U-Multirank

Interim Progress Report

Design Phase of the Project

'Design and Testing the Feasibility of a

Multi-dimensional Global University Ranking'

CHERPA-Network

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1 Stocktaking of Rankings and Classifications

1.1 Introduction

1.1.1 Aim and Structure of the Chapter

The aim of this chapter is to introduce the variety of transparency tools that are currently available, to analyse the need for better transparency tools than what is available currently, and to indicate how the current project will address this need. With that aim in mind, we will next give an overview of current transparency tools (and what we understand by that concept), then we will go into the research on rankings and league tables, first giving a critique of methodology and showing good practices, then looking in more detail at two critical aspects: data sources and the impacts of rankings and league tables on users. Finally, we derive conclusions relevant for the design and testing of an alternative, multi-dimensional transparency tool.

1.1.2 Transparency Tools

A major consideration underlying the whole project of a multi-dimensional global university ranking is that on the one hand the need to obtain valid information on higher education across national borders is increasing at this juncture, while on the other hand higher education and research systems are becoming more complex and—at first sight—less intelligible for stakeholders. Asbhy's Law of Requisite Variety makes us realise that the more complex higher education systems become, the more complex our way of looking at them needs to become, too. In other words: if for a simple higher education system all we need to know may be a simple league table, in modern-day, international views on higher education more complex instruments are needed to give us the transparency that we want (cf. van Vught 1993). Sophisticated transparency tools are, therefore, more than ever urgently needed. All the more so, as the role of higher education in society is expanding, implying that more stakeholders in society get into contact with higher education and research who may not have the 'social capital' of knowing the higher education and research system intimately, so that they would have the requisite knowledge 'automatically'. Transparency tools should be designed to help them and it is increasingly realised that the needs for transparency among different stakeholders in higher education are diverse. Transparency tool therefore have to be designed for those different needs.

It is widely recognized now that although the current transparency tools—especially university league tables—are controversial, they seem to be here to stay, and that

especially global university league tables have a great impact on decision makers at all levels in all countries as well as on universities. They reflect a growing international competition among universities for talent and resources; at the same time they reinforce competition by their very results. On the positive side they urge decision makers to think bigger and set the bar higher, especially in the research universities that are the main subjects of the global league tables. Yet, major concerns remain as to the league tables' methodological underpinnings and to their policy impact on stratification rather than on diversification of mission. Governments try to build 'world-class' universities, through special funding, stimulating mergers or taking other measures for those universities; some fear that this concentration of efforts lead to loss of interest and resources for other parts of higher education systems.

In the previous sentences, some target groups (stakeholders) for transparency tools have been mentioned or implied: policy makers and leaders of higher education institutions. In public statements, quite often only another target group is mentioned, i.e. students and potential students. We will come back later to the issue of target groups.

There are theoretically-grounded reasons why transparency tools such as rankings are simultaneously more needed and more debatable in higher education than in an 'average' sector of society. In economical terms, higher education is an *experience good* or maybe even a *credence good*. An experience good is one of which the quality can only be judged after consuming it; this is in contrast to the textbook case of 'search goods', i.e. good whose quality can be judged by consumers in advance. With credence goods, even after consumption consumers do not know the quality of the good (Dulleck and Kerschbamer 2006; Bonroy and Constantatos 2008): doctors' consults, computer repairs and education are given as standard examples. Whether or not students really know how good the teaching has been to enhance their knowledge, skills and other competencies (we may need to distinguish initial from post-initial higher education, in this respect, cf. Westerheijden 2003), we may safely assume that they cannot know the quality beforehand. Similar arguments can be built for other stakeholders in higher education such as companies, professions and governments. This implies that a principal-agent like asymmetry of information exists, and that is what transparency tools such as quality assurance, classifications, league tables and rankings ought to alleviate in order to maximise the social benefit of higher education.

From their beginning, the main purpose of most national rankings has been to inform (prospective) students about universities within a country. At the same they are broad in their scope with regard to dimensions of institutional performance and academic fields included. Most of them focus on indicators that are thought to measure aspects of quality of teaching and learning; but many include indicators on research, reputation and other dimensions, too. Only recently have international and global league tables emerged to compare for the first time universities on a global scale. The best known are the 'Academic Ranking of World Universities' (ARWU) published by Shanghai Jiao tong

University, first released in 2003, the Times Higher Education/QS World Ranking, the bibliometric Leiden Ranking designed by the Center for Science and Technology Studies (CWTS, University of Leiden) and another bibliometry-based one published by the Higher Education Evaluation and Accreditation Council of Taiwan (HEEACT). They are directed to a broader public; as they are a reflection of a growing international competition in particular in research, they largely focus on comparing research performance of universities.

As already indicated, the discussion about the global league tables demonstrates that there is a particular dialectic of league tables and competition: The emergence of international/global league tables on the one hand is an expression of an increasing worldwide competition among universities (for students, staff and resources); yet at the same time those league tables themselves reproduce and intensify this competition by their own results (Federkeil 2006).

The objective of this chapter is to develop an overview on existing transparency tools and to study the international literature on classification and ranking to work out implications for the design of the transparency tool to be developed in the course of the project. Since '… indicators and league tables are enough to start a discussion … they are not sufficient to conclude it' (Saisana and D'Hombres 2008, p. 8), our chapter will also show 'lessons learned' in the area of transparency tools and the standards to be observed in the selection of dimensions/indicators and databases for the worldwide institutional classification and the focused rankings on the one hand and for the field-based rankings on the other.

1.2 Overview on Transparency Tools

Globalization leads to increasing competitive pressures on higher education institutions, in particular related to their position on global university league tables, i.e. the so-called 'reputation race' (van Vught 2008) ,for which their research performance currently is almost exclusively the measure. As we will explain below, existing global league tables implicitly suggest that there is in fact only one model that can have global standing: the large comprehensive research university. This has an adverse affect on diversity since academic and mission drift (isomorphism) can be expected to intensify as a result. Such one-sided competition also jeopardizes the status of activities that universities undertake in other areas, such as undergraduate teaching, innovation, their contribution to regional development, to lifelong learning, etc. and of institutions with different missions and profiles. As a result more *vertical stratification* ('better' or 'worse' prestige or performance) rather than *horizontal diversification* (differences in institutional missions and profiles) can be expected (Teichler 2007). In other words, hierarchy rather than diversity will be enhanced, as specialization and diversification are not generated unless the incentive structure favours this (Marginson and van der Wende 2007). The creation of transparency tools that make diversity (vertical *and* horizontal) and different forms of

excellence transparent rather than hide it, may be a first step towards creating a more diversified incentive structure and thus contribute to maintenance of the necessary diversity in higher education worldwide.

A number of terms have been introduced now that need at least a working definition. For us, *transparency tool* is the most encompassing term, including all the others; it denotes all manners to give insight into the diversity of higher education. A *classification* is a systematic, nominal distribution among a number of classes or characteristics without any (intended) order of preference. Classifications are eminently suited to address horizontal diversity.

Rankings are instruments to display vertical diversity in terms of performance by using quantitative indicators. Most existing rankings in higher education take the form of a league table. A *league table* is a single-dimensional, ordinal list going from 'best' to 'worst', assigning to the entities unique, discrete positions seemingly at equal distance from each other (from 1 to, e.g., 500). There are other approaches to ranking using a multi-dimensional approach and sorting institutions in groups instead of league tables. We want to distinguish such *rankings* (and *call* them 'rankings') from league tables as being the better, more sophisticated instruments. This passage may not seem quite clear now, but we will go into considerable detail to explain why and how. Our point here is that readers need not see a ranking as inherently bad, although there are bad ones around.[1]

Quality assurance is mentioned in this context because evaluation or accreditation processes also produce some information to stakeholders (review reports, accreditation status) and in that sense helps to achieve transparency. As the information function of quality assurance is not very extended (more in §§ 1.4.3 and 1.4.4, below) and as quality assurance is too ubiquitous to allow for an overview on a global scale, in the following we will focus on classifications and rankings/league tables. Let us underline here already that rankings and classifications on the one hand and quality assurance on the other play complementary roles.

The examples of rankings and classifications that will appear most often in our report include the following (for a longer list of rankings around the world, see e.g. www.arwu.org/RankingResources.jsp).

[1] A complication is that 'ranking' may be a noun and a verb, while there is no corresponding verb for 'league table'; some confusion in our use of verbs may be unavoidable.

Table 1-1: Classifications and rankings

Type	Name
Classifications	• Carnegie classification (U.S.A.) • U-Map (Europe; under development)
Global League Tables and Rankings	• Shanghai Jiao Tong University's (SJTU) Academic Ranking of World Universities (ARWU) • Time Higher Education (Supplement) (THE) • Leiden Ranking
National League Tables and Rankings	• U.S. News & World Report (USN&WR; U.S.A.) • Time Good Education Guide (UK) • Guardian ranking (UK) • Forbes (U.S.A.) • CHE Das Ranking / University Ranking (CHE; Germany) • Studychoice123 (SK123; the Netherlands)
Specialised League Tables and Rankings	• Financial Times ranking of business schools and programmes (FT; global) • BusinessWeek (business schools, U.S.A. + global) • The Economist (business schools; global)

1.2.1 Classifications

Attempts to get to grips with the diversity of higher education and research institutions have been in demand ever since these systems became too large for stakeholders to know all institutions individually. In the centrally steered systems of Europe's nation-states, bureaucratic categorisations fulfilled an important function in this respect, distinguishing academy institutes, universities, polytechnic schools, national research centres, colleges, etc. More sophisticated classification instruments became necessary when finer distinctions within such broad categories were needed, or when comparisons were made across state boundaries. Another need for more differentiated distinctions arises from the increasing importance of institutional strategies, which lead to a heterogeneous picture of institutional goals, missions and task priorities. Two classifications stand out internationally: the U.S. Carnegie classification and the European U-Map classification tool.

The major classification in higher education was developed in the U.S.A., where the Carnegie Foundation first published its classification in 1973 as a tool for researchers; it turned into a major, authoritative concept for all of the U.S.A. and beyond (McCormick and Zhao 2005):

> Clark Kerr headed the Carnegie Commission when it created the classification system, so it is not surprising that the scheme bore marked similarities to another element of the Kerr legacy, the mission differentiation embedded in the 1960 California Master Plan for Higher Education. Indeed, one goal of the new system was to call attention to—and emphasize the importance of—the considerable institutional diversity of U.S. higher education. The classification provided a way to represent that diversity by grouping roughly comparable institutions into meaningful, analytically manageable categories.

The Carnegie classification is entirely run and funded by the Carnegie Foundation. The success of the Carnegie classification is due to the fact that the Carnegie Foundation has the generally accepted authority as the implementing organisation of the U.S. classification. Over the years, the Carnegie classification turned into a league table instrument in popular use: it was seen as more prestigious to be a 'research I university' than an associate degree-granting college, in fact taking the nominal length of the highest degree awarded at an institution as a proxy for its overall quality. In the latest version, published in 2005, a multi-dimensional classification has been developed, counteracting this tendency to simplified ranking. 'The new classifications provide different lenses through which to view U.S. colleges and universities, offering researchers greater flexibility in meeting their analytic needs' (www.carnegiefoundation.org/classifications, accessed 2009-10-16). The new classifications are presented as 'different lenses' on the higher education landscape:

> They are organized around three fundamental questions: what is taught (Undergraduate and Graduate Instructional Program classifications), who are the students (Enrollment Profile and Undergraduate Profile), and what is the setting (Size & Setting). The original Carnegie Classification framework—now called the Basic classification—has also been substantially revised.

The European U-Map classification has been under development since 2005. It is nearing completion in 2009 and will be used to complement our new, multidimensional global ranking tool, 'U-Multirank'. U-Map is a user-driven, multidimensional European classification instrument that allows all higher education (and research) institutions to be characterised along six dimensions. By doing so, U-Map allows creation and analysis of specific 'institutional profiles', offering 'pictures' of an institution on the various indicators of all six dimensions. U-Map can be accessed through two online tools (a Profile Finder and a Profile Viewer) that allow stakeholders to analyse the institutional profiles (e.g. for benchmarking), comparative analysis or institutional strategic profiling.

U-Map has been developed in close cooperation with the designers of the most recent Carnegie classification. It is a major new transparency tool in European higher education an in the current project aimed to develop a multidimensional global ranking tool, it will be an important source of experience and inspiration (see www.u-map.eu).

1.2.2 Rankings and League Tables

Since the early parts of the 20th century, rankings and league tables of higher education have existed, starting in the U.S.A. (Dill 2006). An overview on existing ranking systems by the Institute for Higher Education Policy (IHEP)[2] lists more than 30 countries in all continents with a few countries (like the UK) producing a number of competing rankings. Generally speaking, rankings and league tables compare higher education institutions by ordering them one after the other according to the degree to which they fulfil certain criteria. An important characteristic of rankings and league tables is that they allow saying at first sight who is at which rank order position in the 'top-*n*' of something.

In the rest of this section we will present an overview of a number of characteristics of rankings and league tables. The major dimensions to analyse and classify rankings and league tables would seem to be:

- Primary target group,
- Producers: e.g. public vs. private not-for-profit vs. private for-profit,
- Level: e.g. institutional vs. field-based,
- Scope: e.g. national vs. international,
- Focus: e.g. education vs. research.

With five dimensions, a summary overview in the form of a table may be unattainable; we will however mention some examples in each of the following subsections.

1.2.3 Primary Target Groups

Most national rankings started with the professed aim of informing (prospective) students and their parents about universities and programmes of their country. The 2001 edition of 'America's Best colleges' edited by U.S. News & World Report (USN&WR) announced to those target groups that it will 'provide a detailed map to improve your odds of ending up in the right place'.[3] It is a challenge in particular for those rankings to find a balance between the need to reduce the complexity of information for the core target group, prospective students, who are the among the groups least informed about higher education on the one hand, and, on the other hand, the need to deliver sophisticated and elaborate information for the higher education sector itself, which is important for the acceptance of rankings within higher education (Federkeil 2006).

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[2] See http://www.ihep.org/Research/nationalrankingsystems.cfm (accessed 12 August 2009).

[3] U.S. News & World Report: America's Best Colleges. 2001 edition, p. 8.

A similar situation pertains for international field-based rankings, e.g. rankings of business schools in different countries as published by amongst many others (for a long list of MBA rankings, see www.find-mba.com/mba-rankings) the Financial Times (FT; http://rankings.ft.com/businessschoolrankings): they intend to assist prospective students to find the best short course or MBA degree programme for them. It is worth noticing that international field-based rankings have first appeared in professional fields that are internationally integrated, such as business studies. In recent years, more rankings have begun to address specific academic fields in a differentiated manner, e.g. the Excellence ranking of the Centre for Higher Education Development (CHE) in Europe and the field rankings in the Shanghai and Taiwanese league tables.

It should be recognised that not all students are alike: the USN&WR ranking or the student information websites such as Studychoice123.nl (SK123) or of the Centre for CHE ones are in the first instance aimed at students entering higher education for the first time in their lives, typically the adolescents in their last years of secondary education. The Financial Times (FT) one is looking at more mature persons with some years of professional experience wanting to upgrade or extend their knowledge through gaining specific skills. And the Aspen Institute's 'Beyond Grey Pinstripes' ranking of MBAs (www.beyondgreypinstripes.org) is aimed at students interested in curricula emphasising green values and ethical business models. These are groups of completely different students with different cost/benefit calculations of studying in their minds, with different knowledge about higher education institutions and with different information needs as a result of that. Consumption motives (living on campus for 3 to 5 years, broad academic learning to form one's personality, etc.) will be more important to first-time students, while investment motives may more readily characterise the returning students (e.g. which competences and how much additional income will I get from two years part-time study with this particular school or professor?).

In contrast, international/global league tables of higher education institutions as a rule do not refer explicitly to a defined target group. They address a broader public inside and outside higher education and around the world. The most prominent global league table, The Academic Ranking of World Universities (ARWU) originally was intended as an instrument to compare the research performance in science and technology fields of Chinese universities, and of the Chinese national higher education system with the rest of the world, particularly with U.S. universities. Hence it was intended mainly as an instrument of national steering of research policy and planning; the implicit target group of such league tables then is the set of policy-makers in the public authorities (ministries of education and science & technology).

More detailed research rankings like the Leiden Ranking seem to target more specific management decision-support, to find out which universities are comparable to one's own, or which ones might be interesting partners for a benchmarking exercise in the research dimension because they are performing better in specific research areas than

one's own. Such questions and decisions indicate that institutional leaders and their support staff would be the prime target group of this ranking. Similarly, the Webometrics league table informs institutional leaders about the relative web presence of their higher education or research institution, which might lead to decisions regarding e.g. open access publishing. These and comparable rankings are designed to answer specific information needs of staff members (different ones, depending on the individual ranking being focused) in higher education and research institutions closely associated with the strategic decision-making level.

1.2.4 Producers of League Tables

The majority of national league tables are produced by media companies. Again this trend started with *U.S. News & World Report*. Before, there were some league tables (e.g. in economics) produced by academic institutions themselves, but in contrast to the media rankings they did not get much public attention. Other examples of media league tables are *The Times* Good University Guide, league tables by the newspapers *Guardian*, *Independent* in the UK, national league tables in France (*Nouvel Observateur*) and Italy (*Sole 24 Ore*). A minority of rankings is published by independent, national non-profit organisations like the CHE rankings in Germany (with media partner *Die Zeit*), Studychoice123 in the Netherlands and the Polish ranking published by Perspektywy Foundation (www.perspektywy.org). Furthermore there are a few examples of national rankings published by official institutions, e.g. the Higher Education Evaluation and Accreditation Council of Taiwan (HEEACT) or the Nigerian Rectors Conference. In the UK, the government-sponsored Commission for Employment and Skills (Ukces) had a review published in 2009, advocating a ranking of study programmes in further and higher education focusing especially on student retention and earning (www.guardian.co.uk/education/2009/oct/22/league-table-plan-for-universities; accessed 2009-11-04).

In contrast to national rankings, the majority of global league tables (three out of five) are compiled by academic institutions (CWTS/Leiden University, Ecôle des Mines, Consejo Superior de Investigaciones Científicas (CSIC) in Spain). The ARWU used to be made by a university as well, the Shanghai Jiao Tong University (SJTU), but '[s]tarting from 2009, the ARWU has been published by ShanghaiRanking Consultancy, a fully independent organization. Besides ARWU, the Consultancy is going to provide various global comparison and in-depth analysis on research universities, supporting relevant decision making by national governments and universities in global context.' (www.arwu.org, accessed 2009-11-20). The THE ranking is the outlier among the global rankings, being organised by a major newspaper.

The Taiwanese HEEACT and the Dutch SK123 consortium (a consortium including all stakeholders, with governmental subsidy) would seem to be the rankers most closely related to public authorities, yet they are not in any way connected with governmental

policy-making regarding higher education and research institutions, although the HEEACT in its evaluation and accreditation roles is associated with implementation of existing policies. Also the academic institutions producing global league tables are mainly public actors. Both CHE and the Polish foundation Perspektywy are public-private partnerships, being independent non-profit organisation with close relationships to national rectors' conferences.

1.2.5 Institutional and Field-based Rankings

In broad terms, interests of users can focus at institutional or at field levels of higher education and research. By fields, we may mean smaller organisational units like faculties, schools or departments focusing at a single area of knowledge (e.g. academic disciplines like economics or physics, or interdisciplinary areas like business studies or nano-technology) or single programmes of study or programmes of research in such an area. Most global league tables (ARWU, THE, Leiden, HEEACT, Webometrics) rank higher education and research institutions, and it is this focus which most easily connects them with the reputation race. Both ARWU and THE rankings publish results for broad fields, too, but the selection of institutions in those broad field rankings are based on their institutional ranking.[4] Some specialised global rankings are about one specific field, e.g. the Financial Times one about business studies. In a way, the latter one straddles the field vs. institution divide, to the extent that some business schools it ranks may be independent institutions rather than schools/faculties of larger universities.

Many national rankings also pertain to higher education and research institutions as a whole, such as the USN&WR and Perspektywy ones. Again these are closely connected to institutional prestige and reputation. More typically though, national rankings like the CHE Ranking and SK123 are geared to helping prospective students to make an informed choice of study programmes matching their individual needs and wants, rather than about organisational units of higher education and research institutions.

The logic for being interested in the field level is easiest to argue for students or for individual researchers looking for a place to study or to do research: programmes across institutions may deliver quite different qualities (we will return to target groups' information needs in § 1.3.1.1). Showing the average value of indicators for whole higher education and research institutions hides the local strengths and weaknesses, while it is argued that for all but the very best and richest institutions it is neither possible nor desired to be equally prominent in all fields present at the institution (see also § 1.3.1.2, where we approach this issue at the level of methodological critique).

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[4] In November 2009, Shanghai Jiaotong University announced the first publication of field-based rankings within a small number of more narrowly defined fields, too (e.g. physics and chemistry next to natural sciences and mathematics as a whole).

On the other hand, decision-makers in government or leaders of higher education and research institutions have a legitimate interest in the overall characteristics of institutions: some characteristics only apply at the level of an institution as a whole, going across or beyond field levels (e.g. mission, participation policies), or the institutional level is a useful first-order approximation for in-depth characteristics (e.g. for finding partners in benchmarking exercises). Policy-makers often have to be limited to the institutional level because it is at that level that they may make policy decisions, while field-level decisions are the prerogative of institutional management and academic experts (institutional autonomy and academic freedom might otherwise be jeopardised).

1.2.6 National or International Scope

The earliest league tables were published to compare colleges (higher education institutions) across the fifty states of the United States—a national level in a technical sense, but as a higher education system about as large as the European Higher Education Area (EHEA), which eminently is an international higher education system of 46 countries. In character, the USN&WR league tables are more like national league tables and rankings in other countries, though: they aim to inform U.S. students about the 'best' study options available anywhere in the whole of the U.S.A. at the institutional level (USN&WR). Similarly, but then at the field or study programme level, the CHE Ranking started with the aim to inform students looking for undergraduate study across all 16 federal states in Germany as well as students in Austria and (German-speaking parts of) Switzerland. We can fairly safely say that national-level rankings and league tables tend to be designed for a clearer purpose and with a more focused target group in mind than global ones. With growing higher education and research systems in many countries, national actors increasingly see a need for national rankings or league tables to restore transparency; the number of countries where they can be found continually increases.

International league tables, it will be remembered, are more often aimed at ranking whole higher education institutions. They are the most controversial and most talked-about league tables at the moment, at least as far as they have the aura of establishing quality or reputation of the universities as a whole. The most prominent examples include the ARWU and the THE ranking. Other international league tables such as the Leiden Ranking or Webometrics are more explicit about their limited scope and limited claims: they wish to inform about research performance and impact (Leiden ranking) or about web presence and activity (Webometrics). In that way, they seem to evoke less vehement debate than the former two. With regard to the growing demand for more international transparency in the context of international mobility of students, on the one hand we see national rankings expanding to neighbouring areas (the CHE ranking now includes German higher education institutions as well as institutions from amongst others Austria, Switzerland and the Netherlands). On the other hand, the CHE Excellence Ranking focuses on the market for Master and Ph.D. students in as yet a

small number of fields (it was first piloted in 2007) in international, research-oriented universities throughout Europe.

1.2.7 Focus on Education or on Research

The final dimension we mention here has a double meaning. Rankings and league tables may be intended to inform about education or about research. For instance, the professed aim of the CHE rankings and SK123 is to inform students about the best institutions where they can study, which obviously has to do with education. The Leiden ranking is explicit in its focus on informing about the research performance of higher education institutions. The original aim of the ARWU was to inform higher education and research policy-making in China about the position of Chinese universities in research (mainly in science and technology); in its intentions it straddles the distinction of education as opposed to research.

The other meaning of the dimension has to do with the actual indicators used to compose the ranking. One of the criticisms we will go into below, is that there is not always a straight correlation between the indicators used to establish the ranking (often research-based especially when we look at the international league tables) and the focus they claim to have (e.g. to inform students). Most national rankings with their focus on information for (prospective) students show indicators on teaching or they use a mix of teaching and research indicators (plus some context variables). The majority of indicators used in global rankings measure research.

1.3 Research on rankings

This section aims to give a brief overview of the state of the art concerning the research on rankings, with three sub-aspects: a critique of ranking methodology, identification of good practices and investigation of impacts of rankings and league tables.

1.3.1 A Critique of Ranking Methodology

Rankings and league tables have been criticised on methodological grounds by many commentators (amongst many others: Klein and Hamilton 1998; Yorke 1998; Gottlieb 1999; Leeuw 2002; Merisotis 2003; Dill and Soo 2005; Van Dyke 2005; van Raan 2005; Brown 2006; Marginson 2006; Usher and Savino 2006; Enserink 2007; King, Locke et al. 2008; Marginson 2008; Saisana and D'Hombres 2008; van der Wende 2008; Högskolverket 2009; Marginson 2009; van der Wende and Westerheijden 2009); in the following, we will build on their (and others') works to summarise the main methodological criticisms of rankings and league tables.

1.3.1.1 Target groups and information needs

Rankings are said to be for informing students, so that they can make a more rational choice of the higher education institution they are going to attend. Rapp called this 'The common 'politically correct' purpose' (Presentation at EUA, The role of evaluation and ranking of universities in the quality culture, 2009-07-02). But do league tables give the information students want? It is one of the principles of 'good ranking' as embodied in the Berlin Principles (which will be discussed later in this chapter) that rankings should be geared towards their target group, and it can be safely maintained that at least until recently, this aspect was given too little attention: it was simply assumed implicitly that whatever indicators were available, must be relevant, and that this would apply to all groups of readers of rankings (King, Locke et al. 2008).

In the simplest models of communication, three elements are distinguished: the sender, the message and the receiver. To get a view of information needs, we should start with the receivers and with the decision situation they are in. What do they want to do? Which information do they need to do this well? 'Receivers' can be 'customers', institutions or funders. 'Customers' can be further specified into current students, prospective students (sometimes their parents are also seen as customers) and employers or professionals for whom and with whom graduates will work after finishing their studies. When it comes to 'what to do?', the choices that are interesting from our point of view, are: what to study, which candidate to hire, which higher education institution to choose as a partner in a project, which projects to fund, etc. Obviously, for such different decisions, different actors need different information on different objects—the case for a multi-dimensional transparency tool is obvious, once this is realised.

Besides, for some of these decisions, more than just the characteristics ('qualities') of higher education institutions play a role in practice. The college choice process of students is the best example of that statement: prospective students may have very different motivations to go and study a certain programme in a certain location. They may be investment-motivated or focusing on consumption motives (Westerheijden 2009), next to being constrained in their choice of options through social factors. Rankings should give information on investment (e.g. future job chances) *and* consumption motives (e.g. sports facilities at the higher education institution) and in that way alleviate social constraints. They would then fulfil their emancipatory social role. Therefore, multi-dimensionality is even required regarding one single target group. It is contested, however, to what extent existing transparency tools reach the target groups most constrained by social factors (briefly addressed in e.g.: Cremonini, Westerheijden et al. 2008), thus continuing and even strengthening social stratification of students.

Such sociological worries may apply less to choices by e.g. institutional leaders; for them, the lack of credible and comparable information on other higher education institutions is the main reason for their interest in transparency tools. Especially research

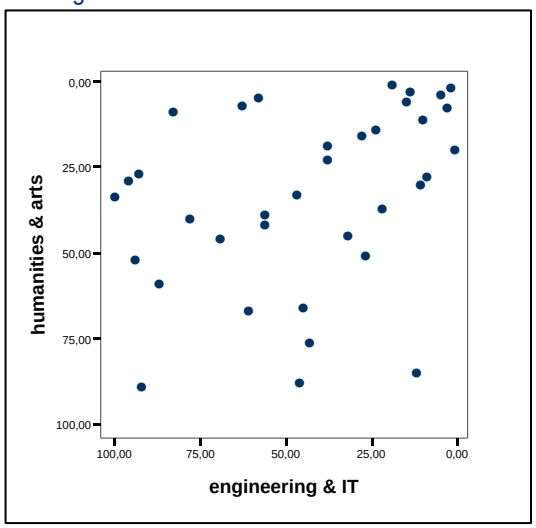
universities and all those that want to be research universities have begun to reference themselves world-wide (Marginson 2008), urging decision-makers in these higher education institutions to think bigger and set the bar higher. A consequence of this world-wide phenomenon may be a global afore-mentioned 'reputation race' (van Vught 2008) among research-oriented higher education institutions. Reputation is an efficient and therefore attractive indicator of 'quality' for actors who do not have the time, need or other resources to delve deep for detailed information (Stigler 1961), or to worry about what makes up 'quality'. Hence also the remark that: 'Rankings enjoy a high level of acceptance among stakeholders and the wider public because of their simplicity and consumer-type information' (AUBR Expert Group 2009). One might question if institutional managers *should* not be interested in the detailed information rather than in reputation, but if we may surmise that institutional managers may expect that stakeholders are mainly interested in reputation, it is in their interest to 'keep up appearances' in the eyes of stakeholders. Reputation is 'good' for institutional managers (van Vught 2008) as a high reputation is what their stakeholders act upon. A good reputation gives better access to funds, highly-performing staff members, well-prepared first-year students, etc., which all will result in actual better performance in later years.

A deplorable side-effect of the information efficiency argument is that there may be a tendency among users of rankings and league tables to simplify them to a one-dimensional league table anyway. We will come back to such effects in § 1.3.2.3.

1.3.1.2 Institutional Rankings and Field-Based Rankings

World university league tables are the type of transparency tools that catch most public attention. They are primarily rankings of *whole* institutions, i.e. they compare whole institutions across all fields, ignoring internal variance in qualities of specific academic fields within an institution. For some purposes, it may be desirable to have institution-wide information, but in many, especially global, league tables treating the institution as a whole seems to be an unquestioned assumption. We would like to call that assumption into question, because evidence shows that universities differ very much in the performance of their departments/fields. Only a very small number of 'world class' universities perform highly in (almost) all of their departments. The most appropriate and realistic strategy for most universities around the world is to focus their efforts to be outstanding on a limited number of fields. The majority of higher education institutions thus have both high and low(er) performing departments. Ranking whole institutions blurs those differences, which in many cases are deliberate profiles based on strategic decisions of universities.

Figure 1-1 Correlation of THE 2008 field rankings



Source: own calculations based on THE 2008

Evidence from a comparison of the engineering and humanities field rankings of the THE Ranking of 2008 per higher education institution shows that only 22% of the universities ranked among the top 100 in one of the two fields are among the top 100 in the other field, too. And even for those few universities that are among the top 100 in both areas the results are quite diverse beyond a small group of top universities in both areas (see Figure 1-1).

In addition many stakeholders, e.g. (prospective) students and teachers/researchers, are mainly interested in information about specific fields (Westerheijden 2009). Prospective students want to be informed about the programmes in the field they want to study (with some context information about the institution as a whole); researchers want to compare with colleagues in their field. Also for university leaders who are interested in managing the competitive position of their whole university, institutional rankings are not sufficiently informative: they need to know which fields/departments are performing well and which are performing poor. For the strategic management of a university ranked somewhere in the middle it makes a decisive difference if all fields present in the university perform average, or if there are some top and some low performers. However with only institutional-level information, in both cases this university ends up in the middle of a league table. With regard to these primary knowledge needs of target groups, institutional league tables produce misleading averages of the performance of fields/departments.

In global league tables that include (broad) field-based rankings (ARWU, THE, HEEACT) the selection of universities that are included in the field-based rankings is based on the institutional league tables. This means that only institutions that are included in the overall institutional league table (e.g. the 200 or 500 'world class' universities overall) can enter the field-based rankings. Some specialised institutions hence may have no chance to enter the ranking in their particular field of strength. An example for this is the Institut d'études politiques de Paris (SciencePo) which has a high reputation in its field but did not make it on the social science list of the THE ranking because it does not offer enough 'mass' by including other fields.

As *national* rankings usually include all higher education institutions within a national system this problem does not occur. Hence their sample of universities in field-based rankings is not dependent from any pre-selection based on institutional indicators. The

Times Good University Guide e.g. calculates a national institutional ranking but the field-based rankings (which make up for most pages in the print edition) list all English universities offering degree programmes in those fields.

1.3.1.3 The Problem of Narrow Range of Dimensions

Global league tables tend to concentrate on the few dimensions for which measurable data are publicly available, e.g. bibliometric databases, or lists of Nobel Prize winners. Global league tables create the impression among readers, however, that they address the institutions' overall *quality*. The ARWU and the HEEACT league tables are prime examples of rankings based on research (productivity and impact); Webometrics looks at the web presence and impact of higher education institutions; the Ecole des Mines ranking is even narrower, being explicitly based on a single indicator of elite labour market success (the number of alumni holding a post of chief executive officer in one of the Fortune Global 500 companies). A problem arises once this narrow range of information is regarded as overall institutional quality, because institutional quality of course is a much more encompassing concept. Even if a number of rankings seem to correlate (e.g. http://rpc264.cs.man.ac.uk/VIA/index.php/VIA25), this may be a measurement artefact (for instance, many rankers use the same database for publications and quotations[5]) rather than an indication of an underlying 'true' quality across different dimensions of performance.

As mentioned above, sometimes the tendency to ascribe overall quality to a narrow ranking is a deplorable side-effect of the natural tendency to strive for information efficiency by users of league tables. Some rankers stimulate that tendency by overtly suggesting that their league tables show the 'best' universities in the world. Others are more reticent in this respect; the Leiden rankings and Webometrics were mentioned as good examples.

All existing global league tables emphasise the research function of higher education institutions, because that is where they can define measurable indicators. The other functions of higher education institutions—education, the 'third mission'—and other characteristics making up the quality of higher education institutions—e.g. international orientation—are not valued.

1.3.1.4 Methodological Flaws of Using Composite Overall Indicators

The 'classical' league table model is based on a single composite indicator calculated out of weighted indicators used in the ranking. Both the Shanghai Jiaotong's ARWU and the THE as well as most national rankings (e.g. USN&WR, Perspektywy) aggregate their

[5] The THE will base its rankings from 2010 onwards on publication and citation data from the same source, Thomson Reuters, as the ARWU and Leiden Rankings.

diverse indicators into a composite overall score by giving particular weights to the single indicators. The same procedure is followed by the HEEACT-ranking, in which the separate bibliometric indicators are aggregated into an overall indicator per university. Composite indicators are used in many performance indicators systems and rankings (cf. OECD et al. 2008). In the course of growing complexity of many social systems they can be seen as an instrument of 'distilling reality into a manageable forms'. But at the same time they carry the danger of oversimplifying complex social realities and calculating misleading averages out of opposite indicators. Presenting results in the form of one composite overall indicator, although very common, at the same time is one of the 'main courses for the institutional unease' with league tables in higher education (Usher and Savino 2006).

Normally the designers and publishers of rankings and league tables set the weights; recently some more interactive rankings emerged (e.g. by the British *Guardian*) where in the web version of the rankings the weights can be attributed by the users individually. This avoids the problem of finding a plausible justification for determining weights.

There are several aspects of a critical assessment of composite indicators. First, assigning weights to individual indicators needs a conceptual model with a set of arguments about the relative importance and priorities of the indicators for the construct of quality. An older study on the U.S. News & World Report Rankings delivered by the National Opinion Research Center (1997) confirmed 'that the weights used to combine the various measures into an overall rating lack any defensible empirical or theoretical basis'.[6] Assigning weights to indicators is necessarily arbitrary, as there are neither generally accepted theoretical nor definite empirical arguments for assigning particular weights to individual indicators (Dill and Soo 2005). At the same time, the chosen arbitrary weights define the model of higher education institutions actually supported by the league table. In ARWU as well as THE, this is a research-oriented, large institution, because that is the type of institution producing large numbers of publications and citations (Filliatreau and Zitt s.a.), and by doing so, set its reputation. Reputation is further enhanced by the higher education institution being located in a (for tourists or newspapers) major, well-known city—and by establishing a university brand (Marginson 2008).

Second, different target groups of rankings and individual users have different priorities and preferences in comparing universities and in making choices. Even more, as mentioned above, prospective students have heterogeneous preferences with regard to their criteria for selecting a university. Rankings that aim to be relevant for users' decision-making processes should take into account this heterogeneity and leave the decision about the relevance—hence weights—of indicators to the users. A composite indicator with fixed weights inevitably means patronising users of rankings by deciding

[6] Cited after the download version: http://www.washingtonmonthly.com/features/2000/norc.html

about the importance and relevance of different indicators. Eccles (Eccles and Gootman 2002) pointed to an additional aspect: the approach of giving fixed weights usually fails to cater to the interests of non-traditional students who may have priorities and interests in finding an institution different from 'mainstream' weighting systems. To come to a more user driven approach some rankings introduced (in web based rankings) an interactive tool to leave the decision about the relevance of indicators to the users. Some rankings (e.g. the Guardian Ranking) are doing this by allowing the user to assign their own weights to a number of individual indicators as the basis for the calculation of a composite indicator. Others like SK123, the CHE University Ranking and the interactive ranking of Taiwan universities made by the Higher Education Evaluation and Accreditation Council (HEEACT) allow users to give priority to a number of indicators and having a personalised ranking of universities fulfilling those user set criteria.

Third, recently the methodology of THE and Shanghai Jiao Tong University rankings to construct their composite indicator has been analysed statistically. (Saisana and D'Hombres 2008) demonstrated that the results of the composite indicator used by both rankings are anything but robust. Based on a sensitivity analysis and simulations using a multitude of possible weighting systems, they showed that the rank position of 67% of universities in the THE ranking and of 60% in the Shanghai Jiao tong Ranking are highly sensitive to the composition of the overall score. Variation of league table positions by different indicator models in general is larger in the lower ranks, but even e.g. the Massachusetts Institute of Technology (MIT) can be classified between the 10th position and the 25th position with the THE data (ibid.: 53). Saisana and D'Hombres concluded that 'no conclusive inference regarding the relative performance for the majority of the universities can be drawn from either ranking' (ibid.: 8).

1.3.1.5 The Problem of League Table Approaches

Most rankings, both national and international, are based on constructing league tables, ordering universities on a continuous scale from number one to number x. This model supposes that each difference in a rank position of an institution marks a difference in performance/quality—number 12 is better than number 14. In league tables 'minimal differences produced by random fluctuations may be misinterpreted as real differences' (Müller-Böling and Federkeil 2007). Empirical analysis of existing league tables suggests that in many cases small differences in the numerical value of indicators lead to quite substantial shifts in league table ranks. For example, in the 2008 edition of the THE World Rankings the difference between the university ranked number 27 (Brown university) and the university ranked 43 (University of Queensland) is only 4,5 points on a 100 point scale. The difference between number 50 and number 100 is only 10 points. Hence league tables tend to exaggerate differences between institutions and put vertical stratification to the extreme. In statistical terms, the league table approach ignores the existence of standard errors in data. Meaningful rankings should be confined to groups or clusters of institutions with similar profiles and/or programmes.

League tables are highly sensitive to changes in the methodology to compile tables, in particular with regard to methods of standardisation of original scores. The introduction of 'z-score aggregation' as a new method of standardisation in the THE ranking in 2008 led to a drop of the London School of Economics from 17th to 59th—still the year-on-year changes are highlighted as if the same thing was measured.

1.3.1.6 Publication and Citation Databases: Field and Regional Biases

The indicators measuring publications both in Shanghai Jiao Tong and in THE Ranking for instance are based on –albeit different– international publication databases: Thomson Reuters' *Web of Science* database and Elsevier's *Scopus* database. There are very few of such databases available; alternatives to the two mentioned here hardly exist. Due to (unintended) biases and shortcomings in their databases, existing global league tables do not give due regard to academic, cultural and language diversity.

- The two major databases on publications and citations that are used for large-scale comparative bibliometric studies mainly include journal articles published in peer-reviewed journals. Publication cultures and modes vary considerably between different fields (e.g. Hicks, 2004; Leeuwen et. al., 2001; Moed, 2005)). These journals are the prime vehicles for knowledge dissemination in the natural sciences, medical sciences and life sciences. Focusing the data collection on those journal articles implies a bias in favour of research outputs in the sciences and medicine. CWTS studies have shown that even within the sciences, there are significant differences regarding publication cultures. In many of the applied sciences and in engineering conference proceedings are often more important than journal articles. In the social sciences and humanities, book publications (both monographs and book chapters) play an important role in knowledge dissemination. As a result the existing *WoS*-based or *Scopus*-based indicators on the institutional level tend to disfavour universities that are strong in fields other than the sciences or that do not have medical schools. So publication cultures have an impact on the outcomes of rankings. However, both databases are rapidly improving the major lacunas in their coverage of these underrepresented domains of knowledge production. Not only have numbers of journal have increased, more and more conference proceedings are indexed as well. For example, as of 2009 the extended version of the *Web of Science* includes a Conference Proceedings Papers database. Comparative research by CWTS (Visser and Moed 2008) on the overlap and differences of coverage with both databases indicates that *Scopus* exhibited a 50% 'surplus' of publications (above the *WoS*) in specific fields: Arts & Humanities; Engineering; Business, Management and Accounting; Energy. Nonetheless, the coverage of both databases is likely to remain unsatisfactory in those fields where neither journals nor conference proceedings papers are used by researchers and scholars as their main vehicle for knowledge dissemination: the arts and humanities in particular.
- The sets of journals in the databases used in the ARWU and THE are biased against non-English speaking countries. In particular the Thomson Reuter database (WoS)

originated in the U.S. and includes predominantly U.S. and English language journals. Hence publications from non-English speaking countries, including large countries with a long science tradition, are underrepresented (e.g. in French, German, Chinese, Japanese). As the sciences are mostly international in their modes of publication while several other fields (humanities, social sciences) are dealing more with national issues publishing in 'native' languages, the bias in favour of sciences is reinforced.

- Both global league tables are implicitly used to assess the performance not only of universities but also of national higher education systems. They implicitly refer to the Anglo-Saxon model of higher education and research organisation. As they only include universities but not non-university research institutions (as e.g. CNRS in France and Max-Planck-Institutes in Germany) they cannot adequately reflect the research performance of major European countries. A valid transparency tool would have to take into account particular national structures and hence include non-university research institutions, too. In addition, drawing an unequivocal line between research institutes and higher education institutions may be complicated if they share staff and facilities.

1.3.1.7 Unspecified and Volatile Methodologies

The early league tables were published just as league tables, with little or no information on the methodology used to compile them. In recent years, increasing application of IREG's Berlin Principles (International Ranking Expert Group 2006, see also next section) has ameliorated this situation. Most, though not all, web sites of major global and national rankings now provide a section on their methodology. Nevertheless, a 2009 report complained: 'Research has found that the results of the Shanghai Jiao Tong Academic Ranking of World Universities (ARWU) are not replicable, thus calling into question the comparability and methodology used' (AUBR Expert Group 2009). It has to be noted that the SJTU group was a founding member of the IREG; its methodology is explained on www.arwu.org/Methodology2009.jsp.

