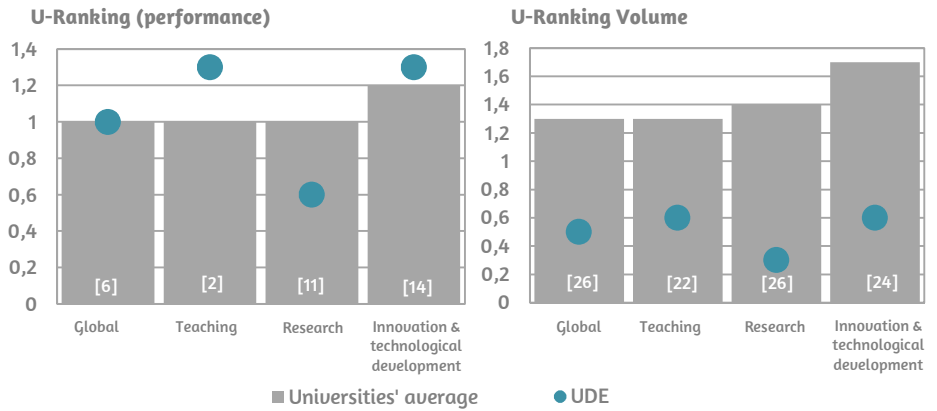
Year of foundation: 1.886
 Type of ownership: Private
 Bachelor's degree students³: 6.892
 Master's degree students²: 1.513
 Faculty members²: 550
 Administration and service staff: 464
 Budget²: not available
 Bachelor's degrees¹: 26
 Master's degrees¹: 52

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

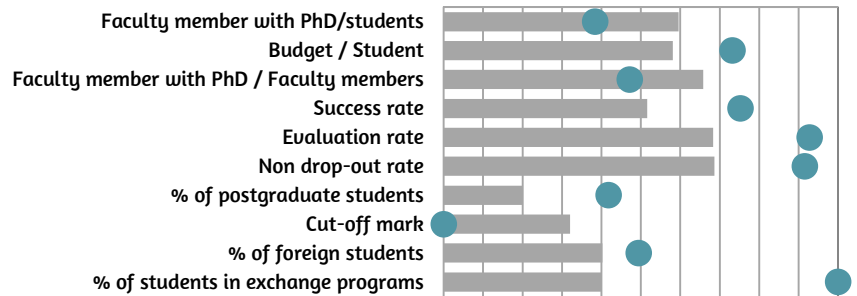
Index and position in the ranking between brackets



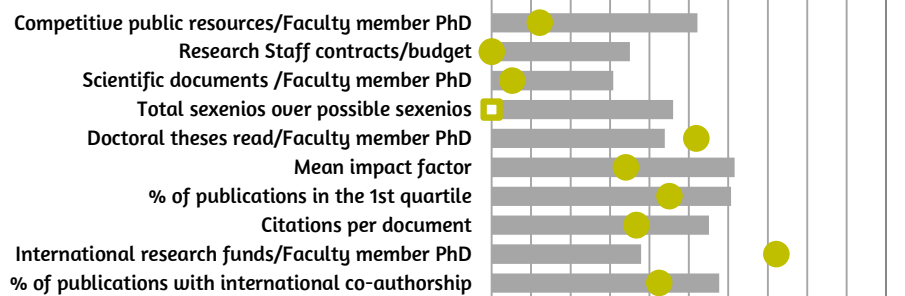
U-Ranking 2016 indicators

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

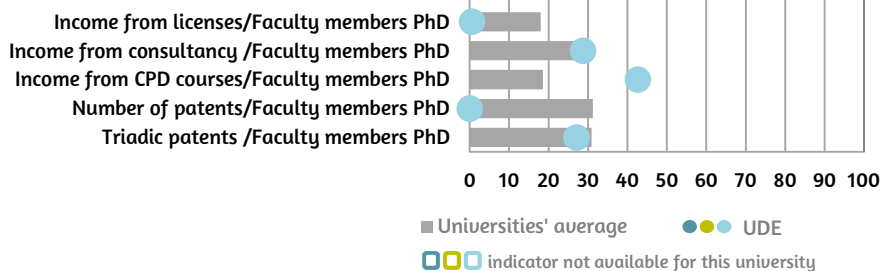
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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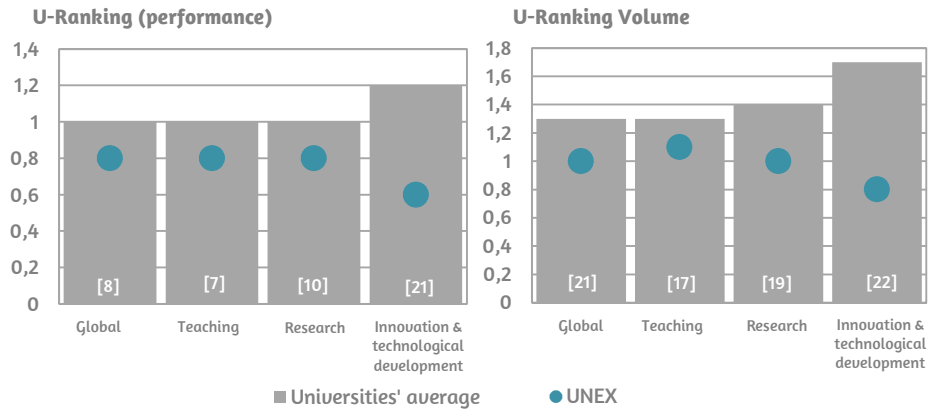
Year of foundation: 1.973
 Type of ownership: Public
 Bachelor's degree students³: 19.806
 Master's degree students²: 1.322
 Faculty members²: 1.915
 Administration and service staff: 885
 Budget²: 134.961.698€
 Bachelor's degrees¹: 59
 Master's degrees¹: 42

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

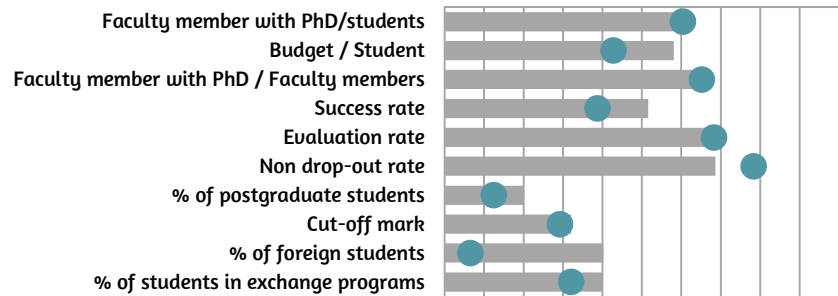
Index and position in the ranking between brackets



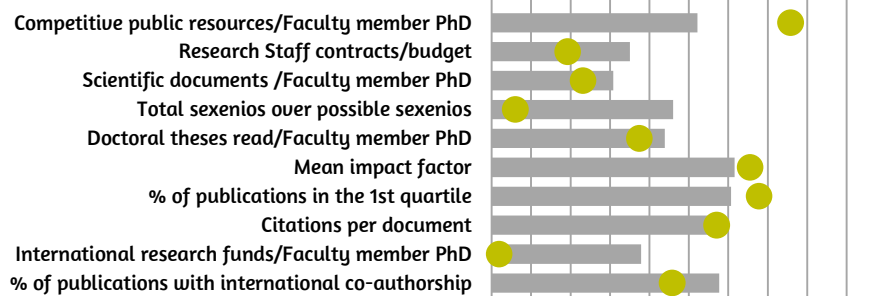
U-Ranking 2016 indicators

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

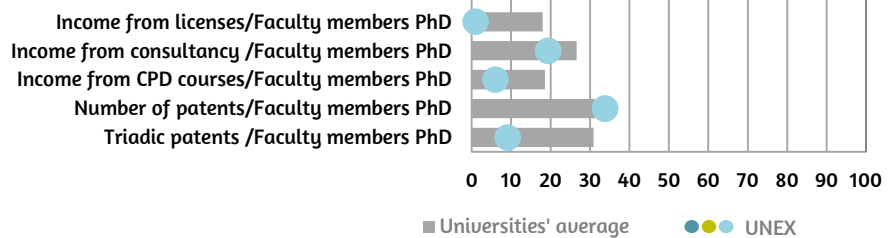
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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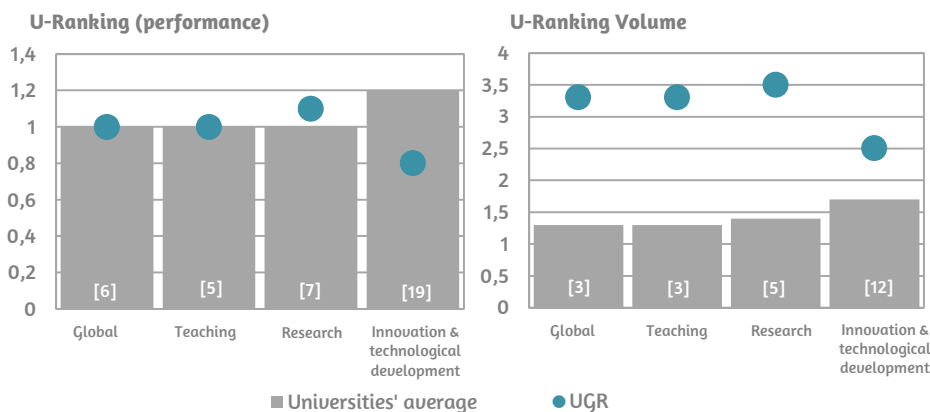
Year of foundation: 1.531
 Type of ownership: Public
 Bachelor's degree students³: 49.888
 Master's degree students²: 3.748
 Faculty members²: 3.562
 Administration and service staff: 2.217
 Budget¹: 410.361.034€
 Bachelor's degrees¹: 63
 Master's degrees¹: 110

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

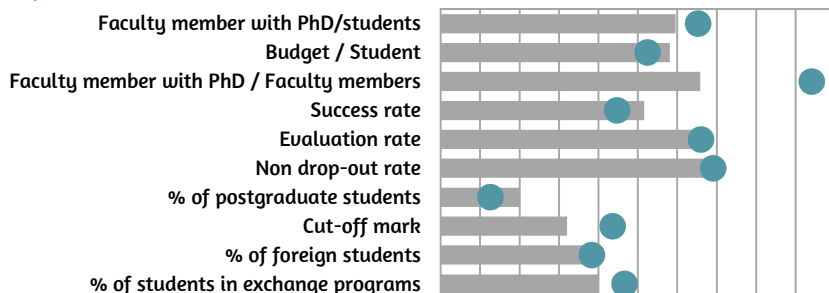
Index and position in the ranking between brackets



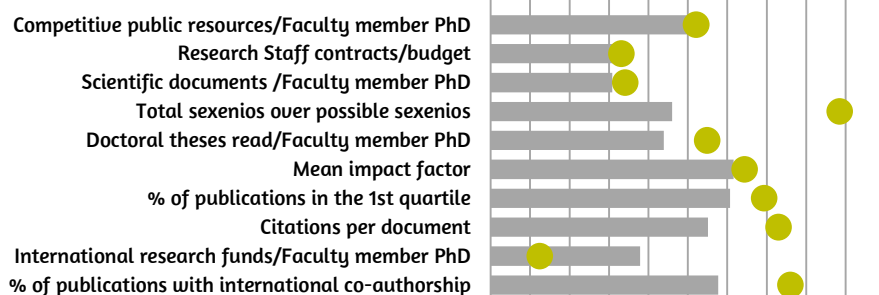
U-Ranking 2016 indicators

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

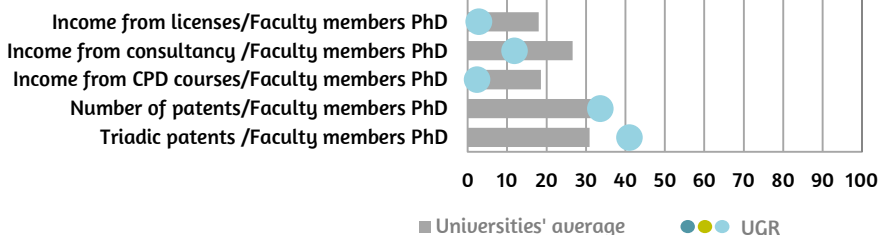
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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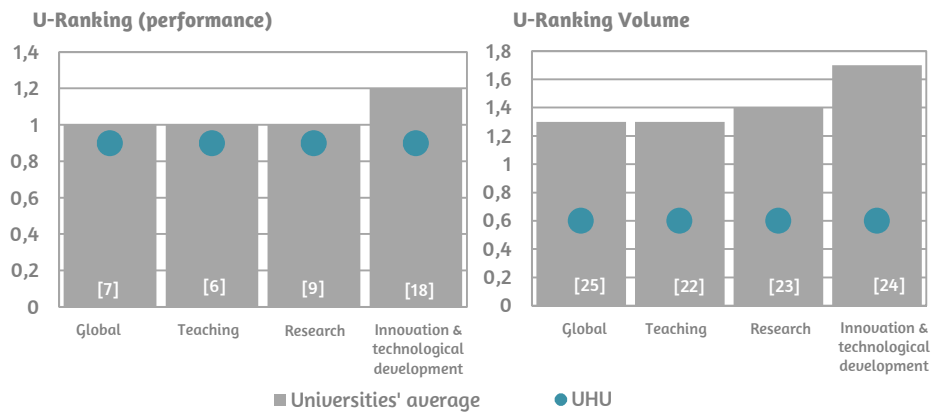
Year of foundation: 1.993
 Type of ownership: Public
 Bachelor's degree students³: 10.903
 Master's degree students²: 652
 Faculty members²: 802
 Administration and service staff: 440
 Budget²: 77.140.503€
 Bachelor's degrees¹: 29
 Master's degrees¹: 33

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

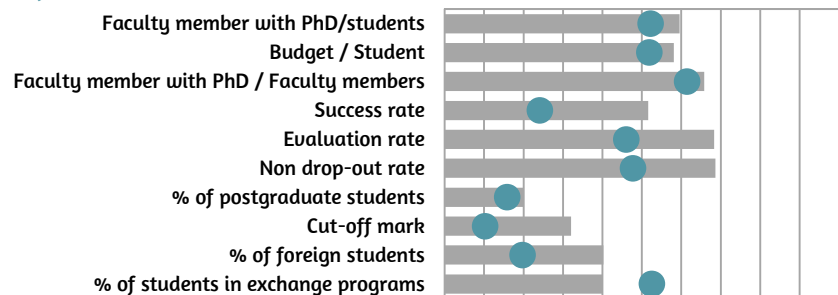
Index and position in the ranking between brackets



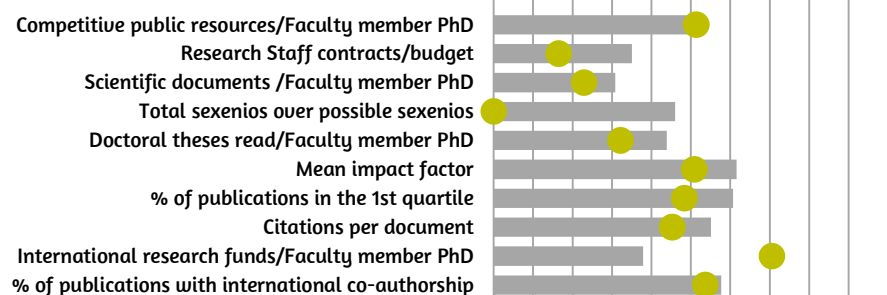
U-Ranking 2016 indicators

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

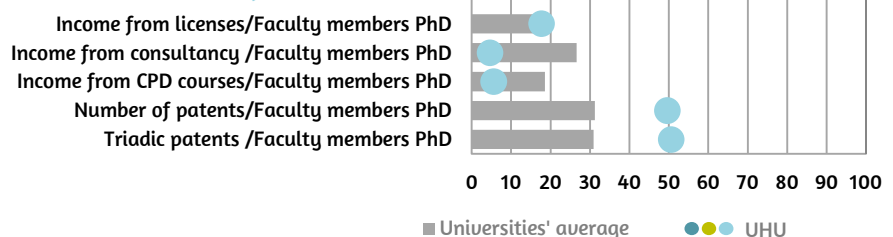
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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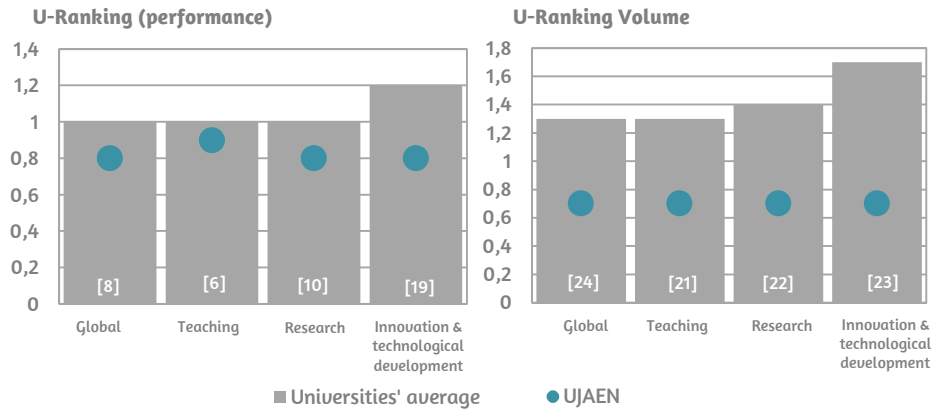
Year of foundation: 1.993
 Type of ownership: Public
 Bachelor's degree students³: 14.183
 Master's degree students²: 979
 Faculty members²: 897
 Administration and service staff: 505
 Budget¹: 102.069.616€
 Bachelor's degrees¹: 34
 Master's degrees¹: 45

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

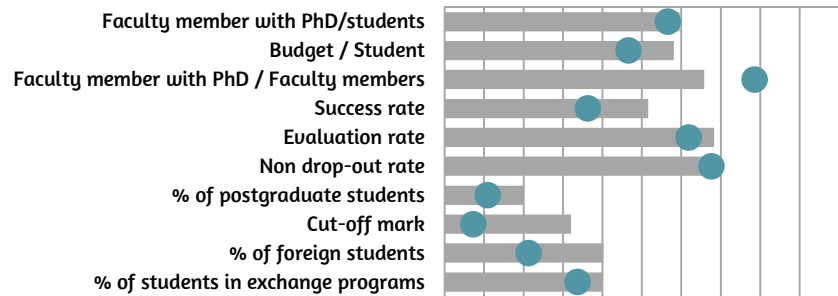
Index and position in the ranking between brackets



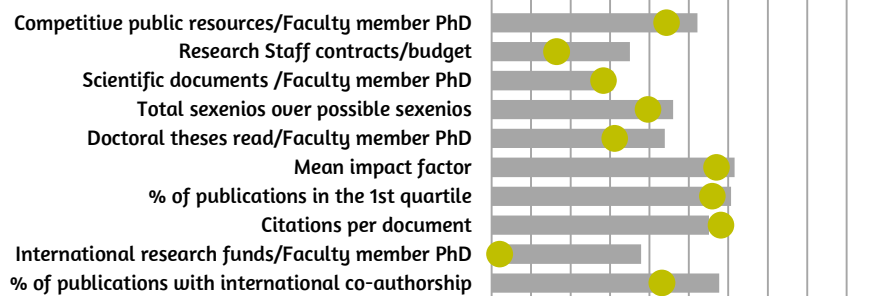
U-Ranking 2016 indicators

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

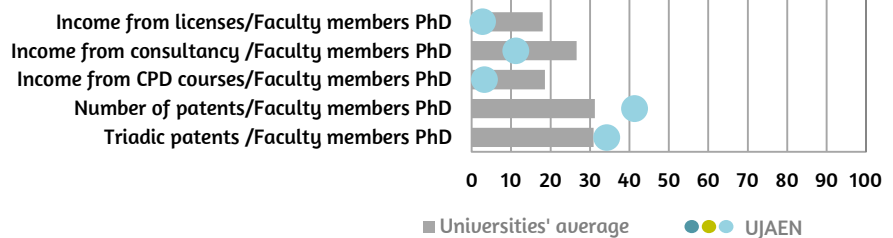
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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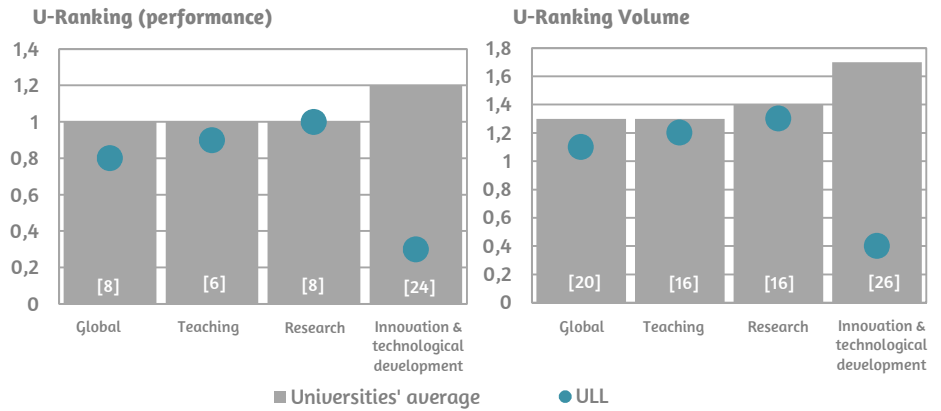
Year of foundation: 1.701
 Type of ownership: Public
 Bachelor's degree students³: 19.663
 Master's degree students²: 779
 Faculty members²: 1.686
 Administration and service staff: 821
 Budget³: 147.647.589€
 Bachelor's degrees¹: 45
 Master's degrees¹: 64

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

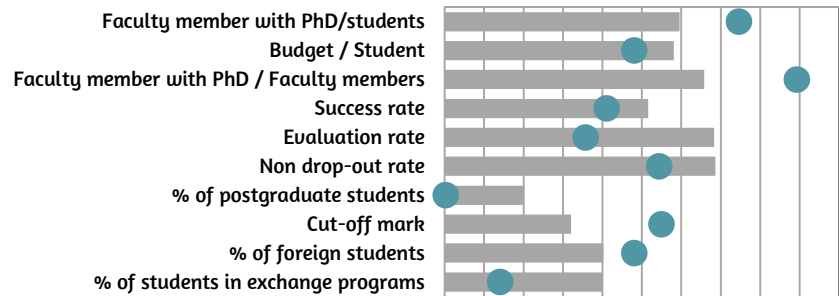
Index and position in the ranking between brackets