Besides, magazines publishing annual league tables have been accused of changing their methodology in order to achieve changes in their top positions, otherwise the news value of having again the same universities at the top would be too small, which could reduce magazine sales (Dill and Soo 2005). Such motives do not affect other suppliers of rankings like universities or independent foundations.

1.3.2 Good Practices and Current Projects

Methodological critiques like the ones presented above, and which echo observations in other research, seem to indicate that all rankings and league tables are 'bad'. To counter that impression, we now turn to some examples of good practices, targeting the main points which were identified as problematic.

1.3.2.1 Berlin Principles on Ranking of Higher Education Institutions

In the second of a series of conferences of the International Ranking Expert Group (IREG), which is a group of persons and organisations engaged in producing or researching rankings, convened in Berlin in 2006, a set of basic principles for good practice of rankings was agreed, the so-called *Berlin Principles on Ranking of Higher Education Institutions* (International Ranking Expert Group 2006). The Berlin Principles refer to four aspects of rankings: the purposes and goals of rankings, the design and weight of indicators, the collection and processing of data and the presentation of ranking results. Accordingly, the 16 principles call for:

- Being clear about purpose and target groups.
- Recognising the diversity of institutions
- Being transparent regarding the methodology
- Measuring outcomes rather than inputs
- Providing consumers with a clear understanding of all of the factors used to develop a ranking and offering them a choice in how rankings are displayed.
- Applying quality assurance principles to the ranking itself: enabling understanding and intersubjective control by enabling feedback, giving feedback possibilities to end-users, and acting on feedback to correct errors and faults.

In general, the Berlin Principles are accepted as a set of relevant and appropriate indications of what should be seen as 'good' rankings. In our work on U-Multirank, we shall apply such principles.

From 2011 onwards, the IREG plans to audit and recognise rankings to be prepared 'in accordance with the highest quality standards – set up in the Berlin Principles…' (IREG Observatory flyer, 2009).

1.3.2.2 Rankings for Students: CHE and Studychoice123

In the area of transparency tools meant to support (prospective) students alternatives to the league tables found in the USN&WR and its followers have been developed. The German-based rankings published by the CHE are internationally seen as good practice (Dill and Soo 2005; Van Dyke 2005; Usher and Savino 2006; Thibaud 2009); the Dutch Studychoice123 (SK123) is a very similar ranking based on paper versions since the 1980s and available online since 2006. The main principles underlying this type of rankings include the following (see also Table 1-2):

- Definition of a stakeholder target group and explicit focus on aiding prospective students to find the study programmes best matching their aims, needs and wants, selecting information in which they might be interested (including investment and consumption motives);

- Field-based rankings: Ranking of units within single disciplines or subject areas rather than giving averages for whole higher education institutions;
- Multidimensional rankings, interactively presented so that end-users may decide which indicators weigh most heavily in their eyes, supported by web-based technologies allowing interactive rankings;
- Robust grouping of units into top – middle – bottom groups on each indicator rather than the spurious precision of league tables from 1 to *n*;
- Multi-perspective ranking: use of different and where possible verified data sources (available statistics, factual information from higher education institutions, and opinion/satisfaction surveys among students, graduates and teaching staff, information about the university facilities, local amenities, etc.).

Table 1-2: Main indicators in selected national field-based rankings

	CHE Excellence Ranking	Studychoice 123	USN&WR 2009 'America's Best Colleges'	Forbes 2009 'America's Best Colleges'
Research output	• Publications (P)			
Research impact	• Citation 'crown indicator'(CPP/FCSm) • Highly-cited books			
Quality of education	• Students' overall satisfaction • Student mobility • Participation in an Erasmus Mundus programme	• Students opinion per course • Student opinion on facilities by institution • Job market by discipline	• Retention (freshmen, graduation) (20, 25%) • Student selectivity (high-scoring entrants, acceptance rate) (15%) • Financial resources for education (10%) • Graduation rate performance (related to expected rate) (0, 5%)	• Student evaluations of professors from Ratemyprofessors.com (25%) • Post-graduate success: Listing of alumni in the 2008 *Who's Who in America* + average salaries of graduates reported by Payscale.com. (25%) • Four-year graduation rates (16 2/3%)
Quality of staff	• Teaching staff mobility in ERASMUS (incoming + outgoing) • International staff		• Faculty resources (class size, salary, staff degrees, full-time, staff-student ratio) (20%)	
Reputation			• Peer assessment of academic excellence (25%)	
General	• International master's students • International doctoral students	• Accessibility and facilities by institution • Admittance and selection per course	• Alumni giving rate (5%)	• Enrolment-adjusted numbers of students and faculty receiving nationally competitive awards (16 2/3%) • Estimated average four year accumulated student debt of those borrowing money (20%)
Web sites	www.excellenceranking.org	www.studychoice123.nl	www.usnews.com/rankings	www.forbes.com/2009/08/02/best-colleges-ratings-opinions-ranking-2009_land.html
Notes	More information is available in in-depth comparison of user-selected study programmes.	Mentioned here are headings, each encompassing 3-10 'rankable' indicators and/or 4-6 non-'rankable' items of information. Besides, there is more information in the form of 'basic facts' for higher education institutions, locations, etc.	There are alternative weightings for master and baccalaureate colleges as opposed to liberal arts colleges and 'national universities' on retention and graduation.	

1.3.2.3 Leiden Ranking of University Research

The Centre for Science and Technology Studies (CWTS), of Leiden University, in 2008 for the first time published a ranking entirely based on its own bibliometric indicators (www.cwts.nl/ranking). In their own words, the Leiden Ranking aims at comparison of research institutions with impact measures that take the differences in disciplines into account. The ranking focuses on all universities worldwide with more than 700 Web of Science indexed publications per year. This implies that the about 1,000 most productive (in terms of number of publications) universities in the world are covered.

There are in fact several rankings, because CWTS follows a multiple-indicator approach. On the basis of the same publication and citation data and the same technical and methodological starting points, different types of impact-indicators can be constructed, for instance one focusing entirely on impact of the university as a whole, and another in which also scale (size of the institution) is taken into account. Rankings based on these different indicators are not the same, although they originate from exactly the same data. Moreover, rankings are strongly influenced by the size-threshold used to define the set of universities for which the ranking is calculated. For instance, smaller universities that are not present in the top-100 (in size) may take high positions in impact ranking if the size threshold is lowered. Publishing multiple rankings is a way to give room for several perspectives on research performance in higher education and research institutions.

1.3.2.4 Tuning Educational Structures and Qualifications Frameworks

In the Bologna Process, attention has gone from degree restructuring, to international cooperation in quality assurance, to qualifications frameworks as increasing application of means to stimulate compatibility of studies across Europe (CHEPS, INCHER Kassel et al. 2009). Attention has increasingly come to lie, in that shift, on students' learning outcomes. However, the descriptors used in the European qualification frameworks developed to date are so abstract that they are not directly useful for development of indicators in our ranking (see Table 1-3). They do underpin our general focus on outcomes, though, as a part of the educational process that is eminently relevant for international comparison and compatibility.

Table 1-3: Descriptors of graduates' learning outcomes in European Qualification Frameworks

Level	EQF—LLL (EU)	EQF EHEA
Level 6 / First cycle	• Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles • Advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study • Competences: (i) manage complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts; (ii) take responsibility for managing professional development of individuals and groups	• have demonstrated knowledge and understanding in a field of study that builds upon their general secondary education, and is typically at a level that, whilst supported by advanced textbooks, includes some aspects that will be informed by knowledge of the forefront of their field of study; • can apply their knowledge and understanding in a manner that indicates a professional approach to their work or vocation, and have competences typically demonstrated through devising and sustaining arguments and solving problems within their field of study; • have the ability to gather and interpret relevant data (usually within their field of study) to inform judgments that include reflection on relevant social, scientific or ethical issues; • can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences; • have developed those learning skills that are necessary for them to continue to undertake further study with a high degree of autonomy.
Level 7 / Second cycle	• Highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research • Critical awareness of knowledge issues in a field and at the interface between different fields • Specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields • Competences: (i) manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches; (ii) take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams	• have demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with the first cycle, and that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context; • can apply their knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study; • have the ability to integrate knowledge and handle complexity, and formulate judgments with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments; • can communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and nonspecialist audiences clearly and unambiguously; • have the learning skills to allow them to continue to study in a manner that may be largely self-directed or autonomous.
Level 8 / Third cycle	• Knowledge at the most advanced frontier of a field of work or study and at the interface between fields • the most advanced and specialised skills and techniques, including synthesis and evaluation, required to solve critical problems in research and/or innovation and to extend and redefine existing knowledge or professional practice • competence: demonstrate substantial authority, innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new ideas or processes at the forefront of work or study contexts including research	• have demonstrated a systematic understanding of a field of study and mastery of the skills and methods of research associated with that field; • have demonstrated the ability to conceive, design, implement and adapt a substantial process of research with scholarly integrity; • have made a contribution through original research that extends the frontier of knowledge by developing a substantial body of work, some of which merits national or international refereed publication; • are capable of critical analysis, evaluation and synthesis of new and complex ideas; • can communicate with their peers, the larger scholarly community and with society in general about their areas of expertise; • can be expected to be able to promote, within academic and professional contexts, technological, social or cultural advancement in a knowledge based society.

In a less abstract and more field-based manner, the Socrates-supported project 'Tuning Educational Structures in Europe' (*Tuning*, for short; http://tuning.unideusto.org), has been working on developing descriptors of typical learning outcomes of graduates in 28 areas of knowledge. These descriptors are mostly content-based, e.g. in physics, a first-cycle graduate should 'have a good understanding of the most important physical theories (logical and mathematical structure, experimental support, described physical phenomena)' and in civil engineering: 'understanding of the interaction between technical and environmental issues and ability to design and construct environmentally friendly civil engineering works'. Where the EQFs may be too abstract for ranking indicators in U-Multirank, *Tuning* may be too concrete for us.

1.3.2.5 Assessment of University-Based Research Expert Group

The DG Research of the European Commission has been engaged in data collection about university-based research because of the key role of higher education institutions in the Lisbon strategy. An Expert Group has been appointed in 2008 'with a view to proposing a more valid comprehensive methodological approach', to 'promote and contribute to the development of multidimensional methodologies designed to facilitate the assessment of university-based research' (AUBR Expert Group 2009). CHERPA partners CWTS and CHE have been part of this Expert Group. The Expert Group's draft report concludes that there is not a single set of indicators that responds to all information needs of all stakeholders, and continues to propose guidelines that should be used in developing focused approaches to assessing university-based research:

1. Fitness for purpose and objectives, which is possible through a matrix of possible indicators, and which could be operationalised in a multi-dimensional, web-based tool;
2. Quantitative and qualitative information should be combined;
3. The appropriate scale should be 'knowledge clusters' e.g. faculties, departments, or interdisciplinary clusters.

For continued preparation of data collection, the Expert Group proposed to establish a European Observatory for Assessment of University-based Research. Finally, the Expert Group recommends that 'good practice' models, including its own proposed Multidimensional Research Assessment Matrix, should follow a number of principles (AUBR Expert Group 2009):

- Consultation with Researchers and Universities;
- Data Collection through Digital Repositories. Such non-obtrusive data collection might be extended beyond its current niches;
- Peer Review Panels to ensure a broader understanding of the research and its contribution to knowledge, including the importance of new disciplines and interdisciplinarity;

- Indicators: All twenty systems surveyed by the AUBR Expert Group use bibliometric indicators, although many balance this with other information. Moreover, the AUBR Expert Group acknowledges that indicators measure past performance rather than potential, while decision-making by definition is about the future. And they draw attention to the limitation that '[e]mphasis on global impact can undermine the importance of regionally relevant outcomes' (AUBR Expert Group 2009);
- Purpose: the Expert Group assembled a matrix of instruments and purposes, enabling scenario-type recommendations of the type 'If one has purpose X, then instruments A, B, C are most appropriate';
- Self-evaluation: three research assessment schemes include self-evaluation as a key component in the process;
- Social and Economic Impact and Benefits: Several countries and universities are experimenting with measuring societal impact, demonstrated through case studies, end-user opinion, and appropriate indicators. This is most notable in the Australian Research Quality Framework (RQF), developed in 2005-07, Aalto University in Finland, and the Netherlands;
- Unit of Assessment: research assessments should focus on the research discipline or unit, because it is necessary to accommodate differences in research quality within individual universities;
- Not mentioned by the Expert Group as a good practice, but important nevertheless is that positive attributes of research assessments include aiding strategic planning, international benchmarking, and bringing about greater cohesion and organisation among discipline groupings (AUBR Expert Group 2009). In other words: good assessments respond to information needs of important stakeholder groups.

Some of the good practices indicated by the Expert Group AUBR are already included in the design of U-Multirank (stakeholder consultation, purposefulness, being responsive to stakeholder information needs, focus on social and economic impact, consideration of unit of assessment—see also the next chapter), one is a point for further development (use of digital repositories), others are specific to small-scale assessment schemes which would be too costly in a global exercise (use of peer panels, self-evaluation) or are specific to research (use of bibliometric indicators) while U-Mulitrank encompasses five other dimensions beyond research.

The Expert Group AUBR also warns against unintended consequences of mismatches between purpose, decision-making and limitations of rankings and assessments. For instance, the Expert Group illustrates 'the risk of aligning higher education priorities and resources to match indicators' (AUBR Expert Group 2009): decision-making should not become data-driven however desirable it may be to make decision-making evidence-based.

1.4 Information, Indicators and Data Sources in Transparency Tools

Description of the actual indicators that we shall use in our feasibility study will be postponed until the next chapter. Let us here, however, take a brief but critical look at the types of data sources available and used in current league tables and rankings. We integrate the quality assurance aspect in this chapter because this field shows relevant experiences with different data sources. The discussion includes databases that currently are used as well as data sources originating in other contexts but that could play a role for international rankings, too.

There is no neutral measurement of social issues; each measurement – the operationalisation of constructs, the definition of indicators, and the selection of data sources depend on the interest of research and the purpose of the measurement. International rankings in particular should be aware of possible biases and be precise about their objective. 'Not all nations or systems share the same values and beliefs about what constitutes 'quality' in tertiary institutions, and ranking systems should not be devised to force such comparisons' (International Ranking Expert Group 2006, nr. 5). For instance, an evaluation of publication activities over a *past* period by bibliometric means would use a different approach to count publications of researchers who changed positions during the period of measurement than a ranking that wants to show the *potential* of researchers currently active at an institution, although the indicators may look the same at first glance. The appropriateness of data for the specific purpose of the ranking and the comparability of concepts, definitions and data between institutions are crucial issues, particularly in international rankings, and must be checked very carefully.

1.4.1 Information offered by Classifications

1.4.1.1 Carnegie

The Carnegie Classification typifies higher education institutions along a large number of dimensions and indicators (www.carnegiefoundation.org/classifications). Describing all indicators goes beyond the scope of this work as some involve intricate analysis including factor analysis; they have to do with:

- Degree levels conferred by the higher education institution, absolute numbers and proportions of each level (from associate to doctorate);
- Fields of study (range, concentration, degrees per field, etc.);
- Location (town size and type, from metropolitan to rural);
- Numbers of students;
- Student profile (distribution of test scores of newly entering students; full-time or part-time status; degree-seeking or not; transfer origin [for higher degrees]; residential status [on-campus or otherwise]);

- Single or multiple campus;
- Research expenditure, research staff; combined into aggregate as well as per-capita measures.

The information needed to construct those indicators is derived completely from publicly available databases in U.S. higher education, in particular those collected in the IPEDS. The Integrated Postsecondary Education Data System (IPEDS) is based on surveys conducted annually by the U.S. Department's of Education's National Center for Education Statistics (NCES; see http://nces.ed.gov/ipeds/). IPEDS gathers information from all higher education institutions in the U.S.A. that benefit from federal student financial aid programmes. There is a legal obligation for those higher education institutions to report data on enrolments, programme completion, graduation rates, staff, finances, tuition fees, and student financial aid. The federal agency checks the quality of the self-reported data. The Carnegie Foundation is thus neither responsible for the data collection, nor for its verification; the data are freely available at the federal level in the U.S.

If higher education institutions do not provide the data, imputations are made by the Carnegie researchers. In some borderline cases regarding institutional profile, there is communication with the higher education institution to choose their most-fitting classification (e.g. mostly bachelor or mostly master-degree institutions).

The only exception to using publicly-available databases in the Carnegie classification concerns the voluntary mentioning of higher education institutions as 'community engaged'; for this special category, descriptive self-documentation was provided and reviewed by a U.S.-wide consultation panel.

1.4.1.2 U-Map

The U-Map project, which is nearing completion when U-Multirank is starting up (van Vught 2009), is in a less advantageous position than the Carnegie Foundation, as there is no European database available at the level of higher education and research institutions. The U-Map partners have put great effort in defining indicators and collecting the necessary information from several sources. However, national statistics did not often prove rich enough for the information needs, so that ad hoc collection of information from higher education and research institutions has been the main data source in U-Map. U-Map's two dozen or so of indicators together make up six dimensions:

- Teaching and learning profile
    - Orientation of degree
    - Subject areas covered
    - Degree level focus
    - Expenditure on teaching

- Student profile
    - Mature or adult learners
    - Students enrolled (headcount)
    - Part-time students
    - Students enrolled in distance learning programs
- Research involvement
    - Expenditure on research
    - Peer reviewed publications
    - Doctorate production
- Regional engagement
    - First year bachelor students from the region
    - Importance of local/regional income sources
    - Graduates working in the region
- Involvement in knowledge exchange
    - Cultural activities
    - Income from knowledge exchange activities
    - Patent applications filed
    - Start up firms
- International orientation
    - Foreign degree seeking students
    - Importance of international sources of income
    - Students sent out in European and other international exchange programs
    - Incoming students in European and other international exchange programs
    - Non-national teaching and research staff

U-Map has also tested 'pre-filling' higher education institutions' questionnaires, i.e. the data available in national public sources are entered into the questionnaires sent to higher education institutions for data gathering. This should reduce the effort for higher education institutions, and give them the opportunity to verify the 'pre-filled' data as well. The U-Map test with 'pre-filling' from national data sources in Norway appeared to be successful and resulted in a substantial decrease of the burden to gather data at the level of higher education institutions.

1.4.2 Information Offered by Global Rankings

Global rankings and league tables share broad principles and approaches, although they are driven by different purposes and differ in relation to their methodologies, criteria, reliability, and validity (Dill and Soo 2005). The latter suggests that there is no commonly accepted definition of quality of higher education—as research on quality assurance has also found since almost two decades (Brennan, Goedegebuure et al. 1992)—and hence a single, objective league table cannot exist (Van Dyke 2005; Brown

2006; Usher and Savino 2006). This is shown even by a cursory comparison of the indicators that major global rankings use (cf. Table 1-4), which we will go into in the following subsections.

All of the following rankings limit their range to a couple of hundreds of pre-selected higher education institutions—universities, to be precise. We shall not go into the criteria used to establish a threshold, but generally they have to do with research output in total of the institution: size of the institution, and therefore its visibility, are generally seen as a prerequisite for being ranked.

Rankings have different purposes and different foci; hence they use different indicators on the same dimensions. With regard to global rankings the selection of the sample of university is guided by different methodologies and indicators, too. So there are only limited possibilities to use data of existing rankings for the U-Multirank project, although there will be a discussion (in WP3) regarding which indicators that are used by other rankings can be used here as well.

In addition, the existing '[g]lobal rankings suggest that there is in fact only one model that can have global standing: the large comprehensive research university' (van der Wende and Westerheijden 2009). The higher regard for research institutions cannot be blamed on the league tables as such, but arises from the academy's own stance towards the importance of research. Although it can be argued that a league of world-class universities needs to exist as role models (on the concept of the world-class university cf. (Salmi 2009)), the evidence that strong institutions inspire better performance is so far mainly found in the area of research rather than that of teaching (Sadlak and Liu 2007). This means that in the existing rankings data are available only for one type of higher education institution, the large, comprehensive international research university, which represents only a minority of the higher education and research institutions of the world.

Table 1-4: Indicators and weights in global university rankings

	HEEACT 2008	SJTU 2008	THE 2008	Leiden Rankings 2008
Research output	• Articles past 10 years (10%) and last year (10%)	• Articles published in Nature and Science (20%) • [Not calculated for institutions specialized in humanities and social sciences]		• Number of publications (P)
Research impact	• Citations last 10 years (10%) and last 2 years (10%) • Average annual number of citations last 10 years (10%) • Hirsch-index last 2 years (20%) • Highly-cited papers (15%) • Articles last year in high-impact journals (15%)	• Articles in Science Citation Index-expanded and Social Science Citation Index (20%)	• Citations over the last 5 years per staff (20%)	• Size-independent, field-normalized average impact ('crown indicator' CPP/FCSm) • Size-dependent 'brute force' impact indicator (multiplication of P with the university's field-normalized average impact): P * CPP/FCSm • Citations-per-publication indicator (CPP)
Quality of education		• Alumni of an institution winning Nobel Prizes and Fields Medals (10%)	• Staff/student ratio (20%)	
Quality of staff		• Staff winning Nobel Prizes and Fields Medals (20%) • Highly cited researchers in 21 broad subject categories (20%)		
Reputation			• Peer review survey (40%) • Employer review survey (10%) • International staff score (5%) • International students score (5%)	
General		• Sum of all indicators, divided by staff number (10%)		
Website	http://ranking.heeact.edu.tw/en-us/2008/Page/Methodology	www.arwu.org	www.topuniversities.com	www.cwts.nl/ranking/LeidenRankingWebSite.html
Notes				There are four rankings, each focusing on one indicator.

1.4.2.1 Shanghai's Jiao Tong University's ARWU

The Shanghai Jiao Tong University's (SJTU) Academic Ranking of World Universities (ARWU) focuses on research. The publication concerns the top-500 of about 1,000 universities in the SJTU database. It is based on indicators about publications, citations and highly cited authors as registered in worldwide databases, and on the list (and c.v.'s) of Nobel prize and Field medal winners, besides institutions' staff numbers. As all indicators are size-dependent an additional indicator was introduced to calculate productivity per staff member. 60% of the composite score rely on indicators on bibliometric indicators, 30 % on Nobel Prize/Field medal winners and the remaining 10% on the size-independent indicator.

The indicators on research mainly refer to research *activity* measured by the number of publications rather than on research *impact* (citations). Publications in journals *Science* and *Nature* are counted twice (they are part of SCI publications, too). This implies an even stronger bias towards the natural sciences.

Nobel prizes are awarded for a limited number of academic fields only (physiology/medicine, chemistry, physics, economics; literature and peace do not refer to academic achievements). This means that 40% of the overall score refer to five fields of research only (incl. the Field medal for mathematics). Nobel Prize winners are taken into account since 1910, but with higher weights for more recent laureates. They are used for two indicators. First, as Prize winners they are counted for the university to which they were affiliated at the time of winning the prize. Nobel prizes are usually awarded many years after the original research was undertaken and many prize winners changed university in the meantime. It can be questioned, therefore, if this indicator measures an institution's research excellence or rather its ability to attract researchers with high reputations. Second, Nobel prizes are counted for a university's graduates, which also has a tenuous, long time-lag relationship with the excellence of an institution at this moment: to what extent has becoming a Nobel prize winner been 'caused' by teaching in the university where they studied for their first or second degree?

Hence the institutional ARWU ranking has a strong bias in favour of the natural sciences due to the selection of indicators (e.g. the use of publications in science and nature). The use of the (mainly English language) bibliometric database in addition raises questions of language and cultural bias.

In addition to the institutional ranking, ARWU publishes rankings of broad academic fields for natural sciences/mathematics, engineering/technology and computer science, life and agricultural sciences, clinical medicine and pharmacy and social sciences. The indicators are slightly different from the institutional ranking: instead of articles in *Science* and *Nature* the broad field rankings are measuring the number of articles in top

journals in the fields. As there are no Nobel Prizes in engineering, external research funds are substituting this indicator.

Table 1-5: Indicators and weights in ARWU

Indicator	Weight	Science	Engineering	Life Sciences	Clinical Medicine	Social Sciences
Alumni	10 %	X	-	X	X	X
Awards	15 %	X	-	X	X	X
Publications (SCI, SSCI)	25 %	X	X	X	X	X
Top Journal Publications	25 %	X	X	X	X	X
Highly Cited authors	25 %	X	X	X	X	X
Research Funds	25 %	-	X	-	-	-

In 2009 Shanghai Jiao Tong University for the first time published rankings for five fields: mathematics, physics, chemistry, computer science and economics/ business. In these field-based rankings the indicators are the same as those used for the respective broad fields.

The methodology of the rankings is described in detail on the ARWU website (www.arwu.org). The rankings exclusively rely on existing, publicly available databases. Due to the limitations and biases inherent in the indicators the ranking gives valid information on research in the natural sciences and medicine; but validity is limited for engineering and very problematic for the social sciences and humanities (which are not included in the field-based rankings). To be fair, we must keep in mind that the Shanghai ranking originally was developed to compare the research performance in science and technology of the Chinese universities with the rest of the world.

ARWU's presentation is on a website (www.arwu.org), but the ranking is fixed; there is no interactivity beyond choosing the global institutional ranking, the field ranking or the subject ranking. Registered users (registration is free) can also get a view of each university's profile, which gives the total ranking over the years since 2003 as well as the field and subject rankings in which the university figures since those started (2007 and 2009, respectively).

1.4.2.2 The Times Higher Education (THE) Ranking

The methodology of the Times Higher Education's ranking until 2009, when it was made by the QS company,[7] included at least 500 higher education institutions selected for the purpose according to two main criteria:

> Because we designed these rankings to measure universities in the round, the institutions they include have to teach undergraduates. This excludes many postgraduate colleges of undoubted merit, from London Business School to the University of California at San Francisco. Each university also has to work in at least two of the five principal areas of academic life: science, biomedicine, technology, social sciences and the arts and humanities. (http://www.topuniversities.com/articles/rankings/times-higher-education-%E2%80%93-qs-world-university-ranking-classification-system, accessed 2009-11-20)

Regarding its indicators, it depended strongly on academics' opinions of the 'quality' (rather: reputation) of higher education institutions around the world. Research impact in terms of citations and a proxy for the resources and facilities available to students in the form of the staff-to-student ratio together made up an equal share of the index. Smaller weights were accorded to employers' opinions on graduates' quality and internationalisation of staff and student s at the institution (see Table 1-4).

Whereas the data on citations are based on bibliometric databases (from Elsevier's database Scopus until 2009), the other data are either self-reported institutional data or based on national higher education statistics (student-staff ratio, international students and staff) or come from surveys (reputation). The survey method will be discussed methodologically below (§ 1.4.7), but briefly we can say that it is a method strong in eliciting respondents' opinions rather than facts. This may reflect the adage that 'quality is in the eye of the beholder', but that is only relevant to other users of rankings if the beholders have fact-based opinions, which is questionable on a world-wide scale—even at the smaller scale of the U.S.A. as a whole (where sometimes supposedly informed people blunder to talk about Princeton Law School [http://en.wikipedia.org/wiki/Princeton_Law_School]) or the German-speaking part of Europe (Berghoff and Federkeil 2006) where opinions of academics on other higher education institutions proved to be besides facts.

In addition to the institutional ranking, THE/QS publishes rankings for broad fields. To be included in the field-based rankings institutions have to offer programmes in at least two out of the five broad fields. The league tables for Engineering and Information

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[7] In October 2009, THE announced that a different company, Thomson Reuters, would provide the methodology for its rankings from 2010 onwards. The provider of the rankings until then, Quacquarelli Symonds (QS), said it would continue to publish its rankings in other newspapers, including *U.S. News & World Report*.

technology, Life Science and Biomedicine, Natural Sciences, Social Sciences and Humanities simply express the reputational scores. In addition the citations per publication are listed (except for the humanities).

Evidence shows (Federkeil 2009) that the reputation of universities as an attribution of quality among particular groups is strongly affected by the structure of the sample in terms of regional distribution, fields and the kind of persons being asked. This is particularly challenging for international surveys on reputation. Unfortunately the THE/QS ranking does not give much information about the structure of the two reputational samples. A major problem of the survey among academics is the extremely low response rate of 2%. Academic reputation is known to be rather stable (Federkeil 2009); the fact that there are large changes in the results of some universities from one year to the next suggests that the survey faces problems of reliability. Those changes rather seem to be methodological artefacts than reflecting real changes.

The website where the THE/QS ranking was published (www.topuniversities.com) gives the fixed-order list of the top-500 and allows the user to search for a particular higher education institution.

1.4.2.3 The Higher Education Evaluation and Accreditation Council, Taiwan (HEEACT)

The Higher Education Evaluation and Accreditation Council of Taiwan (HEEACT) publishes a ranking of the academic performance of higher education institutions in a five-year project, running until 2010 (http://www.heeact.edu.tw/ct.asp?xItem=3576&CtNode=674&mp=4, accessed 2009-11-10). The HEEACT pre-selects what it calls 'the top-500' higher education institution to calculate its ranking. The ranking is completely bibliometric; the dimensions involved are 'research productivity, research impact and research excellence' indicated by, respectively, published papers, citations, and highlighting highly-cited papers (for weights, see Table 1-4).

Different from most other rankings the time period taken into consideration is quite long (ten to eleven years). More than other rankings the HEECT ranking thus refers to past performance rather than current potential. Due to the structure of the underlying databases this ranking has a similar bias towards the natural sciences as the ARWU rankings. In its studies of the national universities, the HEEACT also looks at employers' satisfaction with graduates and at university-industry cooperation, using patents as an indicator, but those data are not included in its international ranking and more detailed information is not available in English.

The HEEACT website (http://ranking.heeact.edu.tw/en-us/2009/TOP/100) allows amongst other things for sorting the higher education institutions either according its rank in the top-500, alphabetically by name, or by their scores on one of the ten individual indicators.

1.4.2.4 Leiden Ranking

The Leiden rankings have been discussed above, in § 1.3.2.3. They indicate publications and—mostly—citations from a major international publications and citations database (the Thomson Reuters data underlying what was formerly known as the ISI Web of Science), which undergoes intensive checking and cleaning by the CWTS group to ensure that publications are ascribed to the correct authors in the correct higher education and research institutions.

1.4.2.5 RatER

Finally here, we would like to mention Moscow-based agency RatER, because its ranking purports to be multi-dimensional. RatER, which according to its web site was 'initiated by Russian big private industry in March 2005 in order to investigate problems of higher professional education' ranks over 400 universities from around the world, which are selected by merging rankings in other international league tables (ARWU, THE, Webometrics and Taiwan National University) as well as a selection of Russian and CIS state universities and anyone willing to fill in RatER's online questionnaire on:

- Education (programmes offered, staff and student numbers, student success in international competitions)
- Research (patents, Nobel and Field prizes of staff, staff members in Academies, international citations).
- Resources (total budget, total spending on training and laboratory facilities, data processing amount of the university's computer centre)
- Social recognition of university's graduates ('[t]otal number of the live graduates of the university who achieved the public recognition: prominent men of science, culture and business, politicians, government officials, administrators of territories and cities (with population exceeding 100 thousand), managers and executives of major international organizations (UN, UNESCO, etc.).').
- International activities (partnerships with foreign universities, honorary doctorates abroad, student mobility).

The exclusive use of a questionnaire shows RatER's reliance on ad hoc data collection from higher education institutions. Scales and weights of indicators are then determined by RatER's experts, who subsequently individually rate institutions on each indicator—apparently this is a subjective procedure. Final scores are calculated as averages among the experts' ratings (www.globaluniversitiesranking.org/index.php?option=com_content&view=article&id=68&Itemid=128, accessed 2009-11-11).

1.4.2.6.1 Business rankings

As analysed in the previous sections, most international rankings refer to whole institutions; the two most influential global rankings – ARWU and THE/QS- additionally offer rankings for broad fields. The field where we find most specific, field-based rankings are business schools resp. MBA rankings. There are a number of rankings produced by newspapers and journals like *Business Week*, *Financial Times*, *The Wall Street Journal*, *The Economist*, and *U.S. News & World Report*. 'Each of those rankings has its own methodology and collects its own data. Some rankings are based on surveys of constituent groups, such as graduating students (e.g., BusinessWeek) or corporate recruiters (e.g. The Wall Street Journal). Others apply at least some weight to data reported directly by schools (e.g., U.S. News & World Report, Financial Times)' (AACSB 2005).

The most prominent ranking of MBA programmes is published by the *Financial Times* (http://rankings.ft.com/businessschoolrankings/). The ranking follows the traditional approach of calculating a composite overall indicator that is transformed into a league table. In contrast to the ARWU and THE/QS rankings, which confine themselves to a small number of indicators, FT's MBA ranking uses 20 indicators to calculate the composite overall score (and some indicators themselves are composite indicators out of a number of single measures). Related to the specific profiles of MBA programmes 40% of the overall score comes from two indicators on graduates' salaries; 10% is due to the to the number of faculty publications in a list of 40 academic and practitioner journals weighted by size of institutions); the rest is distributed evenly across the various indicators.

Table 1-6: Indicators FT MBA ranking

Indicator	Weight
Weighted salary	20 %
Salary percentage increase	20 %
Value for money	3 %
Career progress	3 %
Aims achieved	3 %
Placement success	2 %
Employed at three months	2 %
Alumni recommended	2 %
Women faculty	2 %
Women students	2 %
Women board (1)	1 %
International faculty	4 %
International students	4 %
International board	2 %
International mobility	6 &
International experience	2 %
Languages	2 %
Faculty with doctorates	5 %
FT doctoral rank	5 %
FT research rank	10 %

The single indicators are described on FT's website but the scores of the composite indicators are not published. Hence there is no information about the distances between the institutions in terms of scores.

The FT website amongst other things gives the option to re-sort the institutions along each of the individual indicators shown on screen (which can be a standard sub-set or up to all of the indicators used); specific schools can be compared with one another, and the rankings can also be downloaded as a worksheet.

The report by the AACSB Task Force criticised that special rankings of MBA programmes run the risk of creating a narrow view on universities and business schools (AACSB 2005: 7).:

> This task force believes that media rankings have had other more serious negative impacts on business education. Because rankings of full-time MBA programs are commonly presented under the label of 'best b-schools,' the public has developed a narrow definition about the breadth and value of business education. This diminishes the importance of faculty research, undergraduate programs, and doctoral education and compels schools to invest more heavily in highly-visible MBA programs

But there is also criticism against the selection of indicators used in terms of relevance and the their reliance on easy-to-measure indicators: 'Measures used in media rankings are often arbitrary, selected based on convenience, and definitely controversial. Characteristics that are of little importance are often included, while important characteristics are excluded because they are more difficult to measure' ((AACSB 2005): 7).

1.4.2.6.2 *International Engineering Rankings*

Up to now there are no original international rankings in engineering. The rankings available are the broad field rankings within ARWU and the THE/QS World Rankings. With regard to the selection of institutions in those rankings and their sets of indicators this means that their rankings for engineering are focussing on international research universities only. This has important implications:

- The rankings cover only a minority of all higher education institutions in the field
- The focus is on research performance; performance in education and other dimensions of higher education (as e.g. life-long learning, community outreach) are not taken into account.
- Indicators of research performance are confronted with severe methodological problems in engineering. The indicators used are mainly bibliometric; the international bibliometric databases, largely rely on journal articles whereas in (many fields of) engineering, other forms of publication, in particular conference proceedings, are more important than journal articles. Hence indicators based on bibliometric analysis only measure publication output and impact for some sub-fields of engineering.

1.4.2.7 Miscellaneous Other League Tables

The league tables and rankings mentioned above do not constitute the full set of international league tables, but they are the ones discussed most widely. Other global rankings include the Global University Ranking by Wuhan University, which is only

available in Chinese, though in the Wikipedia it is briefly mentioned as being based on 'Essential Science Indicators (ESI), which provides data of journal article publication counts and citation frequencies in over 11,000 journals around the world in 22 research fields' (http://en.wikipedia.org/wiki/College_and_university_rankings #Global_University_Ranking, accessed 2009-11-11).

Another one is SCImago, a ranking of mainly higher education and research[!] institutions in the 17,000 journals in the Scopus bibliographic database (SCImago Research Group 2009). It uses '… 5 indicators of institution research performance, stressing output (ordering criteria), collaboration and impact.'

Then there are some global rankings of a specialised nature (see next sub-section) and national or regional ones that deserve mention because of some special focus (second sub-section).

1.4.2.7.1 International: The Scientist, Webometrics

Very clearly directed to a particular target group is *The Scientist's* ranking of higher education and research institutions according to their being attractive places to work for post-docs or for scientists (http://www.the-scientist.com/bptw, accessed 2009-11-10), which has been annually published at least since the year 2000. Its data are collected through a survey among readers of *The Scientist* and its web site, giving sufficient data on 119 higher education and research institutions (94 from the U.S.A. and 25 from the rest of the world). Its indicators included:

- Job Satisfaction
- Peers
- Infrastructure and Environment
- Research Resources
- Pay
- Management and Policies
- Teaching and Mentoring
- Tenure and Promotion

Much broader in its appeal but also narrow in its explicit aims and approach is the Webometrics league table (www.webometrics.info). Published since 2004, this indicates an institution's web presence through web sites, repositories with documents (research reports and materials for students), etc. which on the web site is claimed to be 'a good indicator of impact and prestige of universities'. It looks more democratic than most other global rankings, because based on its web techniques it can afford to include not a few hundreds but over 17,000 higher education and research institutions. Somewhat similar is the 'G-Factor ranking', looking at higher education institutions' scores in Google. However, there is not single, clear interpretation of what web presence is

measuring with regard to the core functions of higher education and research institutions.

1.4.2.7.2 American: USN&WR and Forbes

Rankings of U.S. higher education institutions are not international league tables, but one of them has set the whole rankings 'business' in motion, and another one is mentioned for its focused approach. The former is of course the *U.S. News & World Report* (www.usnews.com/sections/rankings). It lists the 'best colleges' and the 'best graduate schools', classifying higher education institutions on the basis of the Carnegie basic classification, and using indicators collected through a questionnaire to higher education institutions. They are:

- Peer assessment of institution's quality (25% of total score) –this was the measure coming under attack in 2009 because it was subject to 'gaming', i.e. intentionally judging peer institutions lower to gain a better position for one's own institution (see below);
- Student retention and graduation rates (20-25%, depending on institution's mission/classification);
- Staff resources (20%; class size, academic staff salaries);
- Student selectivity at entrance (15%);
- Financial resources spent on educational matters, per student (10%);
- Better than expected graduation rate (5% in some classes of higher education institutions);
- Alumni giving rate (5%).

Joining the ranks of rankers in 2008, *Forbes* magazine has a somewhat different, more economic approach (Vedder and Ewalt 2009) to ranking 660 undergraduate colleges from what it defines as a students' perspective. Its indicators include:

- Listing of Alumni in *Who's Who in America* (25%)
- Student evaluations of professors from an independent web site (ratemyprofessors.com) (25%)
- Four-year graduation rates (16.67%)
- Numbers of students and faculty receiving nationally competitive awards, related to student size of the institution (16.67%)
- Average four year accumulated student debt of those borrowing money (16.67%).

Forbes does not distinguish types of higher education institutions, apart from their funding base: public or private. Its production-oriented indicators (fast graduation, high earnings) bring not the 'usual suspects' like Harvard or MIT out on top, but military academy West Point.

1.4.3 Information Offered by Quality Assurance in Research: Peer Review, Bibliometrics and Practical Research Assessment

1.4.3.1 Peer Review and Performance Indicators

Peer review has grown out of networks of correspondence by letters among gentlemen-scientists in the middle of the 17th century. Henry Oldenburg, secretary of the British Royal Society, has been credited with the innovation, made in order to ensure the quality (i.e. truthfulness and originality) of the Royal Society's *Proceedings* (Boas Hall 2002). It began, then, as gentlemen-scientists reading other gentlemen-scientists' manuscripts for contributions to the *Proceedings*, a publication read by again other gentlemen-scientists.

When performing science became a matter for competitive grants from the public purse, the same method was applied: colleagues would read and judge others scientists' proposals, and rate (or rank) them to decide who would win part of the limited amount of grant money. The scarce good changed from journal space to grant money; the reading changed from scientific results, observations and methods to research plans; the audience changed from fellow-scientists to decision-makers (Rip 1994). Evaluating research proposals became a standard peer review practice in many countries for many decades, as national or disciplinary research councils distributed their funds (e.g. the NIH in the U.S.A., Sweden's Vetenskapsrådet or the British ESRC). The peer review method itself remained mainly accepted (Zuckerman and Merton 1971), because the peers kept to judging individual written pieces (manuscripts or proposals) against the background of a the discipline as a body of accepted knowledge. It is also important to realise that at any one time, only a minority of researchers would apply in a round of research fund competitions: these research evaluations were (and are) piecemeal exercises, from the point of view of their method.

Next, peer review made a dimensional jump to judging the state of large chunks of research fields or even a discipline as a whole, as happened in all kinds of smaller and larger foresight exercises especially since the 1970s (e.g., Irvine and Martin 1984; van der Meulen, Westerheijden et al. 1991). These exercises most often intended to inform decision-makers about strategic funding of large research efforts or research programmes, e.g. on the establishment of a national supercomputer centre. Their method changed peer review from an individual reviewer's exercise to ad hoc committee work.

The final step was to extend the method of peer committee review into countrywide research assessment exercises. These were first introduced in Europe in British higher education and research in the early 1980s (Leisyte, Enders et al. 2008; Westerheijden 2008), but other forms appeared as well, as in the Netherlands. The contrast between the British and Dutch approaches merits some attention.

In the 'hard' New Public Management approach characterising the UK (Paradeise, Bleiklie et al. 2009) the research assessment exercise (RAE) was meant to determine funding, not of some individual research projects or programmes but for all public research funding in the 'normal' recurrent funding of higher education. In essence, its method was that ad hoc committees of peers were given publications and information by university departments, which they had to process to come to a single, semi-numerical judgement about the quality of the department's research. The best outcome was the judgement that a department's research was leading in the world (in different RAE exercises, this could be expressed as '5', '5*' or something similar). More than 25% of all the quality-related research funding went to four higher education institutions (Cambridge, Oxford, University College of London and Imperial College), which were also among the institutions for which more than 50% of their total recurrent governmental grant resulted from the research funding (Westerheijden 2008). Obviously, then, the British RAE first of all was meant to inform the funding authorities and judging by the recurrence of RAEs ever since the 1980s, the funding councils were on the whole satisfied with this type of information.