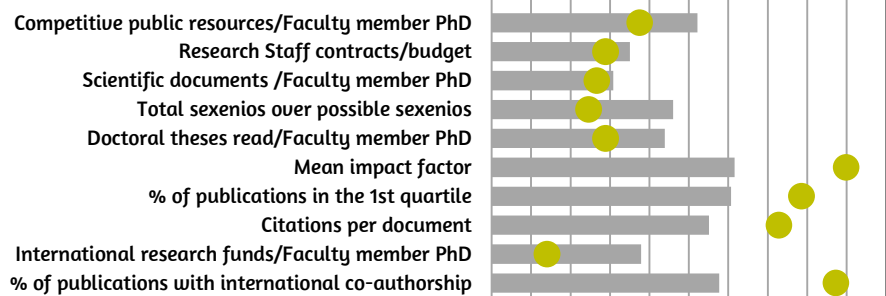
U-Ranking 2016 indicators

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

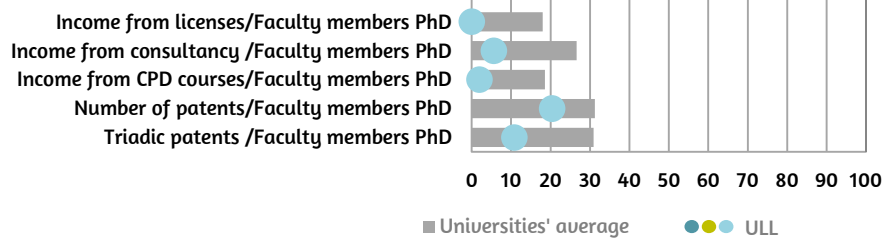
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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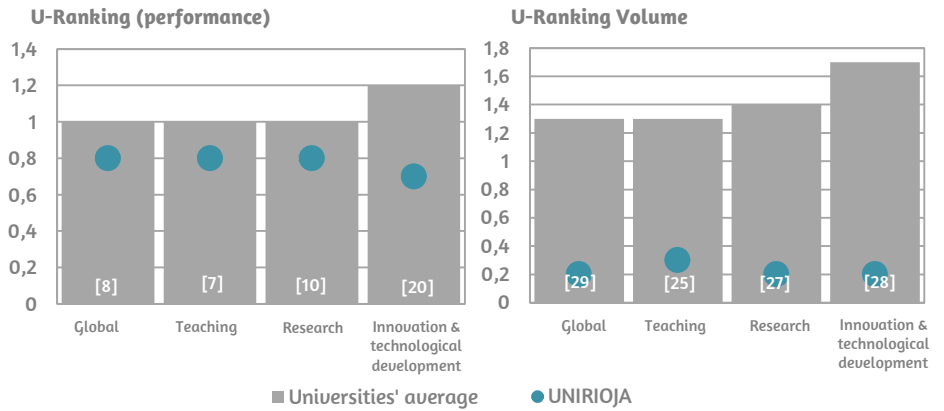
Year of foundation: 1.992
 Type of ownership: Public
 Bachelor's degree students³: 4.015
 Master's degree students²: 240
 Faculty members²: 415
 Administration and service staff: 258
 Budget¹: 40.289.185€
 Bachelor's degrees¹: 19
 Master's degrees¹: 18

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

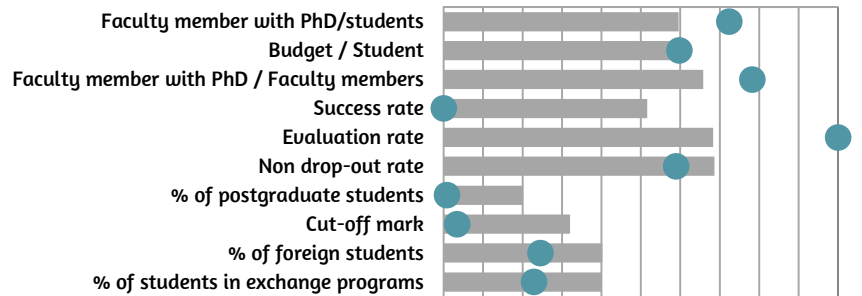
Index and position in the ranking between brackets



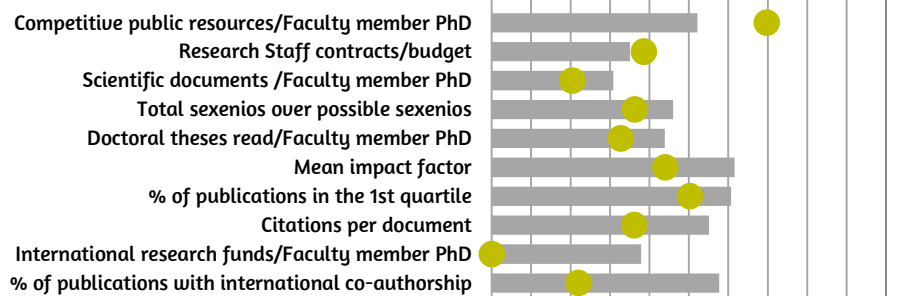
U-Ranking 2016 indicators

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

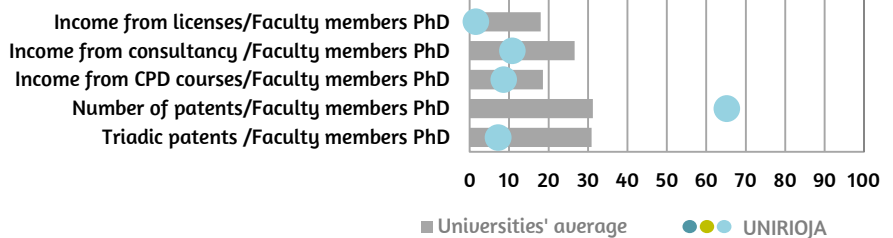
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD DE LAS PALMAS DE GRAN CANARIA



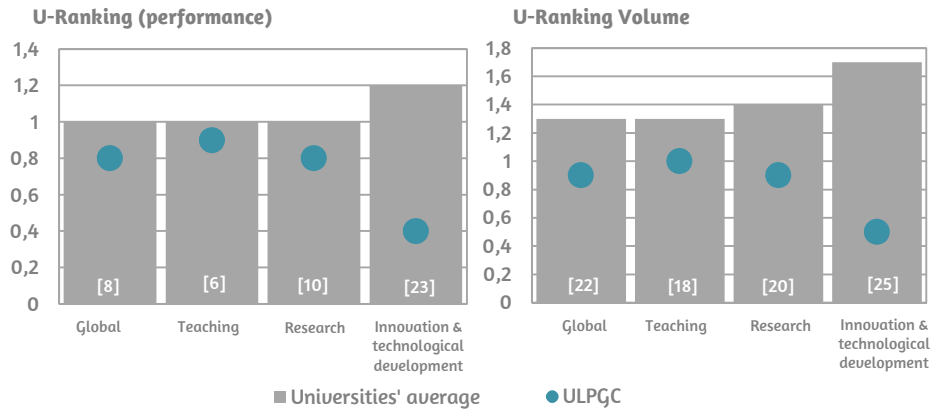
Year of foundation: 1.979
 Type of ownership: Public
 Bachelor's degree students³: 19.839
 Master's degree students²: 862
 Faculty members²: 1.576
 Administration and service staff: 756
 Budget²: 135.820.240€
 Bachelor's degrees¹: 36
 Master's degrees¹: 36

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

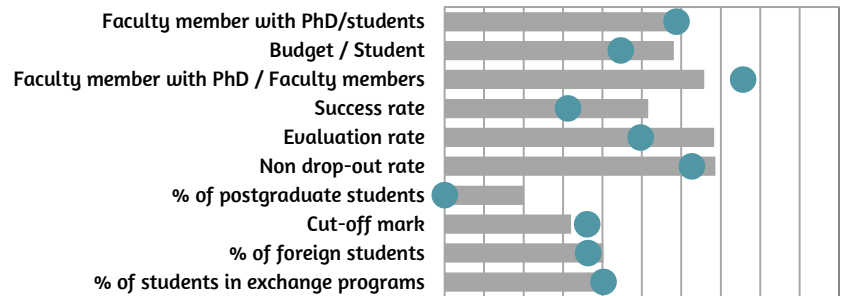
Index and position in the ranking between brackets



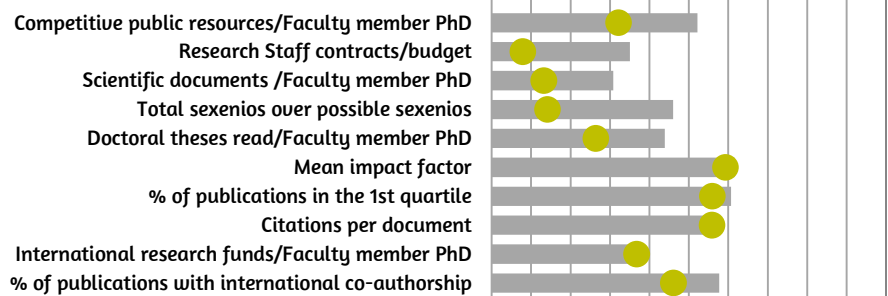
U-Ranking 2016 indicators

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

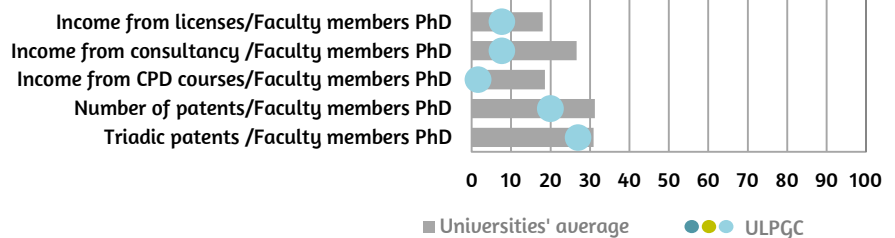
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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



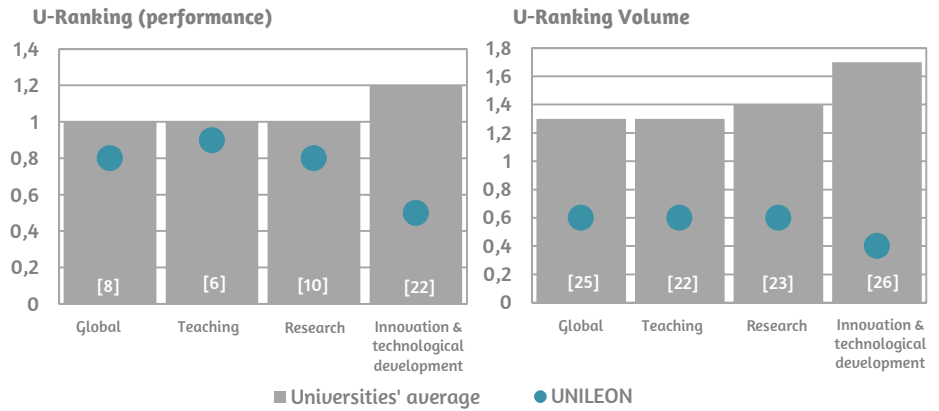
Year of foundation: 1.979
 Type of ownership: Public
 Bachelor's degree students³: 12.104
 Master's degree students²: 800
 Faculty members²: 883
 Administration and service staff: 468
 Budget¹: 81.784.038€
 Bachelor's degrees¹: 39
 Master's degrees¹: 38

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

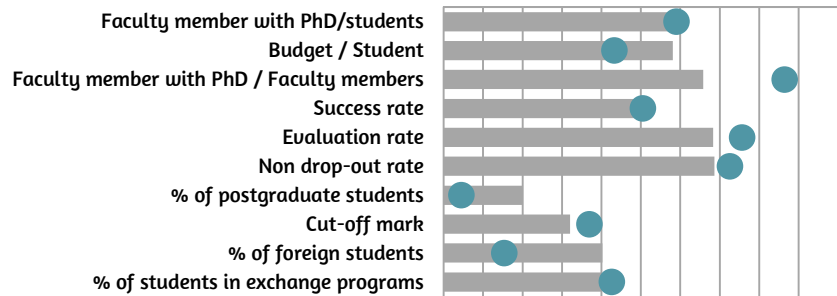
Index and position in the ranking between brackets



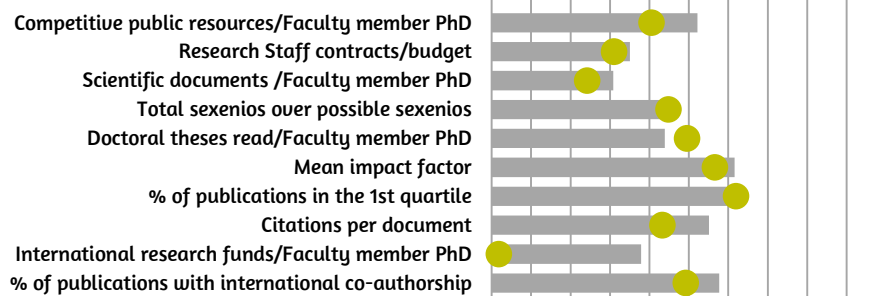
U-Ranking 2016 indicators

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

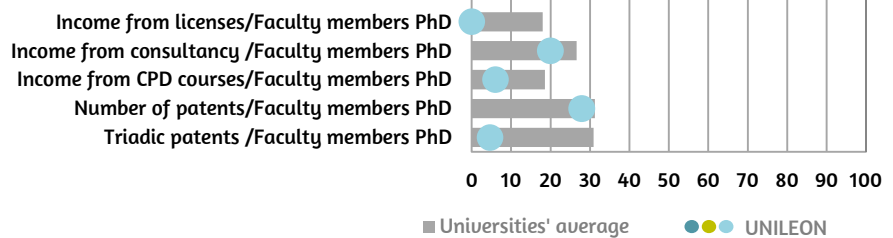
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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

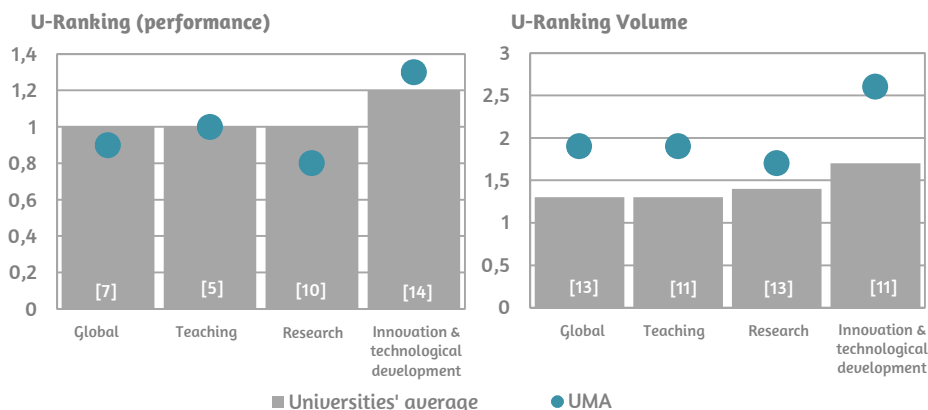
Year of foundation: 1.972
 Type of ownership: Public
 Bachelor's degree students³: 34.065
 Master's degree students²: 2.194
 Faculty members²: 2.400
 Administration and service staff: 1.269
 Budget²: 253.381.863€
 Bachelor's degrees¹: 58
 Master's degrees¹: 63

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

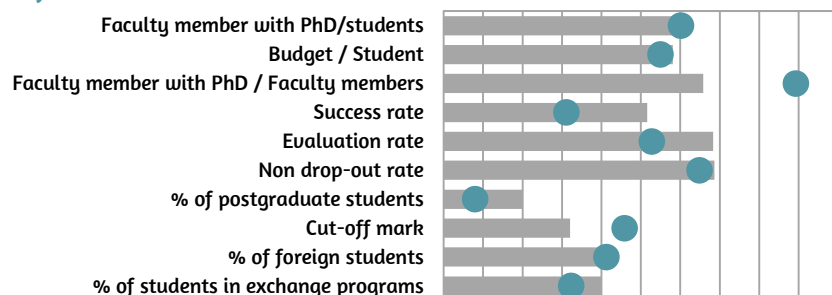
Index and position in the ranking between brackets



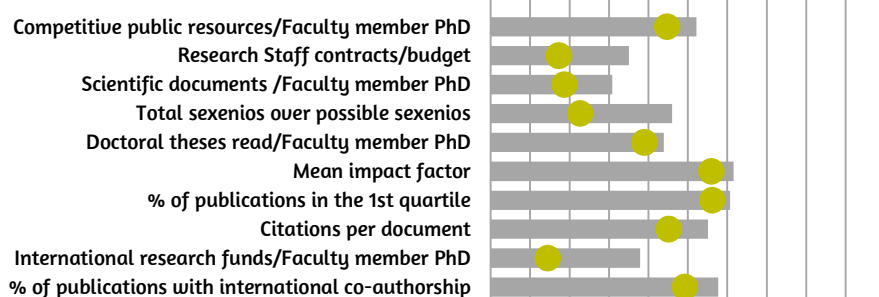
U-Ranking 2016 indicators

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

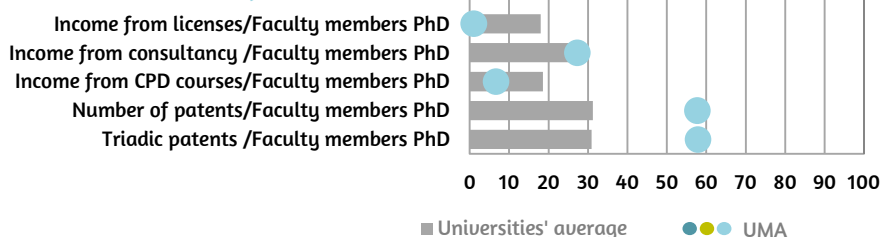
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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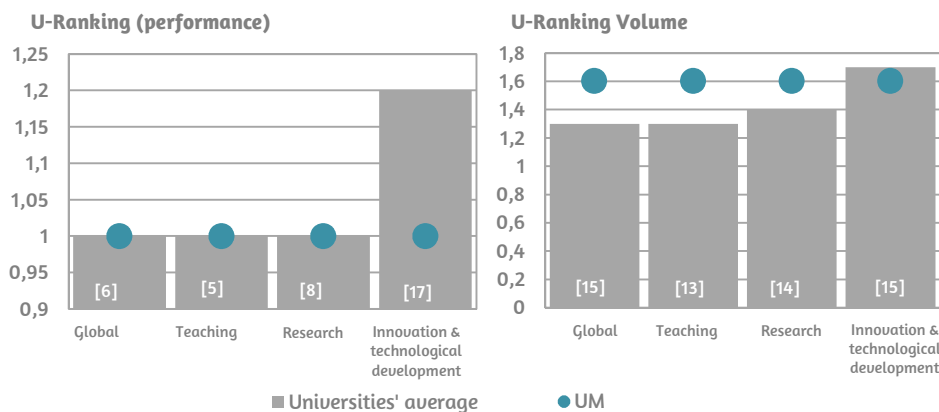
Year of foundation: 1.915
 Type of ownership: Public
 Bachelor's degree students³: 28.492
 Master's degree students²: 2.349
 Faculty members²: 2.575
 Administration and service staff: 1.150
 Budget²: 188.826.820€
 Bachelor's degrees¹: 48
 Master's degrees¹: 86

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

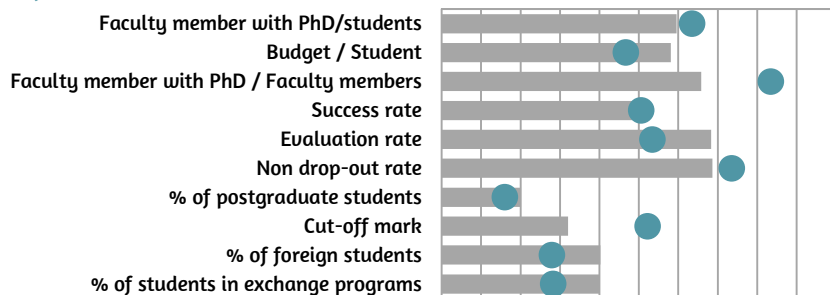
Index and position in the ranking between brackets



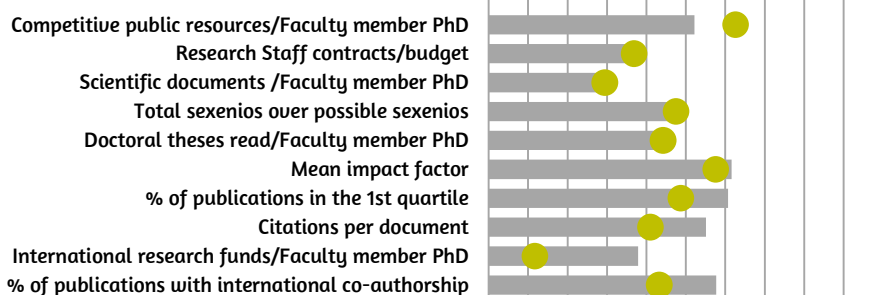
U-Ranking 2016 indicators

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

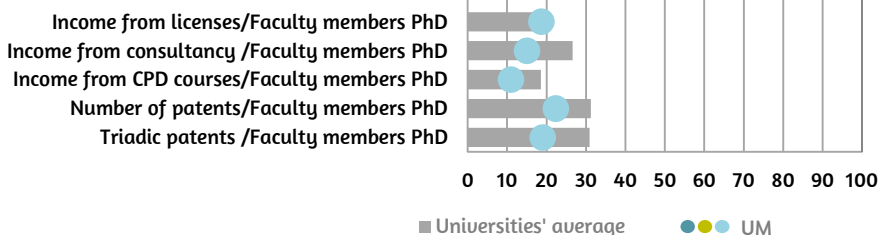
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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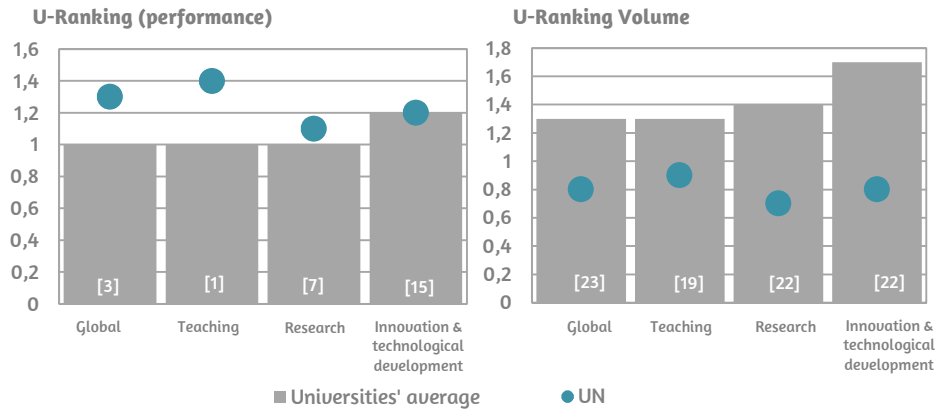
Year of foundation: 1.952
 Type of ownership: Private
 Bachelor's degree students³: 7.664
 Master's degree students²: 1.779
 Faculty members²: 1.369
 Administration and service staff: 1.379
 Budget²: not available
 Bachelor's degrees¹: 37
 Master's degrees¹: 33

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

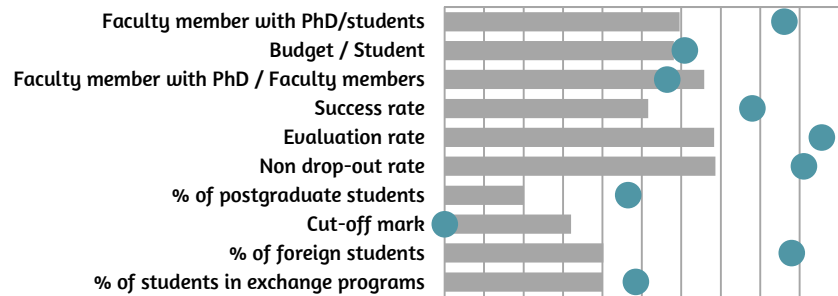
Index and position in the ranking between brackets