In the much softer approach in the Netherlands, after some initial controversial ad hoc budget reduction exercises in the first half of the 1980s (de Groot and van der Sluis 1986; Grondsma 1987), research evaluations were introduced that in fact were *not* used to redistribute governmental research funding (Spaapen, van Suyt et al. 1988). After two rounds, the government even relinquished control of the research evaluations completely, leaving them to the umbrella organisation of universities, for the sole purpose of informing research management decisions by institutional leadership (VSNU 1994). Accordingly, the Dutch research evaluations since the early 1990s had institutional leaders as their intended audience. And those leaders were happy to use the information, for all kinds of decisions from bonuses for well-performing research groups to reorganisations of badly-performing ones (Westerheijden 1997; Jongbloed and van der Meulen 2006). The information they were given consisted mostly of four numerical indicators about a research group's productivity, quality of products, relevance of its research and vitality and feasibility of the research group and its programme (Vereniging van Universiteiten, Nederlandse Organisatie voor Wetenschappelijk Onderzoek et al. 2003). Additionally, short texts about each research programme gave some qualitative argumentation for the indicators and could inform more detailed management decisions.

In some Central European countries, after the fall of communism around 1990, countrywide research evaluations were introduced too, in order to inform public funding of university research. In their effort to do away with the corrupting effects of the *nomenklatura*, these regularly recurring evaluations were strongly based on objective performance indicators: publication figures played an important role in e.g. Poland and Slovakia. It is interesting to observe that the British research assessment exercise after 2008 will be relying much more on objective indicators, too.

1.4.3.2 Fundamental Research Assessments

The types of indicators used in research assessment in recent decades have evolved from crude counting of publications to sophisticated measures of impact. Maybe that development helps explain why in the UK nowadays the indicators for the new type of RAE are called 'metrics' rather than 'performance indicators'. Since this is not the place to give a detailed account of bibliometrics, let us just summarise them as measurements of research outputs, in particular publications, and their impacts. They can be used for different purposes (e.g. for mapping newly emerging areas of research), but they are most well-known as indicators of research quality—note that quality is equated not with productivity (numbers of publications), but with *impac*t of the products (number of citations as signs of use by fellow-scientists) (Cozzens 1981; Moed and et al. 1985; Leydesdorff and van der Schaar 1987; Moed 2005). As such they have given much new insight and are among the mainstays of 'informed peer review' (Rinia, van Leeuwen et al. 1998). However, their use is not without problems: the standard model of research from which bibliometric indices proceed, i.e. that the large majority of knowledge claims are published in international (English-language) peer-reviewed journals, applies only to a small portion of disciplines and—as far as the English language is concerned—to only part of the world (van Raan 2005). Alternative measures are being developed for knowledge areas where this standard communication model does not apply, e.g. focusing more on conference proceedings or book publications. Besides, pros and cons of alternative indicators remain under debate, e.g. the superiority of the 'crown indicator' of the Leiden rankings over the 'Hirsh index' (Hirsch 2005; van Raan 2006; Bornmann, Wallon et al. 2008).

As a by-product, all these research evaluations can be used to inform stakeholders and the general public by rating or ranking higher education institutions according to the 'points' earned in the assessment exercises. In the UK, results of existing national peer-review based schemes on research quality (RAE) are used as indicators in some rankings (e.g. *The Times* Good University Guide) together with information derived from the teaching quality (TQA) exercises. Peer-review based assessments enrich rankings with a widely accepted perspective on the performance of institutions. National peer reviews differ very much in the purposes, concepts and measures or ratings; their results cannot be standardized or normalized for international comparison. Up to now there are no regular and systematic international peer reviews that could be used to inform international rankings.

What the points awarded in research evaluation exercises actually mean, or how those meanings shifted over the years, appears to have been less important to some users than the fact that they could be ranked and rated: so many '5-stars' etc. In the UK, the RAEs were given ample public attention through press media. In the Netherlands this was much less the case, maybe because there was not a single major news event in the form of publication of all national ratings at the same time. Rather each discipline, and more recently each (small cluster of) research groups in a single university, was evaluated

separately, leading to minor news attention—if any. However, institutional leaders in the Netherlands often used the absolute amount of points gained by research groups as a criterion for internal financial reallocation (Westerheijden 1997; Jongbloed and van der Meulen 2006), even though the evaluating agencies kept warning against adding up the scores on the different dimensions.

1.4.3.3 Practical Research Assessments

Much of the knowledge-generating activity in higher education institutions can be called applied research—this applies (in different rates) both to higher education institutions called 'universities' but also to, e.g., the 'universities of applied sciences' (*Fachhochschulen*) of Germany or the 'institutes of technology' in Ireland. The archetype of peer review, still so influential in the quality assurance schemes for research just mentioned, was developed in the context of fundamental research; what does that mean for the evaluation of applied research? We have to acknowledge that the term 'applied research' is contested, if not downright old-fashioned. This indicates that the characteristics of knowledge-creating activities can be manifold and that, therefore, it is difficult to come up with a single name for everything that is not the purest form of basic research: mode-2 research is one of the more popular ones (Gibbons, Limoges et al. 1984). In line with that, evaluation of these other forms of knowledge-creating activities must be manifold as well. The route from fundamental research to product innovation may lead through patents and co-authored papers—indicators have been developed on patents, income from licences, co-authored papers, etc.[8] (Debackere, Verbeek et al. 2002). Indeed, 'practice-oriented research' in universities of applied science may have a range of outputs; the Dutch Council of the Universities of Applied Science, the HBO-Council, mentions 'publications, presentations and other products' (HBO-raad 2008).

It may be warranted to mention the Dutch situation here, as it is one of the few places in the world where systematic approaches to evaluating other forms of research are being developed; their main thrust is 'evaluation of research in context' (ERIC is therefore the acronym of what was previously known as the sci-Quest method), i.e. seeing research as more than just (international, peer-reviewed) publications for fellow-researchers, but rather as knowledge processes and products for use by non-academic or non-scientific stakeholders. This implied that (Spaapen, Dijstelbloem et al. 2007):

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[8] A worldwide scoreboard of University-Industry Co-publications (UICs), as identified within the international peer-reviewed research literature indexed by Thomson Reuters' Web of Science (WoS) database, covering more or less the same higher education institutions as appear in the ARWU, may be found on www.socialsciences.leiden.edu/cwts/hot-topics/scoreboard. This scoreboard is primarily designed for international benchmarking and strategic analysis of higher education institutions' (applied) research performance.

> we are not looking for an instrument to evaluate a specific research group or program, but a process of interaction. And we are not so much looking for indicators that can tell us how good or bad the 'quality' of the research is, but we are looking for indicators that tell us whether the group succeeds in fulfilling its mission in a relevant context.

We call this evaluation of 'other' knowledge production 'practical research assessments'. The core of the ensuing evaluation method is called the 'Research Embedment and Performance Profile (REPP)', including, in one of the pilots, several indicators in each of the following dimensions: science & certified knowledge; education & training; innovation & professionals; public policy & societal issues; and collaboration & visibility.

In its quality assurance scheme for such practice-oriented research, the HBO-council mentions a wide range of products and further refers to impact on, and satisfaction of, development of the field, the profession and society, and education and training (HBO-raad 2008). Besides, the HBO-council's quality assurance scheme looks at the relevance and sustainability of networks with stakeholders (true to the characteristics of Mode-2 research).

Just like the national research evaluations in the Netherlands, these alternative evaluations are meant to inform research management within the higher education institutions; institutional leadership therefore remains the main audience. These methods have been developed recently; it is too early, therefore, to look at their impact or to expect their having been used in communication with wider audiences.

1.4.4 Information Offered by Quality Assurance in Higher Education: Peer Review, Performance Indicators, Accreditation and Audits

Quality assurance schemes for the educational function of higher education institutions have been designed starting in the 1970s but mostly since the 1990s in many countries around the world (Goedegebuure, Maassen et al. 1990; Dill 1992; Brennan, El-Khawas et al. 1994; Neave 1994; van Vught and Westerheijden 1994; Westerheijden, Brennan et al. 1994; Woodhouse 1996). This simple statement is the clue to much of the answer to the question regarding the information provided by quality assurance in higher education. First, the statement implies that the current quality assurance schemes still bear the markings of their perhaps 15 to 40 year history (path dependence in their development): they were made to answer questions relevant at the time (Jeliazkova and Westerheijden 2002; Westerheijden, Stensaker et al. 2007). Second, quality assurance was designed as a national issue, answering to national agendas—although those agendas themselves were partly inspired by international policy developments, such as the spread of variants of New Public Management (Paradeise, Reale et al. 2009).

The national agendas were mainly influenced by the dominant stakeholders, which in many countries meant that the public authorities played an important role, and their

perspective through the eyes of public higher education generally is in the legal context. The latter addition means that nationally existing classifications of higher education institutions were taken for granted from the very beginning: there was no calling into question of what makes up a 'university', a 'polytechnic', a *Fachhochschule* or whatever were the names used for different categories of higher education institutions. Similarly, nationally defined degrees were taken for granted (Schwarz and Westerheijden 2004). Comparability across jurisdictions was hardly ever an issue in the initial design of quality assurance schemes.

Quality assurance schemes, depending on their design, produce different types of information, some of them tending towards 'hard data' in (performance) indicators, others tending towards 'soft' judgements by external reviewers. The externally available data are a core product of quality assurance from the accountability viewpoint: through giving objective and comparable information governmental (or other public) funding bodies and the tax payers may know that their money was well-spent. Accountability is a major aim of quality assurance in the governance perspective, stimulated by New Public Management approaches which focus on proving performance across all public services. The other main aim of quality assurance, quality improvement or quality enhancement, is served more by judgemental information and specific recommendations from knowledgeable peers to the individual study programme or higher education institution that has been evaluated; in other words, by focusing on peer review. The judgemental type of information resulting from peer review processes may benefit from not being too public; otherwise the open discussion among peers may be negatively influenced by considerations of what the public (the press!) may make of statements about weaknesses and problems (van Vught and Westerheijden 1994). The line between helpful recommendations and 'naming and shaming' is no thicker than a newspaper.

Another type of problem surfaces in basing quality assurance solely on performance indicators. The natural tendency then is to give most attention to their being *measurable*. In research terms: reliability is prioritised over validity of the indicators. We have addressed this problem above.

At least a partial way out of the paradox that performance indicators tend to produce comparable but irrelevant information and peer review does not produce much public information (and if it does it is not of a comparative nature) is that in the practice of quality assurance the two are complementing each other: indicators are used for reporting and as a basis for more holistic judgemental statements by knowledgeable peers ('informed peer review').

Quality assurance, inserted as it is in the governance discourse, is almost invariably about ensuring that provision of higher education does not fall under a threshold level of quality; public authorities want to protect students against 'rogue provides', 'degree mills' and the like. Accordingly, the information given publicly by quality assurance

schemes in the large majority of cases is limited to statements that programme X or institution Y is of 'basic quality', 'sufficient', 'trustworthy', and that these programmes or institutions can be 'accredited'. Sometimes differentiations are made between 'confidence' and 'broad confidence', or between 'conditional accreditation' and 'accreditation', suggesting that some remain closer to the threshold than others, but the differences are not easily understood by outsiders such as the potential students.

The main point for us is that quality assurance in this way does not make differences among study programmes or institutions very visible: all higher education seems to be lumped together as 'generally OK' (except the few that do not pass the test). In this way, the academic conception of quality as *excellence* (Harvey and Green 1993) is not evidently supported by most quality assurance schemes, whatever the rhetoric of the decision-makers when justifying these policy instruments.

In quality assurance schemes focusing on the programme level, the information produced in the form of indicators is mainly about the educational process, its inputs, throughput and outputs, and about the processes supporting the educational process, including services such as ICT, libraries etc. In quality assurance schemes focusing on the institutional level, the balance of information tends to be different, with descriptions of the institutional organisation, processes, administration being prevalent, and more summary information on the education function. When these institutional evaluations focus on the organisation and implementation of institutional quality assurance systems, they are usually called 'audits'. Audits address quality assurance at a meta-level, evaluating the mechanisms and processes that institutions have in place to assess their internal education quality.

1.4.5 National and International Statistics

Availability and comparability are the two issues concerning national statistics on higher education and research. Availability depends on the capacity and resources of governments (or other higher education authorities, but let us call them governments, for short) for collecting information, and on their needs. Different steering models require and produce different information; for instance, only if governmental funding of higher education institutions depends on student numbers, must statistics on students be collected by the government's statistical office. Going deeper, it may depend on the peculiarities of the funding model what happens with part-time students, students from migrant backgrounds, students in non-degree programmes, disabled students, etc. When are they counted: at the beginning or the end of the academic year? Are they counted as 'heads' or as 'full-time equivalents'? Etc. As a consequence, it becomes understandable that nationally-collected statistics are not necessarily available and even less may they be comparable for cross-national transparency tools. International publications on statistics, e.g. OECD's annual *Education at a Glance*, are therefore ridden

with footnotes in every table or indicator, showing limited comparability of international statistics.

Prohibiting for our purpose is also that international databases like those of UNESCO, OECD and Eurostat [9] are collected at the national level, not at the level of individual higher education and research institutions, let alone units/programmes within higher education and research institutions.

1.4.6 Data from the Inside: Higher Education Institutions' own Information

Many rankings and league tables ask participating higher education and research institutions to produce data themselves, due to the lack of externally available and verified statistics (Thibaud 2009). Many types of data are most efficiently gathered from higher education and research institutions, e.g. about staff composition, institutional facilities, budget reallocation, or licence income. However, monopolies on data create a 'principal-agent' problem and invite 'gaming the rankings' through manipulation of data (see § 1.5.6, below). Less sinister, individual institutions' definitions of terms may be different—certainly across countries but sometimes even within countries. Normalisation to a single, globally-used definition may not always be straightforward.

For these reasons, self-reported data ought to be externally validated or verified. Measures for verification include statistical methods of checking plausibility (e.g. analysis of extreme cases and time series analysis), triangulation with other data-sources (e.g. on research funds) including official national higher education statistics and using the expertise and knowledge of an advisory board.

In the U.S.A., the Integrated Postsecondary Education Data System (IPEDS) has long been established as a publicly available, verified source of data on higher education institutions (http://nces.ed.gov/ipeds). It is based on a system of interrelated surveys conducted annually by the U.S. Department of Education's National Center for Education Statistics (NCES). We already mentioned IPEDS in the section on the Carnegie Classification (§ 1.4.1.1). A European bridge between institutional data and regular collections of statistics is being designed (and piloted) in the EC-supported EUMIDA project, which started almost at the same time as U-Multirank, in 2009. The project is carried out by an international consortium from Italy (University of Pisa, coordinator), Germany, Austria, Switzerland and Norway. EUMIDA intends to explore the feasibility of publishing detailed data at the level of all individual higher education institutions as part of a future European Observatory on Universities. The comprehensiveness of the project may not be as complete as intended in the foreseeable future, as the pilot project

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[9] The EU has started a project to investigate options of getting institutional-level data; see EUMIDA in the next section.

must needs be limited to a sample of the most research-active universities. In the framework of the Observatory, regular data collection is intended, in cooperation with EU member states' representatives in Eurostat. Also, the Expert Group AUBR recommends setting up a regular observatory on research information from higher education and research institutions (AUBR Expert Group 2009).

Until IPEDS and higher education and research institution observatories become world-wide phenomena, ad hoc data collection by asking higher education and research institution directly will remain a necessity.

1.4.7 Surveys

A number of rankings use survey-data to get information on especially institutions' reputations, through peer surveys (e.g. THE/QS, USN&WR, CHE), as well as satisfaction information from surveys among students and graduates (e.g. CHE, SK123).

Student (or graduate) satisfaction with their higher education experience at their university is relevant in particular for rankings that address prospective students. Experience from e.g. the CHE and SK123 rankings and national student surveys in the UK and Australia shows that student and graduate surveys produce robust comparative information about higher education institutions. But up to now there is not much experience with international comparability of this type of survey data. Conducting global student satisfaction surveys will be a part of the feasibility study with uncertain outcome. In any case they demand high quality methodological standards including a strict control of access to the questionnaires.

The other subject mentioned, for which surveys are often used, concerns institutional reputation. An analysis of CHE data on reputation of German, Swiss and Austrian universities (Federkeil 2009) showed that reputation has to be treated with caution in international rankings. The quality of results heavily depends on the quality of the sample. In 2009, a discussion broke out in the U.S.A. about the trustworthiness of peer reports as used in the USN&WR (and the same might apply to the THE league table): respondents to the ranking survey were accused of valuing other higher education institutions lowly to make their own institution stand out better (see e.g. www.insidehighered.com/news/2009/08/19/rankings).

1.5 Uses and Effects of Rankings

Rankings not only provide information on the performance of higher education and research institutions, either rightly or wrongly, but they also have major impacts on decision-making in higher education and research institutions and on the sector more broadly. According to many commentators, their effect on the sector is rather negative: encouraging wasteful use of resources, promoting a narrow concept of quality, and

inspiring institutions to engage in 'gaming the rankings'. As shown in the end of this section, a well-designed ranking can have a positive effect on the sector, encouraging higher education and research institutions to improve their performance. While specific effects depend on the details of each ranking exercise, some common tendencies of current rankings nevertheless can be highlighted in this section.

1.5.1 Student Demand

Most rankings intend to affect student demand and there is clear evidence that they indeed have an impact on student choices. It has been shown in the U.S. that when an institution improves its position in the rankings, the next year it receives more applicants, sees a greater proportion of its accepted applicants enrol, and subsequently sees that the students in the incoming class have higher entrance scores and that the institution can reduce the amount of institutional grant aid that it spends to attract its class (Monks and Ehrenberg 1999). The experience of the CHE ranking in Germany confirms this result. In some fields, e.g. psychology and medicine, the number of applications at the recommended universities increased significantly after publication of the ranking: in psychology the number of applications rose on average 19% in universities that were recommended as excellent in research and 15% in universities that were recommended as efficient and supportive in teaching (Federkeil 2002). It is shown both in the U.S. and in Europe that rankings are not equally used by all student groups. They are particularly used by students of high achievement and from highly educated families (McDonough, Antonio et al. 1998; Heine and Willich 2006; Cremonini, Westerheijden et al. 2008).

1.5.2 Consolidation of Public Funding

Higher education and research rankings get not only the attention of students, but also of national policy-makers and the public in general. There are now many examples in many parts of the world that policy-makers are not satisfied with the position of their higher education institutions in the global rankings and therefore have begun to reform their higher education systems and adapt or increase the funding to the sector. Within national systems, the rankings have prompted the desire for more and higher ranked higher education institutions both as symbols of national achievement and prestige and supposedly as engines of the knowledge economy (Marginson 2006). Salmi (2009) discussed several patterns of reactions of countries to global higher education rankings. In his view (Salmi 2009):

> Adopting the goal of building world-class universities does not imply, however, that all universities in a given country can be or should aspire to be of international standing. A more attainable and appropriate goal would be, rather, to develop an integrated system of teaching, research, and technology-oriented institutions that feed into and support a few

centers of excellence that focus on value-added fields and chosen areas of comparative advantage and that can eventually evolve into world-class institutions.

Ways to do so include upgrading existing institutions, merging institutions to concentrate strengths, or create new ones (or combinations of these strategies)—in order of increasing costs. Yet higher education authorities are willing to go to great lengths to get 'their' institutions into the top rankings. For instance, Vietnam uses much of its World Bank loan for higher education to establish a new 'world class university'. Saudi Arabia uses its own ample funds to create a 'world class university' in the area of technology. Similar initiatives exist in a number of countries (including China, South Korea); in some cases they refer to global rankings explicitly and define goals to have a certain number of higher education institutions among the top in the rankings in a given target year. In some countries (e.g. Denmark) mergers of universities were influenced by global rankings too, as their concepts and indicators favour large units. The Minister in France stated that France's poor showing in the rankings underlined the absolute necessity to reform French higher education (Marshall 2008). The French government has allocated additional funding to create centres of excellence and position France among the highest-ranking universities in the world. The German 'excellence initiative' which gives additional money to a number of universities to enhance their research performance also was clearly influenced by the results of global rankings. Finally, it has been shown that after the USN&WR ranking was introduced in the U.S. at a larger scale, state appropriations to public universities increased. State appropriations per student were more responsive to USN&WR rankings exposure if a state had more citizens who were politically active, cared about higher education, and bought USN&WR from the newsstand (Jin and Whalley 2007).

Rankings have to be aware of the incentives they are setting and of potential unintended effects on institutions and higher education systems resulting from their choice of concepts and indicators.

1.5.3 The Higher Education 'Arms Race'

One of the major concerns that rankings have brought up, especially in the U.S.A., is their tendency to encourage an 'arms race' in the higher education sector (van Vught 2008). (Ehrenberg 2002) sees rankings as one reason why the costs of higher education in the U.S.A. have escalated over the last decades. Rankings exacerbate the competition in the sector and as a result higher education institutions have to invest more and more into attracting the most talented students and staff and building the reputation of the school. Since the position in a ranking is not absolute but always relative to what others do, there is no end to this race. The problem of the arms race is that the investments do not always lead to better education and research, and that the resources spent might be more efficiently used elsewhere.

One aspect of the arms race is the concentration on research. Most rankings focus disproportionately more on research, as shown above, either directly by using research output measures or indirectly by using measures that characterize research intensive universities (e.g. low student/staff ratio). Yet the link between the quality in research and quality in teaching is not particularly strong (see Dill & Soo, 2006). This misrepresentation leads not only to incomplete, misleading or bad decision-making (Marginson 2006) but also—again—to a wasteful use of resources. It leads to a situation where even higher education institutions that see their mission primarily in teaching are forced to invest more in research only because research indicators 'signal' the quality of their education in the rankings. Since research is an expensive endeavour, this leads to an ineffective use of resources.

The reputation race can thus increase higher education costs significantly (van Vught 2008). Massy (Massy 2003) describes the situation in the U.S.A. as follows: 'Universities press their pricing up to the limits that markets, regulators, and public opinion will allow. They justify their actions in terms of the rising cost of excellence and other factors beyond their control, but that is only part of the story. The impetus for price hikes stems from the university's own choices'. If public policies in other countries follow the U.S. example and increase the competition in a system where reputation is the major driving force, similar cost explosions should be expected (van Vught 2008).

1.5.4 The Concept of Quality and a Threat to Diversity

Any ranking or for that matter any indicator system, no matter how carefully designed, simplifies reality and offers an incomplete picture of institutional quality. The major problem of this is not a somewhat flawed picture on institutions, but the fact that this incomplete framework tends to get rooted as a definition of quality. One of the greatest dangers of rankings is their ability to redefine what 'quality' is in the higher education sector (e.g. (Tijssen 2003) 'Rankings define the purposes, outputs and values of higher education and interpret it to the world at large, in a fashion that is far more compelling than either the policy reports of governments or the reasoned analyses of scholars of higher education' (Marginson 2006). This is particularly the case for league tables that use a single composite indicator for the total 'score' of an institution. The characteristics that weigh less or that even are not captured in the rankings threaten to become increasingly ignored by the institutions and by the public in general.

A study on American law schools made evident that administrators considered rankings when they defined goals, assess progress, evaluate peers, admit students, recruit faculty, adopt new programs, and create budgets. Rankings thereby created self-fulfilling prophecies by encouraging schools to become more like what rankings measured. In a perverse way, this reinforces the validity of the measure. 'Rankings impose a standardized, universal definition of law schools which creates incentives for law schools to conform to that definition' (Espeland & Sauder, 2007).

The problem of this phenomenon is that some ignored aspects nevertheless may be highly important for the society. The major rankings, for example, contain incentives to shift institutional and government resources from education to research.

Furthermore, rankings are likely to reduce horizontal diversity in higher education systems. The existing global rankings take a comprehensive research university as their model (Marginson 2006). Alternative models, such as vocationally-oriented universities of applied sciences (*Fachhochschulen)* in Germany or liberal arts colleges in the U.S.A. are by definition 'punished' by such rankings. In the absence of policies to protect diversity by other means, attention to global research rankings may trigger the evolution of more unitary, and mainly vertically differentiated systems. There is no reason to assume that intensified competition will generate more horizontal diversity, either nationally or globally, unless the incentive structure concurs with the ambition to do so (Marginson 2006; van Vught 2008).

1.5.5 Increasing Performance Gaps between Institutions

As a result of the vertical differentiation, rankings are likely to contribute to wealth inequality and expanding performance gaps among institutions (van Vught 2008). On the one hand, rankings and especially league tables create inequality among institutions that would be hard to distinguish otherwise (see also § 1.3.1.5). They create artificial lines that imply the danger of becoming institutionalized and real (Espeland & Sauder, 2007). The competitive framework creates a 'Matthew effect' (Matthew 13:12), i.e. a situation where already strong institutions are able to attract more resources from students (e.g. increase tuition fees), the government (e.g. research funding), and third parties, and thereby strengthen their market position even further. On the other hand, rankings have exacerbated competition for the leading researchers and best younger talent, and are likely to drive up the price of high performing researchers and research groups (Marginson 2006) making these financially unaffordable for some institutions.

There is also a growing emphasis on institutional stratification and research concentration by policy-makers. To ensure that some national higher education institutions figure in the top of the global rankings, additional funding is channelled only to a few high potential institutions, which puts these in a privileged position and which may jeopardise the level and quality of resources for some of the not-winning higher education and research institutions. In many European countries higher education and research institutions are assumed to be equal to their peers in terms of resources, quality and prestige, but this new pressure replaces the egalitarian model with a distinct hierarchy.

1.5.6 Gaming the Results

In the systems where the position of a higher education institution in a ranking is important in the eyes of the stakeholders, institutional leaders are under great pressure to improve their institution's position. In order to do so, these institutions sometimes engage in activities that improve their position in a ranking but can have negligent or even harmful effect on the performance in its core activities. Experiences in the U.S.A. around, e.g., the UNS&WR league tables have shown that higher education institutions sometimes are very aware of the strategic importance of those league tables and that they may present themselves in a favourable light, or even take recourse to 'gaming the rankings' (Dill and Soo 2005) by manipulating data or by manipulating the situation. Ehrenberg (Ehrenberg 2002) demonstrated that almost every indicator in the USN&WR ranking may lead to gaming by the institutions. For instance, to raise their ranking score on selectivity (an indicator in the USN&WR rankings) some institutions invested in stimulating students to apply although they would never accept those students (Schreiterer 2008). Also, since the standardized test score of applicants is considered in the ranking, some institutions make submitting the score voluntary to applicants, knowing that only students with a high score have an incentive to provide it, which will increase the institution's average. Faculty salary also counts in the ranking, and there are examples of institutions increasing salaries without discussing if this would improve teaching and learning, if it would contribute to faculty retention or if there would be a more effective use of these resources. Finally, since USN&WR counts full-time faculty for its student/staff ratio in the fall term, departments encourage their faculty to take an academic leave in spring, not in fall (Espeland and Sauder 2007).

Moreover, since the position in the ranking is not absolute, but relative to how others do, institutions have an incentive to make their main competitors look worse. If a ranking has a survey element in it that asks for the reputation of other institutions, it is in the interests to manipulate these results. There are examples of institutions deliberately downgrading the academic reputation of their competitors (van der Werf 2009) (see also § 1.4.7). In Germany, the CHE rankings no longer use an academics' survey, because with the increasing public attention for the CHE ranking, academics started to 'game' the survey and use it as a marketing instrument for their own institution.

1.5.7 Rankings and Internal Management

Rankings strongly impact on the internal management in higher education institutions. The majority of higher education leaders—63%, according to Hazelkorn's survey (Hazelkorn 2007)—report that they use potential improvement in rank to justify claims on resources, which is confirmed by a survey of 'strategic plans' and 'annual reports' (Espeland & Sauder, 2007). Moreover, lacking other benchmarks, some administrators use rankings as a heuristic to help allocate resources internally, particularly by rewarding current winners (the 'Matthew effect'), e.g. by investing in laboratories that

have had major research impact scores. In that way, they tend to focus on targeting the indicators in league tables that are most easily influenced, e.g. the institution's branding, institutional data and choice of publication language (English) and channels (counted in the international databases like Thomson Reuters or Scopus), in extreme cases leading to what Hazelkorn (2007) called 'Fetishisation of particular forms of knowledge, contributors and outputs' and stimulating returning to Mode-1 research at the cost of Mode-2 research. At the same time, Mode-2 research is regarded as highly relevant for stimulating higher education and research institutions' role in the knowledge economy. From that perspective, turning towards Mode-1 research is a perverse effect.

The changes in an institution's position in a ranking can have a major effect on the leadership of an institution. There are various examples of cases in which leaders' salary bonuses were directly linked to their institution's position in the ranking (Jaschik 2007), or in which administrators had to step down because of a negative outcome in a ranking, even though the drop in the ranking may have been caused by erroneous data (see Siang 2005; The Star 2006).

1.5.8 Potential for a Positive Impact

Most of the effects discussed above are rather negative to students, to institutions and to the higher education sector more broadly. The problem is not so much the existence of rankings as such, but the fact that many of the existing rankings and league tables are flawed and create dysfunctional incentives. What can be concluded from these results is that higher education and research institutions as well as policy-makers at the system level are very responsive to the rankings. If a ranking would be able to create useful incentives, it could be a powerful tool for improving the performance in the sector.

The experience with e.g. the CHE rankings shows that a well-designed ranking may provide institutions with an incentive to genuinely improve their core educational and research processes. Well-designed rankings may be used as a starting point for internal analysis of strengths and weaknesses. Rankings offer the possibility to compare one's own institution with others, either for partnership benchmarking or for positioning oneself against competitors. Some rankings offer institutions the possibility to get tailor-made analyses (e.g. CHE ranking, SK123). Without rankings, higher education and research institutions have only data on their own institution at their disposal, which does not allow any positioning in the field. To fulfil this task rankings have to offer results on a level of aggregation that corresponds to the needs of internal strategic decision-making.

Similarly, rankings may provide useful stimuli to students to search for the best-fitting study programmes, and to policy-makers to consider where in the higher education system to invest for it to fulfil its social functions optimally. The point of the previous sections was not so much that all kinds of stakeholders react to rankings, but that the

current rankings and league tables seem to invite over-reactions on too few dimensions or indicators.

1.6 Conclusion: Consequences for the Design of a New Worldwide Ranking Tool

In our long overview, we discussed positive and negative results with regard to existing transparency tools in the current, complex higher education systems. Some commentators have found it remarkable that such different rankings all have the same institutions in their top tiers. Does this indicate that an underlying concept of 'quality' is measured through all the proxies that those rankings define? Cynics may reply that all rankings make sure that the same institutions make up the top to gain credibility ('face validity' in its crude sense of reinforcing prestige). From our point of view, concerned as we are to design a meaningful ranking for higher education and research institutions, we rather stay at the level of empirical and methodological critique. In particular, one-dimensional league tables prove to be neither informative nor a valid approach to measure differences between institutions; they do not correspond to the information needs of the different groups of external stakeholders and they do not correspond to the needs within universities for strategic decision-making. Instead we need multi-dimensional, robust rankings that give various groups of end-users options to adapt them to their individual information needs, so that intended behavioural consequences may ensue without (many) unintended, perverse effects on behaviour of higher education and research institutions ('gaming the rankings'), students (being guided towards high-reputation institutions but perhaps low-quality programmes within them) and decision-makers (adapting aims and decisions to available indicators).

In the previous sections the methodology of existing international and national rankings, both institutional and field-based, have been discussed. With regard to the design of an alternative model of a global, multi-dimensional ranking, a number of conclusions can be drawn with regard to the methodology, the sample of institutions involved, the set of indicators and the way of calculating rankings.

a. Most international institutional rankings (like ARWU and THE/QS) focus on one 'type' of higher education institution: the large, international research university. First, they either focus exclusively on research (ARWU, Leiden, HEEACT) or their selection criteria and/or indicators include a pre-dominance of research (THE/QS). There are only few international rankings that specialise on different aspects (labour market success – Ecole des Mines; web presence – Webometrics) and hence include other types of institutions, too;

b. As the most prominent and influential global rankings are confined to measuring research performance, the global perception of a 'world-class university' is identical with research excellence (see Salmi 2009);

c. The availability of (bibliometric) databases, the indicators used and the procedures to select the institutions included in most current rankings imply biases in terms of fields as well as language and culture. In line with the Berlin Principles an alternative approach has to give more attention to avoiding biases;

d. With regard to biases in underlying databases as well as differences in concepts, indicators and measures, issues of validity and reliability are particularly problematic for international rankings. A feasibility study has to pay attention to those aspects;

e. Institutional global rankings are using either institutional information only or they are calculating unweighted averages out of field-based data. (The only exception is the Leiden ranking where the so called 'crown indicator', the field-normalised citation rate, is field-specific by definition.) This raises the question of how to deal with differences between fields in aggregating information in institutional rankings.

Our critical review also gave points of departure for a better practice, both theoretically inspired and looking at existing good practices.

f. Following the Berlin Principles, classifications and rankings should explicitly define and address target groups, as indicators and the way to present results have to be focused;

g. Rankings and quality assurance mechanisms are complementary instruments. Rankings represent an external, quantitative view on institutions from a transparency perspective; traditional instruments of internal and external quality assurance are aiming at institutional accountability and enhancement. Rankings do not equal causal analysis but they may help to ask the right questions for processes of internal quality enhancement;

h. For some target groups, in particular students and researchers, information has to be field-based; for others, e.g. university leaders and national policy-makers, information about the higher education institution as a whole has priority (related to the strategic orientation of institutions); our multi-level set of indicators must reflect these different needs;

i. Field-based comparisons must be made between higher education and research institutions of similar characteristics, leading to the need for a pre-selection per field-based ranking of a set of more or less homogeneous institutions;

j. Rankings have to be multi-dimensional (see limitations of composite indicators; heterogeneity of preferences/priorities within target groups);

k. There are neither theoretical nor empirical reasons for assigning fixed weights to individual indicators to calculate a composite overall score; within a given set of

indicators the decision about the relative importance of indicators should be left to the users;

l. International rankings have to be aware of potential biases of indicators; aspects of international (global!) comparability therefore are an important aspect of our study;

m. Rankings should not use league tables from 1 to X but should differentiate between clear and robust differences in levels of performance. The decision about the adequate number of groups have to be taken with regard to the number of institutions included in a ranking and the distribution of data;

n. Rankings have to use multiple databases to bring in different perspectives on institutional performance. As much as possible available data sources should be used, but their availability will be limited in this feasibility study (cf. § 1.4.). U-Multirank will not be possible without gathering additional data from the institutions. Therefore, the quality of the data collection process is crucial. An adequate model could taken from U-Map and would imply be to send partly 'pre-filled' questionnaires to the institutions;

o. In addition rankings should be self-reflexive with regard to potential unintended consequences and undesirable/perverse effects. This is a decisive task for a feasibility study that should be addressed explicitly.

p. Involvement of stakeholders in the process is a good way to keep feedback loops short, so as to avoid misunderstandings and so as to enable a high quality of the designed instruments;

q. A major issue are the measures to ensure quality of the ranking process and instruments. This includes statistical procedures as well as the inclusion of expertise of stakeholders, rankings and indicator experts, field experts (for the field-based rankings) and regional/national experts. A major condition for the acceptance of rankings is the transparency about their methodology. The basic methodology, the ranking procedures, the data used (including information about survey samples) and the definitions of indicators have to be public for all users. Transparency includes informing about limitations of the rankings.

These general conclusions will be an important source of inspiration for the next phases of the project during which we intend to design a new, global, multidimensional ranking instrument (U-Multirank). In the next chapter we will, based on these conclusions, formulate a set of design principles that will guide the development of this new tool.

2 Identifying dimensions and indicators for focused institutional rankings and field based rankings

2.1 Design Principles

The conclusions from WP1 will now be translated into a number of design principles that form the foundation of the instrument we intend to develop in the remainder of this project. This instrument regards a multi-dimensional and global approach to ranking higher education and research institutions.

The design principles that are formulated here are in accordance with both the Berlin Principles and the recommendations by the Expert Group on the Assessment of University-based Research (see WP1). The Berlin Principles emphasise (a.o.) the importance of being clear about the purposes of rankings and their target groups, of recognising diversity of institutional profiles, of providing users the option to create tailor-made approaches, and of the need to focus on performance rather than on input factors. The AUBR Expert Group (a.o.) underlines the importance of stakeholders' needs and involvement, as well as the principles of purposefulness, contextuality, and multi-dimensionality of rankings. All these recommendations and suggestions are implied in our list of 12 design principles, which consists of two sets.

The first set of design principles has to do with the aims and broad functions of the instrument as a whole:

1. The choice and definition of indicators must be based on a *conceptual model*. This conceptual model should explain the selection of indicators to be used in the ranking processes. In addition, there should be a common, integrated model for the rankings at the two different levels in our approach (institutional and field-based rankings).

2. The perspectives of the different groups of users must be taken into account in the selection of dimensions and indicators; *relevance* of dimensions and indicators in their eyes should be one of the leading principles. The principle of user-relevance implies that the purpose of any specific ranking is an effect of the user's selection of dimensions and indicators.

3. Relevance to user groups implies that they can value different dimensions and indicators differently, and thus that rankings must allow a *multi-dimensional* approach.

4. For some groups of users, rankings at the levels of fields (e.g. study programmes, research areas) are most relevant, while others want rankings of whole institutions. Our transparency tool therefore should incorporate *at least two levels of aggregation*: the level of the institution and the level of the disciplinary fields.

5. Rankings should primarily focus on the realized quality of the activities in which stakeholders are interested in. They should focus on the *performance* of (programs in) higher education and research institutions and not only on the factors that allow the enabling of this performance.

6. Rankings should be made of higher education and research institutions that are comparable. A pre-selection or filtering must be possible to group higher education and research institutions with *homogeneous* features.

7. International rankings have to take account of the linguistic, cultural, economic, and historical *contexts* of the educational systems in which they are applied. International rankings in particular should seek to prevent potential biases and be precise about their objectives.

The second set of design principles focuses on the methodological requirements of science-based, systematic ranking:

8. Indicators must be *measurable* at least at an ordinal level.

9. Indicators have to pay attention to issues of possible – in particular undesirable/perverse – incentives resulting from their use. Indicator definitions, data sources and data collection processes should be designed in such a way that they maximise *resistance against manipulations* ('gaming the results') through interested parties.

10. Indicators have to meet the general requirements for empirical research and therefore must show high degrees of *validity*, *reliability* and *comparability*.

    a. Ranking indicators must have high *construct validity*. In particular, many measures of performance are dependent on the size of institutions/units. Ranking indicators should therefore be defined in such a way that they measure 'relative' characteristics, controlling for size. In addition, calculating composite overall indicators, assigning fixed weights to each indicator, should be avoided

    b. The measurement of institutional or programme characteristics, through ranking indicators has to be consistent. It should be independent of who applies the indicators and the place and time of measurement.

c. Ranking indicators have to produce information that is comparable across institutional and national settings and through time. Context characteristics that may comprise this comparability have to be identified.

11. *Availability* of comparable information for indicators at a worldwide level is a serious boundary condition. When selecting indicators this availability will have to play a major role.

12. A ranking tool must be *parsimonious* with regard to data collection demands, for reasons of feasibility. For the selection of indicators, this implies that those indicators will be prioritised that do not imply large extra efforts for data collection by higher education institutions.

These principles will guide our further work on the selection and development of dimensions and indicators for our feasibility study.

A crucial part is the development of a conceptual framework (design principle #1); therefore we will turn to that first of all. Besides, the discussion of our conceptual framework provides a good opportunity to explain some of the terms used in our design principles.

2.2 Conceptual Framework

In WP1 we argued that a meaningful ranking requires a conceptual framework both in terms of content and methodology. The basic methodological principles (#8-12) have already been outlined in section 2.1. We can strengthen that argument: for any good selection of indicators, rather than an availability-driven laundry list that characterises many current league tables, a conceptual framework is needed (although availability of data remains an important boundary condition). Some points of departure of a general framework for studying higher education and research institutions can be found in the higher education literature. We will combine four different conceptual perspectives.

The first two perspectives are used to define the relevant dimensions of a ranking. Our design principles indicate that a ranking should be multi-dimensional; the conceptual framework has to deliver a rationale for the dimensions to be included.

First, a common point of departure is that processing knowledge is the general characteristic of higher education and research institutions (Clark 1983; Becher and Kogan 1992). 'Processing' can be the discovery of new knowledge as in research, or its transfer to other stakeholders outside the higher education and research institutions (knowledge transfer) or to various groups of 'learners' (education). Of course, a focus on the general purposes of higher education and research institutions in the three well-known primary processes or functions of 'teaching and learning, research, and

knowledge transfer' is a simplification of the complex world of higher education and research institutions. These institutions are, in varying combinations of effort, committed to the efforts to discover, conserve, refine, transmit and apply knowledge (Clark 1983). But the simplification helps to encompass the wide range of operating activities in which higher education and research institutions are involved. The three functions are a useful way to describe conceptually the general purposes of these institutions and therefore are underlying three dimensions of our new ranking tool.

The second conceptual perspective is that the performance of higher education and research institutions may be directed at different 'audiences'. In the current higher education and research policy area, two main audiences have been stressed: on the one hand, the *international orientation* of higher education and research institutions. This perspective emphasises how these institutions are portals for societies to the globalised world (both 'incoming' influences and 'outgoing' contributions to the international discourse). On the other hand the institutions' *engagement with the region* can be distinguished. Here the emphasis is on the involvement with and impact on the region in which a higher education institution operates. It is understood that the functions higher education and research institutions fulfil for international and regional audiences are emanations of their primary processes, i.e. the three functions of education, research and knowledge transfer mentioned before. What we mean by this is that there may be educational elements of the international orientation, research elements of the international orientation and knowledge transfer elements of the international orientation. Similarly, also the regional engagement may show in an institution's education, research and knowledge transfer activities. International and regional orientation will be two further dimensions of the multi-dimensional ranking.

The term 'processing' used above points to the third main conceptual perspective, namely the *major stages in any process of creation or production*: input, throughput (or the process in a narrow sense) and its results, which can be subdivided into immediate outputs and further-reaching impacts. A major issue in higher education and research institutions, as in many social systems, has been that the transformation from inputs to performances is not self-evident. As a matter of fact one of the reasons why there is so much criticism of league tables to the extent that they emphasise input factors, is exactly the point that from similar sets of inputs, some higher education and research institutions may reach quite different types and levels of performance than others. We shall make a general distinction between the 'enabling' stages of the general creation on the one hand and the 'performance' stages on the other. The enabling stages consist of the inputs and processes of creation/production processes while the performance stages include their outputs and impacts. We shall use the distinction of the various stages of a creation/production process to further elaborate the conceptual framework for the selection of the indicators in the new ranking instrument.

A fourth perspective refers to the different *stakeholders* or *users* of rankings. Ranking information is produced to inform its users about the value of higher education. The users need that information as it is not possible or feasible to determine this value by themselves. (Higher) education is not an ordinary 'good' for which the users themselves may assess the value a priori (using, e.g., price information). Higher education is to be seen as an experience good (Nelson 1970): the users may assess the quality of the good only while or after 'experiencing' it (i.e. the higher education programme), but such 'experience' is ex post knowledge. It is not possible for users to know beforehand whether the educational program meets their standards or criteria. Ex ante they only can refer to the perception of previous users. Some even say that higher education is a credence good (Dulleck and Kerschbamer 2006): the value of the good cannot be assessed while experiencing it, but only (long) after that. If users are interested in the value added of a degree program on the labour market, information on how well a class is taught is not relevant. They need information on how the competences acquired during higher education improve their position on the labour market or their social live. They have to rely on information on that impact.

The ambivalent character of higher education (between experience and credence good) is related to the multitude of users and their motives for using higher education.

Some users are interested in the performance of higher education and research institutions as a whole (e.g. policy-makers) and for them the internal processes contributing to these performances are of less interest. The institution may well remain a 'black box' for them. Other stakeholders (students and institutional leaders are the prime examples) are interested precisely in what happens inside the box. For instance, students may ask what is the quality of teaching in the fields in which I am interested? Students may be interested in how the program is delivered as they may consider this as an important aspect of their learning experience and their time in higher education (consumption motives). Students may also be interested in the long-term impact of taking the programme. They may see enrolling in higher education as an investment and are therefore interested in its long-term returns.

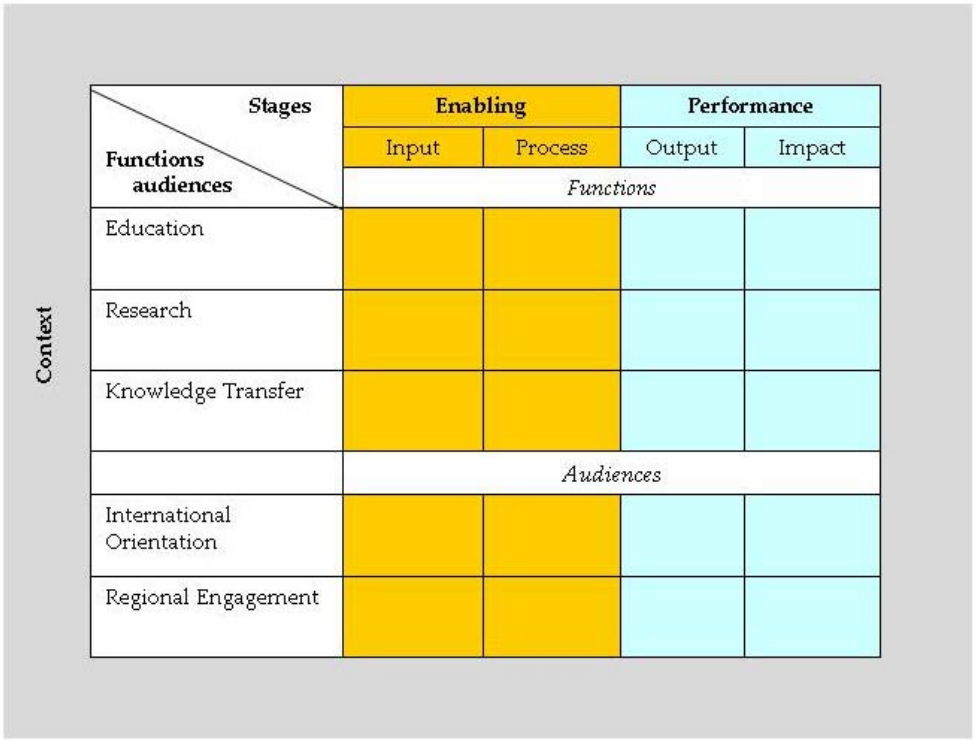
Different users engage with higher education for various reasons and are therefore interested in different dimensions and indicators of the performance of higher education institutions and the programmes they offer. Rankings therefore have to be designed in a balanced way, including relevant information on the stages of the processing of knowledge relevant to the different stakeholders and their motives for using rankings. The conceptual grid shown below (see

Table 2-1) therefore has to be applied twice: once to the institution as a whole, and once at the field-level and it has to accommodate interests in the performance as well as in the process. For different dimensions (research, teaching & learning, knowledge exchange transfer) and different stakeholders/users the relevance of information about different aspects of performance may differ.

The result of this elementary conceptual framework is a matrix showing the types of indicators that could be used in rankings and which could be applied at both levels (the institutional and the field level). One additional conceptual remark should be made here: we mentioned in our design principles (no 6) that especially for filtering higher education and research institutions into homogeneous groups, we need contextual information rather than only what is directly connected with enabling the knowledge processes (input and process information). Contextual information of higher education and research institutions regards their positioning in society and their specific institutional appearances. It describes the conditions in which the primary processes of education, research and knowledge transfer operate. Because we intend to include context information in our conceptual framework, context indicators are shown here as a special aspect of our conceptual grid.

An important part of the resistance against rankings and league tables is based on the fact that often their selection of indicators is guided primarily by the (easy) availability of data rather than by relevance. In many cases this leads to an emphasis on indicators of the enabling stages of the higher education production process, rather than on the area of performance. That is mainly because traditionally, governance of higher education and research institutions has concentrated on the bureaucratic (in Weber's, neutral sense of the word) control of inputs: budgets, personnel, students, facilities, etc. Also, it is inputs and process that can be influenced by managers of higher education and research institutions. They can deploy their facilities for teaching, but in the end the students have to learn and, after graduation, have to work with the competencies they have acquired. Similarly, for research, higher education and research institution managers may make facilities available for research, but they cannot guarantee that scientific breakthroughs are 'created'. It appears that inputs and processes are the parts of higher education and research institutions' processes that are best documented. But assessing the performance of these institutions implies a more comprehensive approach than the partial focus on inputs and processes. As a matter of fact, the unease among users of most current league tables and rankings is that they often are more interested in the performance of the institutions while the information they get is often largely about inputs. We shall select not only enabling (particularly process) indicators but also output and impact indicators.

Table 2-1: Conceptual grid for indicators in rankings



Based on the (simplistic) conceptual framework presented above we have selected a set of indicators for the new multidimensional ranking instrument (see below). As was indicated before, we have called this instrument U-Multirank.

The conceptual framework also allows us to apply the design principle of comparing groups of homogeneous institutions (design principle number 6). We intend to make use of particularly context information and enabling (input and process) indicators to allow for the 'pre-selection' of comparable institutions. For this we shall make use of a classification instrument that has been developed recently: U-Map. We shall select comparable institutions first (by using the U-Map instrument) before the ranking tool will be used (by applying the U-Multirank instrument). It should be pointed out that the two instruments are clearly separated. U-Map is a descriptive classification tool that uses enablers and context indicators that differ from the indicators we propose for rankings to be produced by U-Multirank. In addition, using different indicators ensures that data are not used in a double sense, first to select institutions and then to rank them on the same data.

A substantial part of the relevant context is captured by applying U-Map in pre-selecting higher education and research institutions. Additional context information may be

needed to allow for valid interpretation of specific indicators by different stakeholders. Once the list of indicators is decided on, we shall determine what additional context indicators need to be taken into account.

2.3 User-driven approach

To guide the readers' understanding of our approach, we briefly describe to what our conceptual model should lead. The way in which stakeholders or 'end users' will be informed about the indicator values will follow the design principles of user relevance (#2) and multi-dimensionality (#3). This rules out a presentation of the findings in a single league table (on one dimension; the same for all users). We propose an interactive web-based approach, where end users will have the possibility to declare their interests, in a three step, user-driven approach:

1. select a set of institutions or fields-in-institutions ('units' for short) that are homogeneous on issues users judge to be relevant given their declared interests;

2. choose whether they want to focus the ranking on higher education and research institutions as a whole (focused institutional rankings) or on fields within these institutions (field-based rankings);

3. select a set of indicators on which they want to rank the chosen units.

This will result in users creating their own specific and different views, according to their needs and wishes, of certain aspects of the total database.

The first step will be based on the existing U-Map classification tool. It does not make sense to compare all institutions irrespective of their missions, profiles and characteristics. So a selection of comparable institutions based on the classification has to be the basis for any ranking.

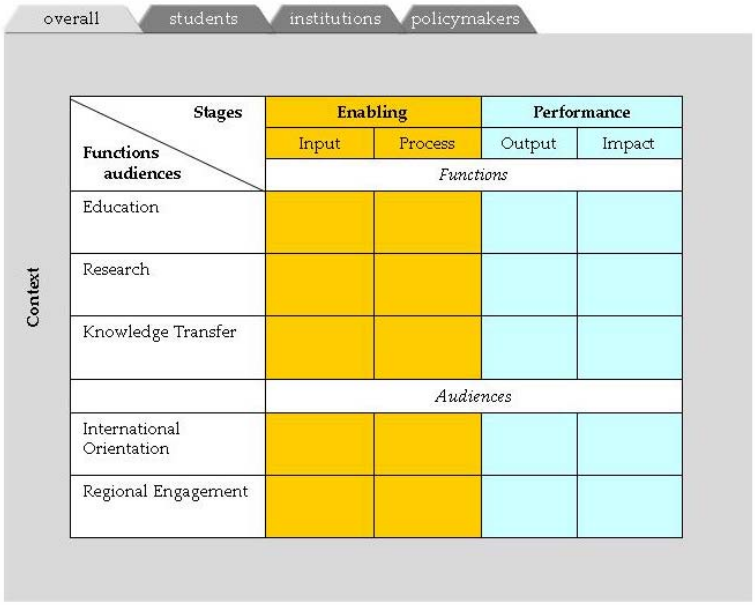
In the second step, the users make their choice regarding the level of the ranking. They will decide whether the ranking will be at the institutional level, leading to a focused institutional ranking, or at the field level, leading to a field based ranking.

The final step is selection of the indicators that will be used in the ranking. There are two ways to organise this choice process. In the first option, the end users have complete freedom in the choice of indicators. They may choose any indicator, from any cell in the conceptual grid. Through this personalised approach the end users may find information on those aspects in which they are interested. This is one of the advantages of our approach compared with standard league tables, however this kind of individualised, one-off ranking which may be different if the same user applies different indicators, is difficult to communicate to the public as 'the' ranking there is no clear non-relative result for a particular institution.

The other way to organise the choice of indicators is by offering different fixed menus of preselected indicators to different end users. As was mentioned before different users will be interested in different aspects of higher education and research institutions. Several groups of end users have been identified (students, higher education and research institutions, policymakers) and other groups may come forward as well. The different needs and wishes of these groups of end users may be catered for by different pre-selections of indicators. Each group of end users may choose a predefined set of indicators, selected according to their needs. There will be a 'student menu', a 'higher education institution menu' etc. (see Table 2-2). The advantage of this approach is its simplicity. The end user does not have to go through the long list of indicators and can make a 'quick' selection. The fixed menu approach will also reduce the multitude of rankings that will be generated. This fixed menu approach requires the ranker to determine what the menus are and what indicators are on it. In our study we shall consult stakeholders to identify the preferred 'menu items'.

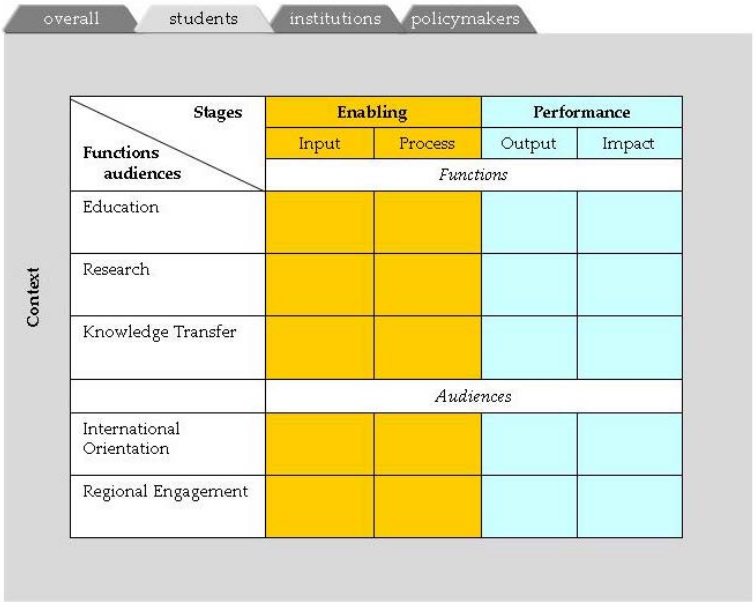
The two approaches, self-selected indicators (the 'overall' tab) and pre-selected menus of indicators, are not mutually exclusive for the design of our ranking tool. They are different ways of entry into the rich collection of options: the compact, quick ranking and the in-depth, self-made ranking.

Table 2-2: Overall and pre-selected views on ranking indicators



In this view the table will be populated with all FIR- or FBR-indicators.

Overall and pre-selected views on ranking indicators (continued)



In this view the table will be populated with FIR- or FBR-indicators that are considered to be of interest to students. This selection will be made in close consultation with the stakeholders (in this case: the students).

2.4 Indicator lists and their present status

For a first selection of indicators we used the conceptual framework as a guideline. We populated the conceptual grid with indicators derived from general literature on higher education and research indicators and rankings, from existing ranking lists, as well as from other research projects focusing on the measurement of processes and performances of higher education and research institutions. We tried to do so in a balanced way, avoiding empty cells in the grid and overcrowding of other cells. A detailed description of the indicators is presented in appendix 1.

The next step towards a final list of indicators was to asses the indicators in terms of their relevance and the methodological criteria (validity, reliability and comparability).

2.4.1 Assessing the relevance of the indicators

According to the Berlin Principles the selection of indicators in rankings should be based on their relevance (and not simply on the availability of data). Defining indicators that have high relevance to stakeholders is an important measure to gain acceptance for a ranking. The relevance of the first the set of indicators was discussed with stakeholders in a stakeholder workshop. The objective of the workshop was to get insight in the stakeholders' opinion on the relevance of the indicators selected (see appendix 3).

The workshop was set up as a modified Delphi study. Stakeholders were asked to express and motivate their views on the relevance of indicators in multiple rounds, in order to achieve a more in-depth insight in the views and the underlying motivations as well as a certain level of consensus among the stakeholders regarding the relevance. The first round was organized as an on-line survey among the invited stakeholders. The second, third and fourth round were set up as discussion workgroup sessions in the workshop and the final round was the survey that was administered at the end of the workshop. 46 Stakeholders participated in the on line survey, half of them representing national organizations and half of them representing international organizations. Most respondents represented higher education institutions and academic staff; a minority students, policy makers, quality assurance and employers. The workshop was set up as a one day event. After an introduction to the objective of the workshop and an instruction regarding the procedures to be followed during the day, the participants were sent of in five working groups, each group being organized around one of the five dimensions of U-Multirank. The task the participants were asked to perform was to select indicators on their relevance: 'is this indicator relevant or not?'.

The workshop was a success as it actively involved a large number of stakeholders in the discussion on the relevance of the indicators presented. New indicators were

proposed and intense discussions were held to convince other group members of the (ir)relevance of specific indicators. Participants were vary active and appreciated the format developed for the workshop. There was a general consensus on the list of indicators voted IN and OUT, although there was also a significant number of participants who expressed their dissent on specific indicators. Both the survey and the stakeholder workshop showed that the indicators developed were generally rated high in terms of their relevance to stakeholders. No indicator was rated as irrelevant. Furthermore, the consensus about the relevance of indicators was quite high among different groups of stakeholders. The stakeholder consultation contributed to a more pronounced rating of importance. While the ratings of the indicators originally considered more relevant raised in the post-workshop survey, the ratings of the indicators considered less relevant in the pre workshop survey decreased further.

For a full report on the Stakeholder workshop see appendix 3.

2.4.2 The methodological criteria

Indicators have to fulfil the methodological standards of empirical research: among them are validity and reliability on the first hand. In addition, comparative research, in particular internationally comparative research, have to deal with issues of comparability and feasibility.

Validity

(Construct) validity refers to the evidence about whether a particular operationalisation of a construct adequately represents what is intended by theoretical account of the construct being measured. When characterising, e.g. the internationality of a higher education institution, the percentage of international students is a valid indicator only if its' scores are not heavily influenced by citizenship law. Using the nationality of the qualifying diploma on entry has therefore a higher validity than using citizenship of the student.

Reliability

Reliability refers to the consistency of a set of measurements or measuring instrument. A measure is considered reliable if it would give the same result over and over again. With regard to the data sources used in rankings this is particularly an issue with regard to survey data (e.g. among students, alumni, staff). Both in surveys and with regard to self-reported institutional data issues of operationalising indicators and formulating questions have to get high attention – in particular in international rankings, where issues of intercultural understanding of questions have to be dealt with. In chapter three it will be outlined how this issue will be addressed in the data collection instruments.

Comparability

Ranking means to compare institutions by numerical indicators. Hence the indicators and underlying data/measure have to be comparable between institutions; they have to measure the same quality in different institutions. In addition to the general issue of

comparability of data across institutions, international rankings have to deal with issues of international comparability. National higher education systems are based on national legislation that sets a specific legal framework, including legal definitions (e.g. what/who is a professor) . Additional problems arise from different national academic cultures. Indicators, data elements and underlying questions have to be defined and formulated in such a way that such contextual variations are taken into account. For example, if we know that in some countries doctoral students are counted as academic staff and in other countries as students, we ask for the number of doctoral students counted as academic staff so we can harmonise data on academic staff (excluding doctoral students).

Feasibility
The objective of the U-Multirank project is to design a multi-dimensional global ranking and to test its feasibility. The ultimate test of the feasibility of the ranking instrument is in a later stage when the data collection instruments are operational and have been administered in a number of pilot institutions. This however does not preclude an a priori assessment of the feasibility of the data collection. Such an a priori assessment consists of an assessment of the availability of data sources that comprise the information on the indicators in the list.

The approach used and the progress made regarding these assessments are described in section 3.1.3 of chapter three.

The preliminary list is not yet perfectly balanced. This process is not a linear process as new indicators may appear during the process that need to be reviewed and assessed and lead to revisions of the list of indicators.

2.5 First list of Indicators for Focused Institutional Rankings

A focused institutional ranking allows comparisons of institutions along a single aspect of institutional activity in the fields of education, research and knowledge exchange or regarding their orientation towards 'audiences' (international orientation, regional orientation). In line with the European classification of higher education institutions (U-Map) such a single aspect is called a dimension. According to the multidimensional approach a focused ranking does *not* collapse all dimensions into *one* rank, but will instead provide a fair picture of institutions ('zooming in') within the multi-dimensional context provided by the full set of dimensions and the indicators within those dimensions. Thus, multiple viewpoints of a higher education institution may be presented—viewpoints that bear relevance to the various users of the ranking, for instance academics, students, administrators, policy-makers on various levels, providers of funding, business leaders, researchers, or the general public.

The focused institutional rankings will provide a comparison with a special focus on the performance of a set of institutions on the dimensions of the ranking. The comparative

analysis of a set of institutions on one singular dimension is a focused ranking of these institutions on that dimension. The implication of this approach is that institutions can be expected to have different comparative results on different dimensions and thus that a multi-dimensional institutional ranking approach implies different outcomes for different institutions on different dimensions.

Individual institutions can of course be expected to 'score' differently on different dimensions. The set of the 'scores' of an individual institution on the whole set of dimensions of the classification defines the institution's *performance profile*.

The overview of indicators for focused institutional rankings presented below is the initial list of indicators. This list has been the basis for the stakeholder workshop in which the relevance was discussed in detail. What indicators of this list (and the list of field based ranking indicators presented in table 2-3) were considered to be less relevant can be found in appendix 3: the report on the stakeholder workshop (appendix 5).

Table 2-3: List of Focused Institutional Ranking indicators

Context

	Enabling		Performance	
	Input	Process	Output	Impact
	Functions			
Education	• Expenditure on teaching	• Time to Degree	• Graduation Rate	• Relative Rate of Graduate Unemployment • Relative Graduate Earnings
Research	• Expenditure on research • Number of post-doc positions	• Presence of clear promotion schemes	• Research Publication Output • Within-country Joint Research Publications	• Field-normalized Citation Impact, • Heavily Cited Research Publications, • International Prizes and Scholarships won
Knowledge Transfer	• Size of TTO • Size of Science Park • Incentives for Knowledge Exchange	• Chairs (co)funded by Industry • CPD courses offered	• University-Industry Joint Research Publications • Number of Spin-offs • Cultural Awards and Prizes Won • Patents • Co-patenting • Cooperative Research Contracts with Industry • Third Party Funding: Direct Industry Funding, • Third Party	• License Income • License Agreements • Number of Spin-offs

			• Funding: Through Public Cooperative Programs • Number of Co-publications with Industry	
	Audiences			
International Orientation	• Size of international office	• Educational programs in English • Internat. academic staff • Joint degree progr.	• International Doctorate Graduation rate • International partnerships • International Joint Research Publications	• International Graduate Employment rate
Regional Engagement	• Income from regional/local sources	• Student placements in the region	• Graduates in the Region • Regional Joint Research Publications • Research Contracts with Regional Business • Co-patents with Regional Firms	• Regional Economic Impact of University

2.6 First list of Indicators for Field Based Rankings

The selection of indicators for specific field based-rankings has to be specified with regards to both the general aspects described above and to the fields themselves. Some indicators are useful only for certain fields (e.g. laboratories for engineering only). In Table 2-4 we present a first inventory of indicators for field-based rankings in which we include a substantial number of input and process indicators.

Table 2-4: List of Field Based Ranking indicators

Context		**Enabling**		**Performance**	
		Input	Process	Output	Impact
		Functions			
	Education	• Computer Facilities: Internet Access • Student Satisfaction: Computer Facilities • Laboratories	• Qualification of Academic Staff • Student-Staff Ratio • Student Satisfaction: o Computer Facilities o Libraries o Rooms o Supply with Course o Teacher Support o Overall Judgment • Inclusion of Work Experience into Programmes • Student/ Graduate Satisfaction: Inclusion of work	• Graduation Rate • Doctoral Completions	• Relative Rate of Graduate Unemployment • Relative Graduate Earnings • Graduate Satisfaction: Labour Market Relevance of their Qualifications

			Experience in the programme • Inclusion of Issues relevant for Employability in to programme/ curricula • Time to Degree		
Research	• External Research Income (per Academic Staff on FTE)		• Student/ Graduate Satisfaction: Research Orientation	• Research Publication Output; • Within-country Joint Research Publications	• Field-normalized Citation Impact • Heavily Cited Research Publications (top % cited publications)
Knowledge Transfer	• Academic Staff with Work Experience in Business Companies			• Patents • Co-patenting • Number of Spin-offs • Joint Research with Companies/ Private Enterprises • university-Industry Joint Research Publications (University-Industry co-publication output)	• License Income • License Agreements
	Audiences				
International Orientation			• Number of International Students • International Academic Staff • Internat-ionalization	• Internatio-nality of Research: International Joint Research Publications (International	

		of Programmes • Student Satisfaction: Opportuni-ties for a Stay Abroad	co-publication output)	
Regional Engagement		• Regional Participants in Continuing Education Programmes • Summer Schools, Courses for secondary Education Students/ Pupils • Support of the University by Local Enterprises • Student Internships in Local Enterprises • Joint R&D Projects with Local Enterprises	• Degree Theses (BA,MA, PhD) in Cooperation with Local Enterprises • Public Lecturers for External Auditorium	

3 Design of the instruments for data collection

In work package 3 the sets of indicators will be transformed into a data model and into instruments to collect data in an international comparative setting.

Work package two has produced so far a long list of indicators that stakeholders deem relevant and that experts think are essential. This list is not the final list of indicators that will be used in the pilot survey for a number of reasons.

- The stakeholders' view on relevance is not always in line with the experts' view, the design principles, or with methodological criteria presented in the previous chapter. We need to balance the sets of indicators across the cells of the conceptual framework. This may imply that indicators that the stakeholder workshop considered to be 'not relevant' may be needed to fill empty cells in the conceptual framework. It may also imply that indicators that are considered to be relevant may have to be excluded because the cells they fit into are already crowded or because there is no comparable data available in different countries.

- Some stakeholders have expressed a strong interest in reviewing the final list of indicators before they are transformed into data collection instruments. Both stakeholders and the Advisory Board take the view that a stakeholder orientation is a crucial aspect of the project. A further consultation regarding the selection of indicators is therefore advisable.

- The 'technical' requirements of all the data elements and indicators need to be verified. The check on feasibility depends partly on the results of other EU funded projects (in particular the EUMIDA-project). Agreement has been reached to share results and progress reports between the EUMIDA and U-Multirank projects. Analysis of these feasibility of indicators will start shortly. It is likely that this analysis will show some constraints on the selection of indicators. It is also foreseen that this analysis will lead to a further specification of the data model: the description of the national databases will be specified per country.

- Some of the indicators proposed either by CHERPA network or by experts and stakeholders have never been used in global rankings. Their validity, reliability, international comparability as well as their feasibility can only be evaluated after they have been collected and analysed. As we can expect that some indicators that are seen to be relevant may not "function" in the end alternative indicators measuring similar aspects will be tested (e.g. the number of joint research project with industry and the volume of funding from this project for universities).

- The stakeholder workshop produced a number of new indicators on which expert opinions still needs to be collected and interpreted.

The 'final' list of indicators will be decided on after a further consultation with stakeholders and advisory board. This implies that the data collection instruments that will be discussed in this chapter are based on a provisional long list of indicators. The data model and the draft questionnaires will change once the list of indicators is finalised. However, the underlying models, procedures and guidelines will be those presented in the following paragraphs.

3.1 Data sources

Evidence from literature and existing national rankings indicates that there are very few international data bases/sources that can be used in rankings.

- Many international data bases on higher education (e.g. Education at a Glance) refer to national higher education systems and not disaggregate data by individual institutions or by fields.
- Problems of comparability: As a result of differences in national higher education systems and in the definitions of indicators, most existing international data bases can be used only for descriptive purposes – with numerous footnotes and additional explanations. As rankings order their objects in terms of their scores on quantitative indicators they require a common specification of the indicators.

The field covered best by existing data bases is research. To measure research performance international rankings can rely on a number of international bibliometric data bases and on patent data bases.

3.1.1 Bibliometric data

The two major data bases are used for research publication output and citation impact studies for large-scale internationally comparative applications:

- Thomson Reuters' Web of Science database (WoS);
- Elsevier's Scopus database.

Both sources include mainly bibliographic information on large numbers of documents ("research publications") that are disseminated in peer-reviewed journals and conference proceedings. The WoS and Scopus are the only two international multidisciplinary databases that offer a broad and high-quality coverage of the worldwide scientific and scholarly literature.

Both databases are readily available within the information system of one of the CHERPA Network partners: the Centre for Science and Technology Studies at Leiden University (CWTS). The CWTS-licensed versions of the WoS and Scopus are specifically designed for customized statistical ('bibliometric') analyses of the research literature and developing bibliometric indicators of research performance. CWTS holds license agreements with the producers of both databases that allow it to engage in contract-

based agreements with 'third party' clients worldwide for supplying advanced bibliometric information on a commercial basis.

Coverage of data bases: an international frame of reference

Research communication cultures and publication modes vary considerably across countries and between different fields of science. What they have in common is that the'language of science' is increasingly shifting towards English. The vast majority of leading peer-reviewed international journals in the Natural sciences, Mathematics, Medical and health sciences, Life sciences, Agricultural sciences are English-language journals. Conference proceedings are a second mode for disseminating research findings (and associated scientific and technological information) to peers and are often more important than journal articles, especially within the broad domain of Engineering and Applied Sciences. Many conference proceeding are also published in English. Similarly, book publications (both monographs and book chapters) play an important role in knowledge dissemination within the domain of the Social sciences and Humanities but here a significant proportion of the books are published in languages other than English (Chinese, Japanese, French, German, etc.). Research-related outputs in the domain of the Arts often take forms and shapes other than publications (e.g. exhibitions), rendering both databases inadequate as the sole source of information in this domain.

On the whole, both the WoS and SCOPUS tend to under-present publication output that is not published in English and originates from research in Engineering and Applied sciences, Social sciences and Humanities. As such, WoS-based and Scopus-based performance indicators are of limited value for capturing key features of the research performance within higher education institutions (HEIs) that are highly active in these particular fields and in interdisciplinary areas. However, on a positive note, both databases are rapidly improving in their coverage of these currently underrepresented domains of knowledge production. Not only has there been a growth in the numbers of journals and conference proceedings that are indexed but both databases have increased their coverage of 'local' journals, many publishing in native non-English languages, as well as adding Open Access journals and book series. Scopus has made the greatest strides in this respect.

In terms of international coverage (across countries and regions worldwide), both databases cover sufficient sources (either journals, conference proceedings, or otherwise) to represent the research performance of large research-active HEIs worldwide. Nonetheless, the coverage of both databases is likely to remain unsatisfactory in those fields where neither journals nor conference proceedings are used by researchers and scholars as their main vehicle for knowledge dissemination: areas in the Arts and

Humanities in particular. The relevance of WoS/Scopus data diminishes rapidly for HEIs with less research output or with a research profile more focused towards Arts and Humanities. In these cases, other information sources need to be included to guarantee a sufficient level of coverage, either through surveying the HEIs themselves, or adding (inter)national databases containing outputs other than research publications.

3.1.2 Patent data

Patent data will be extracted from the Patstat database, produced by the European Patent Office (EPO). PATSTAT (i.e. EPO Worldwide PATent STATistical Database) is a single patent statistics database, held by the European Patent Office (EPO) and developed in cooperation with the World Intellectual Property Organisation (WIPO), the OECD and Eurostat. PATSTAT provides basic patent data coming from around 73 national patent offices worldwide, including of course the most important and largest ones such as the European Patent Office (EPO), the United States Patent and Trademark Office (USPTO), the Japanese Patent Office (JPO) and the World Intellectual Property Organization (WIPO). PATSTAT is a relational database: twenty related tables contain information on relevant dates (of filing, publication, grant,…), applicants, technology classifications, citations etc. Updates of PATSTAT are produced every 6 months, around April and October.

3.1.3 National data sources

In most countries, statistical information on higher education institutions is collected at the national level. The way this national data collection is organised and the organisations involved vary considerably.

- Ministries/ (central) government. In some countries there is a strong role for (central) government or ministries. Large variations exist regarding the scope and detail of the information available.
- Central statistical agencies in many countries also collect information on higher education institutions, although in many cases they are bound to strict confidentiality rules.
- Other national higher education data agencies.
- Associations of higher education institutions. In a number of countries, data are collected and published by national associations of higher education institutions.
- Other national databases. In many countries there are national databases for specific issues such as labour market statistics (graduate surveys) or internationalization. Scope, detail and accessibility vary considerably.

The U-Map project as well as the experience of the CHE-ranking have shown that the bulk of the institutional information needed for classifying and ranking higher education institutions has to be collected from the higher education institutions themselves. This may create a significant administrative burden for the individual institutions, which may prove to be an obstacle to a wide participation of institutions. Using statistical information from national data sources to pre-fill the ranking data base will reduce this administrative burden for the institutions.
The U-Map experience shows that in order to use national data bases it is crucial to have a thorough understanding of the existing data bases and their content. A first analysis of the national data bases that are available will be based on the national reports produced in the EUMIDA project. In each of the participating countries, national experts have written a detailed report on the availability of national data bases, that include institutional level information. In the pilot phase, additional information on specific national data bases will be collected where necessary.
Not all of the countries that will be part of the U-Multirank pilot survey are participating in the EUMIDA project. For these mainly non-EU countries an on-line questionnaire on the availability of national data bases has been sent to a national expert. The results of this quick scan will be used in parallel with the analysis of the EUMIDA reports.

3.1.4 Self-reported institutional data

Self-reported data will play an important role both for institutional and field-based rankings. For some countries there might be national data sources disaggregated by institutions and fields that can be used to pre-fill the questionnaires. This will be checked using a network of national experts. The precondition for using such data bases is a minimum comparability of definitions and data.
Self-reported data will be collected by online-questionnaires at the institutional and field-based level (see appendix 5 and 6). This includes data on staff, students, resources and facilities, research (except publications and citations), knowledge transfer (except patents), regional engagement and information about teaching and learning. The latter includes information on degree programmes (programme characteristics such as international and labour market relations and information on students and graduates).
CHE and CHEPS are experienced in collecting self-reported institutional data in the European context. The pilot data collection of the U-Map project included the collection of the data needed to calculate the indicators of the classification for some 70 higher education institutions spread all over Europe. The CHE University ranking is based on data collection from more than 300 German higher education institutions plus a number of institutions in Austria, Switzerland and the Netherlands. In the CHE European

Excellence Ranking more than 100 universities from all over Europe have been included. The data collection and the questionnaires can therefore make use of well established procedures and instruments.

3.1.5 Survey data

Student survey

The feasibility study will include (field-based) surveys among students in business and engineering programmes (both at Bachelor and Master level). A first draft of its structure is presented in appendix 4. The questionnaire takes into account experiences from questionnaires that have been used nationally or internationally:

- CHE University Ranking Questionnaire (Bachelor and Master versions)
- CHE European Excellence Ranking Questionnaire
- EUROSTUDENT questionnaire
- UK National Student Satisfaction Survey
- US National Survey of Student Engagement (NSSE)

For the prospective students as a target user group of the rankings the evaluation of programmes and HEIs by current students is an important source of information in terms of a "peer" perspective. Student satisfaction data are an important part of the CHE ranking which offers a valid perspective on institutions as the analysis of CHE student survey data has shown. In the context of the international extension of the CHE ranking to Austria, Switzerland and the Netherlands (plus a small number of individual institutions in other countries (e.g. Free University Bozen, University Szeged, Semmelweis University Budapest) as well as in the CHE European Excellence Ranking the instrument of the student survey and its questionnaire have already been tested in a European perspective. The surveys show that European comparisons of student satisfaction data can be made although attention has to be paid to cross-cultural differences in answering questionnaires in general and to specific issues of evaluating higher education institutions in particular.

A major challenge of the feasibility study will be the extension to non-European countries and higher education systems. Do students in other parts of the world (e.g. in the US, in China) evaluate their own university in a similar way as European students do?

Professor survey

After analysing existing studies and rankings using a survey among professors/academic staff (e.g. THE ranking) we decided not to implement such a survey

in U-Multirank. One lesson from the CHE ranking is that there is a strong tendency for academic staff to use these surveys – and hence the rankings – as an instrument for marketing their institution. In some rankings indicators on reputation of universities are included which are based on academic staff surveys (e.g. in the CHE ranking on a national basis and globally in THE ranking). Reputation may be useful information in a national context, but indicators on reputation do not work wellin international rankings (cf. Federkeil 2009). Reputation is heavily dependent on the structure of the sample asked about reputation in terms of group (e.g. academic staff/researchers, university leaders, employers), fields and region while there is no method available to draw a global sample that is representative with regard to those three dimensions.

3.2 Guidelines for data collection

Based on the experience that the CHERPA network partners have in large scale data collection and the processing of institutional level data in higher education and research, a set of guidelines for data collection have been developed.

3.2.1 General guidelines

Common database

All data will be integrated into a common data base which will include basic information on all of the institutions participating in the feasibility study. In a hierarchical model the data base will refer to the level of whole institutions, the faculties/departments[10] which constitute the field level and the individual degree programmes included in the pilot fields.

Communication with institutions

While some data collection/analysis will not involve pilot institutions directly (such as bibliometric analysis) most will be dependent on their commitment and active participation. Intense communication with institutions is an important way of creating trust and assuring the quality of data. The project team will implement a "hotline" (E-mail and phone) during data collection periods to answer questions on indicators/data and on the procedures for the various data collections (e.g. processing student surveys). For this the pilot institutions will be provided with a list of specific contact persons for

[10] In this text we use the 'faculty/department' to refer to the institutional units that are included in field-based rankings. The term does not imply a specific organisational structure. The term refers to the unit that is responsible for the programmes in a field (business or engineering). These units can be a whole faculty, a department, an institute or school or any other sub-unit.

different issues/data collections. The U-Multirank website will keep participating institutions informed about all of the steps/time schedules for data collection. Experience demonstrates the importance of institutions having a single contact person as the co-coordinator of all data requests and collections.

3.2.2 Guidelines for analysing existing data sources

Bibliometric and patent data sources

The analyses of bibliometric and patent data can rely on established procedures that have been carried out by CHERPA Network members. Most of the indicators from bibliometric and patent analyses have been tested and used in national and international rankings before, particularly in the Leiden ranking.

National data sources

The analysis of existing national data sources will follow a similar structure for all countries. First the relevant content in terms of institutional level data will be verified. This does not only refer to the list of indicators but also to the 'types' of institutions that are covered in the data base (universities, universities of applied sciences, art schools, further education, public, private).The next step is to compare the underlying definitions of the data to the definitions used in the U-Multirank data model. If the definitions differ, the data provider will be contacted to see whether these differences can be resolved. Once it is clear which data are available, practical and legal issues need to be discussed. These issues include rules of confidentiality/privacy regarding the data, costs of data retrieval and the technical details of data provision.

If data from a specific national data source are used, proper acknowledgement of the source will be made.

3.2.3 Guidelines for Self-reported institutional data (institutional and field-level)

As a result of the lack of adequate and coherent international institutional data bases, and the limitations of national databases in terms of scope, detail and accessibility of data, the bulk of data on institutions will have to be collected by (online-) questionnaires that the – volunteering – institutions and faculties/departments will need to complete. Both CHE and CHEPS can rely on established questionnaires and procedures of data collection that have been used in prior projects, including the implementation of online-surveys (U-Map, CHE rankings).

General guidelines for drafting questionnaires apply. Questions need to be formulated in such a way that answers can be interpreted in only one way. Definitions for the concepts used, as well as the reason why a question is asked need be clear (and easily accessible to respondents, both through pop-ups and a general glossary). Deviations from standard reference periods and definitions may be allowed only if alternative reference years and definitions are specified and explained. For the feasibility study it is

important to allow the institutions to add specifications and remarks to each question. These have to be taken into account in deciding about the usability of the indicator in terms of validity, reliability and comparability. The final decision about questions, data elements and indicators derived from self-reported data can only be made after data analysis. In the feasibility study we cannot expect to have all information – and all of the indicators – available for all institutions.

The questionnaires will be organised in such a way that answers can be temporarily saved and accessed again by the respondents. As the scope of the institutional data ranges from financial to staff and student data, it is likely that the data will be stored at different places in the organisation. U-Map experience has shown that when the questionnaire is structured along the lines of different types of data (financial, staff, student, research etc.) instead of building it along the lines of the five dimensions, the administrative burden is reduced significantly.

For those questions where data from national data bases have been used to pre-fill the questionnaire, the institution may comment on these data.

Proper procedures for verification will be observed. Even though parts of the questionnaire may be answered by different people in the institution, there will be one person in the institution who is responsible for the data provided. By sending in the completed questionnaire this person will certify that the data are correct. After receiving the completed questionnaire the project team will examine the data provided, looking for inconsistencies, missing data and 'outliers'. External data sets (when available) will be used as well in this examination. If necessary, the project team will contact the responsible person in the institution to discuss questions and comments. A revised version of the data then will be returned to the project team, accompanied by an official statement that the data are correct.

Before the results of the ranking are published the institution will be presented with its results and given the opportunity to comment. If necessary, the project team may review the results of the institution.

The questionnaire will be tested in a pre-test with a small number of institutions from different countries before a revised and final version will be completed (Work package 4). After the survey pilot institutions will be asked to give a short evaluation of the questionnaire in terms of clarity, comprehensibility, time needed to complete the questionnaire, communication and responsiveness).

3.2.4 Student Survey

The first step in the preparation of the student survey is the definition of the sample. As students will be asked to rate their own university and programme, students who have just started studying should be excluded from the sample. The sample should include students

- from the second year onwards in Bachelor and Master[11] programmes and
- from the third year onwards in long (pre-Bologna) programmes

In order to have a sample size that allows analysis and comparison of results the survey should include up to 500 students by university and field. In smaller programmes with less than 500 students in the relevant years all students should be included. In small fields or small programmes the number of students may be too low to expect reliable results. In the pilot fields business and engineering (mechanical and electrical engineering) the number of students will probably be high enough in most undergraduate programme but the sample size may be problematic in Master programmes which are often very specialised and small in scale. Here different programmes in the same field (e.g. mechanical engineering) may be combined.

The survey will be online. The students should answer the questionnaire without any pressure by their university/teachers to rate their own institution positively. Therefore the students should be invited to participate in the survey individually and privately by mail or e-mail – and not in the classroom. Together with the invitation to participate in the survey students will receive an individual password in order to control access to the survey and the quality of data. For reasons of data privacy and practicality the invitation of the students to participate in the survey should be send by the institutions themselves – either by mail or by e-mail. Inviting students by e-mail is less expensive; but the decision should be made by the institutions themselves according to their address data bases and according to the extent students use university e-mail-accounts. In order to control for possible manipulation by institutions a number of control questions will be included in the questionnaire. Students will be asked for information on how they received the invitation and if there were any attempts by teachers, deans or others to influence their ratings.

There will be a pre-test of the student questionnaire on a small sample of students from both fields, on different levels (Bachelor, Master), from different types of institutions and from different countries/regions.

3.3 The data model

The data model consists of two lists: a listing of the indicators and the related data elements and a list of the data elements and the data source(s) that will be used to collect the data. The lists are presented in appendix 1 and 2. As mentioned before, the data model is a provisional data model, based on the long list of indicators. In the final data model, questions will be specified for those data elements that are linked to a questionnaire.

[11] In one-year or two-year Master programmes students could be included after half a year.