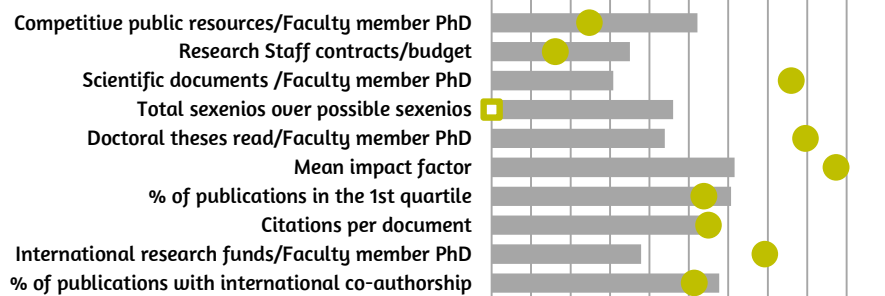
U-Ranking 2016 indicators

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

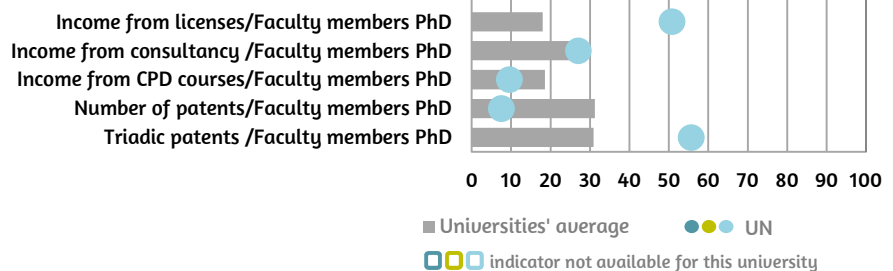
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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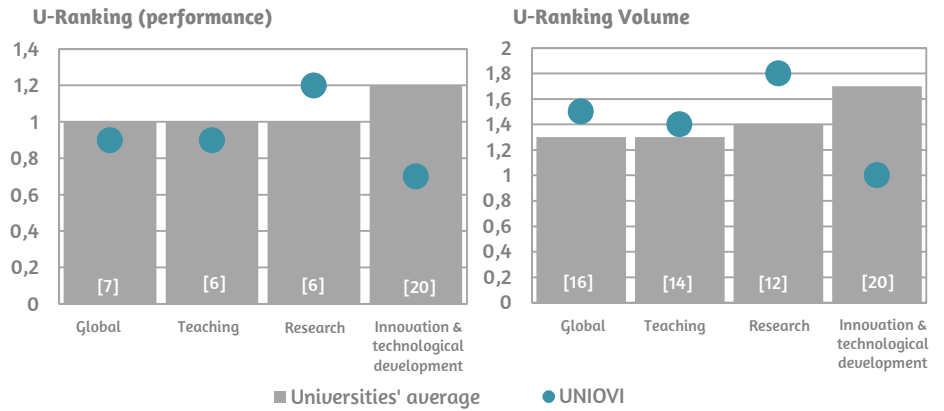
Year of foundation: 1.604
 Type of ownership: Public
 Bachelor's degree students³: 20.440
 Master's degree students²: 1.518
 Faculty members²: 1.972
 Administration and service staff: 948
 Budget²: 179.033.441€
 Bachelor's degrees¹: 52
 Master's degrees¹: 55

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

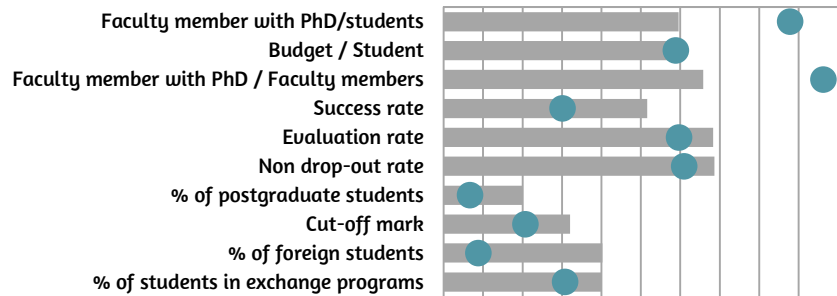
Index and position in the ranking between brackets



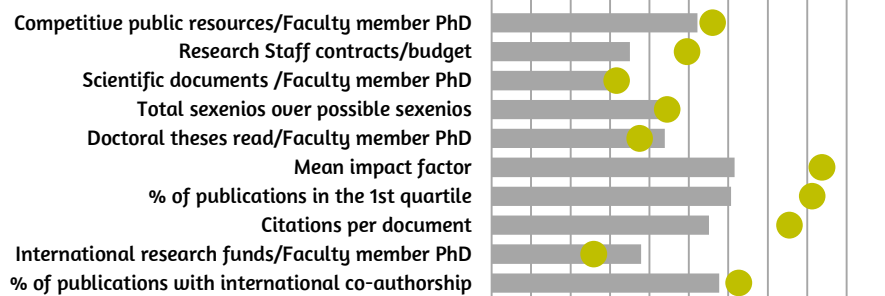
U-Ranking 2016 indicators

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

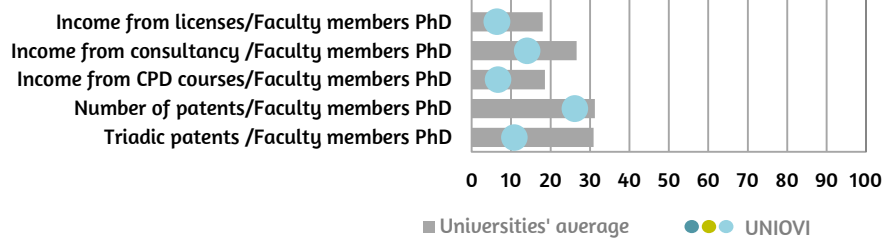
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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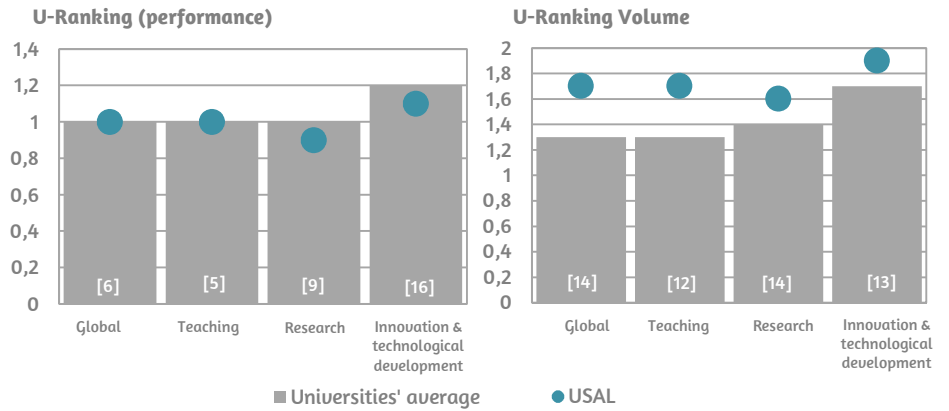
Year of foundation: 1.218
 Type of ownership: Public
 Bachelor's degree students³: 22.980
 Master's degree students²: 1.448
 Faculty members²: 2.312
 Administration and service staff: 1.132
 Budget²: 203.722.331€
 Bachelor's degrees¹: 66
 Master's degrees¹: 68

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

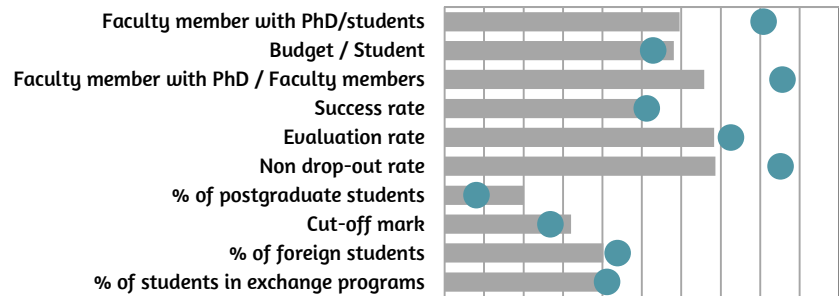
Index and position in the ranking between brackets



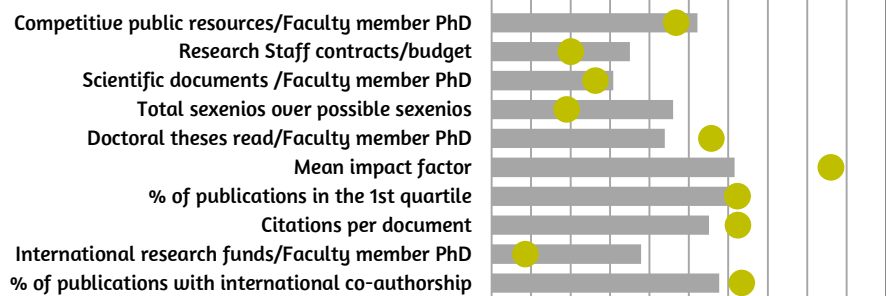
U-Ranking 2016 indicators

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

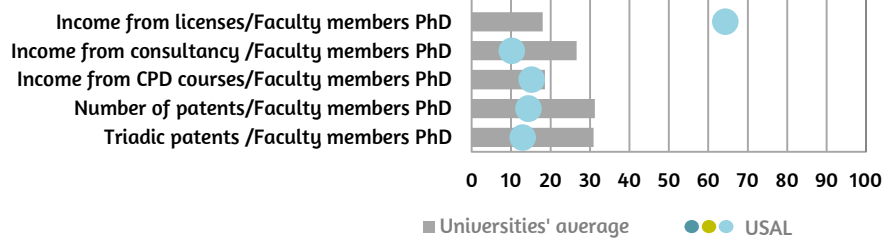
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD SAN JORGE



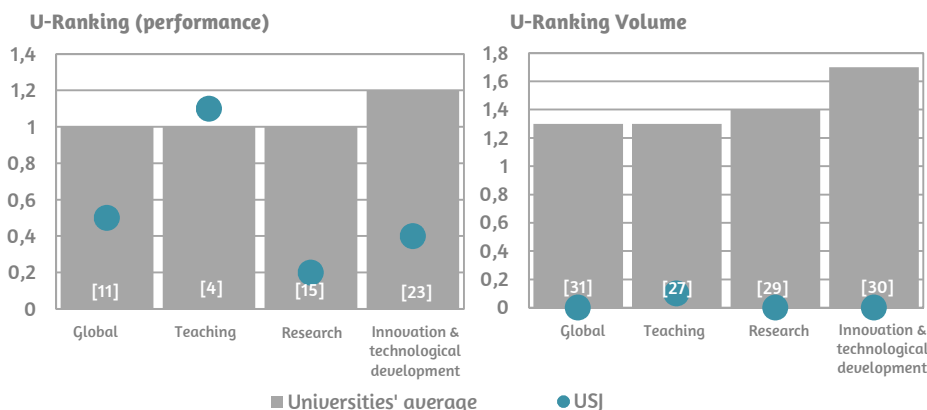
Year of foundation: 2.005
 Type of ownership: Private
 Bachelor's degree students³: 2.059
 Master's degree students²: 50
 Faculty members²: 273
 Administration and service staff: 107
 Budget²: not available
 Bachelor's degrees¹: 14
 Master's degrees¹: 5

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

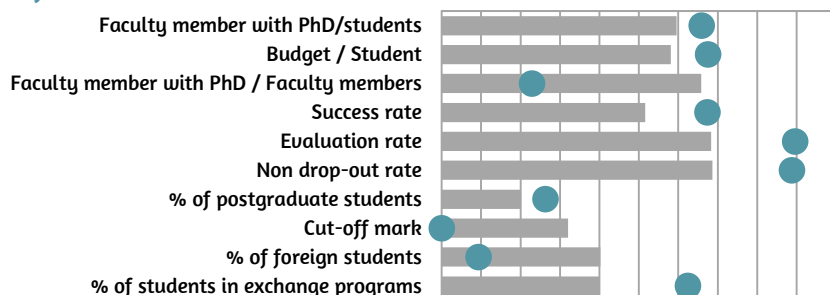
Index and position in the ranking between brackets



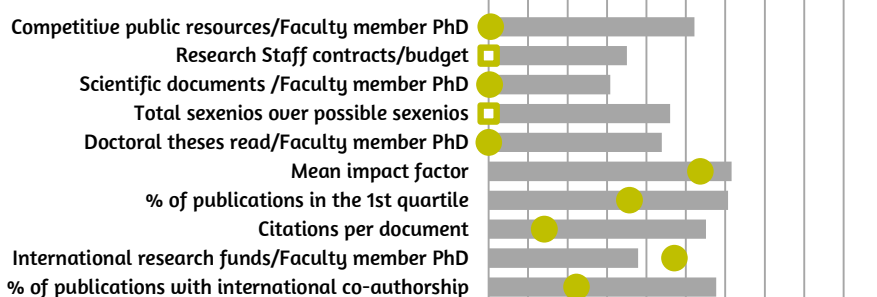
U-Ranking 2016 indicators

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

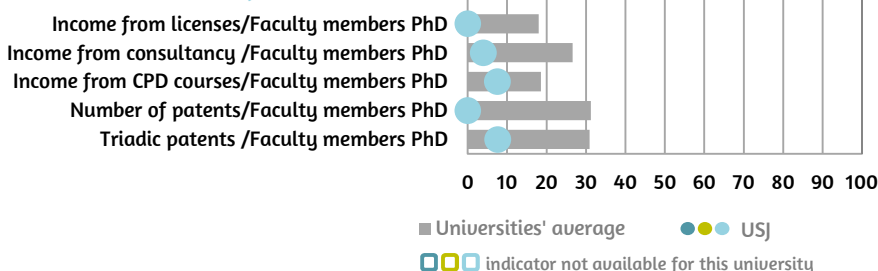
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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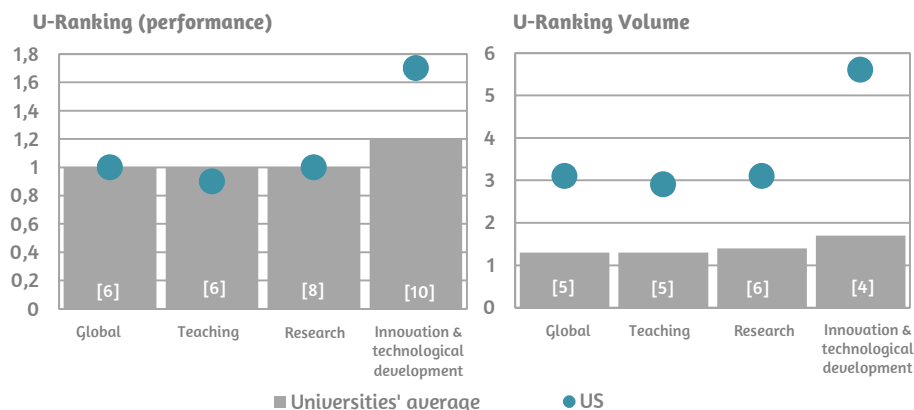
Year of foundation: 1.505
 Type of ownership: Public
 Bachelor's degree students³: 57.185
 Master's degree students²: 3.743
 Faculty members²: 4.364
 Administration and service staff: 2.522
 Budget²: 407.744.183€
 Bachelor's degrees¹: 68
 Master's degrees¹: 105

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

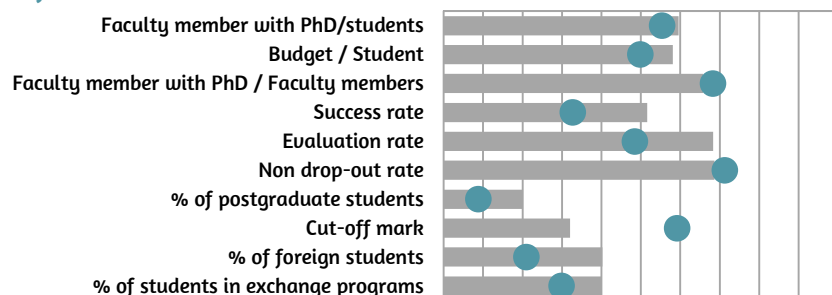
Index and position in the ranking between brackets



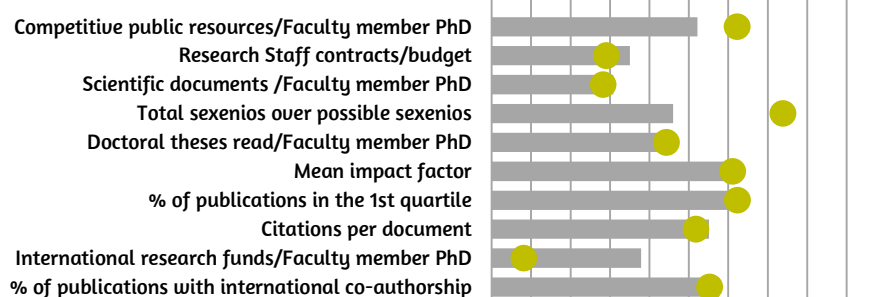
U-Ranking 2016 indicators

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

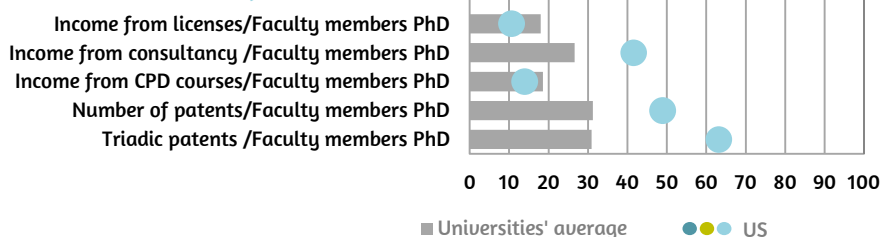
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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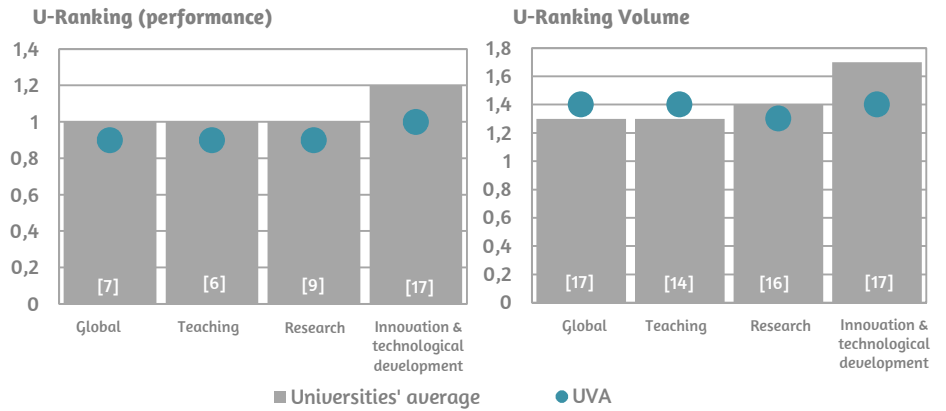
Year of foundation: 1.346
 Type of ownership: Public
 Bachelor's degree students³: 22.360
 Master's degree students²: 1.087
 Faculty members²: 2.260
 Administration and service staff: 1.016
 Budget²: 177.413.269€
 Bachelor's degrees¹: 54
 Master's degrees¹: 63

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

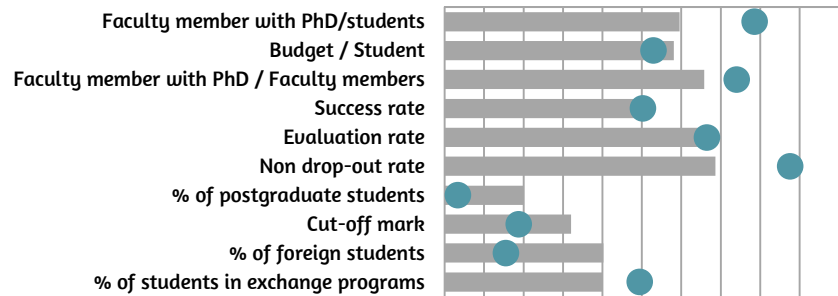
Index and position in the ranking between brackets



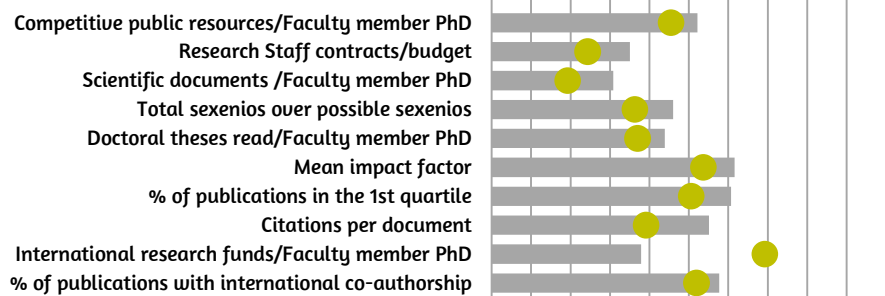
U-Ranking 2016 indicators

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

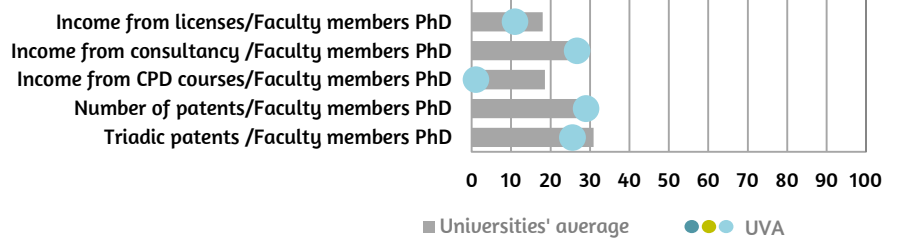
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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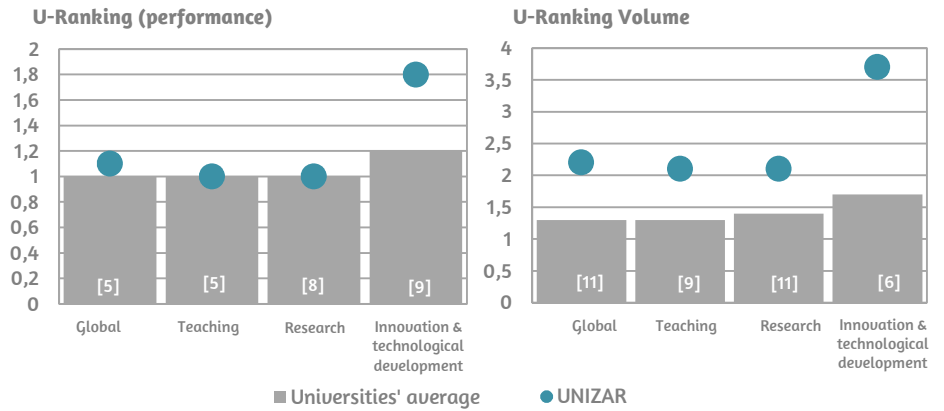
Year of foundation: 1.474
 Type of ownership: Public
 Bachelor's degree students³: 28.754
 Master's degree students²: 1.468
 Faculty members²: 3.650
 Administration and service staff: 1.549
 Budget¹: 273.527.935€
 Bachelor's degrees¹: 54
 Master's degrees¹: 55