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Appendix 1: Detailed list of indicators

Detailed overview of indicators by type of ranking and dimension

Field Based Business

knowledge exchange

Co-patenting

FR-K3

def. Percentage of university patents for which at least one co-applicant is a firm, as a proportion of all patents

rat. When different applicants are registered on university patents, it is interesting to consider the type of partners with which the university shares intellectual property. A firm co-applicant indicates that university research is being translated into a

data element - Co-patents

data element - Patents

[JC](+) Relevant, if field-specificity is taken into account
(+) Data available from secondary sources
(+) Possibility of using identical data source for each institution guarantees good inter-institutional comparability

Co-publications with industry

FR-K8

def. Number of research publications that list an author affiliate address referring to a business enterprise or a private sector R&D unit, relative to fte academic staff

rat. Besides the amount of contract research going on with industrial partners, this bibliometric indicator reflects outputs yielded from such cooperative engagements. It can be considered as an indicator of successful joint research with active involvement

data element - Academic staff (fte)

data element - Co-publications with industry

introduced at SH WS
[GiF] change 'industry' with 'private sector'
[JS] (+) Highly relevant output indicator
(+) Data available from secondary sources
(+) Possibility of using identical data source for each institution guarantees good inter-institutional comparability

regional engagement

Degree theses in co-operation with regional enterprises	FR-RE6

def.	Number of degree theses in co-operation with regional enterprises as a percentage of total number of degree theses awarded	A clear demarcation of the region is required.
rat.	Degree thesis in cooperation with local enterprises which deal with issues and problems of practical relevance, are a means to build co-operations and an indicator of regional knowledge transfer	
data element -	Total number of degrees awarded	
data element -	Degree theses in co-operation with regional enterprises	

teaching and learning

Computer facilities: internet access

FR-TL1

def. Index of: Max mbit of WAN connection at the campus; Percentage of rooms in which WLAN is available to students; Offer of E-mail account to student

rat. The availability of a high speed internet connection for students is among the most important features of IT infrastructure

data element - Max Mbit of WAN connection

data element - Percentage of rooms with WLAN available to students

data element - Student E-mail account

Student satisfaction: libraries

FR-TL1

def. Index including: availability of literature needed; access to electronic journals; support /services e-services

rat. The satisfaction of the students with libraries is a good proxy of the quality of library

data element - Support devices e-services

data element - Access to electronic journals

data element - Availability of literature

Doctoral completions

FR-TL6

def. The number PhD and equivalent research doctorates awarded as a percentage of fte academic staff)

rat. The number of PhDs is an indicator for the intensity of educating young researchers.

data element - Academic staff (fte)

data element - Doctorate degrees awarded

teaching and learning

Gender balance

FR-TL2 1

def. Percentage of female students in total number of students

rat. High percentage of female students in engineering indicates good diversity policy and use up of potentials for engineering education. In general a balanced situation is considered to be preferable.

data element - Total enrolment

data element - Female students

Field Based Ranking

international orientation

Percentage of international students

FR-I1

def. Student who graduated from secondary school abroad as a percentage of total enrolment

rat. The international character /climate of a faculty is affected by the existing of international students and international staff /teachers.

data element - Total enrolment

data element - Foreign degree seeking students

Incoming and outgoing students

FR-I10

def. Incoming and outgoing students as a percentage of total number of students

[GiF] should there be a minimum duration of the stay for students to be counted?
[GiF] specify that we ask for the flows summed all along the year (not the stock on 31 December)

rat. International exchange of students is an important indicator of the international "atmosphere" of a faculty/department. The own students of a university should have the experience of going a broad (outgoing); and vice
versa students from abroad should come to a university (incoming)

data element - Outgoing students

data element - Total enrolment

data element - Incoming students

Student satisfaction: Opportunities for a stay abroad

FR-I11

def. Index made up of several items: The attractiveness of the university's exchange programmes, the attractiveness of the partner universities, the sufficiency of the number of exchange places; support and guidance in preparing the stay abroad; financial support (scholarships, exemption from study fees); the transfer of credits from exchange university; the integration of the stay abroad into studies (no time loss caused by stay abroad) and the support in finding internships abroad)

rat. Students' judgments about their possibilities to arrange a semester or an internship abroad.

data element - Transfer of credits from exchange university

data element - Integration of stay abroad in the study

data element - Financial support (scholarships, exemptions from fees)

data element - Support and guidance in preparing the stay abroad

data element - Sufficiency of exchange places

data element - Attractiveness of university's exchange programme

data element - Support in finding internships abroad

International academic staff

FR-I2

def. Percentage of international academic staff in total number of (regular) academic staff

[GiF] should there be a minimum duration of the stay for staff to be counted?

rat. The international character /climate of a faculty is affected by the existing international staff /teachers

data element - Academic staff (fte)

data element - International academic staff

Internationalisation of programmes

FR-I3

def. Index made up of several issues: existence of joint programmes with foreign universities and student exchange (prevalence, duration

rat. The integration of international learning experiences is a central element of the internationalization of teaching & learning.

data element - Existence of student exchange programmes

data element - Joint degree programmes

Joint international publications

FR-I4

def. Relative number research publications that list one or more author affiliate addresses in another country relative to academic staff

rat. Indicator of successful international research cooperation across the border of countries, showing international involvement and visibility

data element - International joint research publications

data element - Academic staff (fte)

International research grants

FR-I5

def. Research grants attained by foreign and international funding bodies as a percentage of total income

rat. The existence of research projects that are funded by foreign and international souces are a good indicator of the international orientation of research activities (together with international co-publications).

data element - Total income

data element - Income from international research programs

International doctorate graduation rate

FR-I6

def. The number of doctorate degrees awarded to students with a foreign nationality, as a percentage of the total number of doctorate degrees awarded

In order to control for different national regulations on citizenship the indicator would best refer to students who obtained at least one previous degree (BA, MA) abroad.

rat. This indicator shows how international oriented an institution is in producing doctorate degrees holders.

data element - Foreign doctorate degrees

data element - Doctorate degrees awarded

Joint international projects

FR-I8

def. The number of research projects done in co-operation with foreign partners as a percentage of total number of research projects

In the end, either this indicator or the indicator on international research grants should be used. The feasibility study has to test which indicator is beter in terms of availability and comaprability of data.

rat. The number of research projects done in co-operation with foreign partners is a good indicator of the international orientation of research activities, showing international involvement and

data element - Regional joint research publications

data element - Joint international research programmes

knowledge exchange

Academic staff with experience in industry

FR-K1

def. Percentage of academic staff with work experience outside higher education within the last ten years

rat. Academic staff that have experience in external settings are very well-placed to bring this experience into their academic work (teaching but also research). For teaching, this can enhance employability of students. The direct link of these researchers with the external environment moreover benefits knowledge exchange between academic and non-academic partners. Important to bring practical experience into teaching; related to employability. [GF]Is of particualr relevance for non-university higher education instittuions

Change 'industry' in 'non-higher education environment'
"Non-HE experience" needs to be interpreted in a wider sense than industry alone, but should be clearly delineated as well (e.g. do trainee jobs count?)
(-) Questionable relevance as the link with actual knowledge exchange is circumstantial
(-) Availability and reliability of data is questionable

data element - Academic staff (fte)

data element - Academic staff with experience in non-higher education environment

Patents

FR-K2

def. The number of patents awarded to the university related to number of academic staff

rat. Patents are established indicators of technological developments that are potentially useful for further industrial / commercial development

[JC] Considering only patents for which universities act as applicant means that a – often considerable number of – patents with academic inventor but other institutional applicant(s) are not taken into account. (+) Highly relevant, if field-specificity is be taken into account
(+) Data available from secondary sources
(+) Possibility of using identical data source for each institution guarantees good inter-institutional comparability
(-) Needs to be combined with licensing information to better capture exchange and use of patented knowledge (especially because only university-assigned patents are considered).
[GiF] a better name for the indicator is 'patent filing intensity'

data element - Patents

data element - Academic staff (fte)

Number of spin-offs

FR-K4

def. Number of spin offs per academic staff (fte)

rat. Spin offs are recognized as an established mechanism of knowledge transfer from academia to industry.

data element - Start-up firms

data element - Academic staff (fte)

Joint research contracts with private sector

FR-K5

def. Budget (or number) of joint research projects with private enterprises per FTE academic staff

rat. Indicator for (applied) R&D activities; joint R & D activities in co-operation with business and industry are particularly direcetd towards knowledge and technology transfer.

The two alternatives (numbers and budget) should be tested in the feasbility study. Budgets are depending on a number of factors, incl. National differences in wealth/prices, technology intensiveness; but refer to the size of projects. The numbers cannot weight by the volume of projects.

data element - Volume of privately funded research contracts

data element - Academic staff (fte)

Licence income

FR-K6

def. The annual income from licensing agreements as a percentage of total income

rat. Licensing indicates that the patented invention is used for further development (in research or industrial contexts) The actual “exchange” is more overt for this indicator than with the patent indicator alone – Licence agreement means that licensor intends to use the patented invention.

Both the volume and the number should be collected in the feasibility study.

data element - Licensing income

data element - Total income

Licence agreements	FR-K7

def.	The number of licence agreements as a percentage of the number of patents	Ideally, number of license agreements is combined with license income to get an indication of license activities In itself however, the measurement of number of agreements is seen as more robust than the measurement of income At the same time, licensing is not a condition sine qua non for commercialisation (+) Relevant output indicator (-) Data difficult to obtain, but easier than license income (-) Reliability of self-reported figures may be questionable and it is hard to cross-check with another data source
rat.	Licensing indicates that the patented invention is used for further development (in research or industrial contexts); the actual “exchange” and “application” are more overt for this indicator than with the patent indicator alone	

data element -	Licence agreements
data element -	Patents

regional engagement

Regional participants in continuing education programmes

FR-RE1

def. Number of regional participants (coming from city, neighboring districts/administrative regional unit) as percentage of total number of participants

A clear definition of region is needed

rat. The participation of people from the region in continuing education programmes is an aspect of regional engagement of the university.

data element - Participants in continuing education programmes

data element - Regional participants in continuing education programmes

Summerschools/ courses for secondary education students

FR-RE2

def. Number of participants in schools/courses for secondary school students as a percentage of total enrolment

A clear definition of region is needed

rat. The degree to which HEIS offer summer schools and courses for secondary education students show their engagement in the region, as partcipants of such courses/schools are suposed to come from the region
mainly.

data element - Seminar rooms

Financial support by regional enterprises

FR-RE3

def. Income from regional enterprises as a percentage of regional/local income

The indicator is a specification of the indicator on total regional/local income

rat. Financial involvement of regional/local enterprises is a good indicator of the strength of the links between HEIs and their regional/local economic environment

data element - Income from regional and local sources

data element - Income from regional enterprises

Student internships in regional enterprises

FR-RE4

def. Number of internships of students in local enterprises (as percentage of total students (with defined minimum of weeks and/or credits)

rat. Internships of students in local enterprises are a means to build co-operations and connect students to local labour market.

data element - Total enrolment

data element - Internships in local enterprises

Joint R&D projects with regional/local enterprises

FR-RE5

def. The number of graduates working in the region, 18 months after graduation, as a percentage of all graduates employed 18 months after graduation)

rat. Joint R & D projects in cooperation with local enterprises are a means to build co-operations and an indicator of regional knowledge transfer.

data element -

Public lectures for external auditotium

FR-RE7

def. Number of public lectures for an external audience (per 1.000 inhabitants)

rat. Public lectures open to an external, mostly local audience, are a way to intensify contacts to the local community.

data element - Public lectures

Regional spin-offs

FR-RE8

def. The number of reginal spin-offs, including profit as well as not for profit.

rat. Spin offs are an indicator on knowledge and technlogy transfer and on innovation; the focus on regional spin offs measure the relevance of regional engagement in this area.

data element - Start-up firms

introduced at SH WS
[GF] are there non-regional spin offs?
[GiF] depends of the region more than of the university

Percentage of regional enrolment	FR-RE9

def.	The number of first year bachelor students from the region as a percentage of total number of first year students in bachelor programmes	introduced at SH WS [GiF]distinguish three levels (bachelor, master doctorate)
rat.	A high percentage of new entrants from the region can be seen as the result of the high visibility of the regional active HEI. It may also be a result of the engagement with regional secondary schools. It is an indicator of the regional vs national vs int orientation of the HEI	
data element -	First year bachelor students from the region	

research

External research income

FR-R1

def. Level of funding attracted by researchers and universities from external sources, including competitive grants and research income from government, industry, business and community organisations, as a percentage of total income.

rat. The indicator comprises:
•success in attracting grants in national and international competitive, peer reviewed programs;
•overall level of financial support available to support research; and
•success in attracting funding and research contracts from end-user sources.

needs to be at FIR as well
[JC] It is important to include not only contracts with industry but also with other types of external partners.
Annual and accurate numbers hard to retrieve, contracts run over several years.
(+) Highly relevant – input indicator
(-) Data difficult to obtain
(-) Reliability of self-reported figures may be questionable and it is hard to cross-check with another data source
[GF] Problem: Institutions (or even whole HE systems) who have a higher degree of basic funding are less dependant on acquiring "additional" project based funding.

data element - External research income

data element - Total income

Research publication output

FR-R2

def. Number of research publications that were published in international peer-reviewed scholarly journals relative to fte academic staff

rat. Indicator of research activity and capabilities (to produce research publications at the international level

[RT] Reflects ‘successful’ research outputs that were accepted for publication by international peers according to international quality standards;Output levels are field-dependent and language dependent;Research publications in international journals and co
[GiF] add 'inensity' to the name of the indicator

data element - Research publications

data element - Academic staff (fte)

Student satisfaction: research orientation of educational programme

FR-R3

def. Index of two items: research orientation of the courses and opportunities for early participation in research

rat. Students rate the research orientation of their course of study

[GF] Less relevant for more professionally oriented programmes.

data element - Student opportunities for early participation in research

data element - Research orientation of a course

Within country joint research publication

FR-R4

def. Relative number of research publications that exclusively list author affiliate addresses within the same country; relative to fte academic staff

rat. Indicator of successful national research cooperation with partners located in the same country

[RT] A small minority of the cases will represent dual appointments of researcher, or secondments and temporary stays abroad (rather than cross-border joint research efforts); An unknown share of joint research is not published; results a field-dependent and a ??
[GiF] Consider publications that have at least one national coauthoring (not exclusively) because it is even better to collaborate both nationally and internationally

data element - Research publications that exclusively list author affiliate addresses within the same country

data element - Academic staff (fte)

Field-normalised citation rate

FR-R5

def. The relative citation frequency of the set of research publications (relative to the citation frequency of all publications within the same field of science

rat. Indicator of the scientific impact of research outputs within international scientific communities.

[RT] Refers to citations issued and received among publications indexed by the CWTS/Web of Science database and/or CWTS/Scopus database).The field-normalized citation impact enables comparisons of research performance within and across fields of science.

data element - Relative citation frequency

Heavily cited research publications

FR-R6

def. Number of research publications, within the top percentile of a global citation impact distribution within a field of science as a percentage of total number of research publications

rat. Indicator of 'high quality' research with a large international scientific impact.

[RT] Refers to citations issued and received among publications indexed by the CWTS/Web of Science database and/or CWTS/Scopus database).The field-normalized citation impact enables comparisons of research performance within and across fields of science. Top-end citation analysis is less useful in subfields of Business (& Economics) and in Engineering, where high-profile research findings are also published in other outlets (books, reports, conference proceedings

data element - Research publications

data element - Heavily cited research publications

Post-doc positions

IR-R14

def. The number of post-doc positions as a percentage of total academic staff

rat. The number of post doc positions indicates the attractiveness of the institution for young researchers.

data element - Academic staff (fte)

data element - Post doc positions

teaching and learning

Qualification of academic staff

FR-TL

def. Academic staff with a PhD as a percentage of total number of academic staff

rat. Highly qualified academic staff is a precondition for high quality education/programmes. In an international perspective it can be measured and compared by reference to the percentage of staff which holds a PhD. PhD can be seen as a minimum qualification for own scientific work.

This indicator is particularly relevant in international comparisons; normally the requirements for qualification are regulated on a national level; hence it can be expected that there is not much variance intra-national; but it is expected to vary on an international/global scale.
[GiF] It needs to be clear what types of academic staff are counted (tenured versus non tenured etc.)

data element - Academic staff (fte)

data element - Academic staff with PhD (fte)

Student satisfaction: rooms

FR-TL1

def. Index on rooms (lecture halls, seminar rooms, working rooms) including: condition of rooms; technical equipment; number of places (in courses))

rat. The satisfaction of the students with rooms is a good proxy of the quality of general facilities.

data element - Lecture halls

data element - Seminar rooms

data element - Working rooms

student satisfaction: laboratories

FR-TL1

def. Index including: Availability/access for students; number of places; technical facilities/ devices

rat. The satisfaction of the students with laboratories is a good proxy of the quality of technical facilities in the relevant fields

data element - Laboratory access

data element - Laboratory size

data element - Laboratory facilities

Student satisfaction: quality of courses

FR-TL1

def. Index including: Variety of courses offered; engagement of teachers; quality of materials; coherence of courses (integration into curriculum)

This indicator may be culture dependant (nordic vs latin)

rat. Evaluations of teaching quality by students are a good proxy of teaching quality.

data element - Quality of study materials

data element - Engagement of teachers

data element - Coherence of courses

data element - Variety of courses offered

Student satisfaction: support by teachers

FR-TL1

def. Included items Availability of teachers/ professors (e.g. during office hours, via e-mail); Informal advice and coaching; Feedback on homework, assignments, examinations; Coaching during laboratory tutorials / IT tutorials (only engineering); Support during individual study time (e.g. through learning platforms) Suitability of handouts.)

rat. Quality of support is an important indicator for the students and relates to the sense of responsibility of the teachers.

data element - Accessibility of teachers

data element - Informal advice and coaching

data element - Feedback on student work

data element - Quality of handouts

data element - Coaching by teachers

data element - Support during individual study

Student satisfaction: overall judgement

FR-TL1

def. Overall satisfaction of stundets with their programme and the situation at their HEI

In contrast to the other student satisfaction indicators this is not an index indicator. This indicator may be culture dependant (nordic vs latin)

rat. The summary, overall satisfaction of students is a good proxy of the overall quality of teaching & learning resp. programmes.

data element - Overall satisfaction

Interdisciplinarity of programmes

FR-TL1

def. Percentage of programmes involving at least two traditional disciplines

rat. Allowing students to choose a number of courses/credits from other disciplines indicates the degree of interdisciplinarity

introduced at SH WS
Since ECTS is not common/comparable in all countries, an ECTS based definition is not adequate.

data element - Interdisciplinary programmes

data element - Number of programmes

Inclusion of issues relevant for employability in the programme/curricula

FR-TL1

def. Rating existence of inclusion into curriculum (minimum levels/standards) of: project based learning; joint courses/projects with business students (engineering); business knowledge (engineering); project management; presentation skills; existence of external advisory board (incl. employers

rat. Rating from a number of issues which should be included in a curricular/programme in order to enhance employability/labour market relevant qualifications

ECTS cannot be used as a unit of measurement due to the global character of the ranking

data element - Project based learning

data element - Presentation skills

data element - Joint courses with business students

Investment in laboratories

FR-TL2

def. Investment (volume) in laboratories per student

rat. Proxy of the quality of labroratories

This indicator may be cyclical/time dependant (high expenditures in some years, then low expenditures in next years)

data element - Investment in laboratories

data element - Total enrolment

Student-staff ratio

FR-TL2

def. Number of (fte) students per fte academic staff

rat. Indicator for the (expected) intensity of mentoring/tutoring and of contact between students and teachers.

This indicator may be dependant of field and organisational structure of university. E.G. mathematics: a technical university need more math teachers than a not-technical university.Only weakly correlated with student satisfcation with contacts to teachers.

data element - Total enrolment

data element - Academic staff (fte)

Inclusion of work experience into programmes

FR-TL3

def. Rating based on duration (weeks/credits) and modality (compulsory or recommended

rat. Including work experience for students into the programme is an important aspect of enhancing employability.

data element - Work experience in programme

Student/graduate satisfaction: inclusion of work experience in the programme

FR-TL4

def. Index of several items: Students assess the support during their internships, its organisation, the preparation and evaluation of internships, the links with the theoretical phases

rat. Including work experience for students into the programme is an important aspect of enhancing employability

data element - Organisation of internship

data element - Embeddedness of internship in programme

data element - Work experience in programme

Graduation rate

FR-TL5

def. The percentage of a cohort that graduated after x years after entering the programme

rat. Graduation rate is an indication on how well the programs are organized, as well as an indication of the effectiveness of teaching activities.

data element - Graduation rate

Relative rate of graduate unemployment

FR-TL7

def. The rate of unemployment of bachelor graduates 18 months after graduation as a percentage of the national rate of unemployment of bachelor graduates 18 months after graduation) (also for master graduates)

rat. The rate of unemployment indicates the match between the teaching program and the needs of the labour market. A relatively low rate of unemployment signals that graduates find a job relatively easy.

data element - Bachelor unemployment general

data element - Master graduate unemployment

data element - Bachelor graduate unemployment

data element - Master unemployment general

Relative graduate earnings

FR-TL8

def. The rate of monthly earnings of bachelor graduates 18 months after graduation as a percentage of the national level of monthly earnings of bachelor graduates 18 months after graduation) (also for master graduates)

This indicator may be dependent on national and regional economy and labor markets.

rat. The relative earnings of graduates indicate the match between the teaching program and the needs of the labor market. A relatively high level of earnings signals that graduate skills are appreciated by employers.

data element - Monthly earnings of bachelor graduates

data element - Monthly earnings of bachelor graduates, general

data element - Monthly earnings of master graduates, general

data element - Monthly earnings of master graduates

Student satisfaction: computer facilities

FR-TL9

def. Index including: hardware; internet access, incl. WLAN; (field specific) software; access to computers support

rat. The satisfaction of the students with computer facilities is a good proxy of the quality of facilities/infrastructure

data element - Availability of software

data element - Computer support

data element - Computer hardware facilities

data element - Internet access

Focused Institutional Ranking

international orientation

Size of international office

IR-I1

def. The number of fte staff working at the international office as a percentage of total enrolment

rat. Indicates the commitment of the HEI to internationalisation

data element - Size of international office

data element - Total enrolment

Foreign degree seeking students

IR-I10

def. The number of degree seeking sstudents with a foreign diploma on entrance as % of total enrolment in degree seeking programs.

It refers to students who take a full degree program and conclude it with a degree.

rat. A high percentage of foreign degree seeking students reflects a high attractiveness of the HEI to international students, which is assumed to be correlated with a high degree of international orientation.

data element - Foreign degree seeking students

data element - Total enrolment

Number of master programmes in foreign language

IR-I11

def. The number of master programmes offered in a foreign language as a percentage of the total number of master programmes offered

introduced in SH WS
There were some comments whether it should be measured in number of programmes or students enrolled.

rat. This indicator testifies the commitment to welcome foreign students and prepare students for future international activities

data element - Master programmes offered

data element - Master programmes in foreign language

Bachelor programmes offered in foreign language

IR-I12

def. The number of bachelor programmes offered in a foreign language as a percentage of the total number of bachelor programmes offered

rat. Signals the commitment to international orientation in teaching and learning

data element - Bachelor programmes

data element - Bachelor programmes in foreign language

Number of educational programmes in English

IR-I2

def. the number of bachelor programmes offered in English as a percentage of the total number of bachelor programs offered; similar for master)

rat. The international character and climate of an HEI is influenced by its options to study in a world-wide accepted language.

data element - Master programmes offered in English

data element - Bachelor programmes offered in English

International teaching and research staff

IR-I3

def. Foreign academic staff members (headcount) as % of total number of academic staff members (headcount). Foreign academic staff is academic staff with a foreign nationality, employed by the institution or working on an exchange base

rat. A high percentage of international staff flags a strong international orientation.

data element - International academic staff

data element - Academic staff (fte)

Joint degree programmes

IR-I4

def. The number of students in joint degree programmes with foreign university (incl. integrated period at foreign university) as a percentage of total enrolment

rat. The integration of international learning experiences is a central element of the internationalization of teaching & learning.

data element - Joint degree programmes

data element - Total enrolment

International doctorate graduation rate

IR-I5

def. The number of doctorate degrees awarded to students with a foreign nationality, as a percentage of the total number of doctorate degrees awarded

rat. This indicator shows how international oriented an institution is in producing doctorate degrees holders.

data element - Doctorate degrees awarded

data element - Foreign doctorate degrees

International partnerships

IR-I6

def. The number of international networks a HEI participates in as a percentage of the number of academic staff (fte)

rat. The number of international academic networks a HEI participates in indicates the international embeddedness of the HEI.

data element - International partnerships

data element - Academic staff (fte)

International joint research publications

IR-I7

def. Relative number research publications that list one or more author affiliate addresses in another country relative to research staff

rat. Indicator of successful international research cooperation across the border of countries.

An unknown share of joint research is not published; results a field-dependent and are affected on existence of joint facilities – astronomy observatories, high-energy physics facilities, etc.)A small minority of the cases will represent dual appointments of researcher, or secondments and temporary stays abroad (rather than cross-border joint research efforts;
Note that a single foreign affiliate addresses suffices to allocate a publication to this category, irrespective of all other addresses (which may refer to the same country);

data element - Academic staff (fte)

data element - International joint research publications

International graduate employment rate

IR-I8

def. The number of graduates employed abroad or in an international organization 18 months after graduation as a percentage of the total number of graduates employed 18 months after graduation

rat. This indicates the student preparedness on the international labour market.

data element - International master graduate employment

data element - Master graduate unemployment

Incoming and outgoing students

IR-I9

def. Incoming and outgoing students as a percentage of total number of students

introduced at SH WS

rat. International students as an indicator misses the outward aspects of international orientation. Therefore outgoing students needs to be included

data element - Total enrolment

data element - Outgoing students

data element - Incoming students

knowledge exchange

Size of technology transfer unit

IR-K1

def. Number of employees (FTE) at Technology Transfer Office related to the number of academic staff

rat. The presence of an office or service for technology transfer reflects an institute's explicit strategic orientation towards fulfilling the academic third mission. As most universities have installed some TTO, an indicator that limits itself to mere 'presence of TTO' may provide a narrow basis for distinguishing institutes. But there is considerable variety in the scale of transfer activities, part of which is reflected in the amount of employees at the TTO.

data element - Academic staff (fte)

data element - Size of technology transfer office

the indicator is seen as an indicator of the infrastructure.
TTO size is likely related to its year of establishment
(+) Good ground for institutional comparability: sufficient inter-institutional variation for being informative
(+) Reliable data available from secondary sources
(-) Relevant indicator, but signals investment in knowledge transfer activities and does not necessarily reflect how much knowledge is actually being transferred

Co-patenting

IR-K10

def. Percentage of university patents for which at least one co-applicant is a firm, as a proportion of all patents

rat. When different applicants are registered on university patents, it is interesting to consider the type of partners with which the university shares intellectual property. A firm co-applicant indicates that university research is being translated into a

data element - Patents

data element - Co-patents

[JC](+) Relevant, if field-specificity is taken into account
(+) Data available from secondary sources
(+) Possibility of using identical data source for each institution guarantees good inter-institutional comparability

Cooperative research contracts with industry

IR-K11

def. Level of funding attracted by researchers and universities from external sources, including competitive grants and research income from government, industry, business and community organisations, relative to fte academic staff

rat. Research in co-operation with industry/companies can be expected to be transformed into practice.

data element - External research income

data element - Academic staff (fte)

Licence income

IR-K14

def. The annual income from licensing agreements as a percentage of total income

rat. Licensing indicates that the patented invention is used for further development (in research or industrial contexts)
The actual “exchange” and “application” are more overt for this indicator than with the patent indicator alone. Licensing cannot be done in isolation, whereas patenting can occur with no exchange with society

Ideally, number of license agreements is combined with license income to get an indication of license activities
[JC] Relating this indicator to the number of patents gives an indication of potential versus actual exploitation of inventions
this cannot be done in isolation whereas patenting can be done with no exchange with society
'agreements is seen more robust than income'
(+) Relevant output indicator
(-) Data difficult to obtain
(-)Reliability of self-reported figures may be questionable and it is hard to cross-check with another data source

data element - Total income

data element - Licensing income

Licence agreements

IR-K15

def. The number of licence agreements as a percentage of the number of patents

rat. Licensing indicates that the patented invention is used for further development (in research or industrial contexts) The actual “exchange” is more overt for this indicator than with the patent indicator alone – Licence agreement means that licensor intends to use the patented invention.

Ideally, number of license agreements is combined with license income to get an indication of license activities
In itself however, the measurement of number of agreements is seen as more robust than the measurement of income
At the same time, licensing is not a condition sine qua non for commercialisation
(+) Relevant output indicator
(-) Data difficult to obtain, but easier than license income
(-) Reliability of self-reported figures may be questionable and it is hard to cross-check with another data source

data element - Licence agreements

data element - Patents

Third party cooperative funding (public and direct industry)

IR-K16

def. The total amount of external research income and income from knowledge transfer as a percentage of total income

rat.

combination of two other indicators

data element - External research income

data element - Total income

data element - Income from copyright protected products

data element - Income from CPD

data element - Licensing income

Size of science park

IR-K2

def. Number of people employed in the science park related to number of overall staff employed

rat. In addition to the presence of a science park, its size provides more ground for comparison between institutes. The presence of a science park, which is a hub of interaction between the institute and the surrounding business texture, reflects an explicit strategic orientation through considerable investment in stimulating and supporting triple mission activities. An indication of the size of an institute's science park provides grounds for comparing not only investment levels but also their effects.This indicator may need to take into account also the number of companies hosted in the science park.

data element - Size of science park

data element - Academic staff (fte)

Incentives for knowledge exchange

IR-K3

def. Presence of technology transfer activities as part of the performance appraisal system

rat. The presence of institutional incentive mechanisms for knowledge exchange / technology transfer likely exerts great influence on the extent to which institutional members engage in such activities. The presence has to be proved in documents and structures/procedures

(+) Highly relevant
(-) Input-oriented: does not necessarily signal how much knowledge is actually being transferred
(-) Availability and reliability of data is questionable
(-) Comparability between institutes may suffer if definitions / demarcation criteria are not sufficiently clear

data element - Incentives for knowledge exchange

Chairs (co-)funded by industry

IR-K4

def. The number of chairs (co)-funded by industry as a percentage of the total number of chairs

This is one element of third part funding.

rat.

data element - (co)-funded chairs

data element - Chairs

Continous professional development courses

IR-K5

def. Number of CPD courses offered.

rat. The systematic maintenance and improvement of knowledge, skills and competence within multidisciplinary networks helps to dissolve boundaries and to create channels for knowledge exchange.

The number of participants to the CPD courses may be relevant as well.
(-) Questionable relevance as the link with actual knowledge exchange is circumstantial

data element - Continuous professional development courses

University-industry joint publications

IR-K6

def. Relative number of research publications that list an author affiliate address referring to a business enterprise or a private sector R&D unit; relative to ifte academic staff

rat. Indicator of successful joint research with active involvement of staff employed by business enterprises or corporate R&D units

The definition of 'industry' excludes the (private) medical sector;
Relevant indicator for technical universities; of limited value for universities which are not active in fields of interest to the science-based private sector (especially large R&D intensive industrial firms).
An unknown share of joint research is not published;

data element - Co-publications with industry

data element - Academic staff (fte)

Spin-offs

IR-K7

def. The number of spin-offs

rat. Spin offs are recognized as an established mechanism of knowledge transfer from academia to industry.

[JC]A clear definition and demarcation criteria will need to be specified and applied very strictly. A suggested definition is: “start up firms, that are dependent on the use of knowledge and intellectual property that was created or developed at the parent university. Merely financial participations do not qualify. If the university participates in a partnership that has the purpose of providing capital, financial know-how or management to her spin off companies, the hence managed spin offs are calculated as well” (= definition used for the yearly IOF counts at ECOOM)
(+) Highly relevant output indicator, but varies between fields
(-) Sheer “number of spin offs” may not be as informative as their performance (# employees, turnover,…)
(+) Good ground for institutional comparability: sufficient inter-institutional variation for being informative, but field-specificity needs to be taken into account
(+/-) Data available from secondary sources, but strict application of a central definition is warranted as institutional definitions of ‘spin offs’ tend to diverge quite strongly
[GiF] Since this is for many HEIs a small number it would be better to count the total number of employees working in the spin-offs.

data element - Academic staff (fte)

data element - Start-up firms

Cultural awards and prizes won

IR-K8

def. Number of cultural awards and prices won as a percentage of fte academic staff

rat. The success of an institution in (international) cultural competitions is seen as a proxy of the output or even impact of the cultural activities (an indicator in the U-Map classification).

Clear definition and demarcation criteria will need to be specified and applied strictly.
(+) Relevant output indicator
(-) Data difficult to obtain
(+/-) Reliability of self-reported figures: cross-checks with other data sources required
[GiF] Rather use the international award and prizes

data element - Academic staff (fte)

data element - Cultural awards and prizes won

Patent applications filed

IR-K9

def. The number of patent applications for which the university acts as an applicant related to number of academic staff

rat. Patents are established indicators of technological developments that are potentially useful for further industrial / commercial development

A patent is a set of exclusive rights for a fixed period of time in exchange for a disclosure of an invention. The exclusive right granted is the right to prevent of exclude others from making, using, selling or offering to sell or importing the invention. In order to be patented an invention must be novel, useful and not of an obvious nature. Applications for patents are filed to national states or application agencies. Most patents and applications for patents are listed in national and internaltional electronic databases (like the database of the European Patent Office)

data element - Academic staff (fte)

data element - Patent applications

regional engagement

Graduates working in the region

IR-RE1

def. The number of graduates working in the region, 18 months after graduation, as a percentage of all graduates employed 18 months after graduation)

rat. A high proportion of graduates working in the region indicates a close relation between the higher education institution and the region

To be asked either as exact numbers or as broad categories.
What is a region will be determined in two ways: the region the HEI uses in its data reporting (needs to be specified by the HEI) and the NUTS2 region the HEI is located in.

data element - Graduates working in the region

Regional joint research publications

IR-RE2

def. Number of research publications that list one or more author affiliate addresses in the same NUTS2 or NUTS3 region, relative to fte academic staff

rat. Indicator of successful 'local' research cooperation with partners located in the same geographical regions.

An unknown share of joint research is not published; results a field-dependent and are affected on existence of joint facilities;
A small minority of the cases will represent dual appointments of researcher, or secondments and temporary stays abroad. (rather than cross-border joint research efforts); These regional co-publications are a subset of the domestic co-publications in those (larger) European nations with NUTS2 and NUTS3 regions.

data element - Academic staff (fte)

data element - Regional joint research publications

Research contracts with regional business

IR-RE3

def. The number of research projects with regional firms, as a proportion of the total number of collaborative research projects

rat. Firms in a region may benefit from the presence of a university through several channels. Outsourcing research activities is one of them. Consultancy or research contracts with the university are reflections of such activities.

data element - Regional joint research publications

Co-patents with regional firms

IR-RE4

def. The number of patents with a regional firm as co-applicant, as a proportion of the total number of patents co-owned with at least one firm.

rat. Co-patents with regional firms are in most cases the result of cooperative research activities, hence an exchange of knowledge with business in the region. These exchanges likely benefit regional firms

data element - Co-patents with regional firms

data element - Co-patents

Income from regional sources

IR-RE7

def. institutional income from local regional authorities, local/regional charities and local/regional contracts as a percentage of total institutional income

rat. If a relatively large part of the income originates from regional and local sources, the higher education institution is seen as being more connected and engaged with regional/local society.

data element - Total income

data element - Income from regional and local sources

Student internships in local enterprises

IR-RE8

def. The number of student internships in local enterprises as a percentage of total enrolment (with defined minimum of weeks and/or credits)

introduced in SH WS

rat.

data element - Total enrolment

data element - Internships in local enterprises

research

Expenditure on research

IR-R1

def. The amount of money (in euro's) spent on research activities in the reference year as a percentage of total expenditure

The questionnaire will show a list on possible types of research expenditures.

rat. Research expenditure is seen as a strong indicator for involvement in research

data element - Expenditure on research

data element - Total expenditure

Research output

IR-R10

def. The number of peer reviewed research publications as well as the number of peer reviewed art related outputs

This indicator was suggested in the Stakeholder workshop, without any definiton or rationale.
One could assume a rationale in expanding the scope of the indicator from research publication to other research output as it will be more relevant for a large group of HEIs.
Suggestion to skip this indicator.

rat.

data element - Peer reviewed publications

data element - Academic staff (fte)

data element - Art related outputs

Research related HRM development

IR-R11

def. Clearly documented current evidence of performance-based incentive systems, managerial structures and HRM policies to (help) steer career trajectories of researchers within the organisation (e.g. tenure track systems)

introduced at second round SH WS

rat. Institutes that take research serious, have HRM structures in place to plan and foster research career prospects, in order to recruit talented external researchers and enhance the effectiveness of its in-house research capacities

data element - Research related HRM development

Research income from competitive sources

IR-R12

def. The income from competitive sources as a percentage of total research income

rat. It demonstrates the HEI ability to perform in its fields

introduced in 2nd round of SH WS

data element - Research income from competitive sources

data element - Research revenues

Interdisciplinary research activities

IR-R13

def. Research publications with multiple units from the same institition listed in the author address files

rat.

introduced in 3rd round of SH WS

data element - Interdisciplinary research activities

Art related outputs

IR-R2

def. Count of all relevant research-based tangible outputs as a percentage of fte academic staff

rat. This domain specific definition is primarily meant to collect the varied outputs from HE institutions that are (predominantly) active in fields of research belonging to the Arts (and its interface to other knowledge production domains such as the Humanities)

[RT] The output of research publications published in international peer-reviewed scholarly journals, as indexed by databases such as the Web of Science or Scopus, is insufficiently representative for HE institutions active in Arts fields.
[GiF]not highly realistic at the moment because there is no typology to rely on

data element - Art related outputs

data element - Academic staff (fte)

Presence of clear promotion schemes

IR-R3

def. A scheme is considered “clear” if it includes criteria for promotions as well as procedures and time lines.

rat. The presence of clear promotion schemes is an indication of the attractiveness of the institution to (senior) academic staff.

data element -

Research publication output

IR-R4

def. Number of research publications that were published in international peer-reviewed scholarly journals relative to fte academic staff

Was changed into research output by SH workshop

rat. Indicator of research activity and capabilities (to produce research publications at the international level

data element - Research publications

data element - Academic staff (fte)

Within-country joint research publications

IR-R5

def. Relative number of research publications that exclusively list author affiliate addresses within the same country; relative to fte academic staff

[RT] A small minority of the cases will represent dual appointments of researcher, or secondments and temporary stays abroad (rather than cross-border joint research efforts); An unknown share of joint research is not published; results a field-dependent and a ??

rat. Indicator of successful national research cooperation with partners located in the same country

data element - Research publications that exclusively list author affiliate addresses within the same country

Field normalized citation impact

IR-R6

def. The relative citation frequency of the set of research publications (relative to the citation frequency of all publications within the same field of science

Refers to citations issued and received among publications indexed by the CWTS/Web of Science database and/or CWTS/Scopus database).The field-normalized citation impact enables comparisons of research performance within and across fields of science.

rat. Indicator of the scientific impact of research outputs within international scientific communities.

data element - Relative citation frequency

Heavily cited research publications

IR-R7

def. Number of research publications, within the top percentile of a global citation impact distribution within a field of science as a percentage of total number of research publications

[RT] Refers to citations issued and received among publications indexed by the CWTS/Web of Science database and/or CWTS/Scopus database).The field-normalized citation impact enables comparisons of research performance within and across fields of science.

rat. Indicator of ‘high quality’ research with a large international scientific impact.

data element - Research publications

data element - Heavily cited research publications

International prizes and scholarships won

IR-R8

def. The number of international prizes and scholarships won for research work, as a percentage of fte academic staff

scholarships are deleted from the definition by the working groups

rat. A relative high number of prizes/scholarships won may indicate the quality of research activity.

data element - International prizes and scholarships won for research work

data element - Academic staff (fte)

Research income

IR-R9

def. Total income from research activities

introduced by the working group

rat.

data element - Total income

data element - Research revenues

teaching and learning

Expenditure on teaching

IR-TL1

def. The percentage of total institutional expenditure dedicated to teaching activities in the reference year

rat. This indicator highlights the priority given to teaching activities, in relation to research and knowledge exchange.

data element - Total expenditure

data element - Expenditure on teaching

Average time to degree

IR-TL2

def. Average time to degree as a percentage of the official length of the program; by type of program

rat. Time to degree is an indication on how well the programs are organized, as well as an indication of the effectiveness of teaching activities.

data element - Total enrolment

Graduation rate

IR-TL3

def. The percentage of a cohort that graduated after x years after entering the programme

rat. Graduation rate is an indication on how well the programs are organized, as well as an indication of the effectiveness of teaching activities.

data element - Graduation rate

Relative rate of graduate unemployment

IR-TL4

def. The rate of unemployment of bachelor graduates 18 months after graduation as a percentage of the national rate of unemployment of bachelor graduates 18 months after graduation) (also for master graduates)

rat. The rate of unemployment indicates the match between the teaching program and the needs of the labour market. A relatively low rate of unemployment signals that graduates find a job relatively easy.

data element - Master graduate unemployment

data element - Master unemployment general

data element - Bachelor unemployment general

data element - Bachelor graduate unemployment

Relative graduate earnings

IR-TL5

def. The rate of monthly earnings of bachelor graduates 18 months after graduation as a percentage of the national level of monthly earnings of bachelor graduates 18 months after graduation) (also for master graduates)

rat. The relative earnings of graduates indicate the match between the teaching program and the needs of the labor market. A relatively high level of earnings signals that graduate skills are appreciated by employers.

data element - Monthly earnings of bachelor graduates, general

data element - Monthly earnings of master graduates

data element - Monthly earnings of bachelor graduates

data element - Monthly earnings of master graduates, general

Interdisciplinarity of programmes

IR-TL6

def. Percentage of programmes involving at least two traditional disciplines

introduced at SH workshop

rat. Allowing students to choose a number of courses/credits from other disciplines indicates the degree of interdisciplinarity

data element - Interdisciplinary programmes

data element - Number of programmes

U-Multirank

Appendix 2
Data elements by source and type of ranking

Field Based Ranking

CWTS/Scopus

Heavily cited research publications	The number of research publications within the top percentile of a global citation impact distribution within a field science
International joint research publications	The number of research publications that list one or more author affiliate addresses in another country
Regional joint research publications	The number of rsearch publications that list one or more author affiliate addresses in the same NUTS2 region
Relative citation frequency	Citations issued and received among publications indexed by the CWTS/Web of Science database and/or CWTS/Scopus database
Research publications	Number of research publications that were published in international peer-reviewed scholarly journals
Research publications that exclusively list author affiliate addresses within the same country	Research publications that exclusively list author affiliate addresses within the same country

CWTS/Web of science

Heavily cited research publications	The number of research publications within the top percentile of a global citation impact distribution within a field science
International joint research publications	The number of research publications that list one or more author affiliate addresses in another country
Regional joint research publications	The number of rsearch publications that list one or more author affiliate addresses in the same NUTS2 region
Relative citation frequency	Citations issued and received among publications indexed by the CWTS/Web of Science database and/or CWTS/Scopus database
Research publications	Number of research publications that were published in international peer-reviewed scholarly journals
Research publications that exclusively list author affiliate addresses within the same country	Research publications that exclusively list author affiliate addresses within the same country

National data bases

Academic staff (fte)	The number of academic staff in fte
Bachelor graduate unemployment	The rate of unemployment of bachelor graduates of the HEI 18 months after graduation
Bachelor unemployment general	The average rate of unemployment of bachelor graduates in the country 18 months after graduation
Doctorate degrees awarded	The number of doctorate degrees awarded
External research income	Level of funding attracted by researchers and universities from external sources, including competitive grants and research income from government, industry, business and community organisations, in million euros, in reference year
Foreign degree seeking students	The number of degree seeking students with a foreign diploma on entrance (headcount, in reference year)
Income from international research programs	Total income (in 1000 euro) from international research programs
International academic staff	The number of academic staff (headcount) with a foreign nationality

Master graduate unemployment	The rate of unemployment of master graduates of the HEI 18 months after graduation
Master unemployment general	The average rate of unemployment of master graduates in the country 18 months after graduation
Monthly earnings of bachelor graduates	The average monthly earnings of bachelor graduates of the HEI, 18 months after graduation, in 1000 euros
Monthly earnings of bachelor graduates, general	The average monthly earnings of bachelor graduates in the country 18 months after graduation
Monthly earnings of master graduates	The average monthly earnings of master graduates of the HEI, 18 months after graduation, in 1000 euros
Monthly earnings of master graduates, general	The average monthly earnings of master graduates in the country 18 months after graduation
Number of programmes	Total number of degree programmes offered
Outgoing students	The number of students that stay abroad for at least three months in the reference year
Total enrolment	The headcount number of students, enrolled in all types of degree and certificate programs
Total income	The total income of the higher education institution in million euros

Patstat database

Patents	The number of patents awarded

U-Multirank institutional survey

Academic staff (fte)	The number of academic staff in fte
Academic staff with experience in non-higher education environment	Academic staff (in fte) with work experience outside higher education within the last ten years
Academic staff with PhD (fte)	Academic staff that holds a PhD or other doctorate degree (in fte)
Bachelor graduate unemployment	The rate of unemployment of bachelor graduates of the HEI 18 months after graduation
External research income	Level of funding attracted by researchers and universities from external sources, including competitive grants and research income from government, industry, business and community organisations, in million euros, in reference year
First year bachelor students from the region	Total number of first year bachelor students (headcount) who lived within the region before they enrolled
Foreign degree seeking students	The number of degree seeking students with a foreign diploma on entrance (headcount, in reference year)
Foreign doctorate degrees	The number of doctorate degrees awarded to students with a foreign nationality
Graduation rate	The percentage of a cohort that graduates x years after entrance
Income from international research programs	Total income (in 1000 euro) from international research programs
Income from regional and local sources	Total income in million euros from regional and local sources
Income from regional enterprises	The total amount of income from regional and local enterprises in million euros
Incoming students	The number of students who come from abroad to the institutions for a stay of at least three months in the reference year.
Interdisciplinary programmes	Number of programmes involving at least two traditional disciplines
International academic staff	The number of academic staff (headcount) with a foreign nationality
Internships in local enterprises	The number of interships of students (at least two months duration) in local enterprises
Investment in laboratories	Annual spending on laboratories in million euros (average over last three years)
Joint courses with business students	Inclusion of Joint courses with business students programme
Joint degree programmes	The number of students in joint degree programmes with foreign university
Joint international research programmes	The number of research projects done in co-operation with foreign partners
Licence agreements	The average number of licence agreements signed over the last three years
Master graduate unemployment	The rate of unemployment of master graduates of the HEI 18 months

	after graduation
Monthly earnings of bachelor graduates	The average monthly earnings of bachelor graduates of the HEI, 18 months after graduation, in 1000 euros
Monthly earnings of master graduates	The average monthly earnings of master graduates of the HEI, 18 months after graduation, in 1000 euros
Number of programmes	Total number of degree programmes offered
Outgoing students	The number of students that stay abroad for at least three months in the reference year
Participants in continuing education programmes	The number of participants in continuing education programmes
Post doc positions	The number of post doc positions
Presentation skills	Inclusion of Presentation skills in programme
project based learning	Inclusion of project based learning
Public lectures	The number of public lectures for an external audience
Regional participants in continuing education programmes	The number of participants from the region in continuing education programmes
Total income	The total income of the higher education institution in million euros
Volume of privately funded research contracts	The financial volume of privately funded research contracts, in million euros
Work experience in programme	The relative size of work experience in programmes (weeks per year)

U-Multirank student survey

Accessibility of teachers	Student satisfaction regarding Accessibility of teachers
Attractiveness of university's exchange programme	student satisfaction regarding the attractiveness of university's exchange programme
Availability of software	Student satisfaction regarding Availability of software
Coaching by teachers	Student satisfaction regarding coaching by teachers
Coherence of courses	Student satisfaction regarding the coherence of courses
Computer hardware facilities	Student satisfaction regarding Computer hardware facilities
Computer support	student satisfaction regarding access to computer support
Embeddedness of internship in programme	Student satisfaction regarding Embeddedness of internship in programme
Engagement of teachers	Student satisfaction regarding the engagement of teachers
Existence of student exchange programmes	Existence of student exchange programmes
Feedback on student work	Student satisfaction regarding feedback by teachers on their work
Financial support (scholarships, exemptions from fees)	Students satisfaction regarding Financial support (scholarships, exemptions from fees)
Informal advice and coaching	Student satisfaction regarding Informal advice and coaching
Integration of stay abroad in the study	Student satisfaction regarding the Integration of stay abroad in the study
Internet access	Student satisfaction regarding internet acces
Laboratory access	Student satisfaction regarding availability of laboratories for students
Laboratory facilities	Student satisfaction regarding technical facilities in laboratories
Laboratory size	Student satisfaction regarding the number of places in laboratories
Lecture halls	Student satisfaction regarding the number of lecture halls and their condition and size
Organisation of internship	Student satisfaction regarding Organisation of internship
Overall satisfaction	Student overall satisfaction with programme and HEI
Quality of handouts	Student satisfaction regarding quality of handouts
Quality of study materials	Student satisfaction regarding the quality of study materials
Research orientation of a course	Student satisfaction regarding the Research orientation of a course
Seminar rooms	Student satisfaction regarding the number of seminar rooms and their condition and size
Student opportunities for early participation in research	Student satisfaction regarding Student opportunities for early participation in research
Sufficiency of exchange places	Student satisfaction regarding the Sufficiency of exchange places

Support and guidance in preparing the stay abroad	Student satisfaction regarding the support and guidance in preparing the stay abroad
Support during individual study	Student satisfaction regarding Support during individual study
Support in finding internships abroad	Student satisfaction regarding Support in finding internships abroad
Transfer of credits from exchange university	Student satisfaction regading the Transfer of credits from exchange university
Variety of courses offered	Student satisfaction regarding variety of courses offered
Working rooms	Student satisfaction regarding the number of working rooms and their condition and size

Focused Institutional Ranking

CWTS/Scopus

Co-publications with industry	The number of research publications that list an author affiliate address refering to a business enterprise or a private sector R&D unit
Heavily cited research publications	The number of research publications within the top percentile of a global citation impact distribution within a field science
Interdisciplinary research activities	The number of research publications with multiple units from the same institution listed in the author address files
International joint research publications	The number of research publications that list one or more author affiliate addresses in another country
Regional joint research publications	The number of rsearch publications that list one or more author affiliate addresses in the same NUTS2 region
Relative citation frequency	Citations issued and received among publications indexed by the CWTS/Web of Science database and/or CWTS/Scopus database
Research publications	Number of research publications that were published in international peer-reviewed scholarly journals
Research publications that exclusively list author affiliate addresses within the same country	Research publications that exclusively list author affiliate addresses within the same country

CWTS/Web of science

Co-publications with industry	The number of research publications that list an author affiliate address refering to a business enterprise or a private sector R&D unit
Heavily cited research publications	The number of research publications within the top percentile of a global citation impact distribution within a field science
Interdisciplinary research activities	The number of research publications with multiple units from the same institution listed in the author address files
International joint research publications	The number of research publications that list one or more author affiliate addresses in another country
Regional joint research publications	The number of rsearch publications that list one or more author affiliate addresses in the same NUTS2 region
Relative citation frequency	Citations issued and received among publications indexed by the CWTS/Web of Science database and/or CWTS/Scopus database
Research publications	Number of research publications that were published in international peer-reviewed scholarly journals
Research publications that exclusively list author affiliate addresses within the same country	Research publications that exclusively list author affiliate addresses within the same country

Institutional webpage

Incentives for knowledge exchange	Presence of technology transfer activities as part of the performance appraisal system
Size of science park	Number of people employed in the science park (fte)

National data bases

Academic staff (fte)	The number of academic staff in fte
Bachelor graduate unemployment	The rate of unemployment of bachelor graduates of the HEI 18 months after graduation
Bachelor unemployment general	The average rate of unemployment of bachelor graduates in the country 18 months after graduation
Doctorate degrees awarded	The number of doctorate degrees awarded
Expenditure on research	Total expenditure on research in million euro in reference year
Expenditure on teaching	The total amount of financial resources (in 1000 euro) spent on teaching activities
External research income	Level of funding attracted by researchers and universities from external sources, including competitive grants and research income from government, industry, business and community organisations, in million euros, in reference year
Foreign degree seeking students	The number of degree seeking students with a foreign diploma on entrance (headcount, in reference year)

Graduates working in the region	Number of graduates who work in the region, two year after graduation
International academic staff	The number of academic staff (headcount) with a foreign nationality
International master graduate employment	The number of master graduates employed abroad or in an international organisation 18 months after graduation
Master graduate unemployment	The rate of unemployment of master graduates of the HEI 18 months after graduation
Master unemployment general	The average rate of unemployment of master graduates in the country 18 months after graduation
Monthly earnings of bachelor graduates	The average monthly earnings of bachelor graduates of the HEI, 18 months after graduation, in 1000 euros
Monthly earnings of bachelor graduates, general	The average monthly earnings of bachelor graduates in the country 18 months after graduation
Monthly earnings of master graduates	The average monthly earnings of master graduates of the HEI, 18 months after graduation, in 1000 euros
Monthly earnings of master graduates, general	The average monthly earnings of master graduates in the country 18 months after graduation
Number of programmes	Total number of degree programmes offered
Outgoing students	The number of students that stay abroad for at least three months in the reference year
Research revenues	The total amount of research revenues in million euros
Total enrolment	The headcount number of students, enrolled in all types of degree and certificate programs
Total expenditure	The total expenditure of the institution, in million euros
Total income	The total income of the higher education institution in million euros

Patstat database

Co-patents	University patents for which at least one co-applicant is a firm.
Co-patents	University patents for which at least one co-applicant is a firm.
Co-patents with regional firms	The number of patents with a regional firm as co-applicant
Patent applications	The number of new patent applications filed by the institution in the reference year
Patents	The number of patents awarded
Patents	The number of patents awarded

U-Multirank institutional survey

(co)-funded chairs	The total number of chairs that are (partly) funded by external enterprise(s)
Academic staff (fte)	The number of academic staff in fte
Art related outputs	The number of all relevant research based tangible outputs
Bachelor graduate unemployment	The rate of unemployment of bachelor graduates of the HEI 18 months after graduation
Bachelor programmes	Total number of bachelor programmes offered
Bachelor programmes in foreign language	Total number of bachelor programmes that are offered completed in foereign language
Bachelor programmes offered in English	The number of bachelor programmes offered in English
Chairs	The total number of professorial chairs a higher education institution has
Continuous professional development courses	Number of CPD courses offered.
Cultural awards and prizes won	Number of cultural awards and prizes won
Expenditure on research	Total expenditure on research in million euro in reference year
Expenditure on teaching	The total amount of financial resources (in 1000 euro) spent on teaching activities
External research income	Level of funding attracted by researchers and universities from external sources, including competitive grants and research income from government, industry, business and community organisations, in million euros, in reference year
External research income	Level of funding attracted by researchers and universities from external sources, including competitive grants and research income from government, industry, business and community organisations, in million euros, in reference year

Foreign degree seeking students	The number of degree seeking students with a foreign diploma on entrance (headcount, in reference year)
Foreign doctorate degrees	The number of doctorate degrees awarded to students with a foreign nationality
Graduates working in the region	Number of graduates who work in the region, two year after graduation
Graduation rate	The percentage of a cohort that graduates x years after entrance
Incentives for knowledge exchange	Presence of technology transfer activities as part of the performance appraisal system
Income from copyright protected products	Total amount of revenues generated by the copyrights the institution holds
Income from CPD	Income generated by Continuing Professional Development activities in million euros
Income from regional and local sources	Total income in million euros from regional and local sources
Incoming students	The number of students who come from abroad to the institutions for a stay of at least three months in the reference year.
Interdisciplinary programmes	Number of programmes involving at least two traditional disciplines
International academic staff	The number of academic staff (headcount) with a foreign nationality
International master graduate employment	The number of master graduates employed abroad or in an international organisation 18 months after graduation
International partnerships	The number of international networks a HEI participates in
International prizes and scholarships won for research work	The number of international prizes and scholarships won for research work
Internships in local enterprises	The number of interships of students (at least two months duration) in local enterprises
Joint degree programmes	The number of students in joint degree programmes with foreign university
Licence agreements	The average number of licence agreements signed over the last three years
Master graduate unemployment	The rate of unemployment of master graduates of the HEI 18 months after graduation
Master programmes in foreign language	Total number of master programmes offered completely in foreign language
Master programmes offered	Total number of master programmes offered
Master programmes offered in English	The number of master programmes offered in English
Monthly earnings of bachelor graduates	The average monthly earnings of bachelor graduates of the HEI, 18 months after graduation, in 1000 euros
Monthly earnings of master graduates	The average monthly earnings of master graduates of the HEI, 18 months after graduation, in 1000 euros
Number of programmes	Total number of degree programmes offered
Outgoing students	The number of students that stay abroad for at least three months in the reference year
Peer reviewed publications	The total number of peer reviewed publications of the institution
Research income from competitive sources	Total research income (in million euros) from competitive sources like research councils
Research related HRM development	Existence of a clearly documented incentive system, based on research performance, to steer career trajectories of researchers
Research revenues	The total amount of research revenues in million euros
Size of international office	The number of fte staff working at the international office of the HEI
Size of science park	Number of people employed in the science park (fte)
Size of technology transfer office	The number of staff (fte) working at a technology transfer office or service
Total expenditure	The total expenditure of the institution, in million euros
Total income	The total income of the higher education institution in million euros

Stakeholder workshop on the relevance of indicators

Regency Hotel
Brussels
17 December 2009

Introduction

The U-Multirank project has a stakeholder focused approach. In designing and testing the feasibility of a global multi-dimensional ranking of higher education and research institutions, its users/stakeholders have a prominent role.
After the first stakeholder meeting in October 2009, a second stakeholder event was organized on 17 December 2009: the stakeholder workshop on the relevance of the U-Multirank indicators.

The objective of the workshop was to get insight in the stakeholders' opinion on the relevance of the indicators selected (as reported in the interim report of December 2009). The workshop was set up as a modified Delphi study. Stakeholders were asked to express and motivate their views on the relevance of indicators in multiple rounds, in order to achieve a more in-depth insight in the views and the underlying motivations as well as a certain level of consensus among the stakeholders regarding the relevance.
The first round was organized as an on-line survey among the invited stakeholders. The second, third and fourth round were set up as discussion workgroup sessions in the workshop and the final round was the survey that was administered at the end of the workshop.

Pre-workshop survey

The pre-workshop survey was sent to all stakeholders on the list of stakeholders (for a list see appendix 1). It comprised most of the indicators listed in the interim progress report of November 2009 (the final version of this report will be made available on the website in February 2010). For all indicators the question was asked how relevant the indicator is for the respondent in ranking a higher education or research institution cq a field at a specific higher education or research institution, using a five point scale.
98 invited stakeholders completed the on-line questionnaire (see appendix 2).
The results of this first round (for a detailed overview see appendix 3) show that the selection of indicators is, in general seen as relevant; for none of the indicators the average score indicated low relevance. However, within that range of relevance, there were some differences between the indicators by dimension and type of ranking (focused institutional ranking and field based ranking).

In the ‘teaching’-dimension, the relative graduate earnings were considered to be the least relevant. Relative graduate unemployment was seen as more relevant. In the FIR the relevance of graduation rate and relative graduate unemployment rate were at the same level, whereas in the field based ranking assessment, graduation rate was seen slightly more relevant. The scores for the FBR were on average slightly higher than for FIR and within FBR, engineering scored higher than business. This general pattern emerged for all five dimensions.
In the ‘research’-dimension, the ‘within-country joint research publications’ were clearly seen as the least relevant indicator, whereas ‘research publication output’, and ‘external research income’ were the more relevant indicators.
In the ‘knowledge transfer’-dimension, the traditional commercialization indicators (lie licensing income, patents and spin-offs) were considered to be of less relevance in the FBR. ‘External research contracts’ was seen as most relevant.
‘International academic staff’, ‘number of international students’ and ‘internationalisation of programmes’ were the most relevant indicators in the dimension ‘Internationalisation’.
In the dimension ‘Regional engagement’ ‘student internships in local enterprises’, and ‘research contracts with regional business’ were seen as most relevant.

The workshop

The workshop was set up as a one day event. After an introduction to the objective of the workshop and an instruction regarding the procedures to be followed during the day, the participants were sent of in five working groups, each group being organized around one of the five dimensions of U-Multirank.
The task the participants were asked to perform was to select indicators on their relevance: ‘is this indicator relevant or not?’.
Based on the results of the pre-workshop survey a selection was made of indicators that were relevant (IN) not relevant (OUT) and undetermined (?). In the first working group session the participants were asked to move the indicators from the ‘?’-category to either the IN-category or the OUT-category. Indicators in the In- and Out category could be moved as well. All decisions regarding moving indicators from one category to another had to be motivated. A group moderator kept track of the changes and the motivations.
After the first group sessions reconvened in the plenary room to discuss the changes made in an informal market-style set up. Participants then changed to another group to discuss the list of indicators in the IN- and OUT category. Indicators could be moved to the other category, preferably with consensus of the group, but always with a clear motivation. After the second round, a plenary market style discussion followed. For the third session, participants changed groups again and the process of discussion started once again. In the final plenary session the moderators presented the results of the group sessions, as well as the main motivations used. Participants were given the opportunity to dissent with the final result of the working groups.
On their departure, around 30 participants completed the original questionnaire once again (for the results see appendix 4).

The workshop was a success as it actively involved a large number of stakeholders in the discussion on the relevance of the indicators presented. New indicators were proposed

and intense discussions were held to convince other group members of the (ir)relevance of specific indicators. Participants were vary active and appreciated the format developed for the workshop.
There was a general consensus on the list of indicators voted IN and OUT, although there was also a significant number of participants who expressed their dissent on specific indicators. For an overview of the indicators in the categories IN and OUT and the comments made see appendix 5.

Appendix 1: List of Participants

Institution	Name		
Association of Universities of Applied Sciences, FHK	J.		Häfke-Schönthaler
Bologna Follow Up Group (BFUG)	M.		Leegwater
Business Europe	H.		Dettleff
CHE	G.		Federkeil
CHE	F.		Ziegele
CHEPS	M.		Beerkens
CHEPS	F.		Kaiser
CHEPS	F.	van	Vught
COIMBRA	G.		Langouche
Compostela Group of Universities (CGU)	B.		Iglesias Seoane
Compostela Group of Universities (CGU)	J-P.		Roose
Conference of Schools for Advanced Engineering Education and Research (CESAER)	L.		Coninx
Conference of Schools for Advanced Engineering Education and Research (CESAER)	M.		Horvat
Conference of Schools for Advanced Engineering Education and Research (CESAER)	J.		Sjöberg
CRUS	A.		Pacton
CWTS	R.		Tijssen
EC/EAC	R.		Deiss
EC/EAC	R.	van	Ijperen

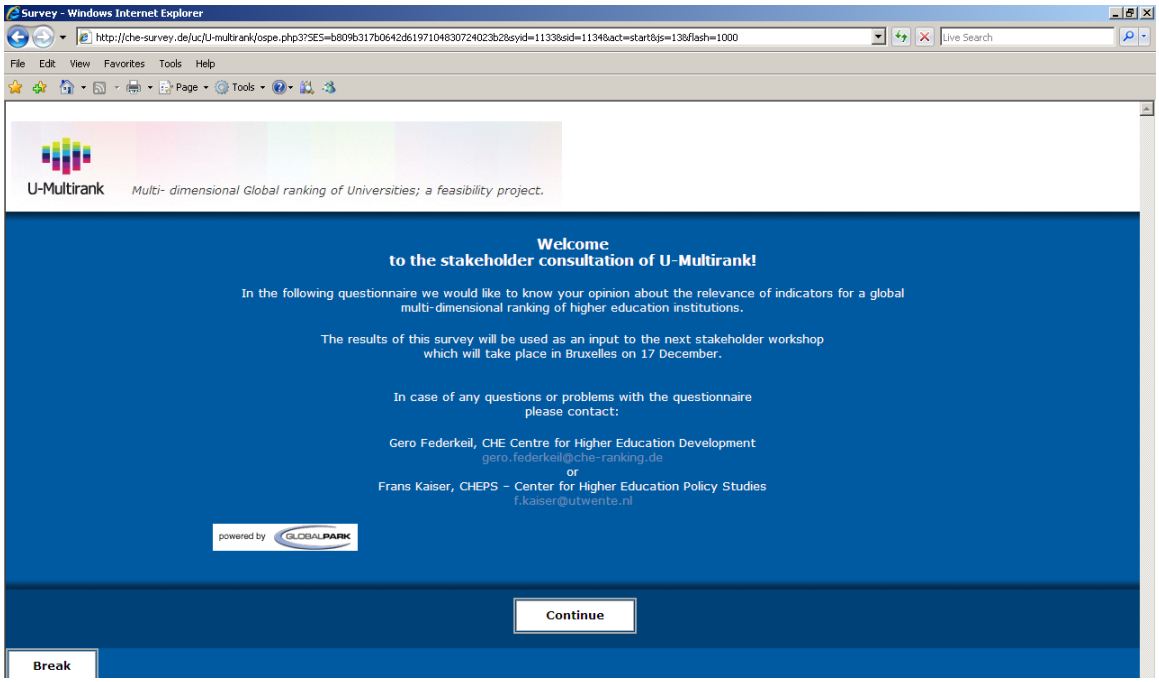
ENIC/NARIC	K.		Guillaume
EUPRIO, King's College	C.		Coe
European Centre for Strategic Management of Universities (ESMU)	N.		Burquel
European League of Institutes of the Arts - ELIA	U.		Dalnäs
European League of Institutes of the Arts - ELIA	T.		Ophuijsen
European Network for Universities of Applied Sciences (UASNET)	T.		Wanker
European Students Union (ESU)	A.		Pall
European University Association	M.		Koops
European University Association	H.		Newby
Flemish Interuniversity Council	S.		Van Lommel
INCENTIM	J.		Callaert
International Association of Universities (IAU)	M.		McGinn
International Association of Universities (IAU)	I.		Turmaine
LERU	J.	van	Asten
Ministry of STI, Denmark	M. J.		Jansen
Network of Universities from the Capitals of Europe (UNICA)	M.		Arménia Carrondo
Network of Universities from the Capitals of Europe (UNICA)	K.		Dejonckheere
Nordic Council of Ministers	C.		Möller
Nordic Council of Ministers	H.		Otte
OST	G.		Filiatreau
OST	P.		Vidal
Rectors' Conference - Czech Republic (CRC)	V.		Stastna
Rectors' Conference - Estonia	T.		Vihand
Rectors' Conference - Germany (HRK)	R.		Peter
Rectors Conference - Iceland (NRCI)	B.		Zarioh

Rectors' Conference - Italy (CRUI)	M.		Carfagna
Rectors' Conference - Lithuania	K.		Krisčiūnas
Rectors' Conference - Norway (UHR)	G.		Bakken
Rectors' Conference - Slovakia (SRC)	M.		Finka
Rectors' Conference - University Colleges Denmark	M.		Thorsen
Rectors' Conference for Danish University Colleges	P.		Aalykke
Rectors' Conference, French Community of Belgium (CREF)	E.		Boxus
Rectors' Conference, French Community of Belgium (CREF)	F.		Michel
Technical University of Catalonia	M.		Juste Ezquerra
The European Association of Conservatoires (AEC)	L.		Messas
The European Association of Conservatoires (AEC)	M.		Prchal
University of Luxemburg	A.		Koenig
Utrecht Network	F.		Salve

Appendix 2: Pre workshop survey

The pre-workshop survey was sent out to 100 persons/ organization who are on the list of stakeholders (see appendix 1)

FIR = Focused Institutional Ranking
FBR = Field Based Ranking
FBRe = Field Based Ranking engineering
FBRb = Field Based Ranking business



U-Multirank *Multi- dimensional Global ranking of Universities; a feasibility project.*

I. Institutional ranking

In the first part of this survey we are interested in your opinion about indicators for an institutional ranking.

Please rate the relevance of the following indicators for an institutional ranking.

	very low	rather low	neither/ nor	rather high	very high
I.1. Teaching & learning					
Expenditure on teaching	○	○	○	○	○
Average time to degree	○	○	○	○	○
Graduation rate	○	○	○	○	○
Relative rate of graduate unemployment	○	○	○	○	○
Relative graduate earnings	○	○	○	○	○
I.2. Research					
Expenditure on research	○	○	○	○	○
Number of post-doc positions	○	○	○	○	○
Presence of clear promotion schemes	○	○	○	○	○
Research publication output	○	○	○	○	○
Within-country joint research publications	○	○	○	○	○
Field-normalized citation impact	○	○	○	○	○
Heavily cited research publications	○	○	○	○	○
International prizes and scholarships won	○	○	○	○	○

Back Continue

Break

U-Multirank *Multi- dimensional Global ranking of Universities; a feasibility project.*

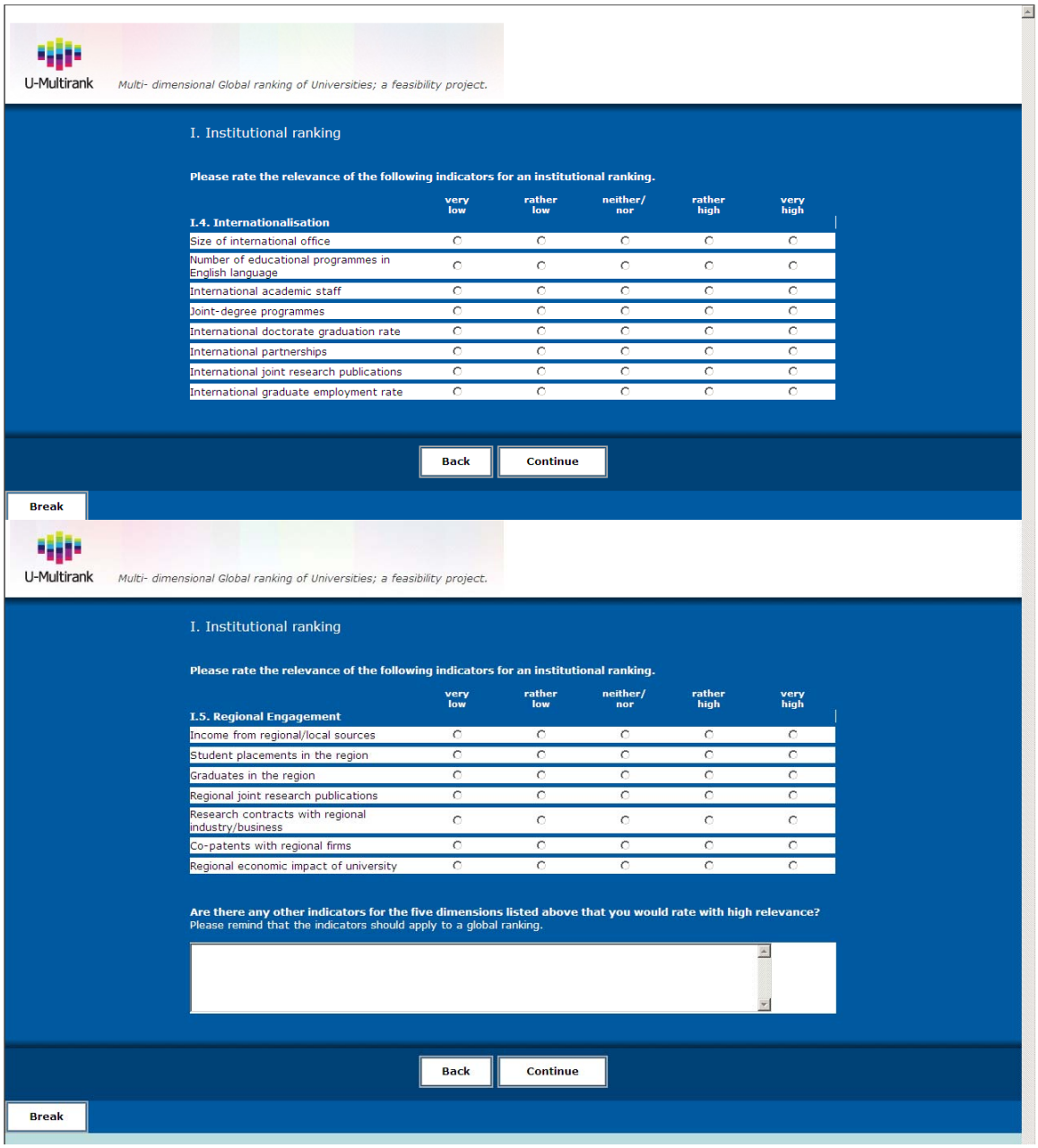
I. Institutional ranking

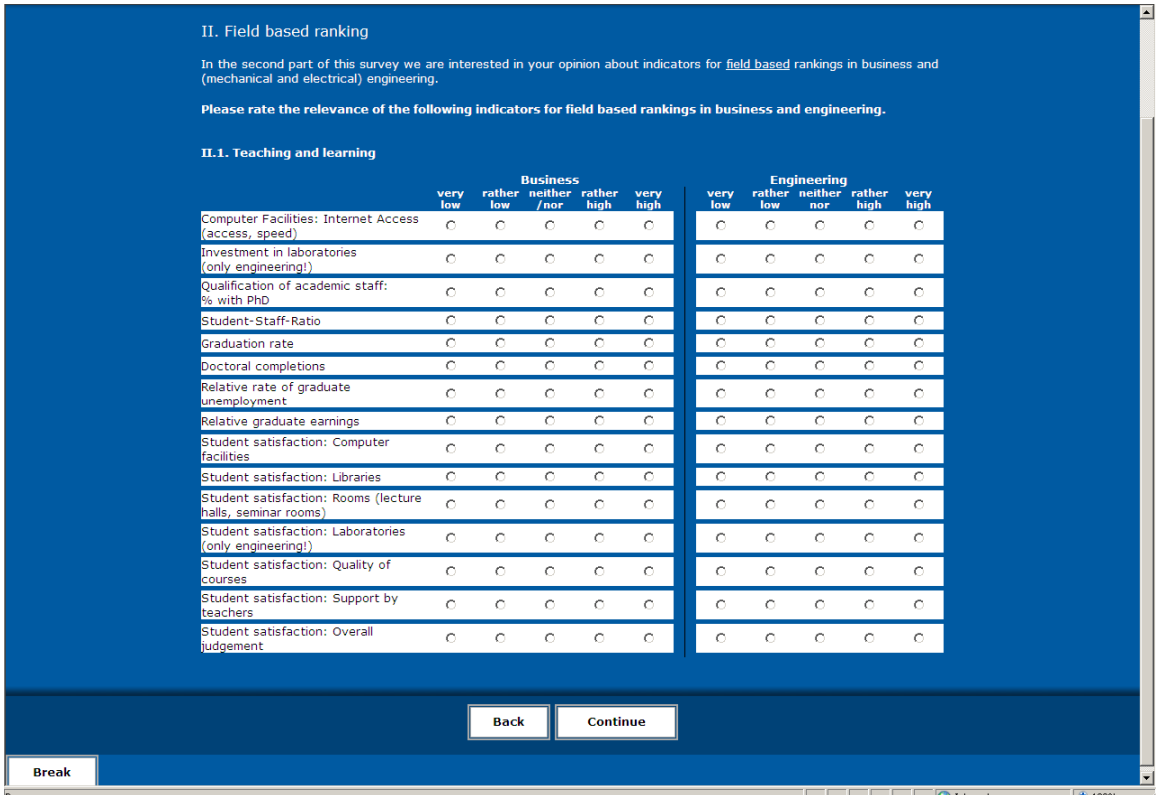
Please rate the relevance of the following indicators for an institutional ranking.

	very low	rather low	neither/ nor	rather high	very high
I.3. Knowledge Transfer					
Size of technology transfer unit	○	○	○	○	○
Size of science park	○	○	○	○	○
Incentives for knowledge exchnage	○	○	○	○	○
Chairs (co-) funded by industry	○	○	○	○	○
Continuos Professional Develoment courses offered	○	○	○	○	○
University-industry joint publications	○	○	○	○	○
Number of spin-offs	○	○	○	○	○
Cultural awards and prizes won	○	○	○	○	○
Patents	○	○	○	○	○
Co-patenting	○	○	○	○	○
Cooperative research contracts with industry	○	○	○	○	○
Third party funding: Direct industry funding	○	○	○	○	○
Third party funding: through public cooperative programs	○	○	○	○	○
License income	○	○	○	○	○
License agreements	○	○	○	○	○

Back Continue

Break


U-Multirank
Multi- dimensional Global ranking of Universities; a feasibility project.
I. Institutional ranking
Please rate the relevance of the following indicators for an institutional ranking.
very low
rather low
neither/ nor
rather high
very high
I.4. Internationalisation
Size of international office
Number of educational programmes in English language
International academic staff
Joint-degree programmes
International doctorate graduation rate
International partnerships
International joint research publications
International graduate employment rate
Back
Continue
Break
U-Multirank
Multi- dimensional Global ranking of Universities; a feasibility project.
I. Institutional ranking
Please rate the relevance of the following indicators for an institutional ranking.
very low
rather low
neither/ nor
rather high
very high
I.5. Regional Engagement
Income from regional/local sources
Student placements in the region
Graduates in the region
Regional joint research publications
Research contracts with regional industry/business
Co-patents with regional firms
Regional economic impact of university
Are there any other indicators for the five dimensions listed above that you would rate with high relevance?
Please remind that the indicators should apply to a global ranking.
Back
Continue
Break



II. Field based ranking

In the second part of this survey we are interested in your opinion about indicators for field based rankings in business and (mechanical and electrical) engineering.

Please rate the relevance of the following indicators for field based rankings in business and engineering.

II.1. Teaching and learning

	Business					Engineering				
	very low	rather low	neither /nor	rather high	very high	very low	rather low	neither nor	rather high	very high
Computer Facilities: Internet Access (access, speed)	○	○	○	○	○	○	○	○	○	○
Investment in laboratories (only engineering!)	○	○	○	○	○	○	○	○	○	○
Qualification of academic staff: % with PhD	○	○	○	○	○	○	○	○	○	○
Student-Staff-Ratio	○	○	○	○	○	○	○	○	○	○
Graduation rate	○	○	○	○	○	○	○	○	○	○
Doctoral completions	○	○	○	○	○	○	○	○	○	○
Relative rate of graduate unemployment	○	○	○	○	○	○	○	○	○	○
Relative graduate earnings	○	○	○	○	○	○	○	○	○	○
Student satisfaction: Computer facilities	○	○	○	○	○	○	○	○	○	○
Student satisfaction: Libraries	○	○	○	○	○	○	○	○	○	○
Student satisfaction: Rooms (lecture halls, seminar rooms)	○	○	○	○	○	○	○	○	○	○
Student satisfaction: Laboratories (only engineering!)	○	○	○	○	○	○	○	○	○	○
Student satisfaction: Quality of courses	○	○	○	○	○	○	○	○	○	○
Student satisfaction: Support by teachers	○	○	○	○	○	○	○	○	○	○
Student satisfaction: Overall judgement	○	○	○	○	○	○	○	○	○	○

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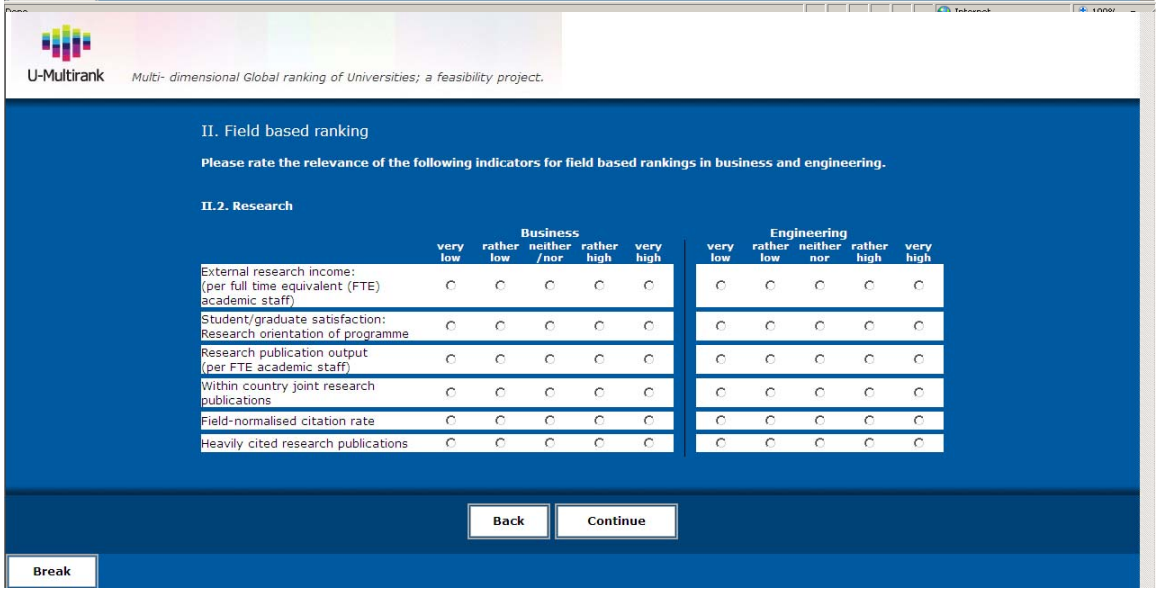

U-Multirank *Multi- dimensional Global ranking of Universities; a feasibility project.*

II. Field based ranking

Please rate the relevance of the following indicators for field based rankings in business and engineering.

II.2. Research

	Business					Engineering				
	very low	rather low	neither /nor	rather high	very high	very low	rather low	neither nor	rather high	very high
External research income: (per full time equivalent (FTE) academic staff)	○	○	○	○	○	○	○	○	○	○
Student/graduate satisfaction: Research orientation of programme	○	○	○	○	○	○	○	○	○	○
Research publication output (per FTE academic staff)	○	○	○	○	○	○	○	○	○	○
Within country joint research publications	○	○	○	○	○	○	○	○	○	○
Field-normalised citation rate	○	○	○	○	○	○	○	○	○	○
Heavily cited research publications	○	○	○	○	○	○	○	○	○	○

Back Continue

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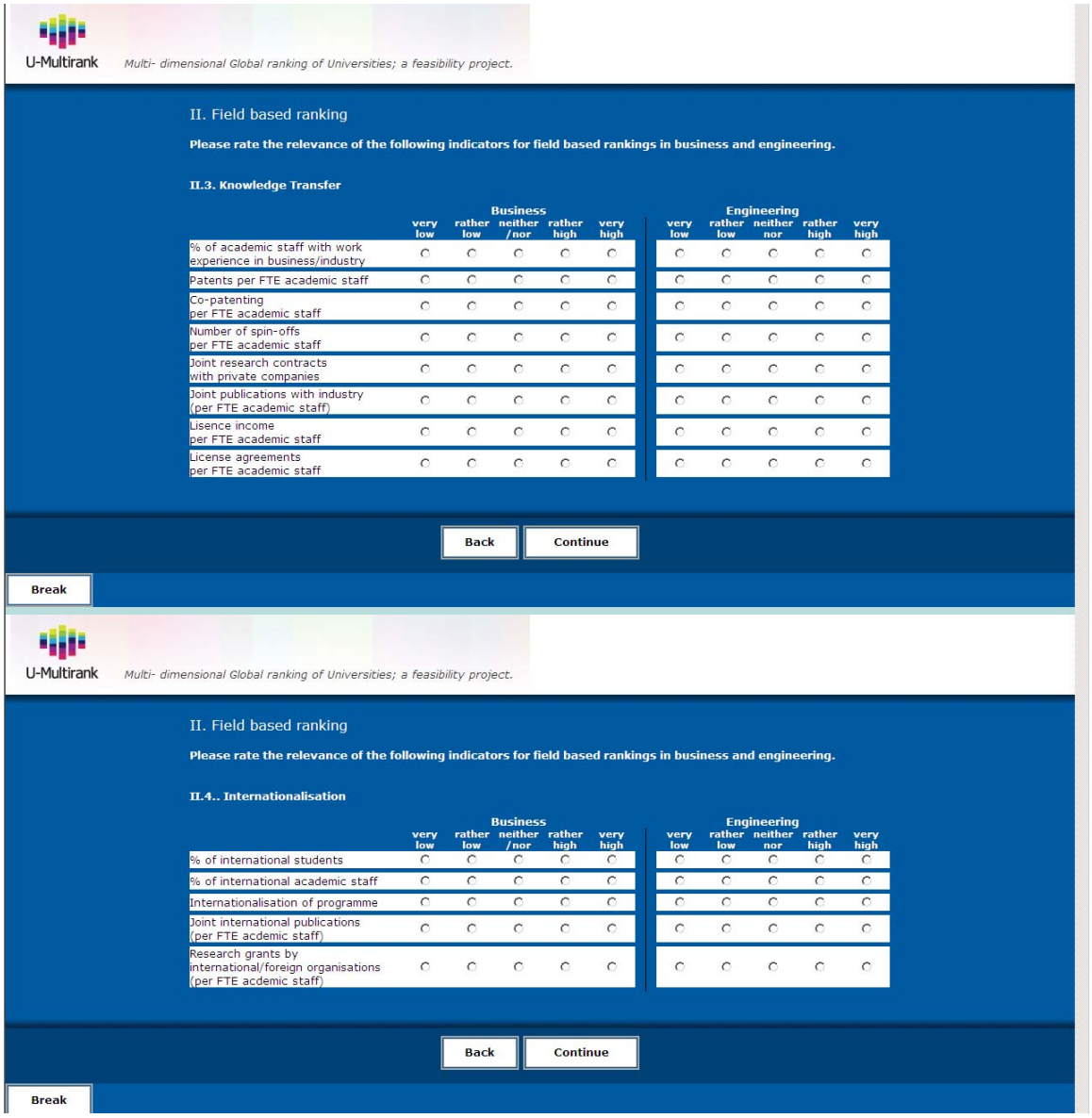

U-Multirank *Multi- dimensional Global ranking of Universities; a feasibility project.*

II. Field based ranking

Please rate the relevance of the following indicators for field based rankings in business and engineering.