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

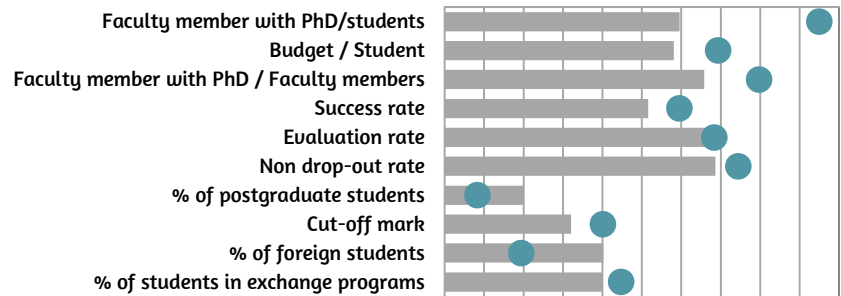
Index and position in the ranking between brackets



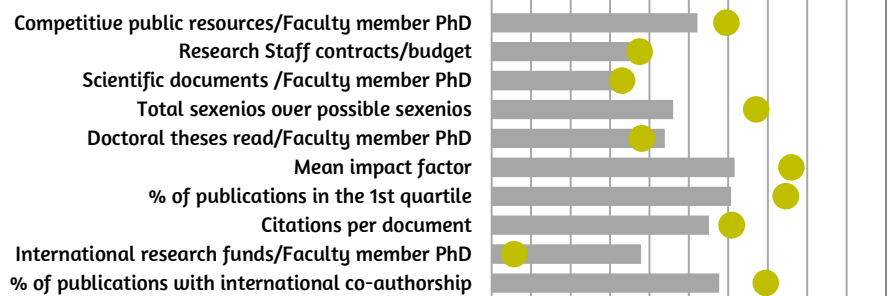
U-Ranking 2016 indicators

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

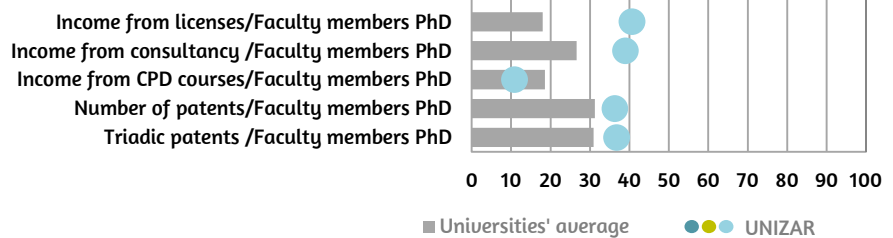
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD DEL PAÍS VASCO



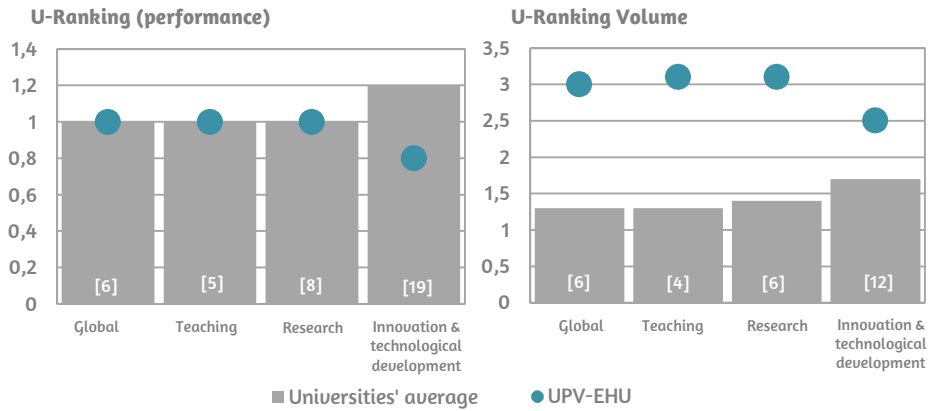
Year of foundation: 1.968
 Type of ownership: Public
 Bachelor's degree students³: 39.099
 Master's degree students²: 2.964
 Faculty members²: 4.450
 Administration and service staff: 1.894
 Budget¹: 422.436.044€
 Bachelor's degrees¹: 70
 Master's degrees¹: 111

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

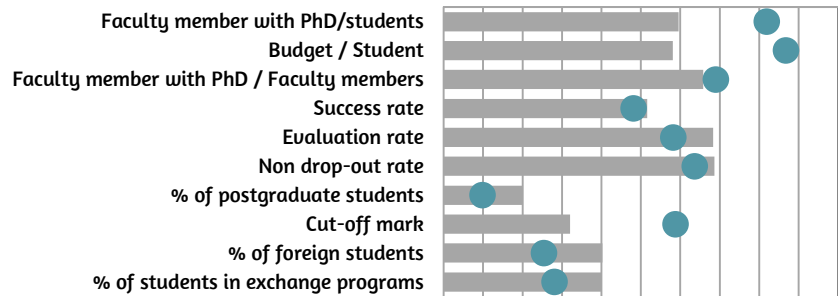
Index and position in the ranking between brackets



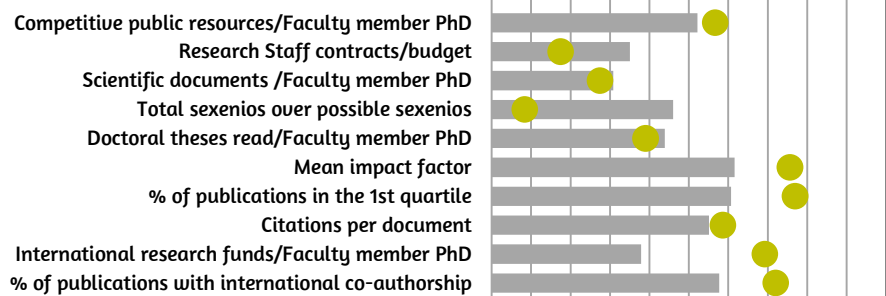
U-Ranking 2016 indicators

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

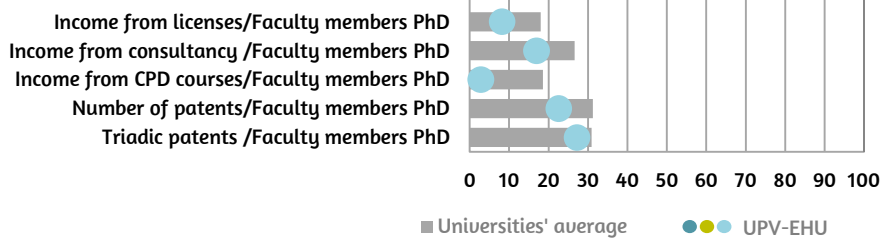
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD EUROPEA DE MADRID



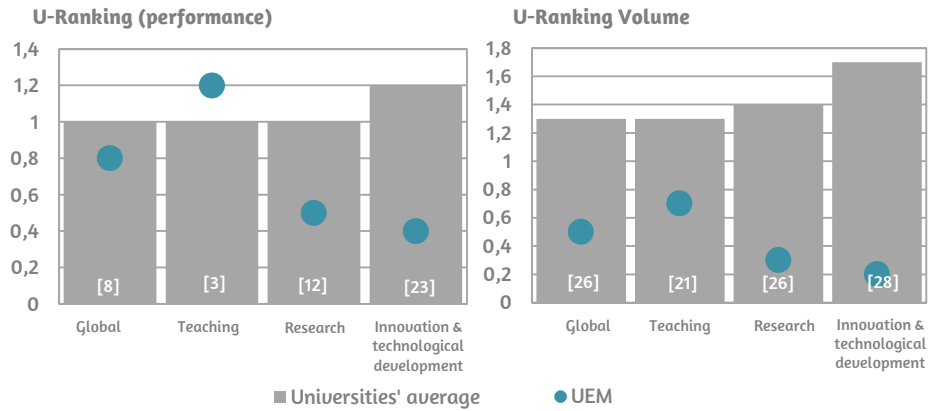
Year of foundation: 1.995
 Type of ownership: Private
 Bachelor's degree students³: 10.736
 Master's degree students²: 1.592
 Faculty members²: 2.376
 Administration and service staff: 535
 Budget²: not available
 Bachelor's degrees¹: 49
 Master's degrees¹: 58

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

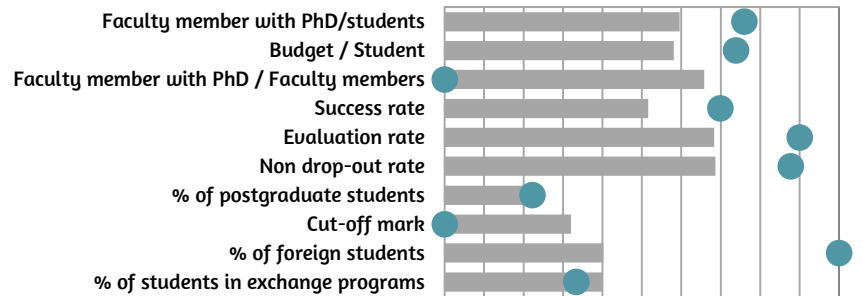
Index and position in the ranking between brackets



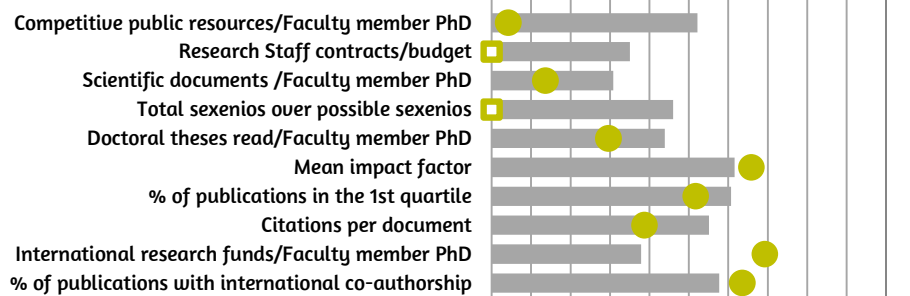
U-Ranking 2016 indicators

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

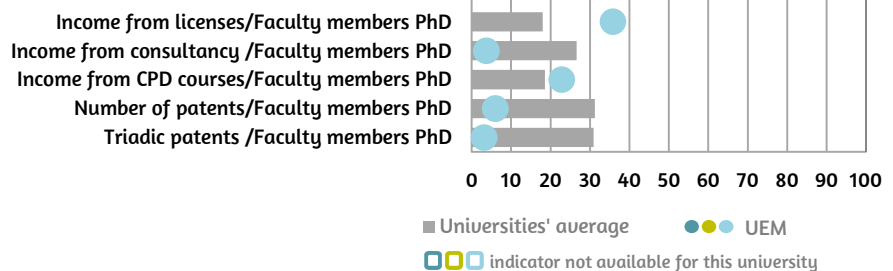
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD EUROPEA MIQUEL DE CERVANTES



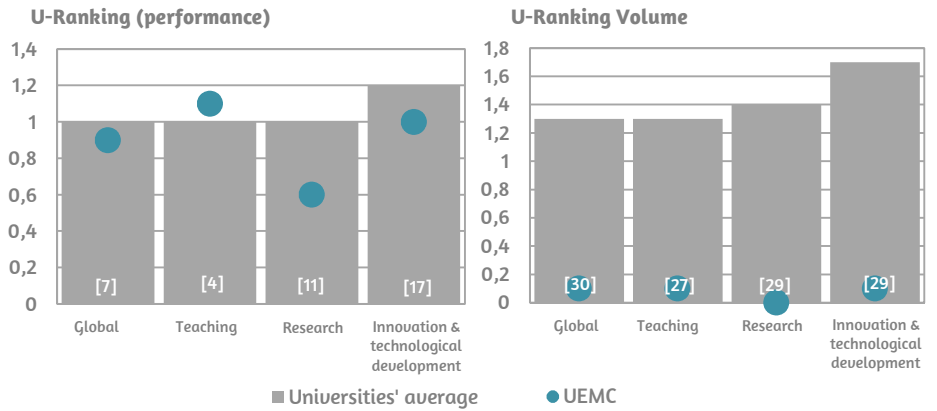
Year of foundation: 2.002
 Type of ownership: Private
 Bachelor's degree students³: 1.004
 Master's degree students²: 48
 Faculty members²: 140
 Administration and service staff: 43
 Budget²: not available
 Bachelor's degrees¹: 13
 Master's degrees¹: 3

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

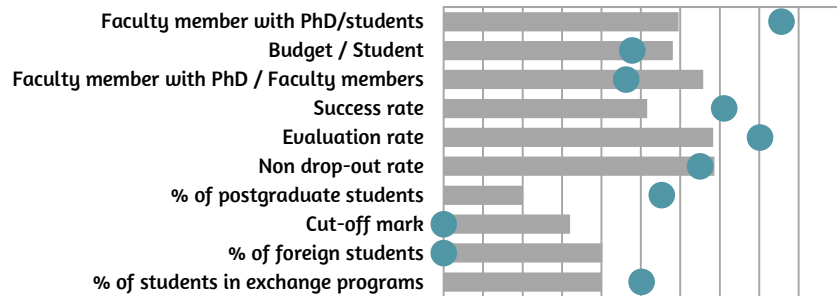
Index and position in the ranking between brackets



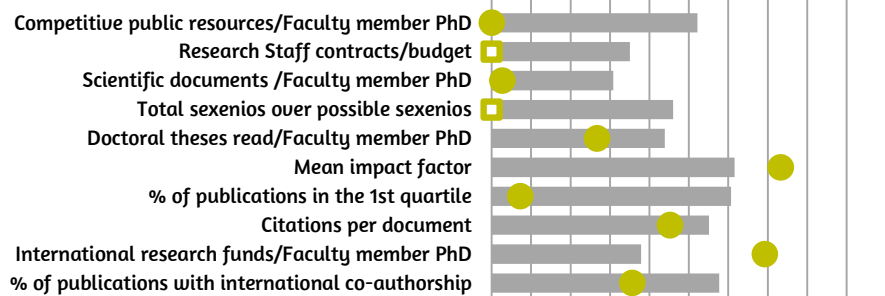
U-Ranking 2016 indicators

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

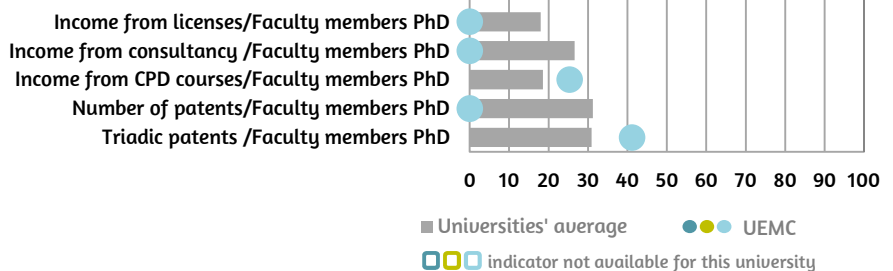
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD MIGUEL HERNÁNDEZ DE ELCHE



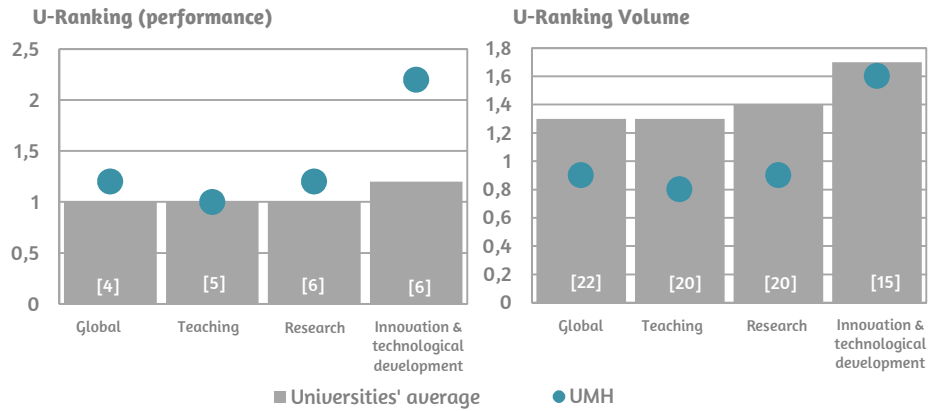
Year of foundation: 1.997
 Type of ownership: Public
 Bachelor's degree students³: 11.849
 Master's degree students²: 1.899
 Faculty members²: 1.115
 Administration and service staff: 418
 Budget²: 109.981.526€
 Bachelor's degrees¹: 28
 Master's degrees¹: 50

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

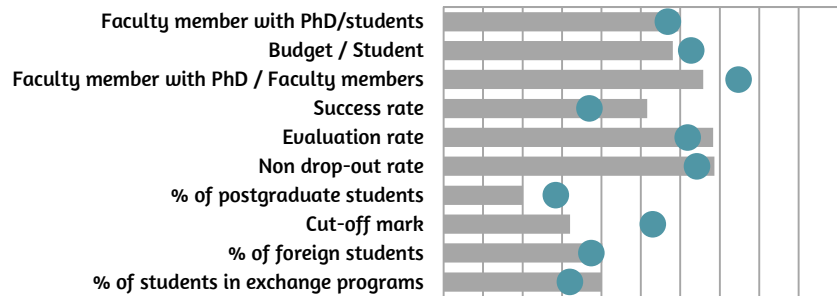
Index and position in the ranking between brackets



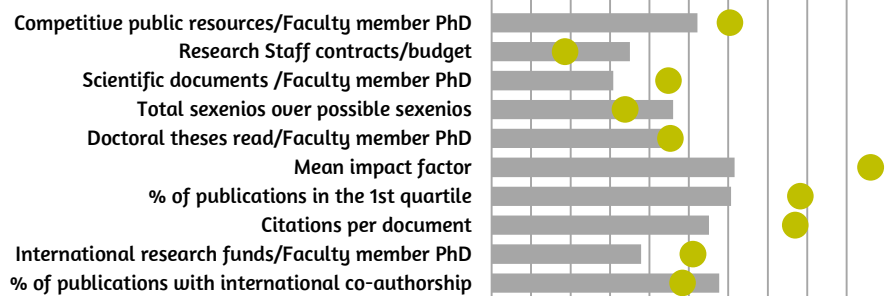
U-Ranking 2016 indicators

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

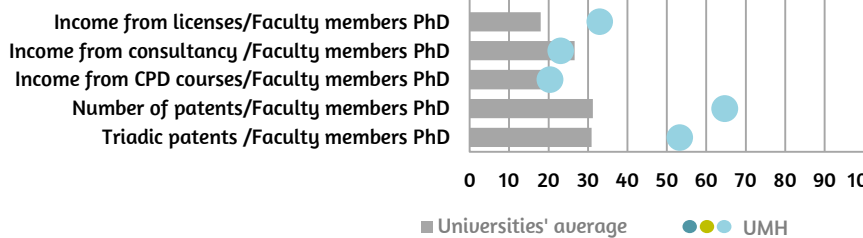
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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

UNIVERSIDAD NACIONAL DE EDUCACIÓN A DISTANCIA



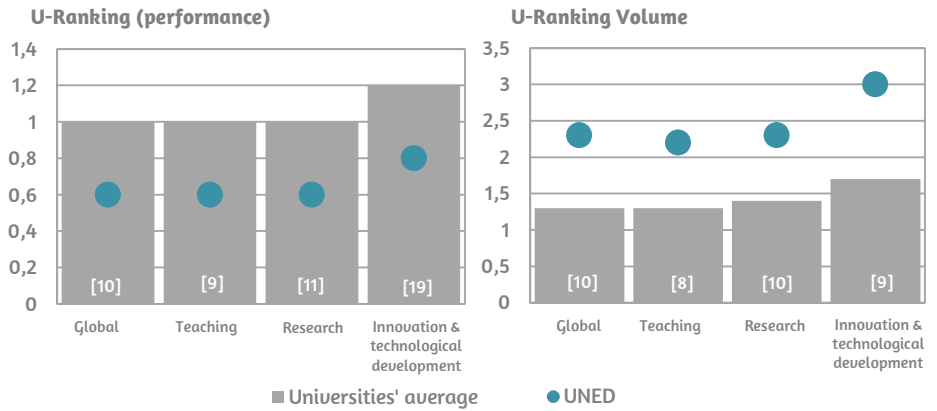
Year of foundation: 1.972
 Type of ownership: Public
 Bachelor's degree students³: 159.541
 Master's degree students²: 8.069
 Faculty members²: 1.358
 Administration and service staff: 1.330
 Budget²: 202.833.701€
 Bachelor's degrees¹: 27
 Master's degrees¹: 72

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

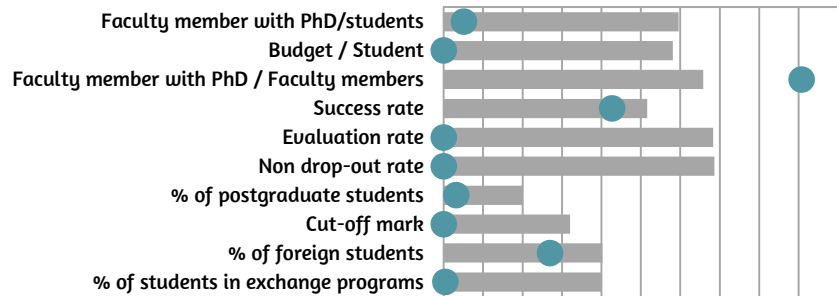
Index and position in the ranking between brackets



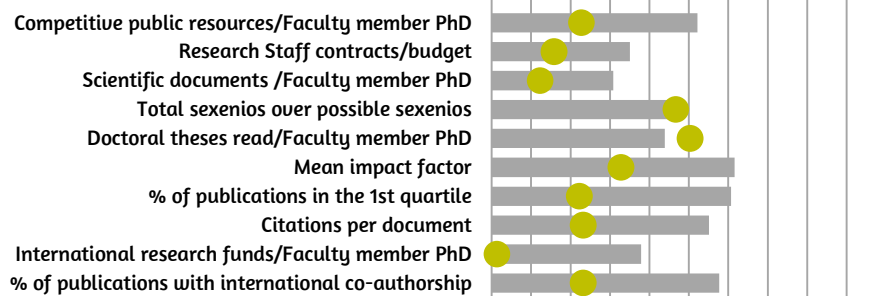
U-Ranking 2016 indicators

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

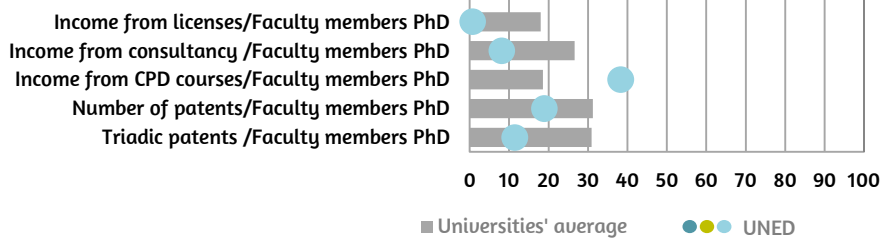
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD PABLO DE OLAVIDE



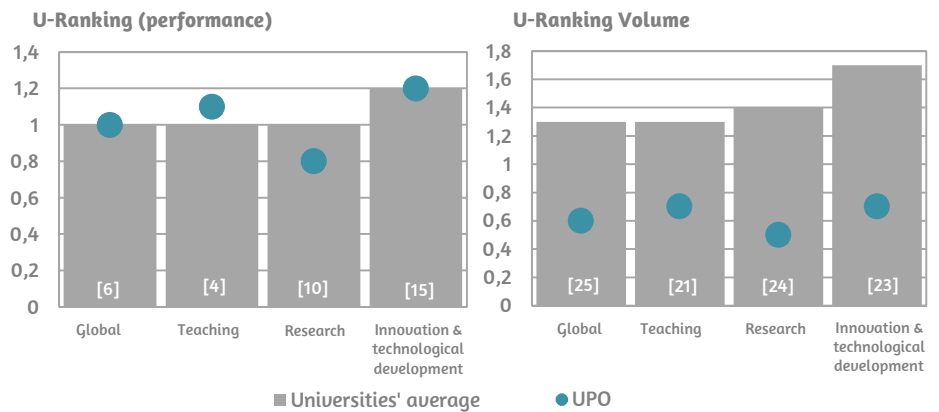
Year of foundation: 1.997
 Type of ownership: Public
 Bachelor's degree students³: 8.985
 Master's degree students²: 1.213
 Faculty members²: 939
 Administration and service staff: 352
 Budget³: 84.804.230€
 Bachelor's degrees¹: 20
 Master's degrees¹: 44

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

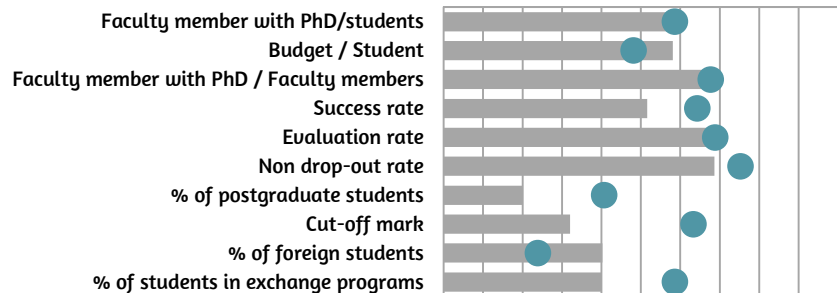
Index and position in the ranking between brackets



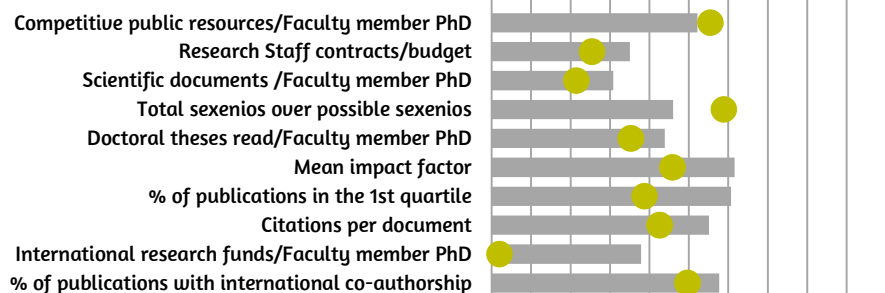
U-Ranking 2016 indicators

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

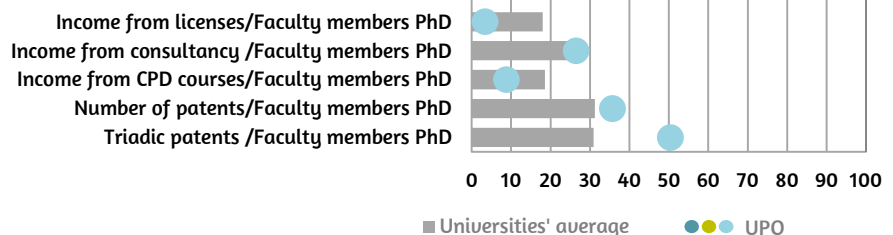
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD POLITÉCNICA DE CARTAGENA



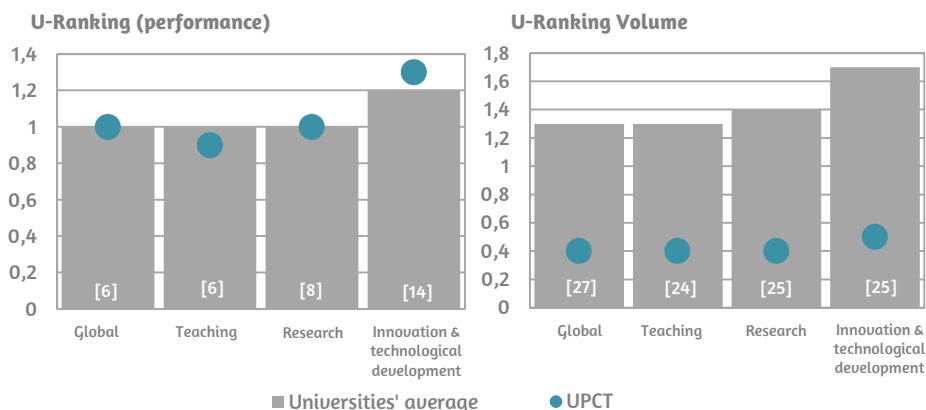
Year of foundation: 1.999
 Type of ownership: Public
 Bachelor's degree students³: 5.414
 Master's degree students²: 305
 Faculty members²: 633
 Administration and service staff: 360
 Budget²: 60.383.197€
 Bachelor's degrees¹: 19
 Master's degrees¹: 20

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

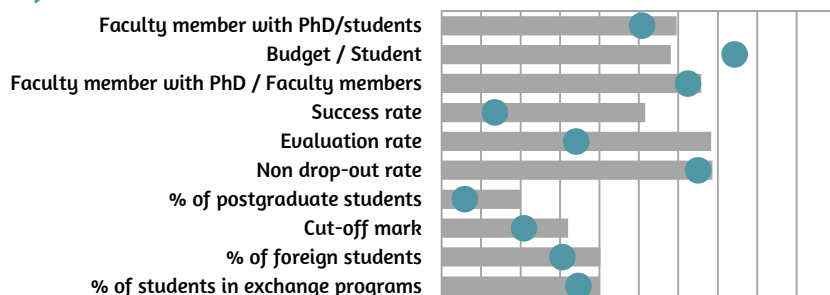
Index and position in the ranking between brackets



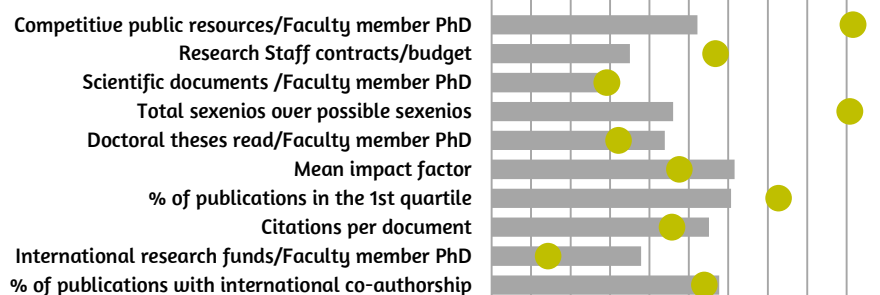
U-Ranking 2016 indicators

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

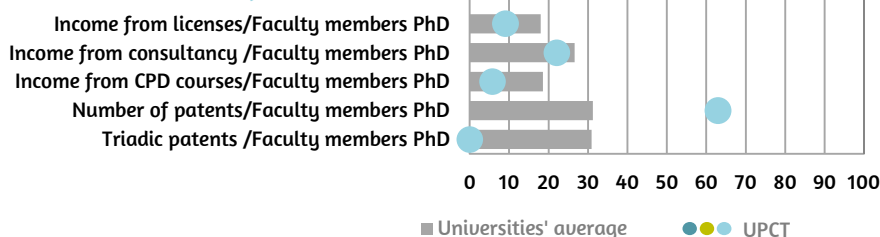
TEACHING INDICATORS



RESEARCH 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



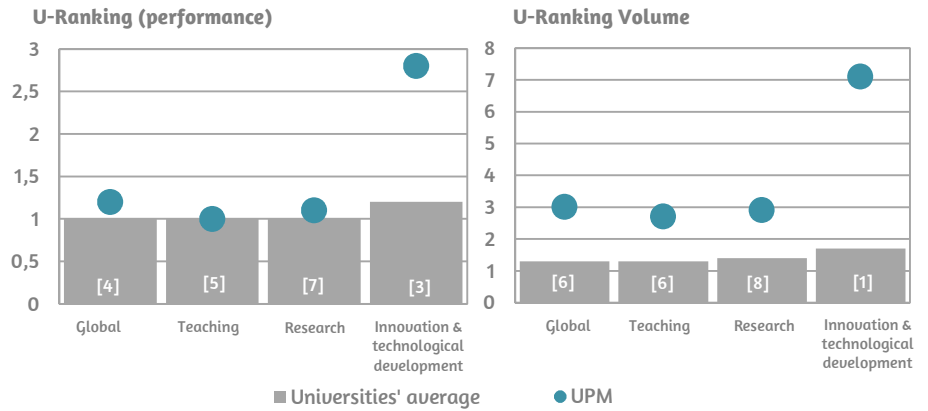
Year of foundation: 1.971
 Type of ownership: Public
 Bachelor's degree students³: 32.849
 Master's degree students²: 2.315
 Faculty members²: 3.029
 Administration and service staff: 2.018
 Budget²: 343.937.556€
 Bachelor's degrees¹: 45
 Master's degrees¹: 80

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

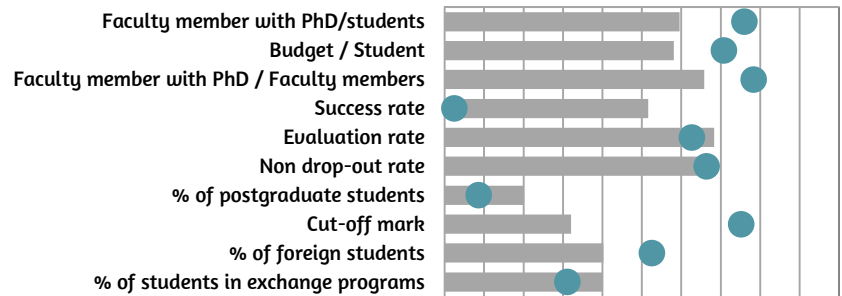
Index and position in the ranking between brackets



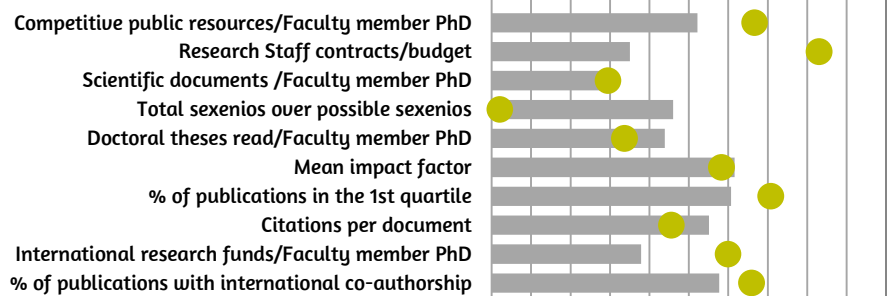
U-Ranking 2016 indicators

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

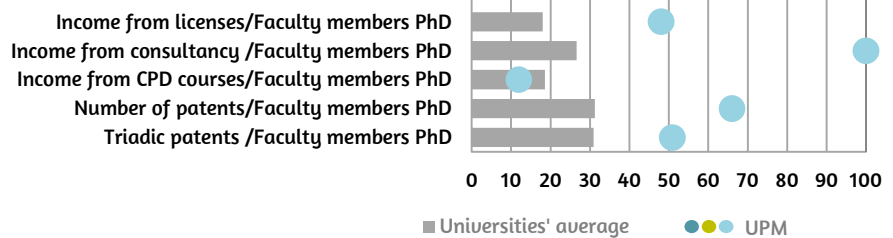
TEACHING INDICATORS



RESEARCH 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



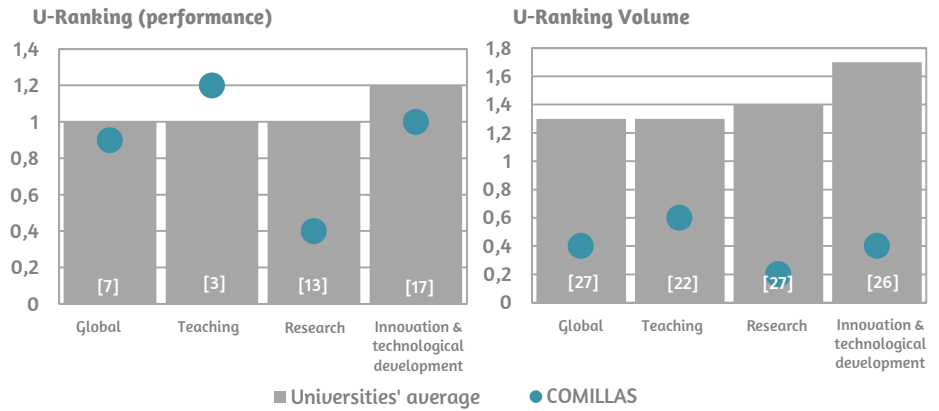
Year of foundation: 1.935
 Type of ownership: Private
 Bachelor's degree students³: 6.126
 Master's degree students²: 1.650
 Faculty members²: 921
 Administration and service staff: 314
 Budget²: not available
 Bachelor's degrees¹: 20
 Master's degrees¹: 26

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

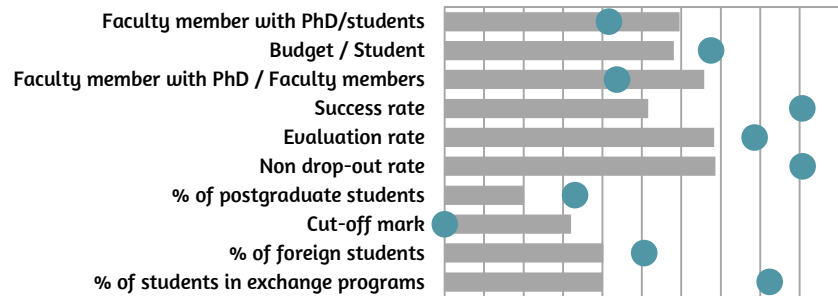
Index and position in the ranking between brackets



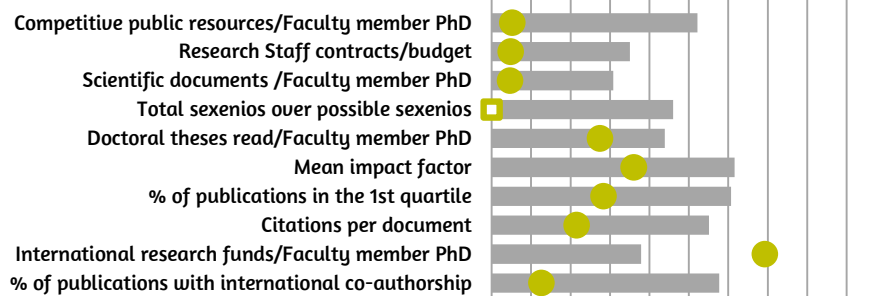
U-Ranking 2016 indicators

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

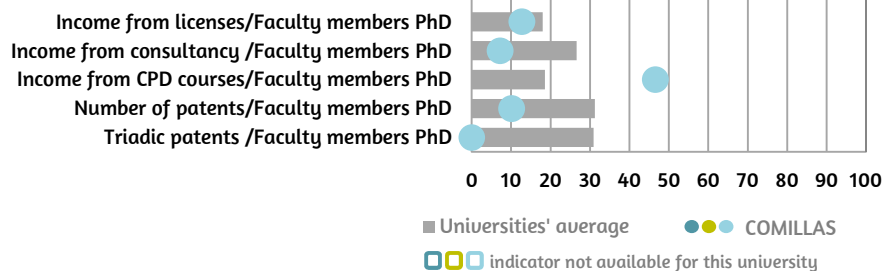
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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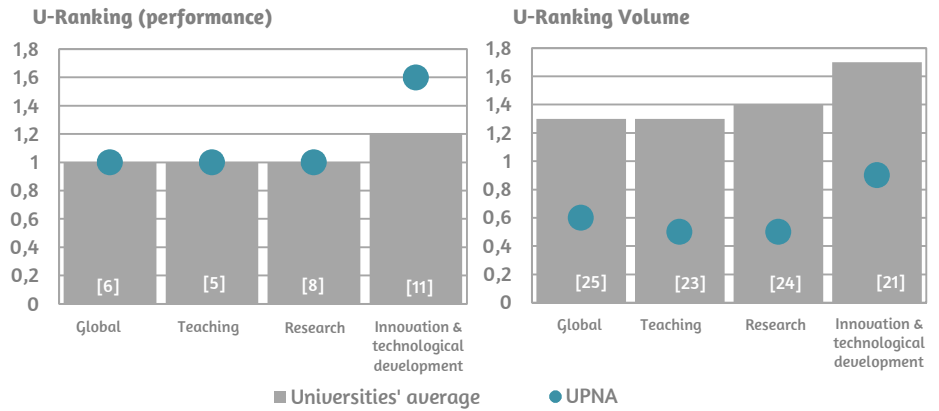
Year of foundation: 1.987
 Type of ownership: Public
 Bachelor's degree students³: 7.000
 Master's degree students²: 724
 Faculty members²: 856
 Administration and service staff: 473
 Budget¹: 70.105.817€
 Bachelor's degrees¹: 18
 Master's degrees¹: 31

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

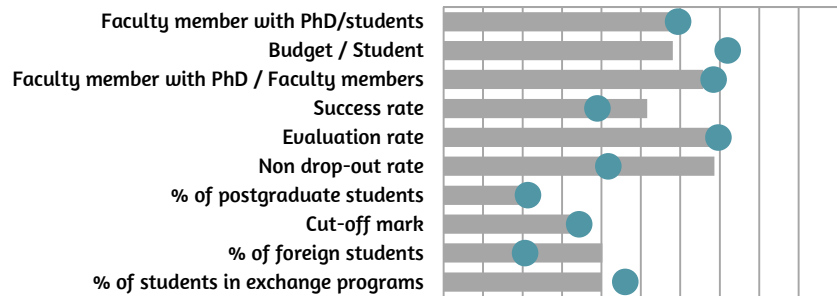
Index and position in the ranking between brackets



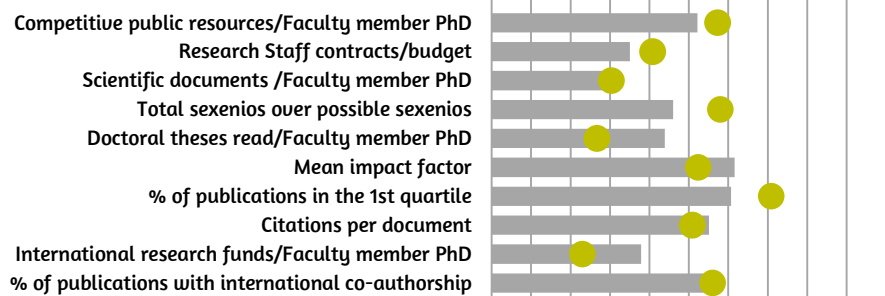
U-Ranking 2016 indicators

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

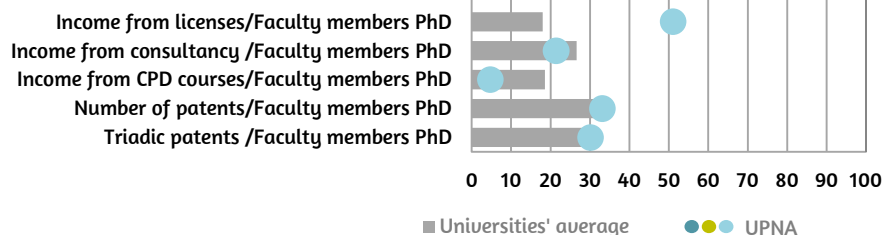
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDAD REY JUAN CARLOS



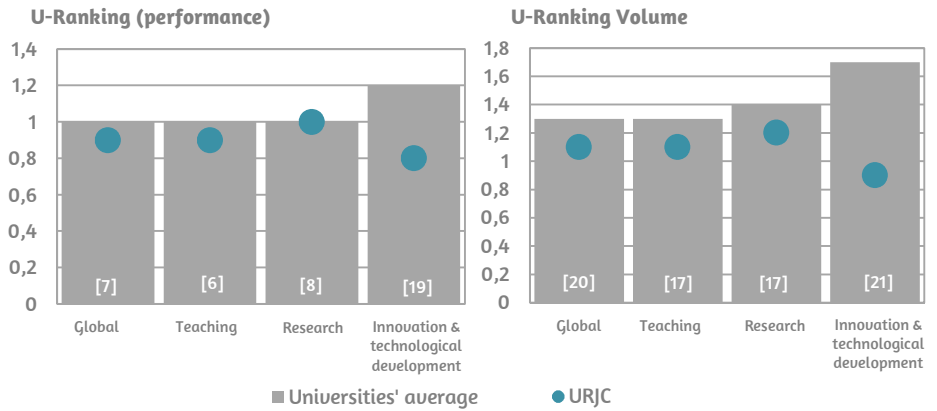
Year of foundation: 1.997
 Type of ownership: Public
 Bachelor's degree students³: 35.737
 Master's degree students²: 3.276
 Faculty members²: 1.488
 Administration and service staff: 649
 Budget¹: 133.811.073€
 Bachelor's degrees¹: 58
 Master's degrees¹: 80

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

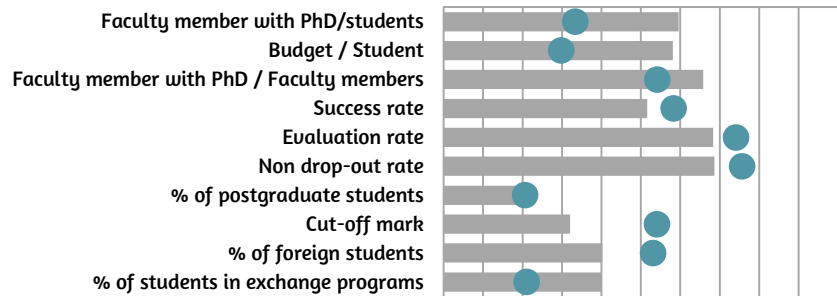
Index and position in the ranking between brackets