II.3. Knowledge Transfer

	Business					Engineering				
	very low	rather low	neither /nor	rather high	very high	very low	rather low	neither nor	rather high	very high
% of academic staff with work experience in business/industry	○	○	○	○	○	○	○	○	○	○
Patents per FTE academic staff	○	○	○	○	○	○	○	○	○	○
Co-patenting per FTE academic staff	○	○	○	○	○	○	○	○	○	○
Number of spin-offs per FTE academic staff	○	○	○	○	○	○	○	○	○	○
Joint research contracts with private companies	○	○	○	○	○	○	○	○	○	○
Joint publications with industry (per FTE academic staff)	○	○	○	○	○	○	○	○	○	○
Lisence income per FTE academic staff	○	○	○	○	○	○	○	○	○	○
License agreements per FTE academic staff	○	○	○	○	○	○	○	○	○	○

Back Continue

Break

U-Multirank *Multi- dimensional Global ranking of Universities; a feasibility project.*

II. Field based ranking

Please rate the relevance of the following indicators for field based rankings in business and engineering.

II.4.. Internationalisation

	Business					Engineering				
	very low	rather low	neither /nor	rather high	very high	very low	rather low	neither nor	rather high	very high
% of international students	○	○	○	○	○	○	○	○	○	○
% of international academic staff	○	○	○	○	○	○	○	○	○	○
Internationalisation of programme	○	○	○	○	○	○	○	○	○	○
Joint international publications (per FTE acdemic staff)	○	○	○	○	○	○	○	○	○	○
Research grants by international/foreign organisations (per FTE acdemic staff)	○	○	○	○	○	○	○	○	○	○

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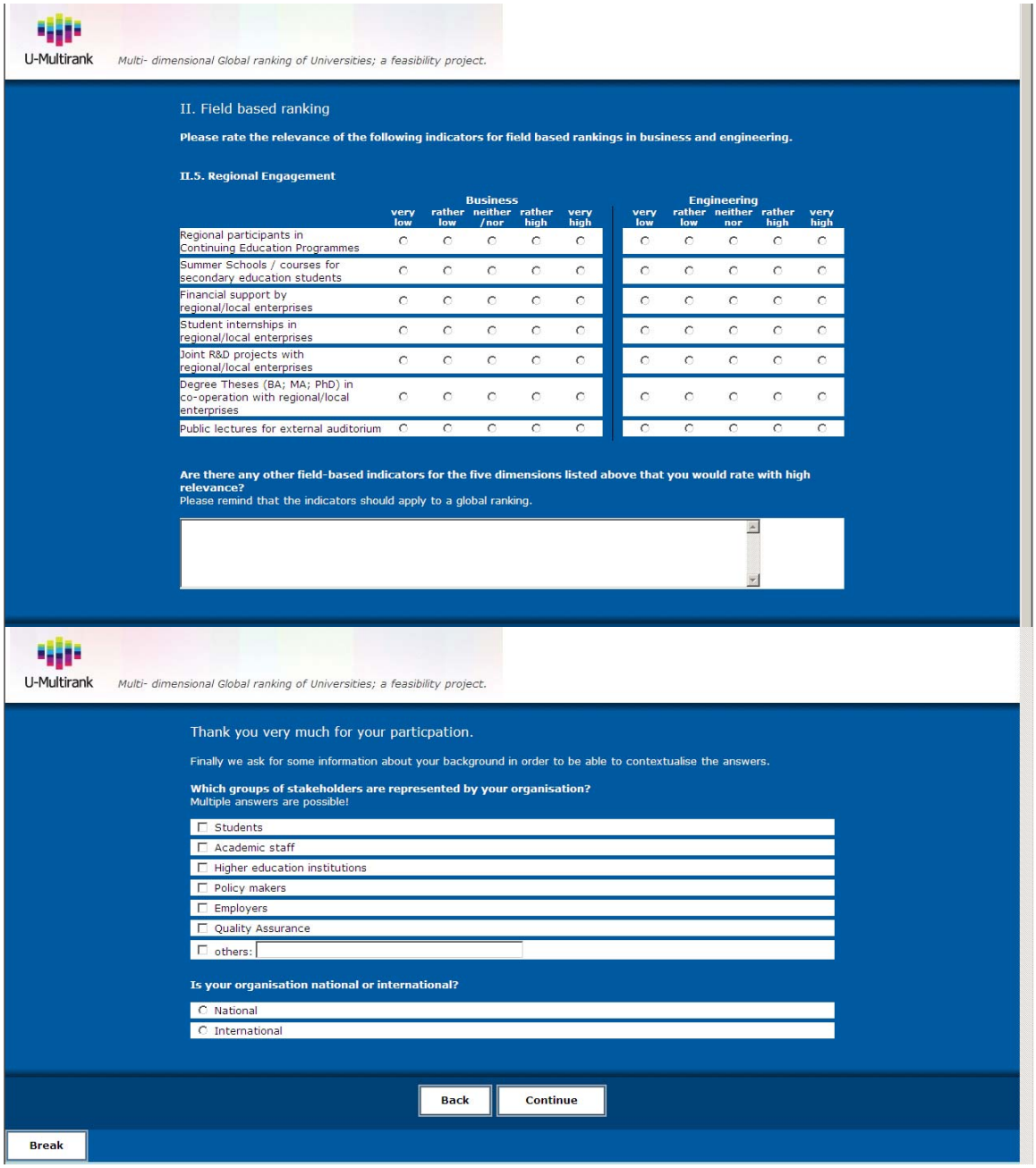

U-Multirank
Multi- dimensional Global ranking of Universities; a feasibility project.
II. Field based ranking
Please rate the relevance of the following indicators for field based rankings in business and engineering.
II.5. Regional Engagement
Business
Engineering
very low
rather low
neither /nor
rather high
very high
Regional participants in Continuing Education Programmes
Summer Schools / courses for secondary education students
Financial support by regional/local enterprises
Student internships in regional/local enterprises
Joint R&D projects with regional/local enterprises
Degree Theses (BA; MA; PhD) in co-operation with regional/local enterprises
Public lectures for external auditorium
Are there any other field-based indicators for the five dimensions listed above that you would rate with high relevance?
Please remind that the indicators should apply to a global ranking.
U-Multirank
Multi- dimensional Global ranking of Universities; a feasibility project.
Thank you very much for your particpation.
Finally we ask for some information about your background in order to be able to contextualise the answers.
Which groups of stakeholders are represented by your organisation?
Multiple answers are possible!
Students
Academic staff
Higher education institutions
Policy makers
Employers
Quality Assurance
others:
Is your organisation national or international?
National
International
Back
Continue
Break

Appendix 3: Pre workshop survey results

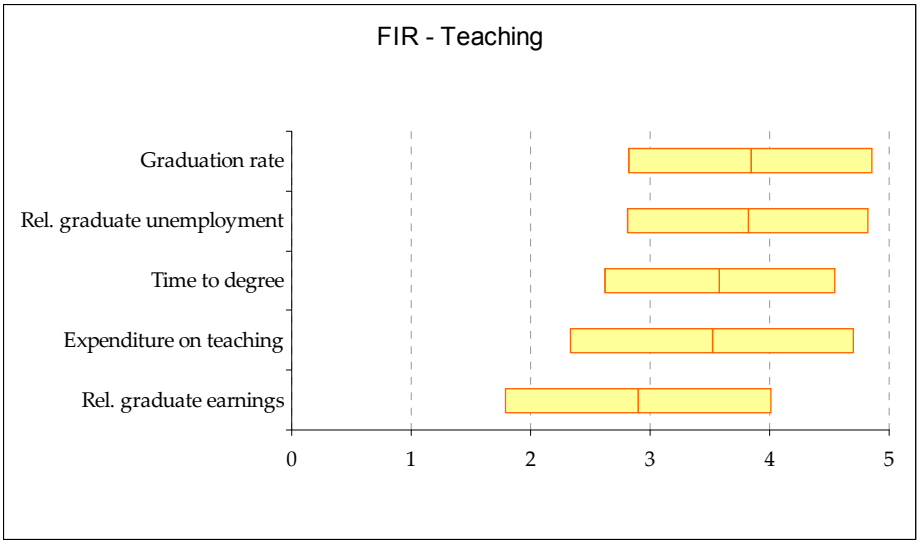
In this short note the results of the online questionnaire regarding the relevance of the U-Multirank indicators are summarized.
These results served as an input for the first working group session at the Stakeholder workshop.

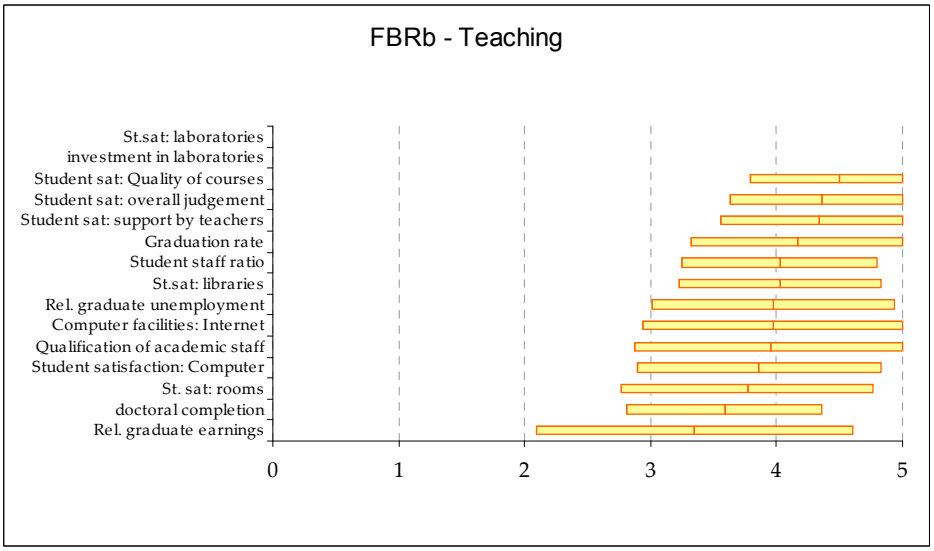
For each indicator the average score is presented, as well as a bandwidth of 1 standard deviation, showing the dispersion around the average. If the bandwidth is small, consensus is high and if the bandwidth is large, consensus is low.

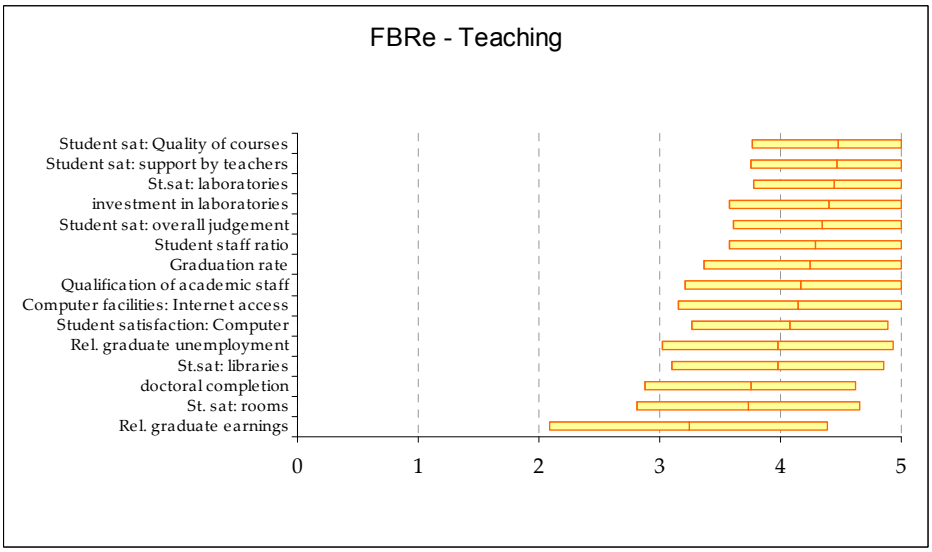
The number of respondents was 63.

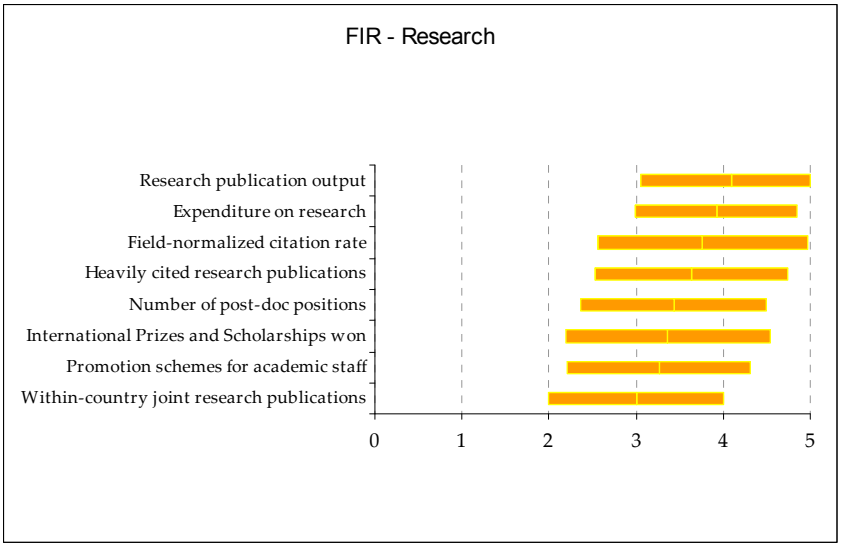
The indicators are presented by dimension and, where appropriate, by type of ranking.

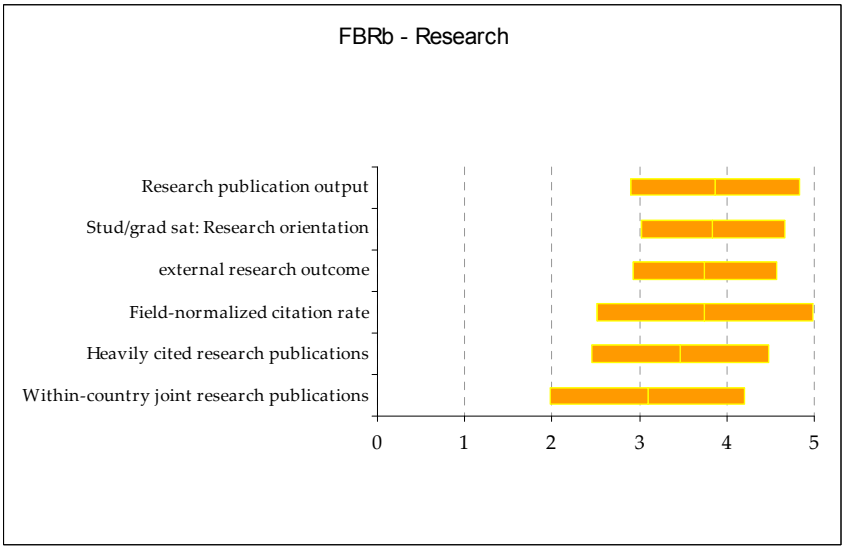
FIR = Focused Institutional Ranking
FBR = Field Based Ranking
FBRe = Field Based Ranking engineering
FBRb = Field Based Ranking business

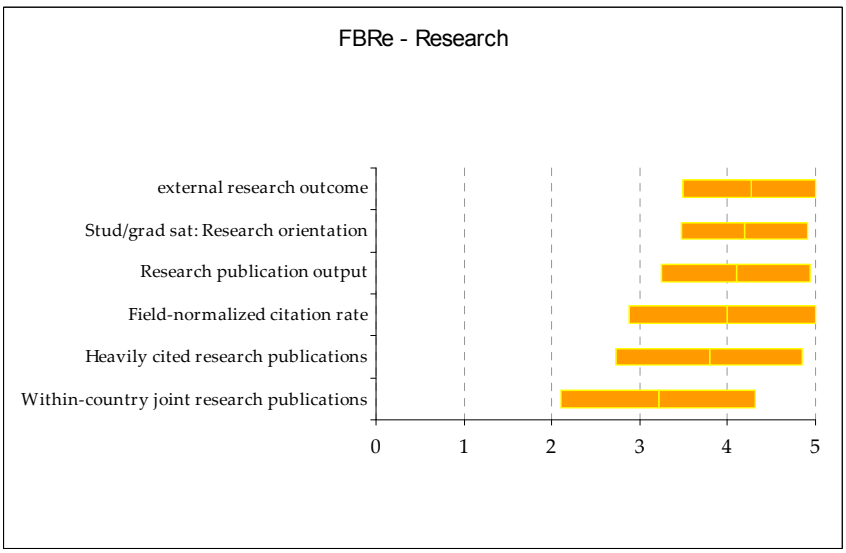

FIR - Teaching
Graduation rate
Rel. graduate unemployment
Time to degree
Expenditure on teaching
Rel. graduate earnings
0
1
2
3
4
5

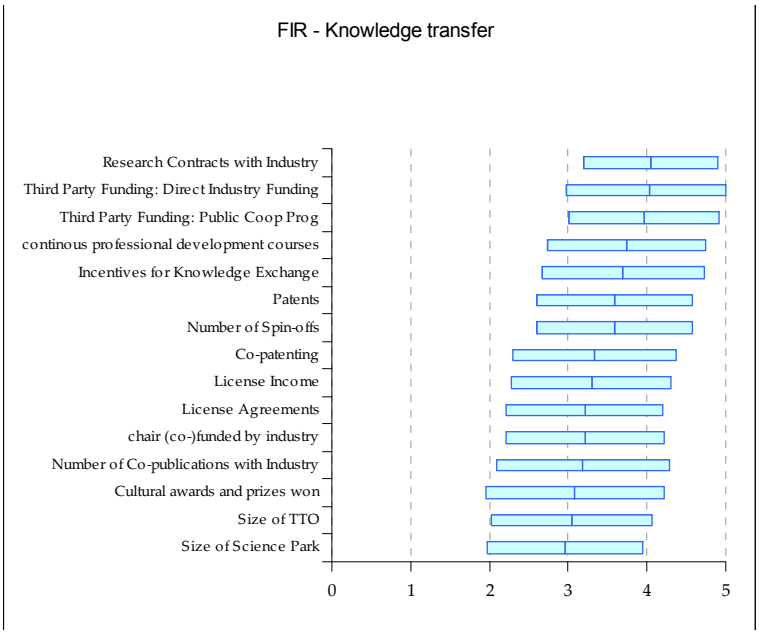

FBRb - Teaching
St.sat: laboratories
investment in laboratories
Student sat: Quality of courses
Student sat: overall judgement
Student sat: support by teachers
Graduation rate
Student staff ratio
St.sat: libraries
Rel. graduate unemployment
Computer facilities: Internet
Qualification of academic staff
Student satisfaction: Computer
St. sat: rooms
doctoral completion
Rel. graduate earnings
0
1
2
3
4
5

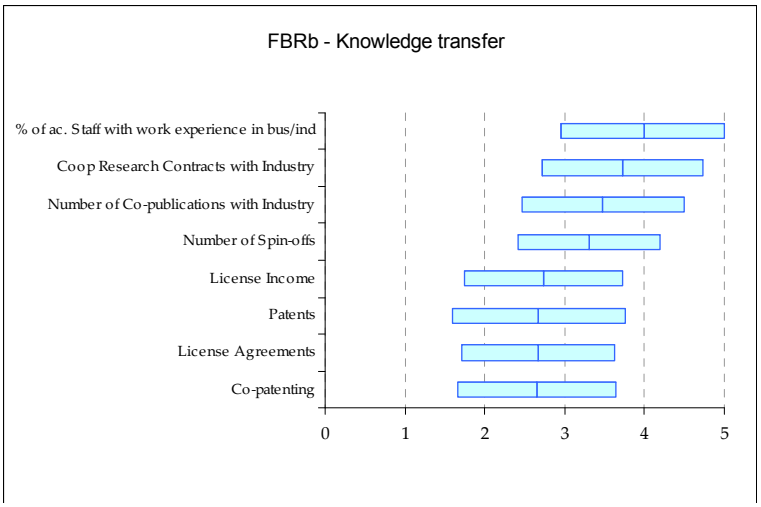

FBRe - Teaching
Student sat: Quality of courses
Student sat: support by teachers
St.sat: laboratories
investment in laboratories
Student sat: overall judgement
Student staff ratio
Graduation rate
Qualification of academic staff
Computer facilities: Internet access
Student satisfaction: Computer
Rel. graduate unemployment
St.sat: libraries
doctoral completion
St. sat: rooms
Rel. graduate earnings
0
1
2
3
4
5

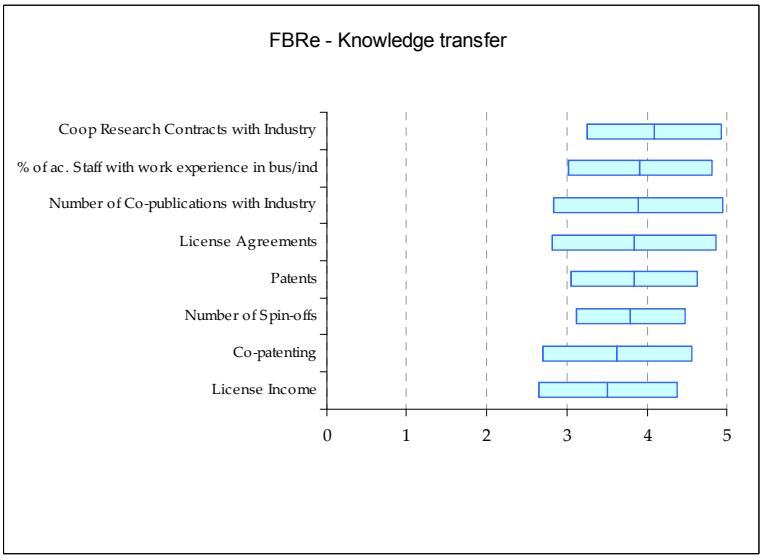

FIR - Research
Research publication output
Expenditure on research
Field-normalized citation rate
Heavily cited research publications
Number of post-doc positions
International Prizes and Scholarships won
Promotion schemes for academic staff
Within-country joint research publications
0
1
2
3
4
5

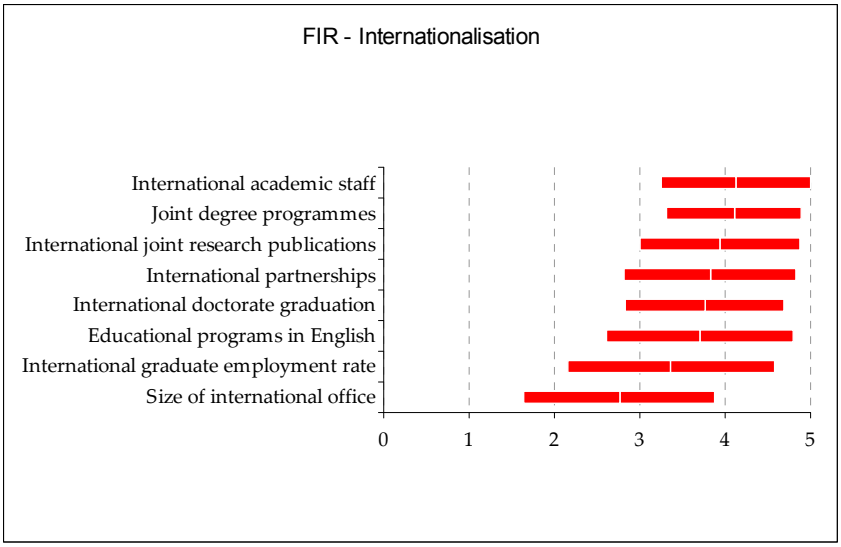

FBRb - Research
Research publication output
Stud/grad sat: Research orientation
external research outcome
Field-normalized citation rate
Heavily cited research publications
Within-country joint research publications
0
1
2
3
4
5

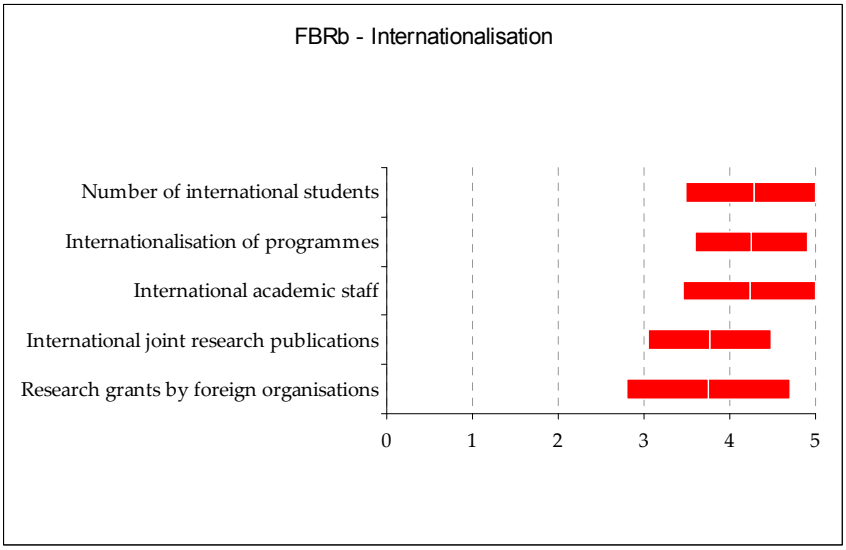

FBRe - Research
external research outcome
Stud/grad sat: Research orientation
Research publication output
Field-normalized citation rate
Heavily cited research publications
Within-country joint research publications
0
1
2
3
4
5

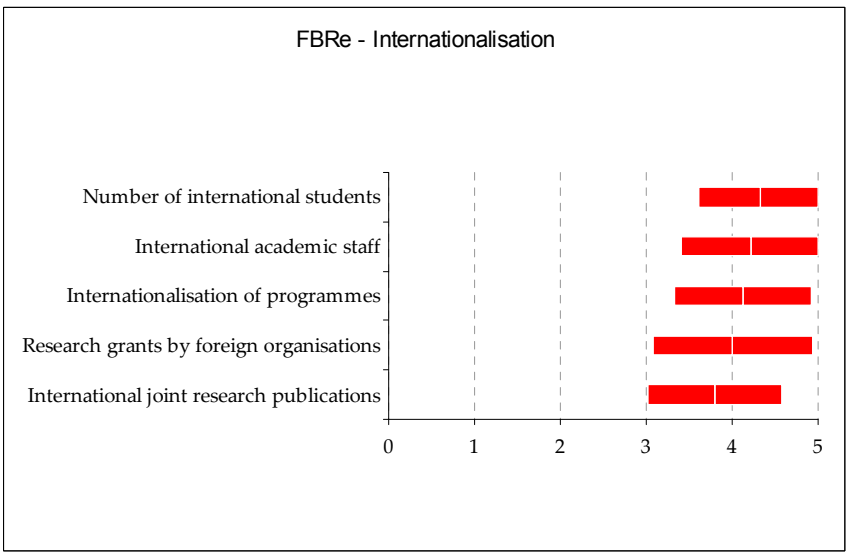

FIR - Knowledge transfer
Research Contracts with Industry
Third Party Funding: Direct Industry Funding
Third Party Funding: Public Coop Prog
continous professional development courses
Incentives for Knowledge Exchange
Patents
Number of Spin-offs
Co-patenting
License Income
License Agreements
chair (co-)funded by industry
Number of Co-publications with Industry
Cultural awards and prizes won
Size of TTO
Size of Science Park
0
1
2
3
4
5

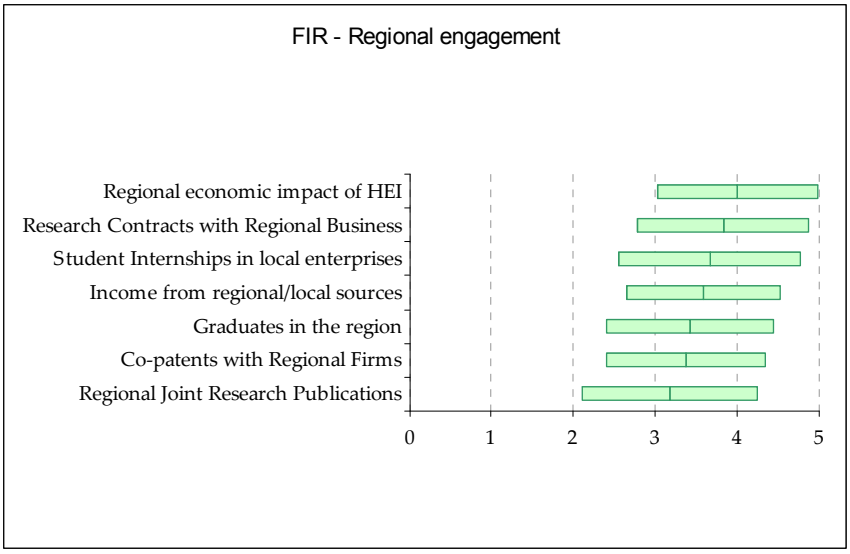

FBRb - Knowledge transfer
% of ac. Staff with work experience in bus/ind
Coop Research Contracts with Industry
Number of Co-publications with Industry
Number of Spin-offs
License Income
Patents
License Agreements
Co-patenting
0
1
2
3
4
5

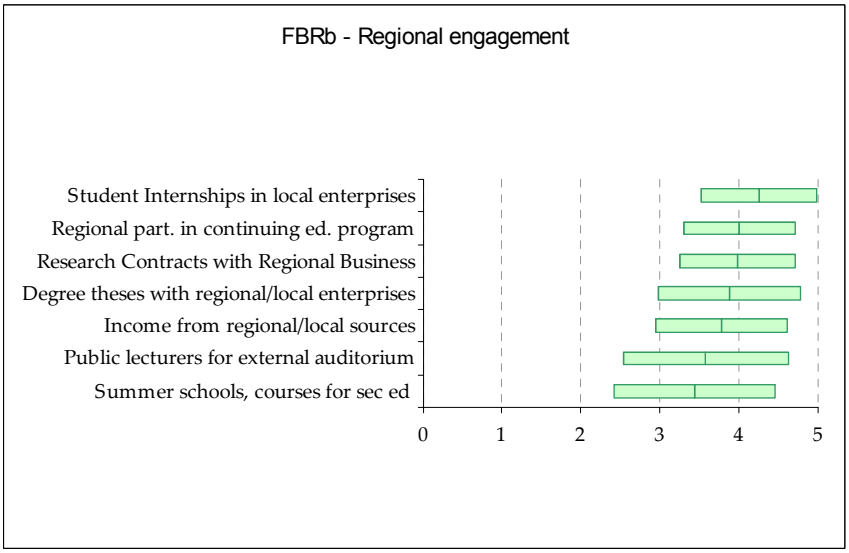

FBRe - Knowledge transfer
Coop Research Contracts with Industry
% of ac. Staff with work experience in bus/ind
Number of Co-publications with Industry
License Agreements
Patents
Number of Spin-offs
Co-patenting
License Income
0
1
2
3
4
5

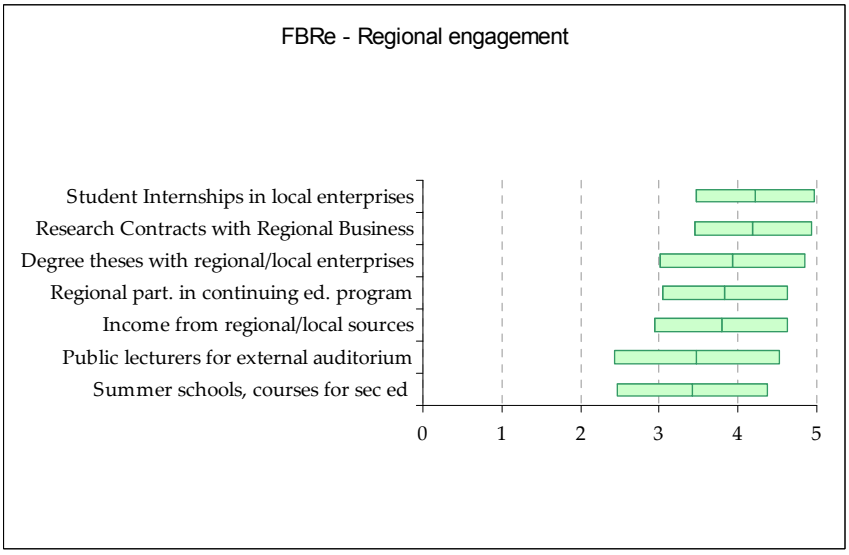

FIR - Internationalisation
International academic staff
Joint degree programmes
International joint research publications
International partnerships
International doctorate graduation
Educational programs in English
International graduate employment rate
Size of international office
0
1
2
3
4
5


FBRb - Internationalisation
Number of international students
Internationalisation of programmes
International academic staff
International joint research publications
Research grants by foreign organisations
0
1
2
3
4
5


FBRe - Internationalisation
Number of international students
International academic staff
Internationalisation of programmes
Research grants by foreign organisations
International joint research publications
0
1
2
3
4
5


FIR - Regional engagement
Regional economic impact of HEI
Research Contracts with Regional Business
Student Internships in local enterprises
Income from regional/local sources
Graduates in the region
Co-patents with Regional Firms
Regional Joint Research Publications
0
1
2
3
4
5


FBRb - Regional engagement
Student Internships in local enterprises
Regional part. in continuing ed. program
Research Contracts with Regional Business
Degree theses with regional/local enterprises
Income from regional/local sources
Public lecturers for external auditorium
Summer schools, courses for sec ed
0
1
2
3
4
5


FBRe - Regional engagement
Student Internships in local enterprises
Research Contracts with Regional Business
Degree theses with regional/local enterprises
Regional part. in continuing ed. program
Income from regional/local sources
Public lecturers for external auditorium
Summer schools, courses for sec ed
0
1
2
3
4
5

Appendix 4: Post workshop survey results

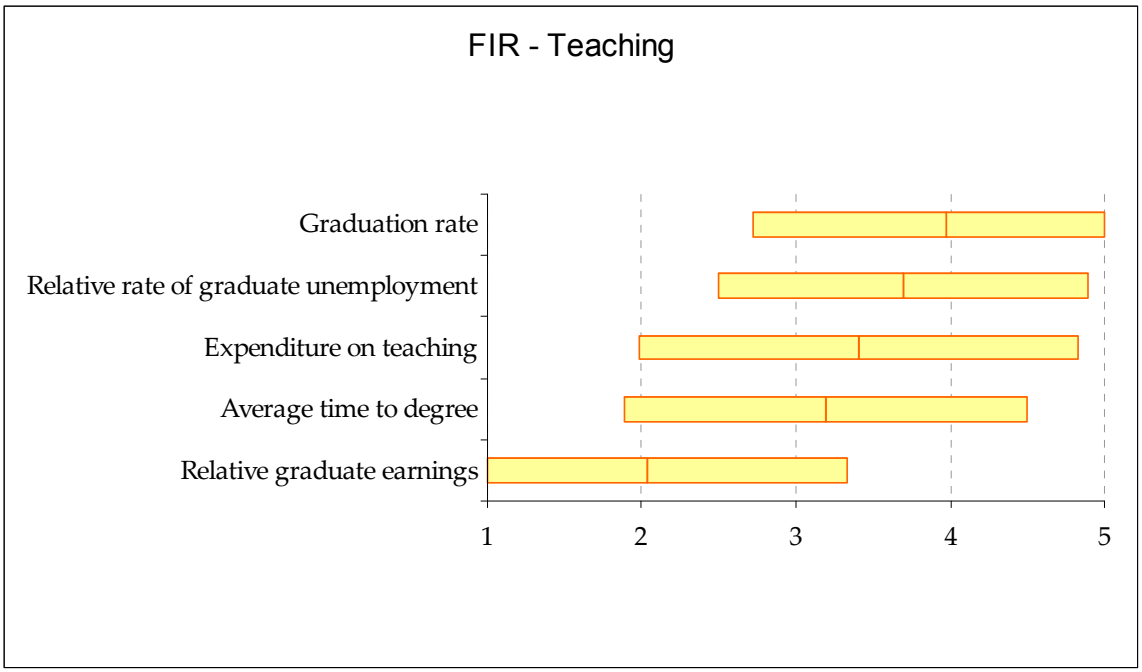
In this short note the results of the survey at the end of the workshop are summarized.

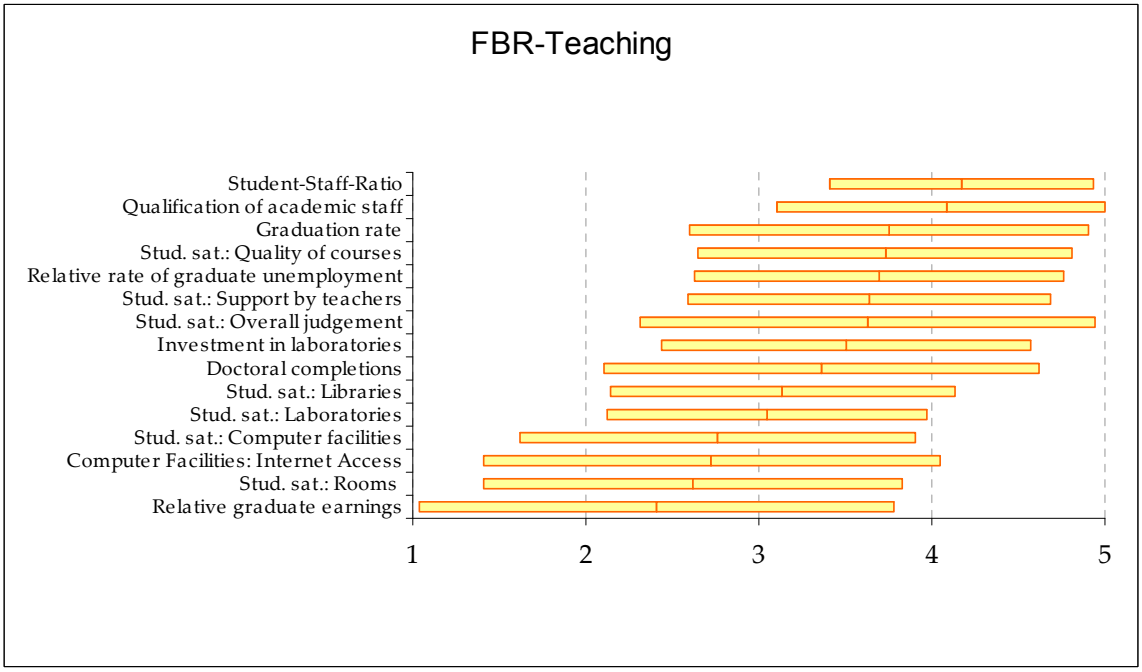
For each indicator the average score is presented, as well as a bandwidth of 1 standard deviation, showing the dispersion around the average. If the bandwidth is small, consensus is high and if the bandwidth is large, consensus is low.

The number of respondents was 30.

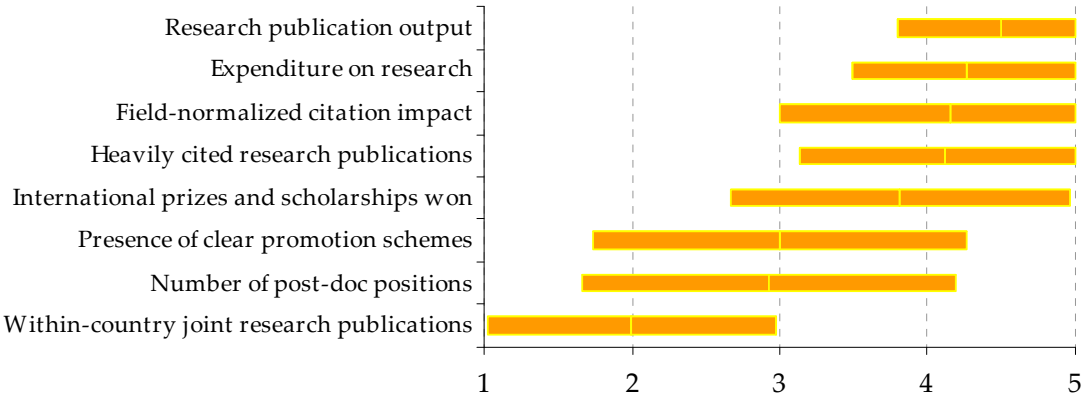
The indicators are presented by dimension and by type of ranking.