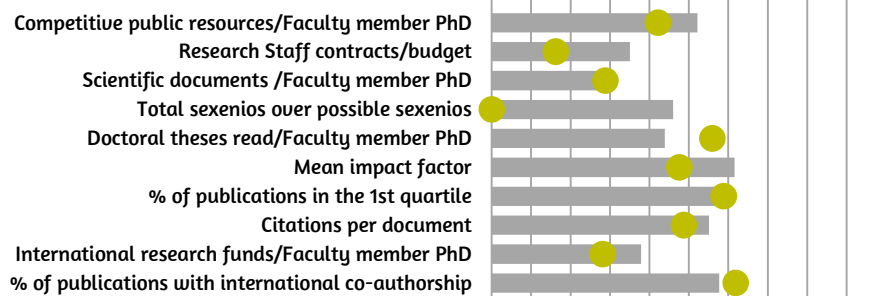
U-Ranking 2016 indicators

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

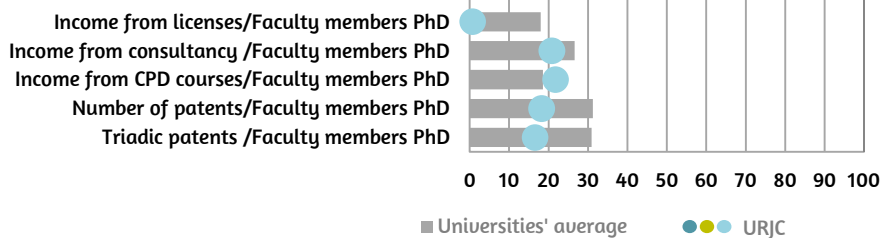
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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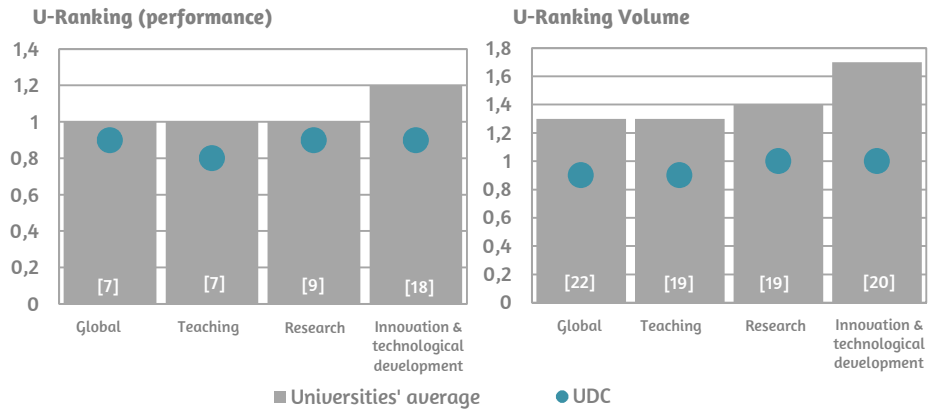
Year of foundation: 1.989
 Type of ownership: Public
 Bachelor's degree students³: 16.813
 Master's degree students²: 1.393
 Faculty members²: 1.488
 Administration and service staff: 766
 Budget¹: 119.188.684€
 Bachelor's degrees¹: 40
 Master's degrees¹: 63

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

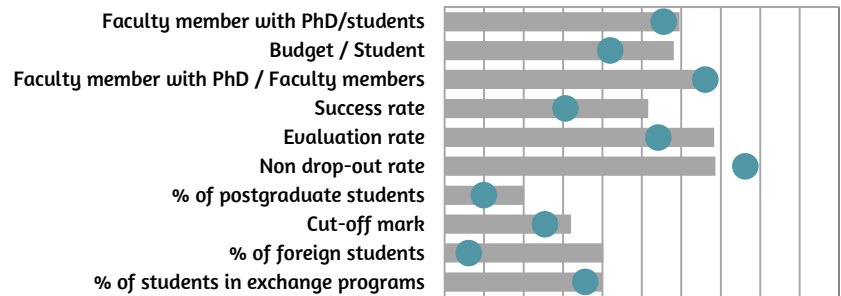
Index and position in the ranking between brackets



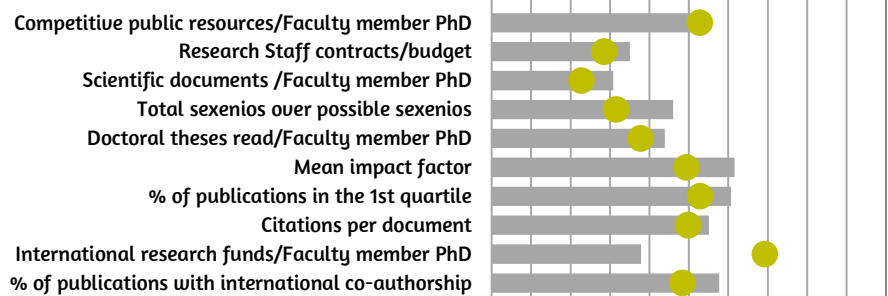
U-Ranking 2016 indicators

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

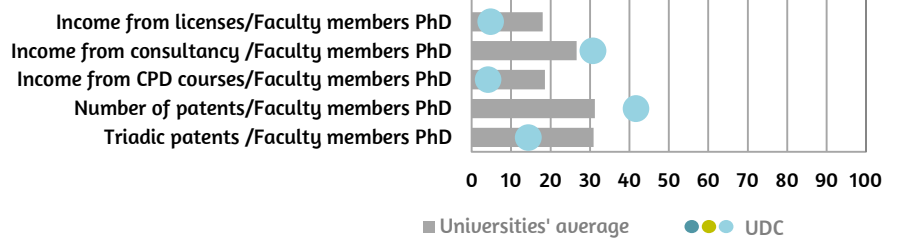
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSIDADE DE SANTIAGO DE COMPOSTELA



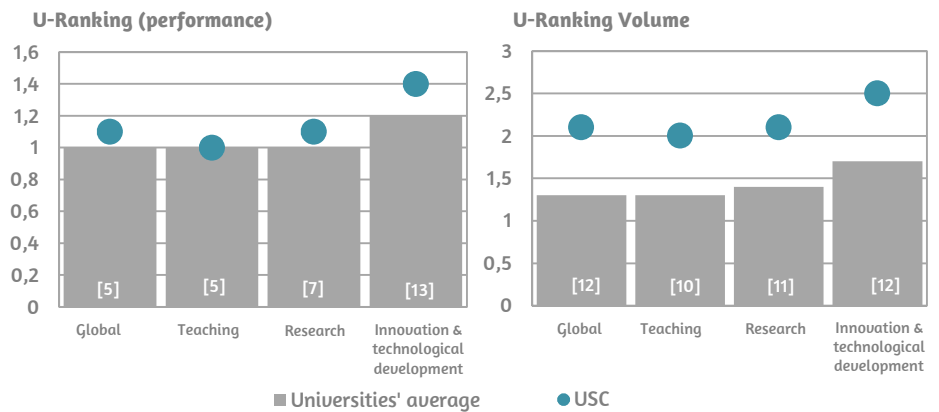
Year of foundation: 1.495
 Type of ownership: Public
 Bachelor's degree students³: 21.515
 Master's degree students²: 2.047
 Faculty members²: 2.164
 Administration and service staff: 1.249
 Budget¹: 228.313.846€
 Bachelor's degrees¹: 44
 Master's degrees¹: 86

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

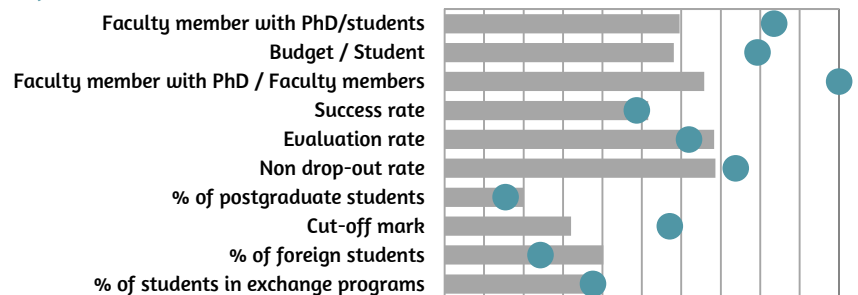
Index and position in the ranking between brackets



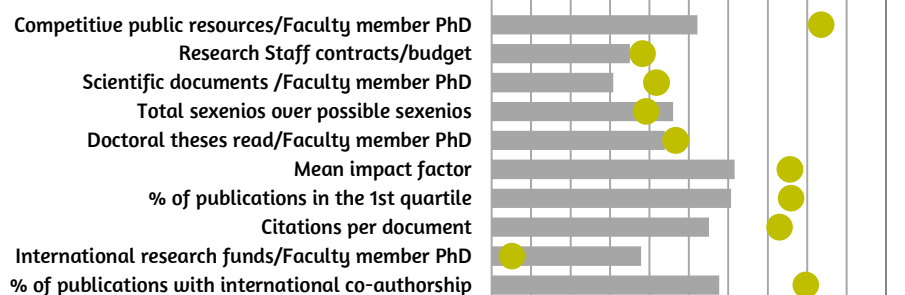
U-Ranking 2016 indicators

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

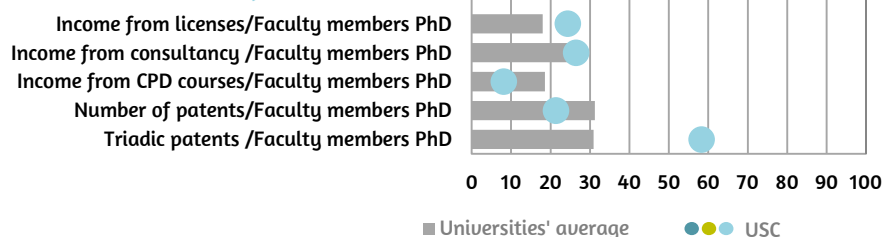
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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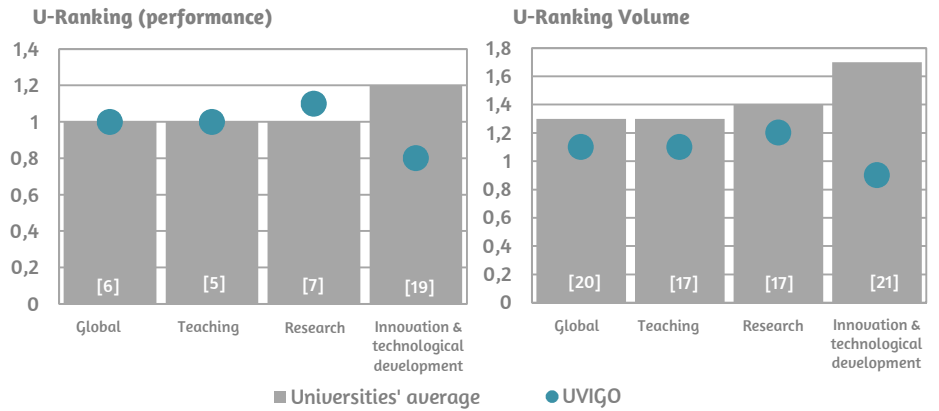
Year of foundation: 1.989
 Type of ownership: Public
 Bachelor's degree students³: 17.832
 Master's degree students²: 2.126
 Faculty members²: 1.631
 Administration and service staff: 733
 Budget²: 151.150.166€
 Bachelor's degrees¹: 40
 Master's degrees¹: 71

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

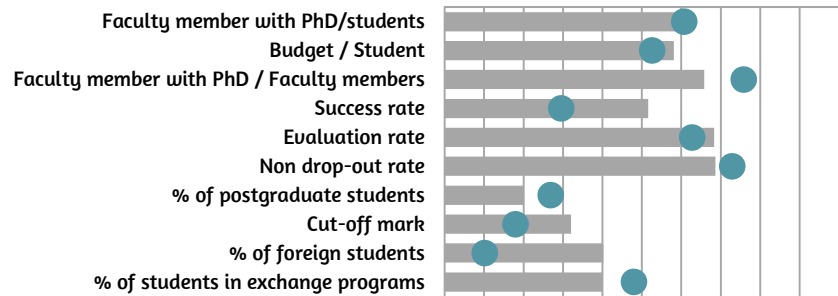
Index and position in the ranking between brackets



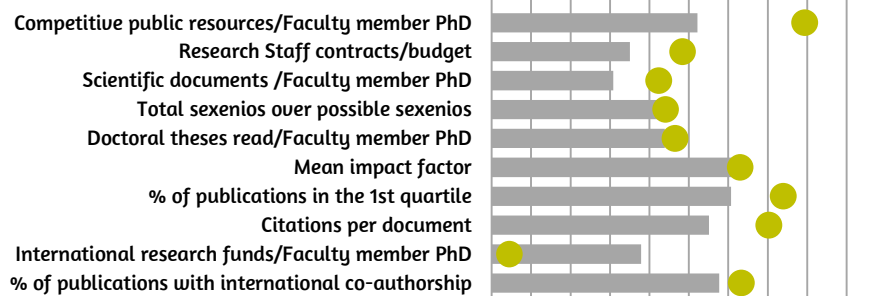
U-Ranking 2016 indicators

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

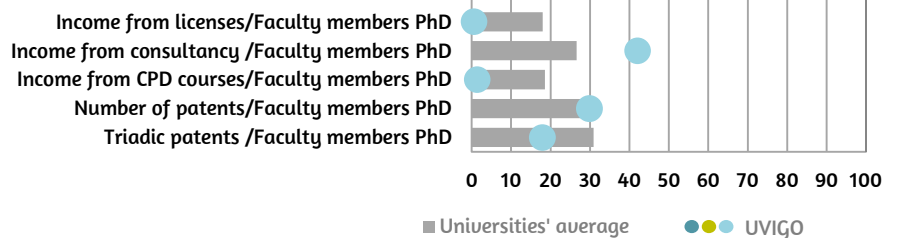
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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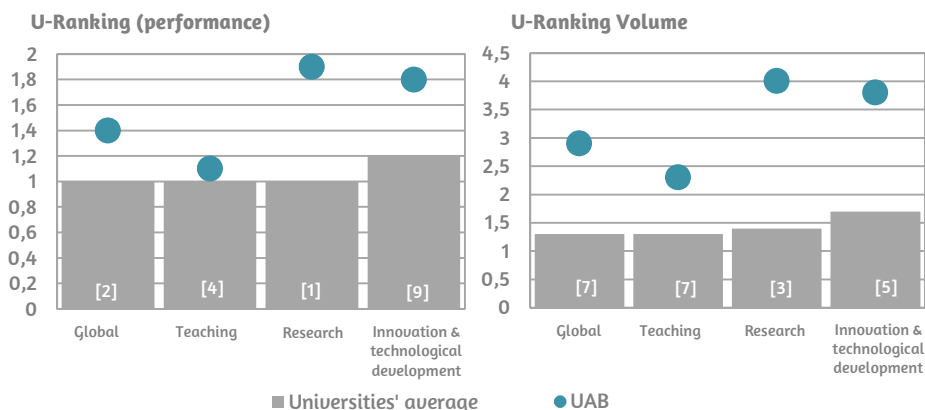
Year of foundation: 1.968
 Type of ownership: Public
 Bachelor's degree students³: 33.453
 Master's degree students²: 2.804
 Faculty members²: 4.224
 Administration and service staff: 1.964
 Budget³: 294.105.779€
 Bachelor's degrees¹: 81
 Master's degrees¹: 242

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

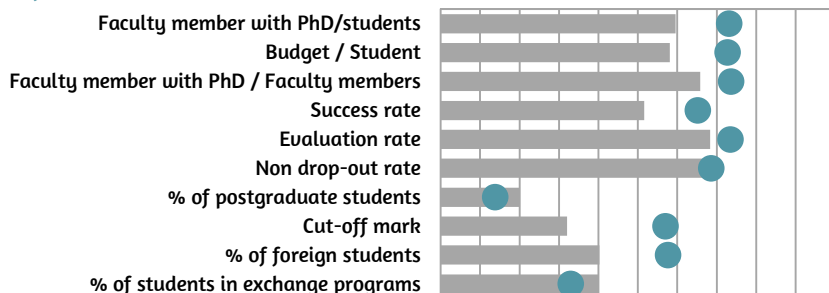
Index and position in the ranking between brackets



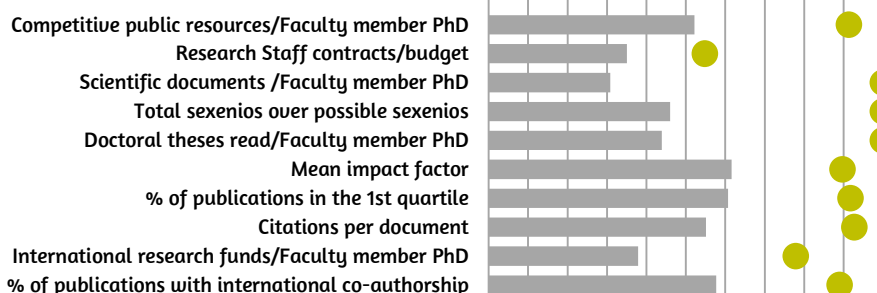
U-Ranking 2016 indicators

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

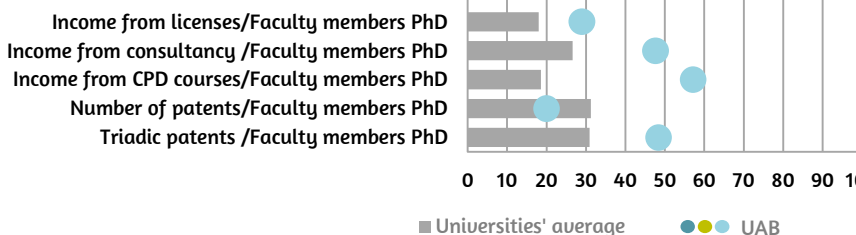
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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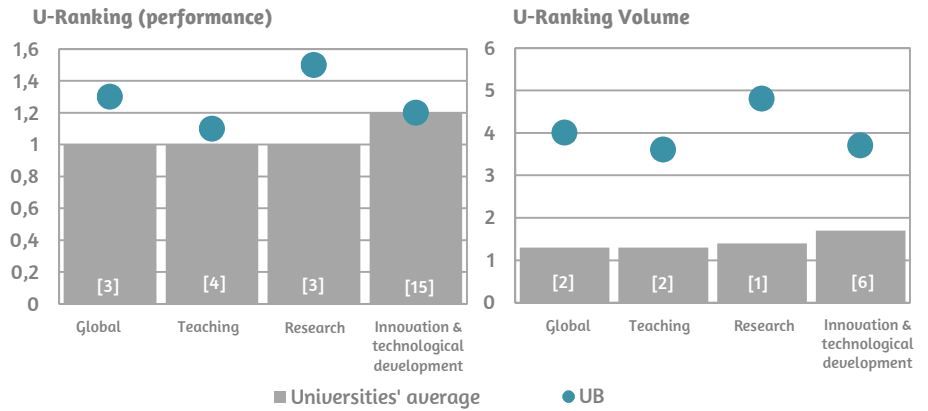
Year of foundation: 1.430
 Type of ownership: Public
 Bachelor's degree students³: 45.101
 Master's degree students²: 4.854
 Faculty members²: 5.171
 Administration and service staff: 2.406
 Budget¹: 371.997.493€
 Bachelor's degrees¹: 71
 Master's degrees¹: 258

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

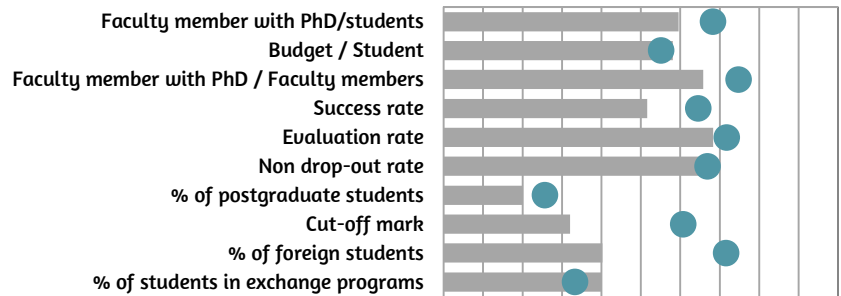
Index and position in the ranking between brackets



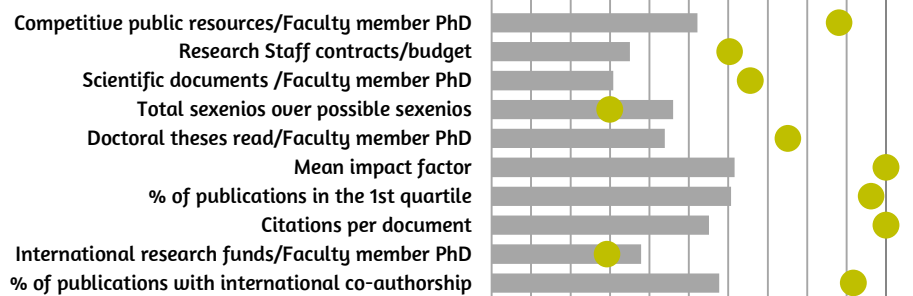
U-Ranking 2016 indicators

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

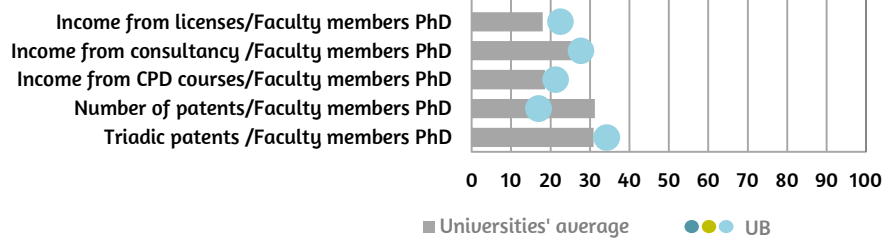
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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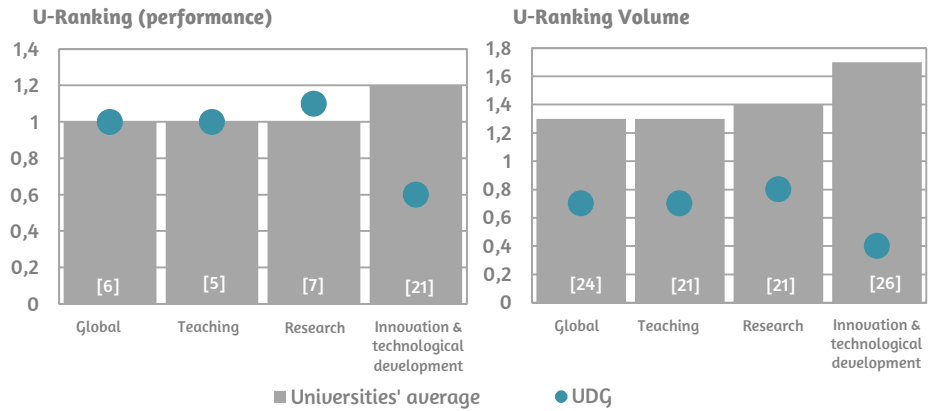
Year of foundation: 1.992
 Type of ownership: Public
 Bachelor's degree students³: 13.509
 Master's degree students²: 676
 Faculty members²: 1.394
 Administration and service staff: 619
 Budget¹: 93.357.400€
 Bachelor's degrees¹: 48
 Master's degrees¹: 80

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

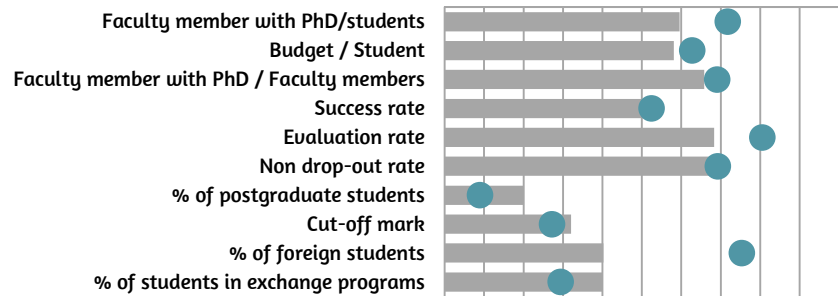
Index and position in the ranking between brackets



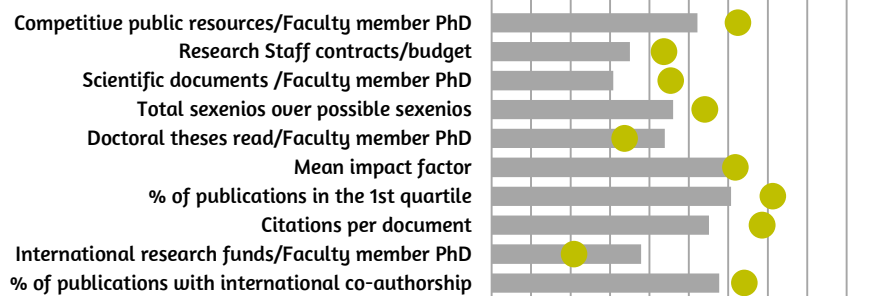
U-Ranking 2016 indicators

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

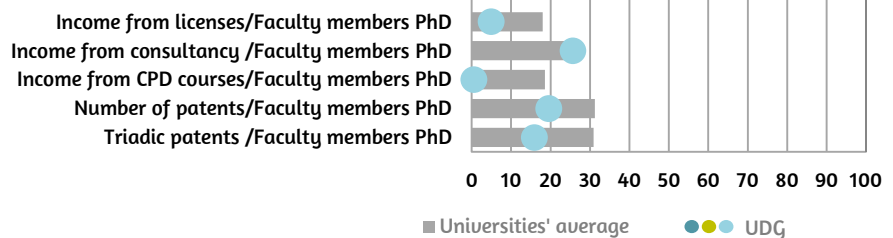
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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UNIVERSITAT DE LES ILLES BALEARS



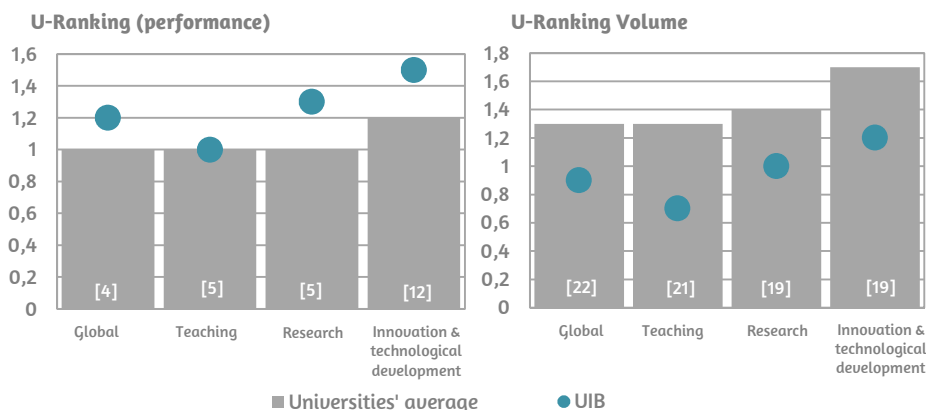
Year of foundation: 1.978
 Type of ownership: Public
 Bachelor's degree students³: 12.171
 Master's degree students²: 1.283
 Faculty members²: 1.369
 Administration and service staff: 549
 Budget³: 80.154.604€
 Bachelor's degrees¹: 33
 Master's degrees¹: 46

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

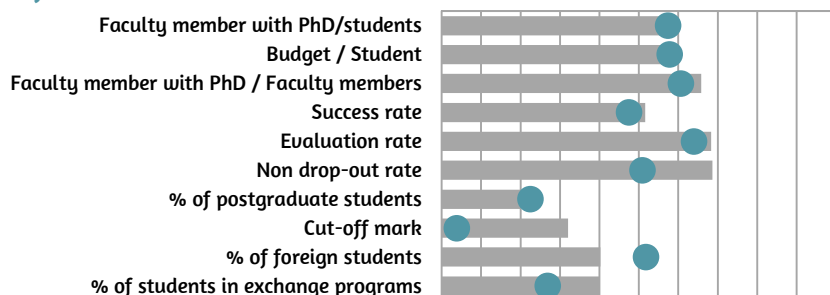
Index and position in the ranking between brackets



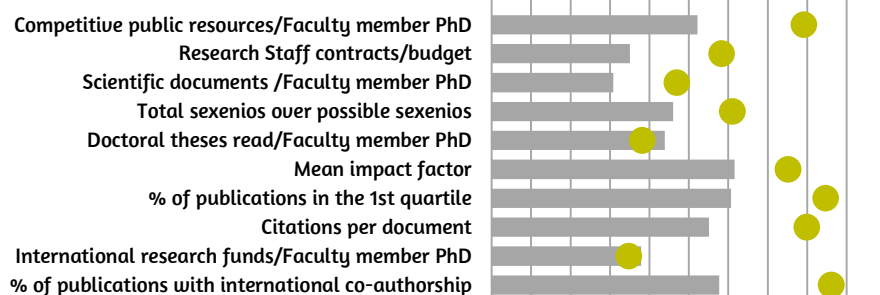
U-Ranking 2016 indicators

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

TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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

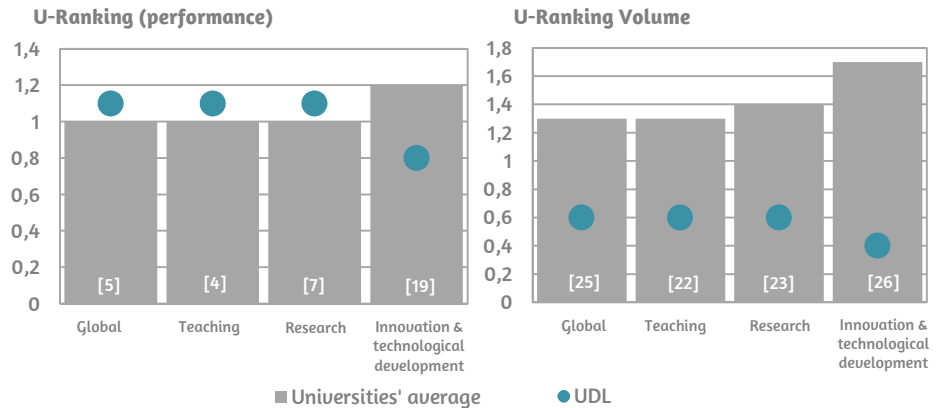
Year of foundation: 1.992
 Type of ownership: Public
 Bachelor's degree students¹: 8.248
 Master's degree students²: 808
 Faculty members²: 1.036
 Administration and service staff: 551
 Budget³: 70.938.793€
 Bachelor's degrees¹: 38
 Master's degrees¹: 63

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

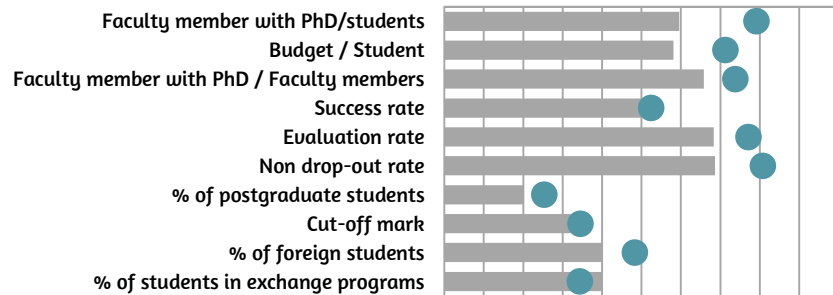
Index and position in the ranking between brackets



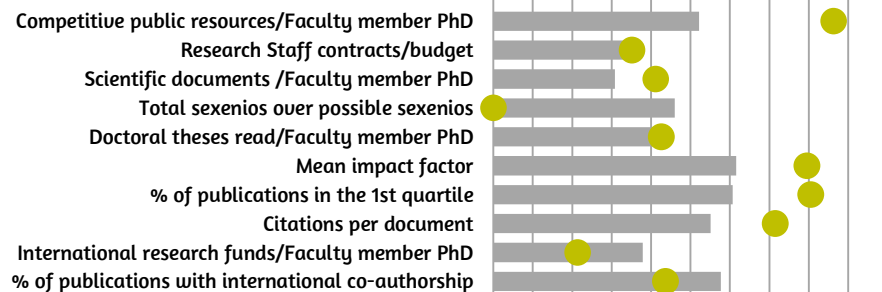
U-Ranking 2016 indicators

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

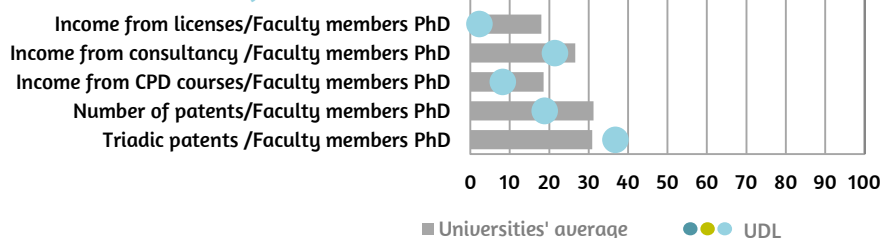
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



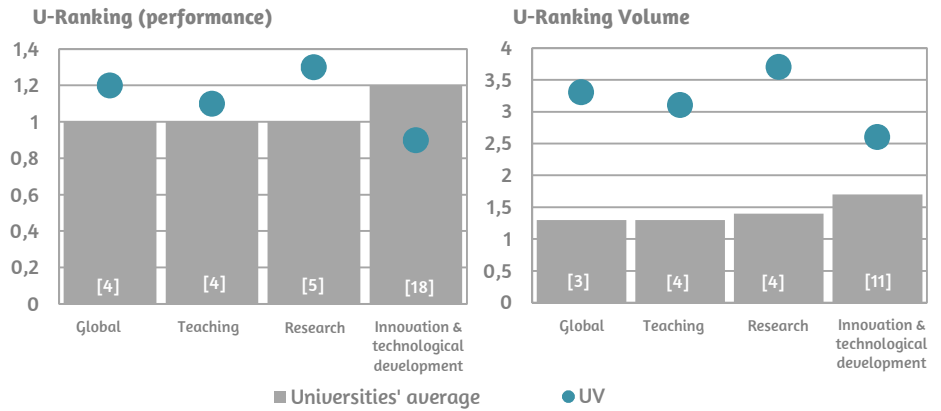
Year of foundation: 1.500
 Type of ownership: Public
 Bachelor's degree students³: 41.073
 Master's degree students²: 5.260
 Faculty members²: 4.045
 Administration and service staff: 1.872
 Budget¹: 411.648.639€
 Bachelor's degrees¹: 54
 Master's degrees¹: 111

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

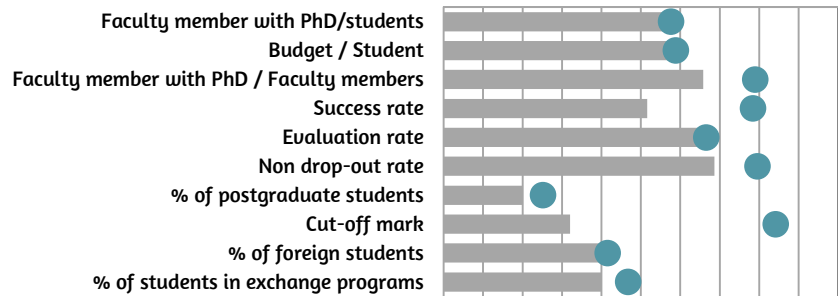
Index and position in the ranking between brackets



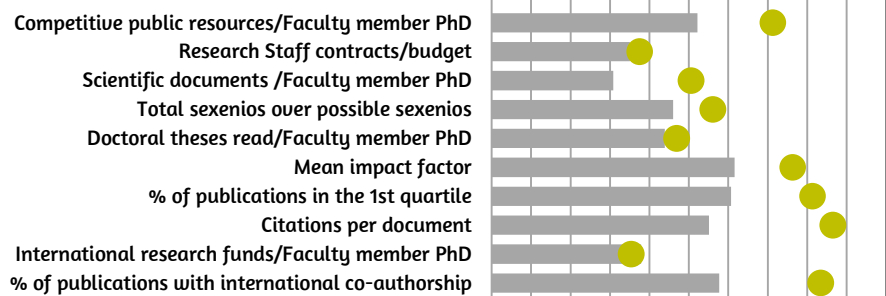
U-Ranking 2016 indicators

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

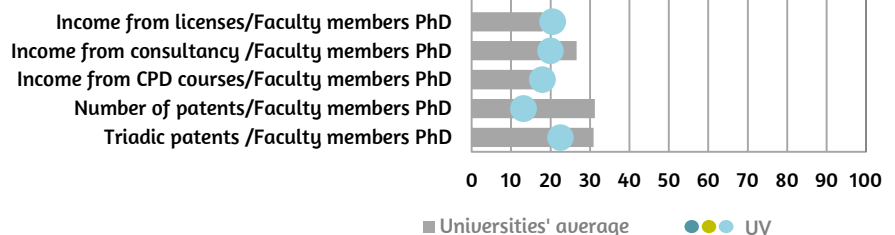
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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

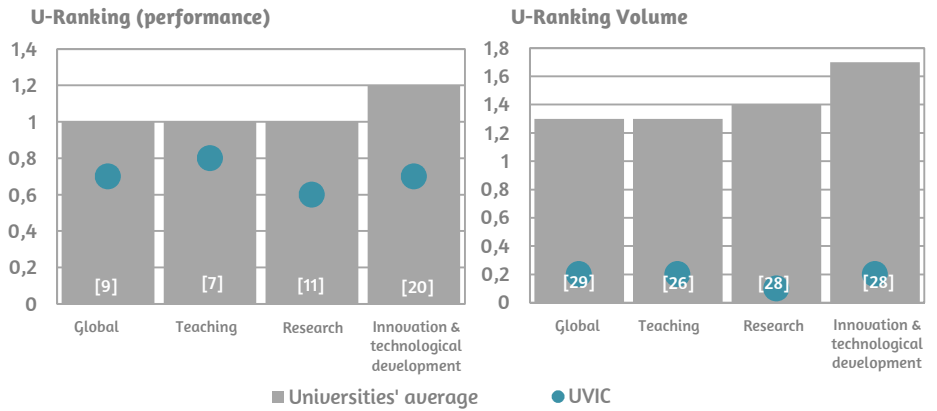
Year of foundation: 1.997
 Type of ownership: Private
 Bachelor's degree students³: 4.957
 Master's degree students²: 308
 Faculty members²: 558
 Administration and service staff: 242
 Budget²: not available
 Bachelor's degrees¹: 39
 Master's degrees¹: 24

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

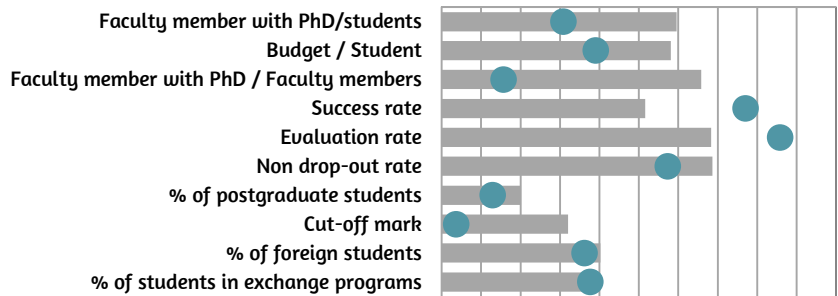
Index and position in the ranking between brackets



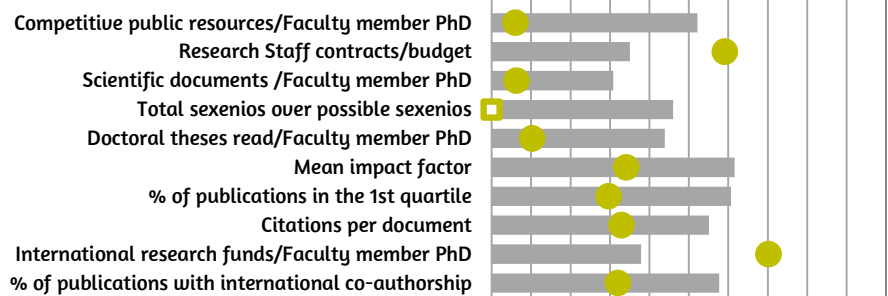
U-Ranking 2016 indicators

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

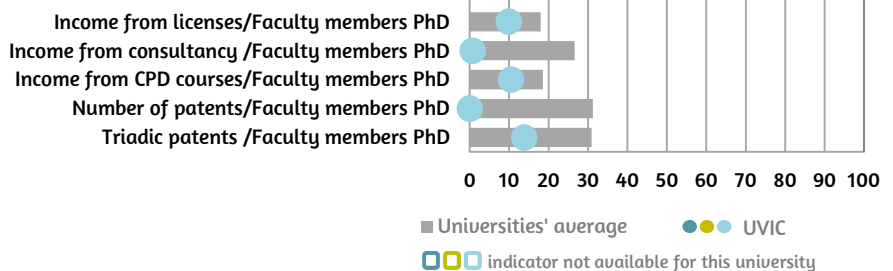
TEACHING INDICATORS



RESEARCH 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

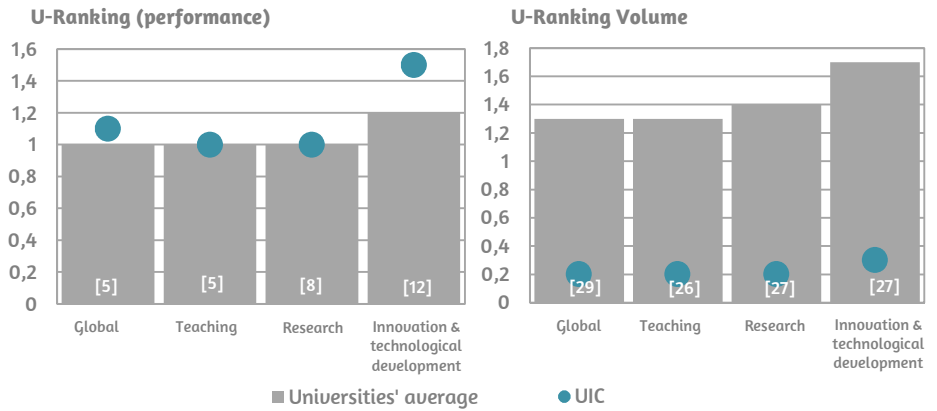
Year of foundation: 1.997
 Type of ownership: Private
 Bachelor's degree students³: 3.030
 Master's degree students²: 250
 Faculty members²: 595
 Administration and service staff: 244
 Budget³: not available
 Bachelor's degrees¹: 14
 Master's degrees¹: 17

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

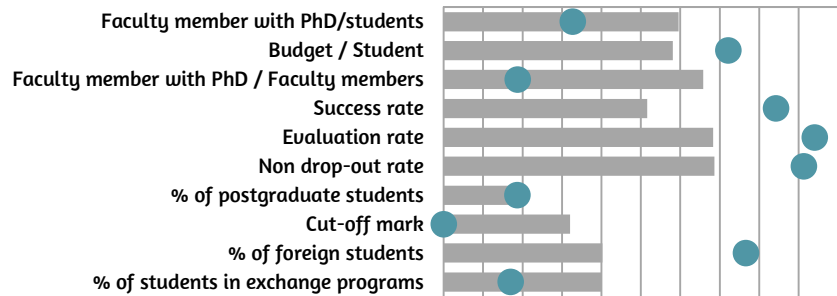
Index and position in the ranking between brackets



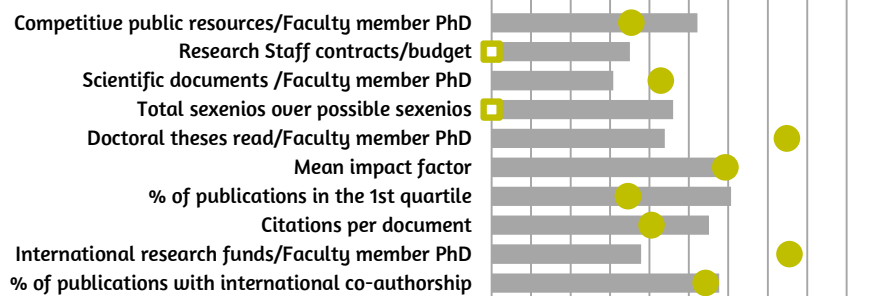
U-Ranking 2016 indicators

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

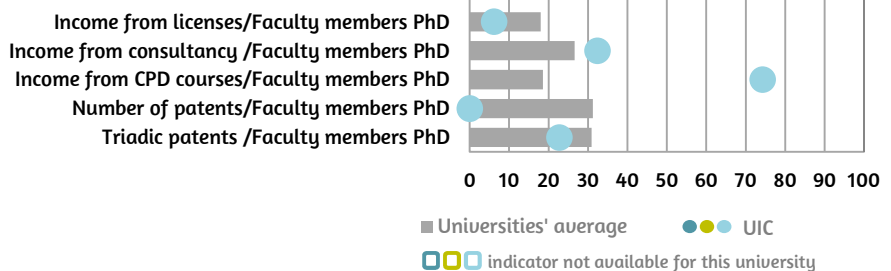
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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

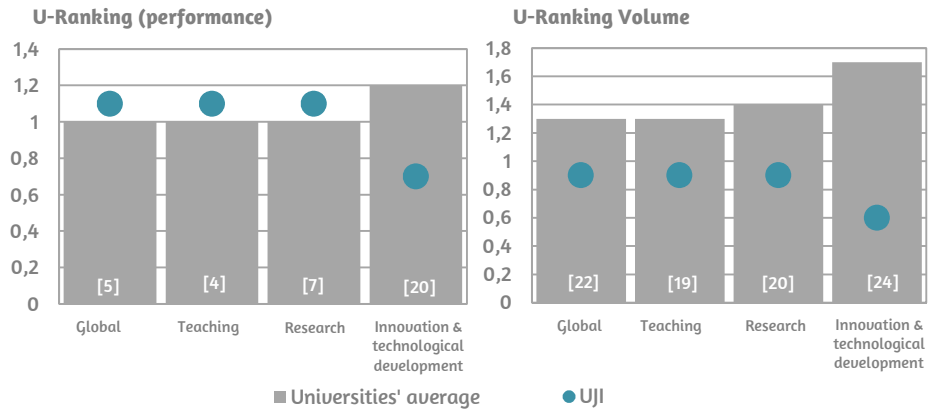
Year of foundation: 1.991
 Type of ownership: Public
 Bachelor's degree students³: 12.044
 Master's degree students²: 1.362
 Faculty members²: 1.164
 Administration and service staff: 619
 Budget¹: 97.398.869€
 Bachelor's degrees¹: 31
 Master's degrees¹: 44

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

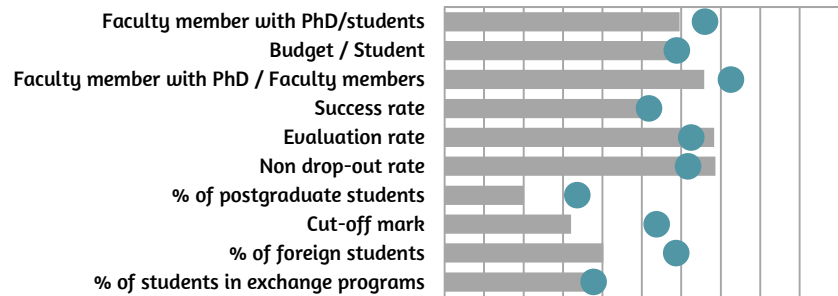
Index and position in the ranking between brackets



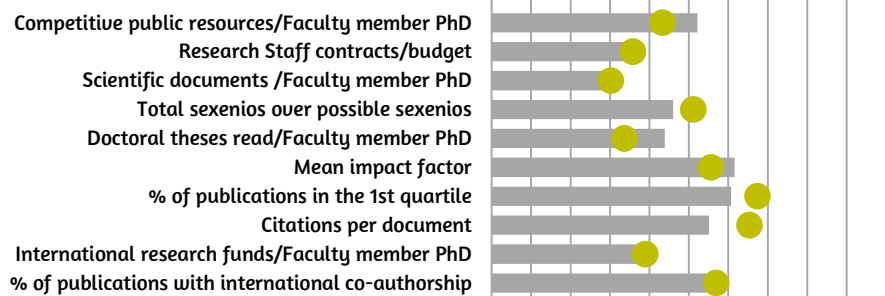
U-Ranking 2016 indicators

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

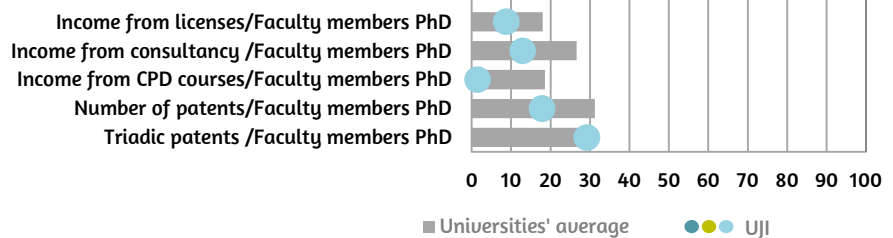
TEACHING INDICATORS



RESEARCH 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



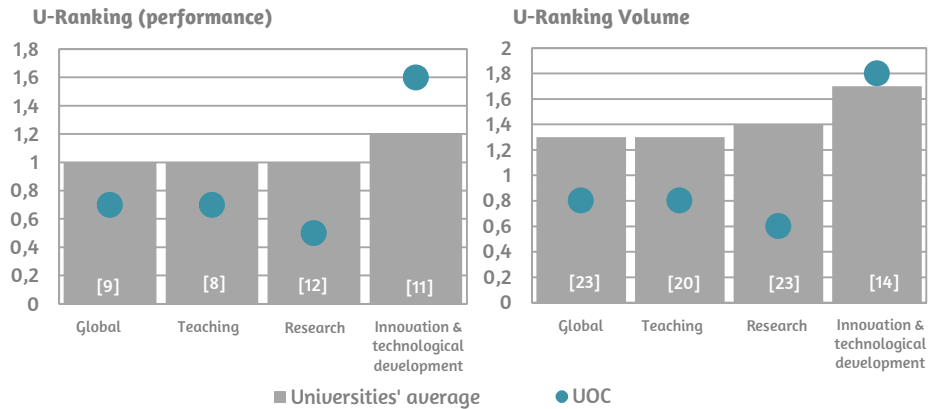
Year of foundation: 1.995
 Type of ownership: Private
 Bachelor's degree students³: 25.403
 Master's degree students²: 4.731
 Faculty members²: 262
 Administration and service staff: 496
 Budget²: not available
 Bachelor's degrees¹: 21
 Master's degrees¹: 47

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

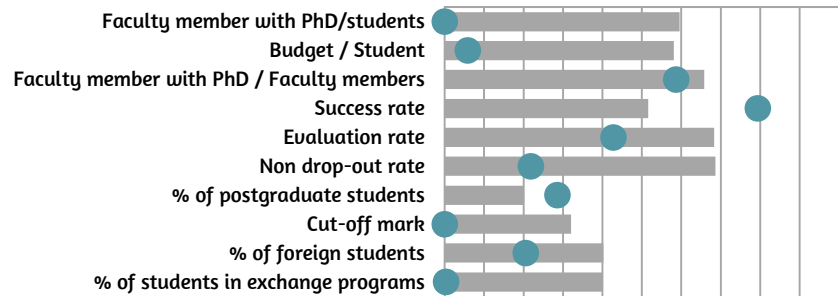
Index and position in the ranking between brackets



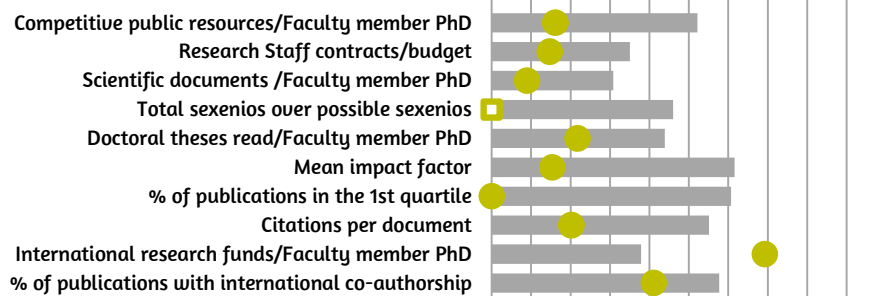
U-Ranking 2016 indicators

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

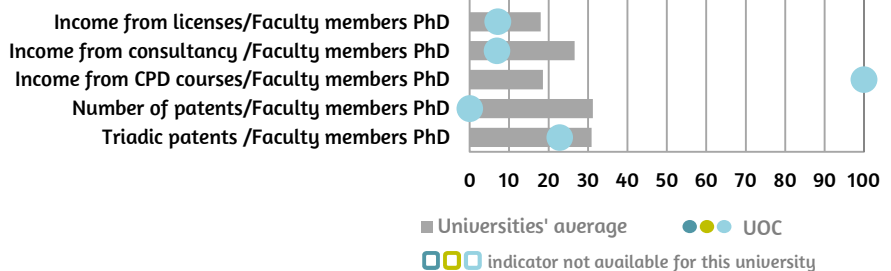
TEACHING INDICATORS



RESEARCH 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



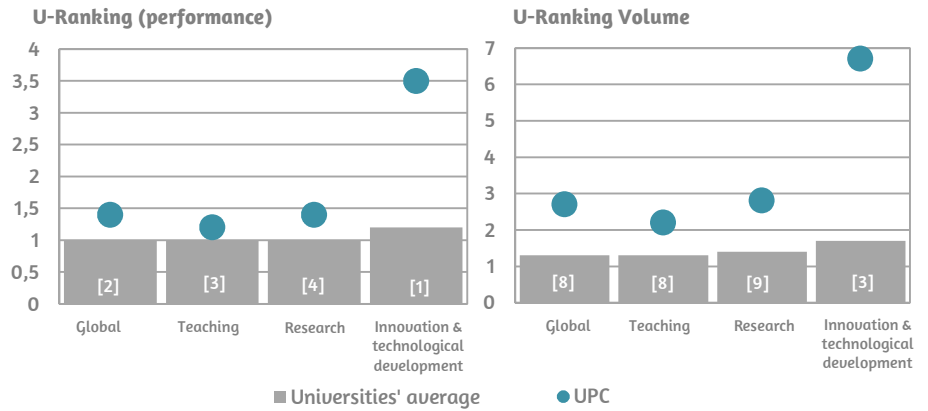
Year of foundation: 1.971
 Type of ownership: Public
 Bachelor's degree students³: 26.038
 Master's degree students²: 2.674
 Faculty members²: 2.646
 Administration and service staff: 1.543
 Budget¹: 284.557.942€
 Bachelor's degrees¹: 50
 Master's degrees¹: 117

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

Index and position in the ranking between brackets



U-Ranking 2016 indicators

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

TEACHING INDICATORS

Faculty member with PhD/students
 Budget / Student
 Faculty member with PhD / Faculty members
 Success rate
 Evaluation rate
 Non drop-out rate
 % of postgraduate students
 Cut-off mark
 % of foreign students
 % of students in exchange programs

RESEARCH INDICATORS

Competitive public resources/Faculty member PhD
 Research Staff contracts/budget
 Scientific documents /Faculty member PhD
 Total sexenios over possible sexenios
 Doctoral theses read/Faculty member PhD
 Mean impact factor
 % of publications in the 1st quartile
 Citations per document
 International research funds/Faculty member PhD
 % of publications with international co-authorship

INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS

Income from licenses/Faculty members PhD
 Income from consultancy /Faculty members PhD
 Income from CPD courses/Faculty members PhD
 Number of patents/Faculty members PhD
 Triadic patents /Faculty members PhD



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

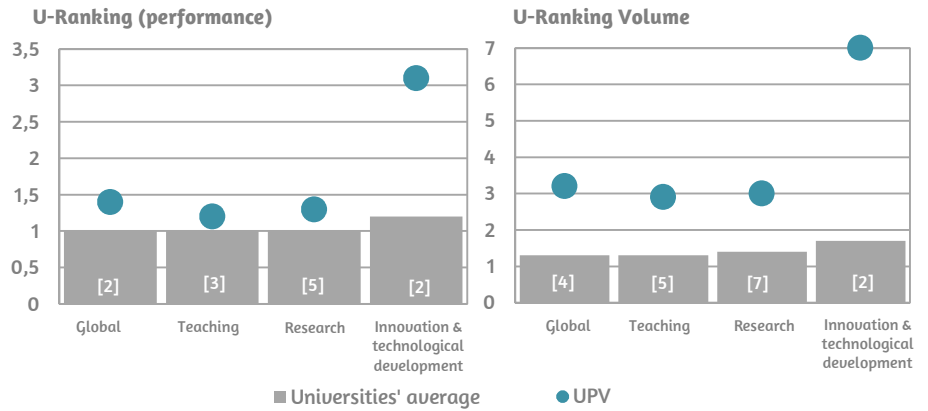
Year of foundation: 1.971
 Type of ownership: Public
 Bachelor's degree students³: 26.170
 Master's degree students²: 3.541
 Faculty members²: 2.615
 Administration and service staff: 1.477
 Budget¹: 364.106.623€
 Bachelor's degrees¹: 31
 Master's degrees¹: 79

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

Index and position in the ranking between brackets



U-Ranking 2016 indicators

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

TEACHING INDICATORS

- Faculty member with PhD/students
- Budget / Student
- Faculty member with PhD / Faculty members
- Success rate
- Evaluation rate
- Non drop-out rate
- % of postgraduate students
- Cut-off mark
- % of foreign students
- % of students in exchange programs

RESEARCH INDICATORS

- Competitive public resources/Faculty member PhD
- Research Staff contracts/budget
- Scientific documents /Faculty member PhD
- Total sexenios over possible sexenios
- Doctoral theses read/Faculty member PhD
- Mean impact factor
- % of publications in the 1st quartile
- Citations per document
- International research funds/Faculty member PhD
- % of publications with international co-authorship

INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS

- Income from licenses/Faculty members PhD
- Income from consultancy /Faculty members PhD
- Income from CPD courses/Faculty members PhD
- Number of patents/Faculty members PhD
- Triadic patents /Faculty members PhD



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

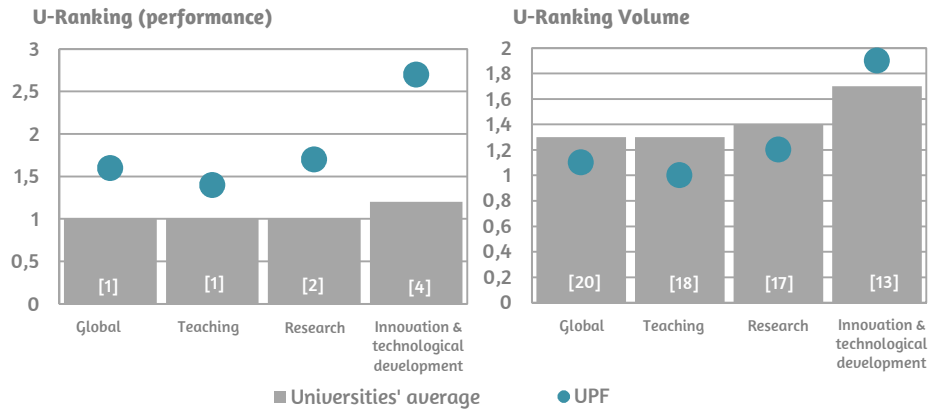
Year of foundation: 1.990
 Type of ownership: Public
 Bachelor's degree students³: 13.290
 Master's degree students²: 2.641
 Faculty members²: 1.194
 Administration and service staff: 897
 Budget³: 120.840.187€
 Bachelor's degrees¹: 38
 Master's degrees¹: 109

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

Index and position in the ranking between brackets



U-Ranking 2016 indicators

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

TEACHING INDICATORS

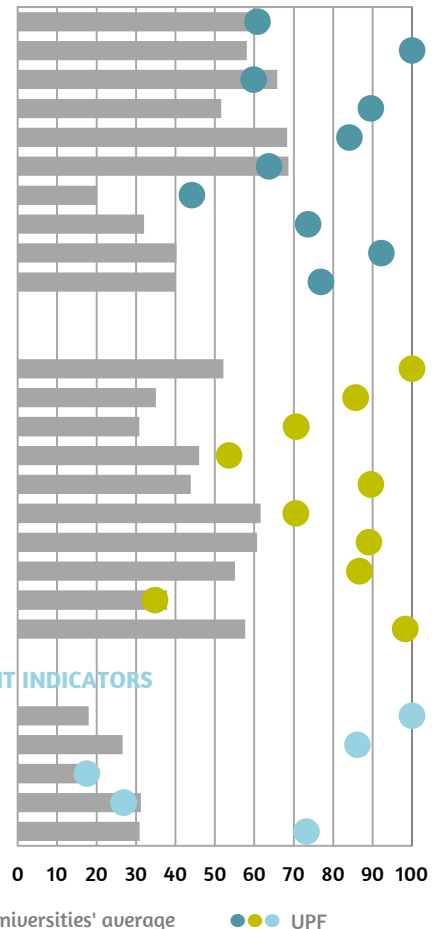
Faculty member with PhD/students
 Budget / Student
 Faculty member with PhD / Faculty members
 Success rate
 Evaluation rate
 Non drop-out rate
 % of postgraduate students
 Cut-off mark
 % of foreign students
 % of students in exchange programs

RESEARCH INDICATORS

Competitive public resources/Faculty member PhD
 Research Staff contracts/budget
 Scientific documents /Faculty member PhD
 Total sexenios over possible sexenios
 Doctoral theses read/Faculty member PhD
 Mean impact factor
 % of publications in the 1st quartile
 Citations per document
 International research funds/Faculty member PhD
 % of publications with international co-authorship

INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS

Income from licenses/Faculty members PhD
 Income from consultancy /Faculty members PhD
 Income from CPD courses/Faculty members PhD
 Number of patents/Faculty members PhD
 Triadic patents /Faculty members PhD



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

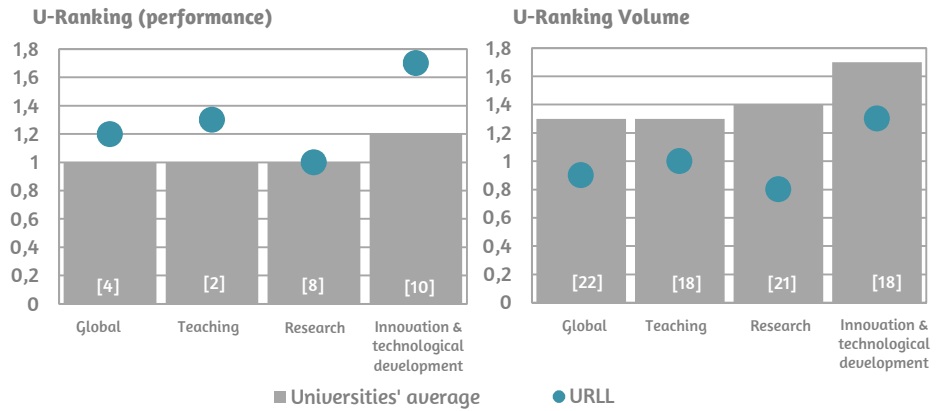
Year of foundation: 1.991
 Type of ownership: Private
 Bachelor's degree students³: 11.382
 Master's degree students²: 2.455
 Faculty members²: 1.004
 Administration and service staff: 682
 Budget²: not available
 Bachelor's degrees¹: 40
 Master's degrees¹: 97

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

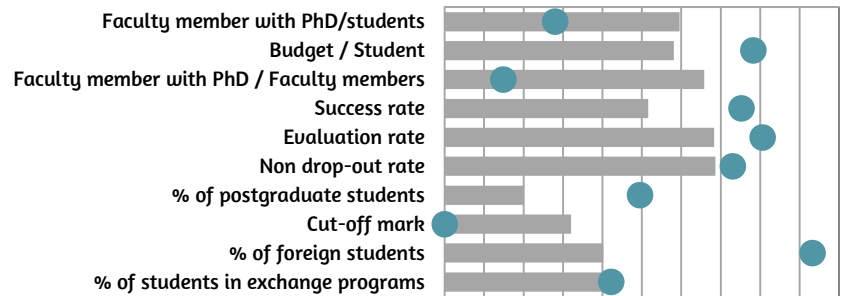
Index and position in the ranking between brackets



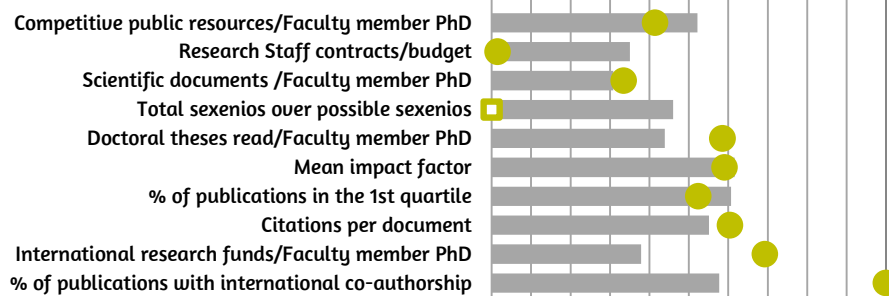
U-Ranking 2016 indicators

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

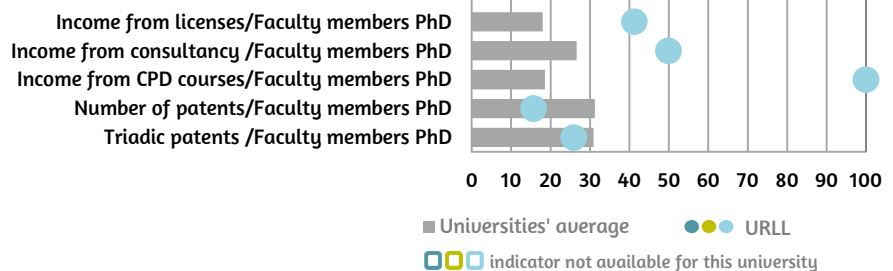
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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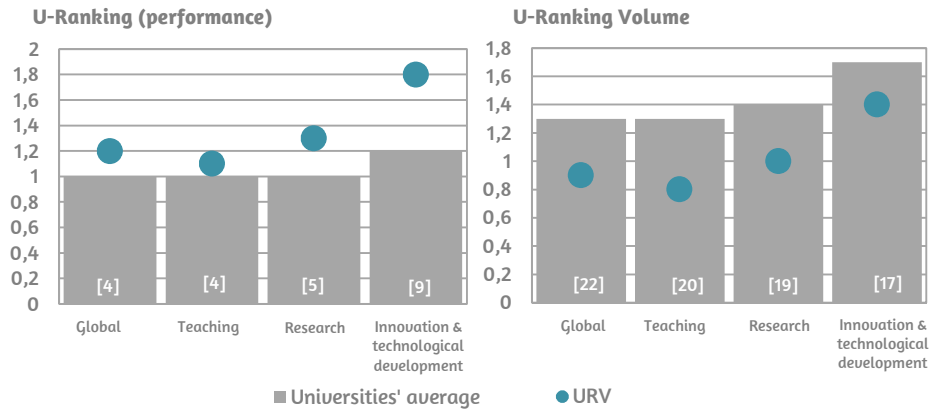
Year of foundation: 1.992
 Type of ownership: Public
 Bachelor's degree students³: 11.852
 Master's degree students²: 1.063
 Faculty members²: 1.693
 Administration and service staff: 704
 Budget³: 102.219.057€
 Bachelor's degrees¹: 41
 Master's degrees¹: 90

¹Course 2015-16; ²Course 2014-15; ³2013
 Source: Ministry of Education, Culture and Sport



U-Ranking 2016 performance and volume indices

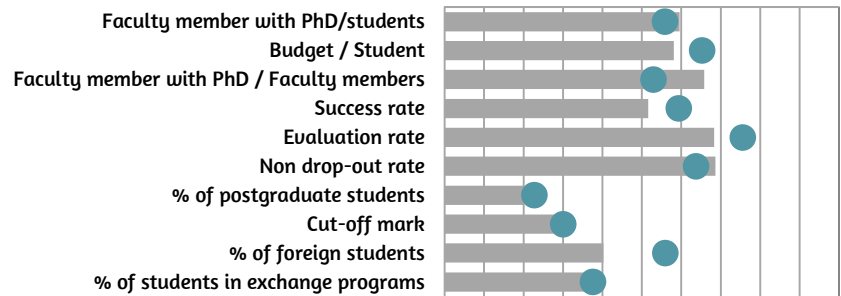
Index and position in the ranking between brackets



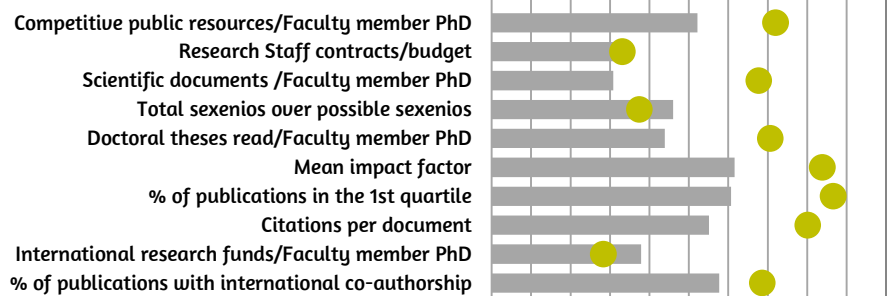
U-Ranking 2016 indicators

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

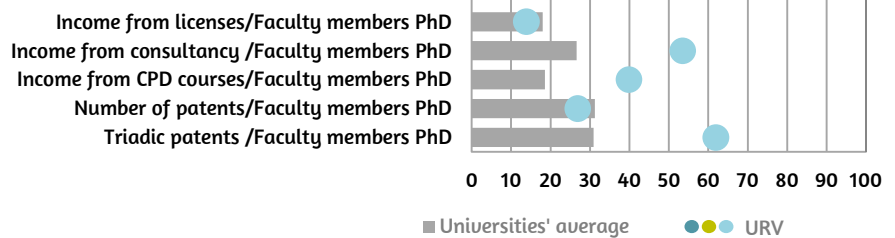
TEACHING INDICATORS



RESEARCH INDICATORS



INNOVATION & TECHNOLOGICAL DEVELOPMENT INDICATORS



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