FIR = Focused Institutional Ranking
FBR = Field Based Ranking

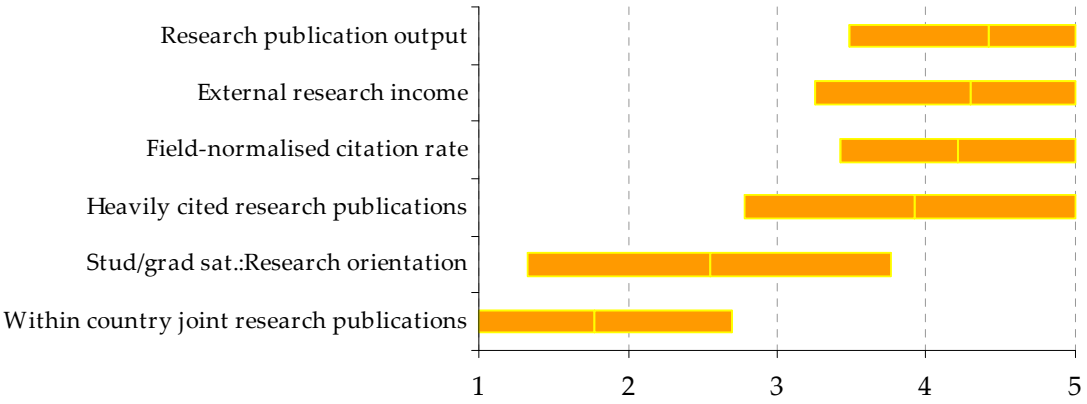

FIR - Teaching
Graduation rate
Relative rate of graduate unemployment
Expenditure on teaching
Average time to degree
Relative graduate earnings
1
2
3
4
5

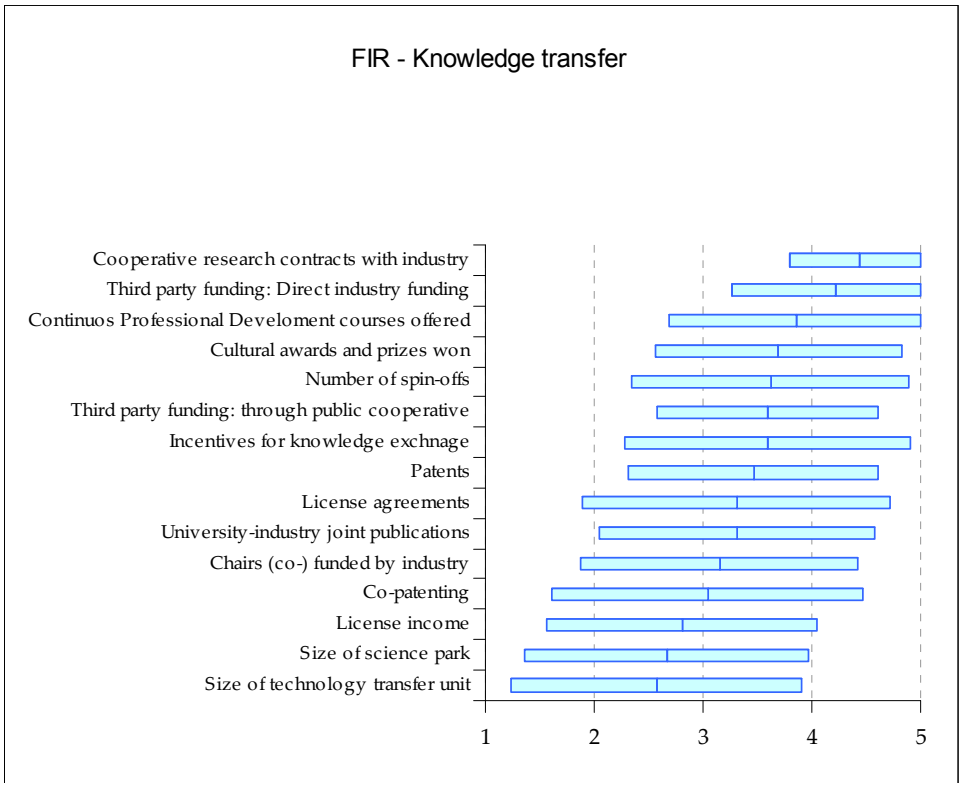

FBR-Teaching
Student-Staff-Ratio
Qualification of academic staff
Graduation rate
Stud. sat.: Quality of courses
Relative rate of graduate unemployment
Stud. sat.: Support by teachers
Stud. sat.: Overall judgement
Investment in laboratories
Doctoral completions
Stud. sat.: Libraries
Stud. sat.: Laboratories
Stud. sat.: Computer facilities
Computer Facilities: Internet Access
Stud. sat.: Rooms
Relative graduate earnings
1
2
3
4
5

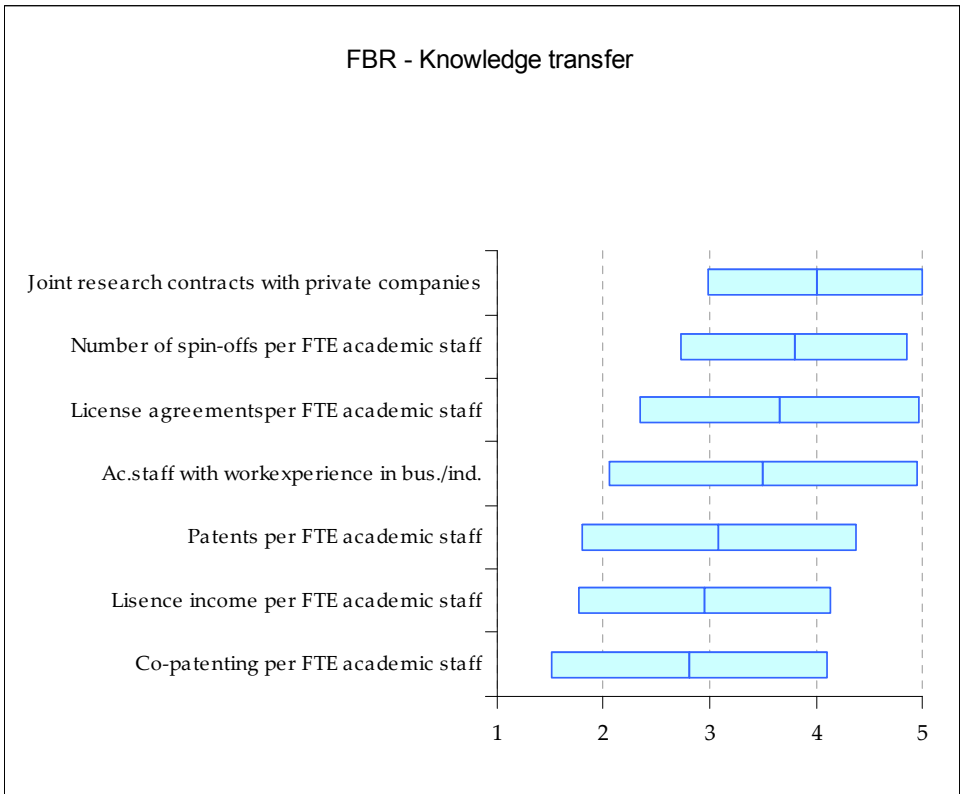
FIR - Research

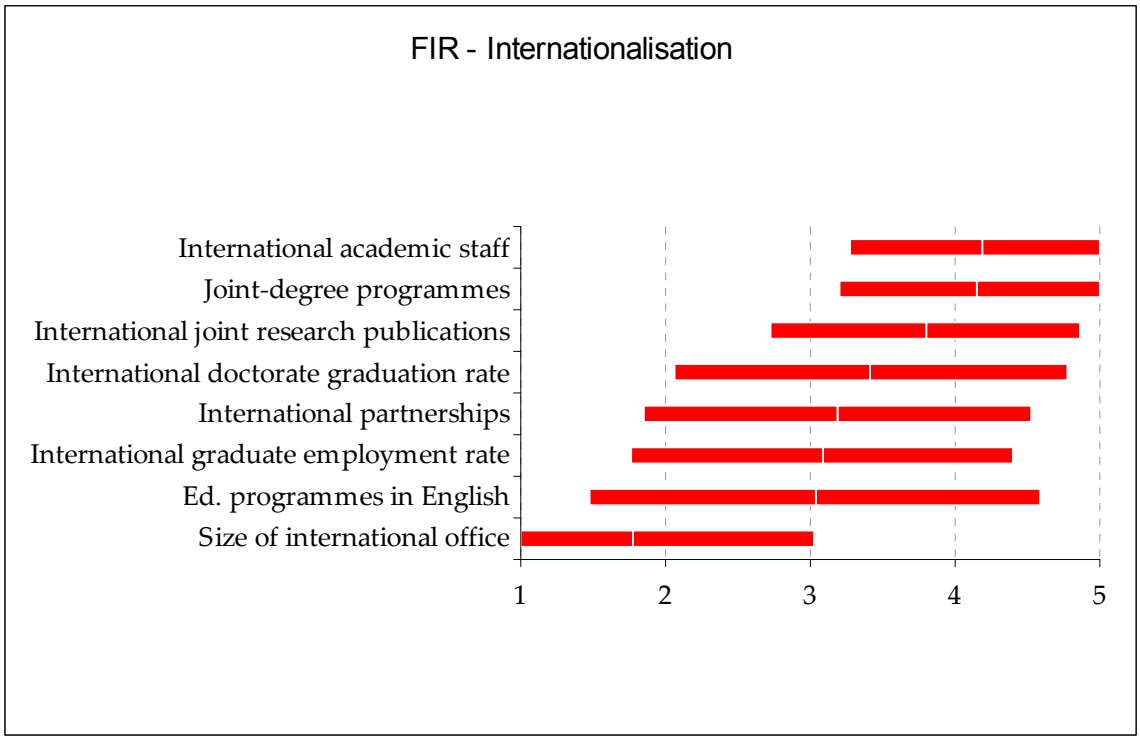


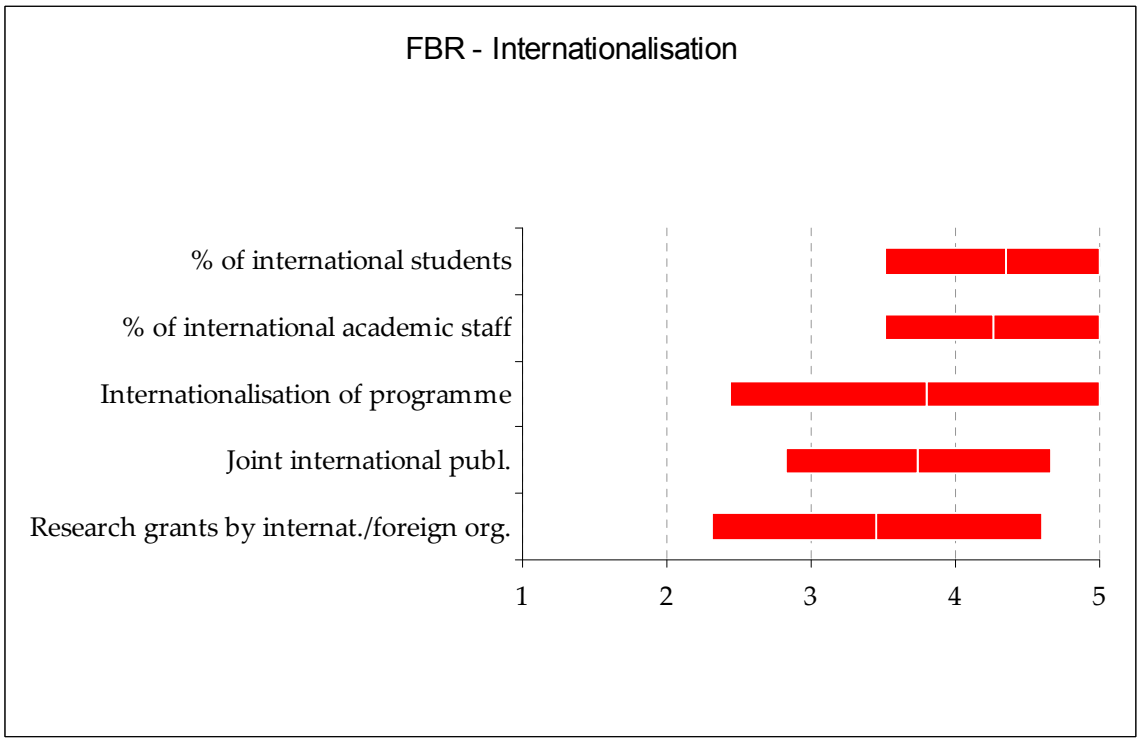
FBR - Research



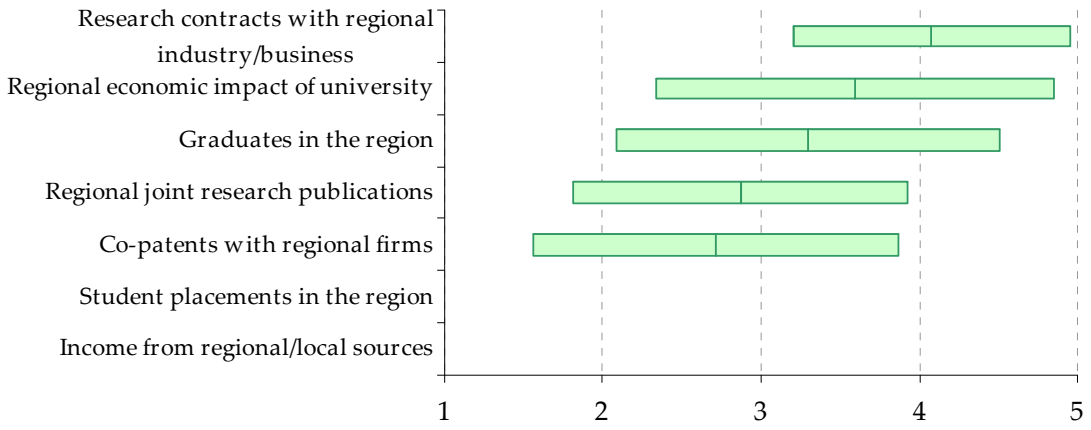

FIR - Knowledge transfer
Cooperative research contracts with industry
Third party funding: Direct industry funding
Continuos Professional Develoment courses offered
Cultural awards and prizes won
Number of spin-offs
Third party funding: through public cooperative
Incentives for knowledge exchnage
Patents
License agreements
University-industry joint publications
Chairs (co-) funded by industry
Co-patenting
License income
Size of science park
Size of technology transfer unit
1
2
3
4
5


FBR - Knowledge transfer
Joint research contracts with private companies
Number of spin-offs per FTE academic staff
License agreementsper FTE academic staff
Ac.staff with workexperience in bus./ind.
Patents per FTE academic staff
Lisence income per FTE academic staff
Co-patenting per FTE academic staff
1
2
3
4
5

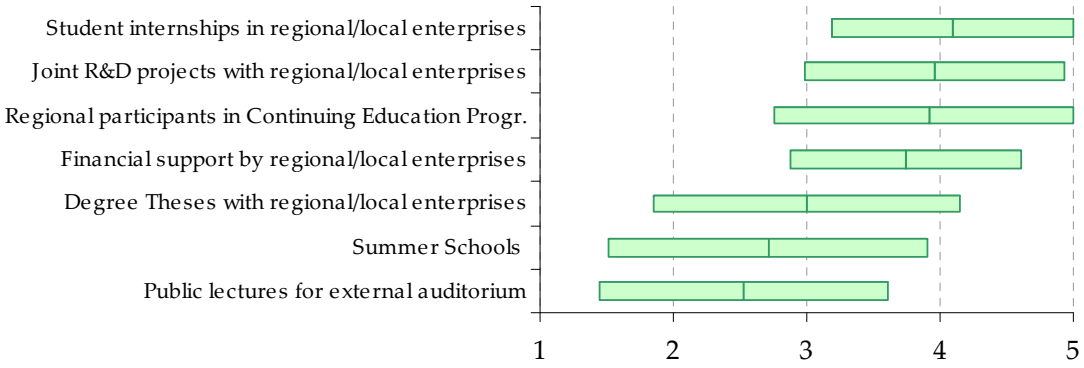

FIR - Internationalisation
International academic staff
Joint-degree programmes
International joint research publications
International doctorate graduation rate
International partnerships
International graduate employment rate
Ed. programmes in English
Size of international office
1
2
3
4
5


FBR - Internationalisation
% of international students
% of international academic staff
Internationalisation of programme
Joint international publ.
Research grants by internat./foreign org.
1
2
3
4
5

FIR - Regional engagement



FBR - Regional engagement



Appendix 5: Overview of U-Multirank indicators, voted 'in' and 'out'

in	out
international orientation	
Field Based Ranking	
• International doctorate graduation rate • International academic staff • Incoming and outgoing students • Joint international publications • Internationalisation of programmes • Joint international projects	• International research grants • Percentage of international students • Student satisfaction: Opportunities for a stay abroad
Focused Institutional Ranking	
• Number of educational programmes in foreign language • International teaching and research staff • International joint research publications • Joint degree programmes • Incoming and outgoing students	• International partnerships • Number of educational programmes in English • International doctorate graduation rate • Size of international office • International graduate employment rate • Foreign degree seeking students
knowledge exchange	
Field Based Business	
• Co-publications with industry	• Co-patenting
Field Based Ranking	
• Licence agreements	• Patents

in	out
• Number of spin-offs • Academic staff with experience in industry • Joint research contracts with private sector	• Licence income
Focused Institutional Ranking	
• Incentives for knowledge exchange • Cooperative research contracts with industry • Size of technology transfer unit • Continous professional development courses • Third party cooperative funding (public and direct industry) • University-industry joint publications • Cultural awards and prizes won	• Third party funds: public cooperation programmes • Licence income • Patent applications filed • Spin-offs • Chairs (co-)funded by industry • Co-patenting • Licence agreements • Size of science park • Third party funds: direct industry funding
regional engagement	
Field Based Ranking	
• Financial support by regional enterprises • Regional participants in continuing education programmes • Joint R&D projects with regional/local enterprises • Student internships in regional enterprises • Regional spin-offs • Percentage of regional enrolment	• Degree theses in co-operation with regional enterprises • Public lectures for external auditotium • Summerschools/ courses for secondary education students
Focused Institutional Ranking	
• Income from regional sources • Community engagement • Research contracts with regional business • Graduates working in the region • Regional impact of university	• Co-patents with regional firms • Regional joint research publications • Student internships in local enterprises
research	
Field Based Ranking	
• Research publication output	• Within country joint research

in	out
	publication
• External research income	• Student satisfaction: research orientation of educational programme
• Heavily cited research publications	
• Post-doc positions	
• Field-normalised citation rate	
Focused Institutional Ranking	
• International prizes and scholarships won	• Presence of clear promotion schemes
• Heavily cited research publications	• Within-country joint research publications
• Field normalized citation impact	• Research publication output
• Research income	
• Research output	
• Research related HRM development	
• Interdisciplinary research activities	
• Art related outputs	
• Expenditure on research	
• Research income from competitive sources	
teaching and learning	
Field Based Business	
• Student satisfaction: libraries	• Computer facilities: internet access
	• Doctoral completions
Field Based Ranking	
• Investment in laboratories	• Graduate satisfaction: Labour market relevance of their qualifications
• Interdisciplinarity of programmes	• Inclusion of issues relevant for employability in the programme/curricula
• student satisfaction: computer facilities	• Inclusion of work experience into programmes
• student satisfaction: laboratories	• Student/graduate satisfaction: inclusion of work experience in the programme
• Student satisfaction: support by teachers	• Student satisfaction: rooms
• Student satisfaction: quality of courses	• Relative graduate earnings
• Student-staff ratio	• Qualification of academic staff
• Student satisfaction: overall judgement	
• Graduation rate	
• Relative rate of graduate unemployment	

in	out
• Percentage of academic staff with workexperience in business and industry	
Focused Institutional Ranking	
• Interdisciplinarity of programmes • Relative rate of graduate unemployment • Graduation rate	• Expenditure on teaching • Relative graduate earnings • Average time to degree

U-Multirank

Feasibility Study

Questionnaire for students

Draft version I

1. **At which Higher Education Institution (HEI) are you currently enrolled?**
   - Country: ……
   - Institution: ……..

2. **In which study programme are you currently enrolled?**
   If more than one of the subjects listed apply, please mark the main subject and use that as point of reference for your responses to all following questions
   - Business / management
   - Mechanical engineering
   - Electrical engineering

3. **Please indicate the degree you are seeking in that field.**
   If more than one of the degrees listed apply, please mark one degree and use that as point of reference for your responses to all following questions
   - Bachelor
   - Master
   - Short national degree (up to 3 years)
   - Long national degree (more than 3 years)
   - Other post-graduate programme

4. **What is the exact name of the degree programme in which you are currently enrolled?**

5. **Have you already been enrolled at your current Higher Education Institution (HEI) in fall 2009?**
    - Yes/no

6. **All in all, how would you evaluate your entire educational experience at this institution?**

7. **How would you evaluate the course delivery / teaching in your programme!**
   Content breadth of teaching offerings?
    - There is a wide range of courses offering a range of approaches to teaching
    - The courses/modules for a coherent integrated whole
    - Staff have a high qualification and are good in explaining things
    - Teaching is including international aspects
    - Courses look at relations to other fields/discipline
    - Learning materials made available on my course have enhanced my learning
    - *Business*: Training in empirical methods/statistics is good
    - *Engineering*: Laboratory courses have high quality

The scale for all evaluative questions will be from “I fully agree” to “I do not agree at all”

8. **How would you evaluate the research orientation of your programme?**
    - The state of the art in research has been presented in courses
    - I had opportunities to participate in research projects
    - Relevant field-specific research methods were taught
    - Introductory classes/courses to academic research and writing were helpful
    - *BA programmes*: I feel well prepared for a research-oriented master programme

9. **How would you evaluate the organisation of the programme and of examinations?**
    - Entrance requirements/admission regulations were made transparent
    - The programme is organised in a way that helps to graduate within the norm time
    - I have a good access to classes (no waiting lists, no overlaps in time)
    - Average class size is not to big for effective learning
    - *Completeness of the offered programme compared to its description in the study guide*
    - Teaching is related to the requirements of examinations
    - The examination system (e.g. criteria used in marking) is made transparent
    - I get regular and prompt feedback on my work by teachers

10. **How would you evaluate the practical orientation of your programme?**
    - Practical elements are sufficiently included in the study programme
    - The number of project learning elements is high
    - Project learning and of practical elements have a high quality
    - *BA-programmes:* I feel well prepared for a professional Master programme

- I am receiving support in finding a subject of practical relevance for my final thesis

11. How would you evaluate the inclusion of work experience into your programme (e.g. internship)?

If you cannot answer these questions, e.g. because you did not do an internship, please mark “not applicable”.

- The opportunities of including a practical work period/internship are sufficient
- I received appropriate support by the university in finding a place for an internship/work placement
- The placement/internship was well integrated into the programme (contents, competencies)
- Preparation and evaluation of the internship / practical training period was good
- I received sufficient supervision on my placement/internship by teachers from my university

12. Please give your opinion about how your university promotes the link to the professional field and the labour market in your field?

- I feel well informed about the labour market relevance of the acquired competencies
- I feel well informed about the professional fields related to my programme and about academic/graduate labour markets
- *BA-students*: I feel well informed about Master's programmes that fit to my Bachelor degree

13. How would you evaluate the quality of advice / coaching by teaching staff in your programme?

- I have close contacts with teachers/ professors (e.g. during office hours, via e-mail)
- Good advice was available when I needed it by teachers
- I received sufficient feedback on my work (homework, assignments and examinations)
- *Engineering*: I received sufficient supervision in laboratory tutorials / IT tutorials
- I received sufficient support during individual study time (e.g. through self-learning platforms)

14. How would you evaluate the evaluation of teaching and learning in your programme?

- Course evaluation by students regularly take place (coverage, regularity)
- Course evaluations include relevant aspects
- I feel well informed about evaluation outcomes
- I experience that results of evaluations have consequences
- Students are sufficiently included in large scale evaluations (e.g. self-reports, peer reviews, commissions)

15. Did you already study abroad?

- Yes, I already studied abroad during my current programme, exchange programme (e.g. ERASMUS)
- Yes, I already studied abroad during my current programme, self-organised
- *Master-students:* Yes, I already studied abroad during my previous programme

- No, I did not study abroad.

16. Do you plan to study abroad?

- Yes, I plan to study abroad.
- No, I do not plan to study abroad.
- I don't know yet.

17. *[Filter: only for students who studied abroad]* How would you evaluate the opportunities and support of your university for study abroad?

- The foreign partner institutions of m university are attractive
- Existing exchange programmes of my university are attractive
- There are enough places available for a stay abroad
- I received sufficient support and advice to study abroad
- There is sufficient financial support for studying abroad
- The recognition of the results obtained (credits) during the study abroad period was easy
- The study abroad was well integrated in my home programme
- There is sufficient support in finding internships abroad

18. How would you evaluate the rooms at your university?

Catgeories: a) lecture halls
b) seminar rooms
c) laboratories

- ... are in good physical condition
- ... the number of places in sufficient with regard to class size
- …technical facilities are up to date

19. How would you evaluate the library (libraries) available at your university?

- Literature necessary for my studies is available when I need it.
- There is a large on-site stock of non-electronic literature.
- Relevant electronic journals are available and easily accessible.
- I can use many facilities to search for literature (e.g. CD-ROM, Internet)
- The library offers access to relevant data bases of my field
- User services and support are available and competent.
- Online-user services like ordering, reserving, extending are implemented well.
- There are enough study/reading places in the library
- Opening hours are satisfactory

20. How would you evaluate the IT facilities for students?

- Internet access for students on campus is available sufficiently
- The availability and the speed of W-LAN on Campus is satisfactory
- The hardware equipment of computers is modern and satisfactory
- Relevant/necessary software is installed on computers that can be used by students
- Maintenance of the computers is good
- Electronic administration of student account is effective (registration, exam results…)

- User support is available and professional

21. How would you evaluate the information provided by your university via the internet?

a) Website of the study programme
   - I find sufficient information on organisational aspects of my programme
   - Information on courses is available and up-date (time schedules, literature lists etc.)
   - *For non-English universities*: an adequate translation in English is available.

b) Overall Website of university
   - Accessibility, quality and quantity of information is sufficient.
   - *For non-English universities*: an adequate translation in English is available

22. As far as electronic learning elements are offered in your study, How would you evaluate the following supporting internet services?

- Download of materials/scripts
  - A high number of courses in my study programme is offering this
  - The materials are of high quality
- Possibility for online communication (e.g. chats, interactive study materials)
  - A high number of courses in my study programme is offering this
  - The materials are of high quality
- Self-learning tools
  - Are availability and easily to access
  - They are helpful to my learning

23. Please quantify the (typical) weekly time you spent for learning in courses and for self-learning (incl. preparation, reading)

- Leaning in courses: … hours per week
- *Engineering:* thereof: laboratory courses … hours per week
- Self-learning: … hours per week

24. How would you evaluate the social climate and the environment at your university.

- The atmosphere with other students stimulates working and learning together
- There is a good relationship between students and teachers (including professors, lecturers, assistants and others)
- There is a positive attitude towards students in town
- Security is satisfactory on campus

25. How would you evaluate the services at your university.

- Student Information & Funding services are offering good advice and services
- Accommodation services are offering good advice and services
- Career services are offering good advice and services
- International Office is offering good advice and services
- Student groups/organisations/associations are active
- *For international students*: Special services for international students offer good advice and services

26. What is your accommodation during this term?

- Student residence, on campus
- Student residence, not on campus
- Private accommodation, living alone
- Private accommodation, living with friends
- Private accommodation, living with partner
- Living with parents
- Other

27. Housing/accommodation

- I am satisfied with my housing situation in terms of
  - quality/standard
  - costs
  - security

28. How big is your house or room (square metres)?

In case you share an apartment, please tell us the size of the whole apartment.
Square m: ……..

How much do you pay on average for rent, including gas, water and electricity?

In case you share an apartment, please tell us how high the monthly costs (rent, gas, water and electricity etc.) for the whole apartment are.
Costs: ……. Currency: ….

29. What is the distance between your regular accommodation and your campus?

- I am living on the campus
- distance (one way) : …. kilometres

<u>Demographics</u>:

- **Age**
- **Gender**
- **Year of first enrolment in programme**
- **Have you been enrolled at another Higher Education Institution previous to your studies at your current Higher Education Institution?**
  - yes no
  - If yes, after which year did you transfer to your current institution?
- **Do you study full-time, part-time or are you inactive at this moment?**
  - I am a full-time student.
  - I am a part-time student, but I am enrolled in a programme that is designed for full-time students.

- I am a part-time student and I am enrolled in a programme that is designed for part-time students.
- I am formally enrolled but not studying actively.

- **Was your current HEI your first choice?**
  - Yes/ no
- **How do you finance your study and costs of living?**
  Please estimate to what extent the following incomes contribute to your whole funding (including living support and tuition).
  - Job outside the HEI: approx. %
  - Scholarship/non-repayable loan approx. %
  - Repayable loan, approx: approx. %
  - Parents, partner, relatives: approx. %
  - Savings approx. %
  - Other sources: approx. %
- **If you were educated in other countries than that of you actual residence, please indicate:**
  - Country in which you acquired your higher education entrance qualification
  - Country in which you acquired your Bachelor degree (or equivalent)
- **For Master students: Was there a time lag between your undergraduate and your graduate studies (e.g. working in your professional field or else)?**
  - no
  - yes, less than one year
  - yes, 1-3 years
  - yes, more than 3 years

<u>Questions controlling the procedure of the survey:</u>

Finally, we would like to ask some questions about the process of the student survey.

- How did you obtain the password letter?
  - The invitation came by postal mail.
  - The invitation came by e mail.
  - The invitation was given to me during a lecture/seminar.
  - The invitation was distributed on campus.
  - Other: ……..
- **Who informed you about the upcoming student survey?**
  (Multiple answers are possible)
  - I was notified only through the invitation letter.
  - The CHERPA letter contained a letter from my own HEI.
  - My HEI sent me an additional letter/ e-mail message.
  - Our professors/teachers informed us during class.
  - The student union informed me about the survey.
  - I read a notice on the HEI's webpage/ on an HEI's bill-board.
  - Other: …..

- **If you have obtained additional information or instructions about the ranking/survey, you can describe it here briefly.**

U-Multirank

Feasibility Study

Questionnaire for faculties / departments

Field: <Field>

1. Please give the **full name and address** of the **unit responsible for organising <field>**		
Name of university:		
Faculty/department:		
Institute or other body, if applicable:		
Street:		
Postal code, town/city:		
Country:		
Website:		
Telephone:		
Comments:		

1a. Please name a contact person who would be available to respond to possible **queries** about this questionnaire:	
Contact person:	
Position:	
Telephone:	
E-mail:	

Part 1: Details about the department

2. Please give the numbers of **academic staff in <field>** (professors and other academic staff; full-time equivalent) employed in your department for the years **2007 to 2009**

Staff (filled posts)	**Full-time equivalent academics in <field>**			
	2007 31/12	**2008** 31/12	**2009** 31/12	**2009:** thereof with completed PhD
Professors*				
Other Academic staff**				
Comments:				

* according to national higher education legislation
** involved in teaching and/or research; holding at least a first degree

3. Please give the **head count** of professors in **<field>** in the academic year 2008/09.

	Professors 31/12/2009	**thereof:**		
		female	**Hired from abroad* (last 5 years)**	
Number				
Comments:				

*irrespective of citizenship

4. Please state the extent of the contribution **international visiting/guest professors** made to teaching in <field> in the academic year 2008/09 with lectures offering credit points (at least 2 credits, no single lectures/talks). Please also state for these lectures the number of possible credits for their lectures/courses.

	Academic year 2008/09	
	Number of guest/visiting professors	**Total number of credits**
International visiting professors giving lectures in your department in <field>		
Comments:		

5. Please state the extent to which professors of your department contributed to teaching in <field> at foreign HEIs in the academic year 2008/09 with lectures offering credit points (at least 2 credits, no single lectures/talks). Please also state for these lectures the number of possible credits for their lectures/courses

	Academic year 2008/09	
	Number of outgoing professors	**Total number of credits**
Professors in the department <field> offering lectures **abroad**		
Comments:		

6. Please indicate the number of **professors with work experience** during the last five years in outside higher education (business, administration,...)

	Number (head count)
Professors	
Comments:	

7. Please indicate the **number of public lectures** for external auditorium in the academic year 2008/2009

	Number
Public lectures	
Comments:	

8. Please indicate the number of **PhDs** completed in **<field>** in the period indicated with the principal examiner coming from your department.

Academic year*		**2006/07**	**2007/08**	**2008/09**
Number of completed PhDs	**Total number**			
	... by women			
	... by international students**			
	... In co-operation with enterprises			
Comments:				

*If not available for academic years: alternatively for calendar years 2007, 2008 and 2009.

** Definition:

9. Please give the **Number** of post-doc Positions in <field> in the academic year 2008/09			
	Number of post-doc positions in academic year 2008/09	**thereof:**	
		female	**international**
Numbers			
Comments:			

10. Please estimate the amount **external research funds** (research promotion and/or contract research) spent by your department in <field> in the last three years (2006, 2007, 2008).

Please do **NOT** state the total amounts spent on the relevant research projects but **ONLY** the **funds calculated from the HEI budget and/or SPENT in the given year**.
Example: For a project that was started in 2008 and completed in 2009 only the amounts spent in 2008 and 2009 are to be listed in the following table.

N.B. Funding for basic equipment are to be **excluded** from your calculations.

Third party funds	**2007 in 1.000 €**	**2008 in 1.000 €**	**2009 in 1.000 €**
From national science foundations			
From national government authorities (national or federal)			
From national foundations			
From industry/private business			
From regional/local sources			
From international/foreign institutions			
From other sources			
Total			
Thereof **third party funding for services rendered** (e.g. material testing)			
Thereof **third party funding of professorships**			
Comments:			

Explanation: Third party funds are only those for which you have to apply regularly, submitting fresh applications as part of an assessment process.

11. License agreements/income: Please give the **number of license agreements and the income raised from licenses.**

Licenses	**2007**	**2008**	**2009**
No. of license agreements			
License income			
Comments:			

12. Please give the **total** number of students enrolled in your department **<field> at present***.
    * Preferably data for academic year 2008/09, otherwise 2007/08 (please indicate)

	Main subject /major in field	**Second/minor subject in field**
Total number of students in <field> at the department		
No. of female students		
No. of international students* (degree students)		
No. of international students* (exchange students)		
Comments:		

- Students who got their entry qualification for higher education abroad

13. Please give the **total** number of students enrolled in your department **<field> at present (academic year 2009/10) by degrees.**

Students enrolled in	**Main subject /major in field**	**Second/minor subject in field**
Bachelor /undergraduate programmes		
Master/graduate programmes		
PhD programmes		

Other programmes		
Comments:		

- Students who got their entry qualification for higher education abroad

14. Please describe the specific **profile** of your institution in <field> with regard to teaching & leaning (max. 600 characters)

Website:

15. Please describe the specific **profile** of your institution in <field> with regard to **research** (max. 600 characters)

Website:

16. Does your department offer **continuing education programmes /professional development programmes in <field>?**

Yes	No
☐	☐

If yes, how many participants/students joint one of those programmes within the past three years?

	2007	**2008**	**2009**
Participants in total			
Thereof regional participants*			
Comments:			

*City, surrounding administrative districts

17. Does you department offer **summer schools / courses for secondary education students in <field>?**

Yes	No
☐	☐

If yes, how many participants joint the summer schools / courses within the past three years?

	2007	**2008**	**2009**
Summer schools			
Courses for secondary education students			
Comments:			

18. Please indicate if there is a any kind of financial **support of the university by local/regional enterprises**, and if there are **joint R&D projects with local enterprises**

Support by local enterprises	**Volume:**	**.... €**
Joint R&D projects with local enterprises	**No of projects**	**....**
	Volume	**..... €**
Comments:		

19. Please indicate how many students in <field> made **internships** (minimum 4 weeks) in local enterprises within the past years

	2007	**2008**	**2009**
Students internships in local enterprises			
Comments:			

20. Please state the number of degree theses in cooperation with local enterprises in 2007 – 2009.

	Bachelor/ Undergraduate	Master/ Graduate	PhD
Degree Theses in cooperation with local enterprises			
Comments:			

Part 2: Details about the individual study programmes

21. Please fill in those degree programmes in <field>which should be included into the ranking.

    Please include only programmes, which

    - **are already running,**
    - are offered as a **main subject/major** in **<field> in your department**

    Please do not include:

    - Continuous education /CPD programmes
    - Distance education programmes only
    - Special programmes for teacher education
    - Programmes in which first year enrolment are not possible any more

    Those programmes can be listed below under “other programmes”.

Please mark the degrees: BA; BSc, MA, MSc , PhDs or give a short explanation for other degrees.

<Programme1>

<Programme2>

<Programme3>

b) Other study programmes (e.g. PhD):	

Comments:

22. Please give basic information about the programmes.			
	Programme offered since year	Standard period of study in years	Average time to degree
<Programme1>			
<Programme2>			
<Programme3>			
Comments:			

23. Please give some information about inter-disciplinary characteristics of the programmes					
	Total number of credits	Thereof: free credits for			
		General studies	Courses in other fields		
<Programme1>					
<Programme2>					
<Programme3>					

24. Please describe the programmes according to the following characteristics: (Multiple answers are possible)				
	Full time presence learning programme	Part time presence learning programme	Distance education programme	Study combined with employment
<Programme1>	☐	☐	☐	☐
<Programme2>	☐	☐	☐	☐
<Programme3>	☐	☐	☐	☐

25. Please give the following information about **students presently enrolled in the programmes**				
	Students			
Study programme	Total number of students	Students in their 1st year	Female students	International students**
<Programme1>				
<Programme2>				
<Programme3>				
Comments:				

* Data preferably for academic 2009/2010, otherwise calendar year 2010.

****** only international students holding a university entrance qualification acquired abroad.

26. Please indicate the number of **study places** and, if applicable, give details about any **tuition fees**.

	Restricted admission in academic year 2008/09	If admission is restricted:		Amount of tuition fees per year in €
		Number of study places for 2008/09	N. of applicants 2008/09	
<Programme1>	☐ yes ☐ no			
<Programme2>	☐ yes ☐ no			
<Programme3>	☐ yes ☐ no			
Comments:				

27. Do the programmes include special issues related to promote the **employability** of the graduates?

			Description
<Programme1>	Yes ☐	No ☐	
<Programme2>	Yes ☐	No ☐	
<Programme3>	Yes ☐	No ☐	
Comments:			

21. Please give details of periods of **work experience** integrated in the programmes.

	Periods of work experience during term		Periods of work experience during the vacation		Specific, practice-oriented lectures and tutorials	No elements of work ex-perience	other, please give details
	Duration in weeks	Mandatory?	Duration in weeks	Mandatory ?	Existing?		
<Programme1>		☐		☐	☐	☐	
<Programme2>		☐		☐	☐	☐	
<Programme3>		☐		☐	☐	☐	
Comments:							

22. Please describe the international orientation of the programmes with regard to the inclusion of study periods abroad (incl. Internships abroad)

	Study period abroad		
	Study period abroad	If mandatory, how long (weeks)?	(max.) number of credits
<Programme1>	*		
<Programme2>			
Comments:			

1= mandatory; 2 = recommended; 3= none

23. Please indicate if there are joint study programmes with foreign partner institutions

	Joint programme with (name of HEIs)		Transferability of credits	
	Partner(s)	No joint programmes	automatically	Not automatically, but possible
<Programme1>		☐	☐	☐
<Programme2>		☐	☐	☐
<Programme3>		☐	☐	☐
Comments:				

24. Please indicate the **share of lectures and tutorials held in a foreign language** by programme.

	Number of credits in courses in a foreign language (only mandatory courses)	Percentage of courses in a foreign language
<Programme1>		
<Programme2>		
<Programme3>		
Comments:		

25. For how many students in <field> in your department have **credits** for achievements **abroad** been recognised?

	Number of students who earned credits for achievement abroad:	
<Programme1>		
<Programme2>		
<Programme3>		
Comments:		

26. Please give the number of **exchange students** from foreign universities in the programmes and the names of up to **three HEIs** from which students most regularly come to your university.

	Number of exchange students from abroad Academic year 2008/09	Most important institutions of exchange: HEI/country (e.g. Oxford University/UK)
<Programme1>		
<Programme2>		
<Programme3>		
Comments:		

27. **Special features of the study programmes:** In 600 characters max. per study programme, give the special characteristics of the study programmes (foci, areas of particularly intensive study, relevance to research, practical relevance, interdisciplinary orientation, etc.)?	
<Programme1>	
<Programme2>	
<Programme3>	

28.Please indicate for each programme the **number of graduates**, if any, and the number of those graduating within the norm period of completion.

	No graduates yet	2007 Number of graduates		2008 Number of graduates		2009 Number of graduates	
		Total	Within norm duration	Total	Within norm duration	Total	Within norm duration
<Programme1>	☐						
<Progarmme2>	☐						
<Progarmme3>	☐						

U-Multirank

Feasibility Study

Questionnaire institution

Draft version I

Welcome to the U-Multirank institutional questionnaire

The questionnaire consists of eight sections.
You may save the data entered and resume later. If all sections are completed, you may sign off the questionnaire.
For each question an explanation or comment is available.

Section 1: general information

	Name of data element	Comment
1.1	Name of institution	Please specify the official name of your institution in the national language
1.2	Name of official contact person	Please specify the name of the person who will act as the contact person for the institution in the U-Map classification
1.3	Position of official contact person	Please specify the position of the official contact person in the institution
1.4	E-mail address of official contact person	Please specify the e-mail address of the official contact person in the institution
1.5	Website	Please specify the official website address of the institution
1.5	What is the legal status of your institution?	Please specify the official legal status of the institution (in national language).
1.6	How would you characterise your institution?	As a guideline for classifying an institution as public or private, see definitions given by the OECD:
		* An institution may be classified as public if ultimate control rests with a public (educational) authority or agency or a governing body most of whose members are appointed by a public authority or elected by public franchise.
		* An institution may be classified as private if ultimate control rests with a non-governmental orginasation or if its governing board consists mostly of members not selected by a public agency.
1.7	When was the institution in its current constitution founded?	Please specify the year the current institution was founded
1.8	If the institution comprises merged institutions, when was the oldest part founded?	Please specify the year the oldest part of the institution was founded.
	comments	

Section 2: student information

2.1	total number of students enrolled	Please specify the headcount number of students, including all levels of programs.
2.2	are doctoral students counted as students or staff?	In some systems doctoral students are not counted as students but as academic staff. To obtain comparable data on academic staff and student numbers, those doctoral students need to be identified.
2.3	if counted as students: how many doctoral students?	
2.4	The number of student internships in local enterprises	Please specify the number of student internships in local enterprises started in the reference year.
2.5	degree seeking students with a foreign qualifying diploma	Number of bachelor degree seeking students who got access to the program based on a qualification awarded abroad
2.6	degree seeking students with a foreign nationality	Number of bachelor degree seeking students with a foreign nationality.
2.7	number of incoming students	Number of degree students who come from abroad to the HEI for a period of at least three months
2.8	number of outgoing students	The number of degree students going abroad to another institution for a period of at least three months
2.9	Number of students in (international) joint programmes	
	comments	

Section 3: programme information

3.1	Number of bachelor programmes offered in English	Please specify the number of programmes offered in English language only
3.2	Number of bachelor programmes offered in a foreign language	Please specify the number of programmes offered in a foreign language only
3.3	Number of bachelor degree programmes offered	Please specify the number of bachelor programmes offered
3.4	Number of master programmes offered in English	Please specify the number of programmes offered in English language only
3.5	Number of master degree programmes offered in a foreign language	Please specify the number of programmes offered in a foreign language only
3.6	Number of master degree programmes offered	Please specify the number of bachelor programmes offered
3.7	Number of CPD courses offered	Please specify the nummer of continous professional development courses offered.
3.8	Number of programmes involving at least two traditional disciplines	Please specify the number of bachelor and master programmes that involve at least two disciplines
	comments	

Section 4: graduate information

4.1	Total number of degrees awarded	Please specify the number of degrees awarded in the reference year, including sub degree, bachelor, master as well as 'old undivided' degrees
4.2	Degree theses awarded in co operation with regional enterprises	Please specify the number of degree theses awarded in co operation with regional enterprises awarded in the reference year
4.3	doctorate degrees awarded	Please specify the number of doctorate degrees awarded in the reference year
4.4	Foreign doctorate degrees awarded	Please specify the number of doctorate degrees awarded to foreign students in the reference year
4.5	Average time to degree for bachelor students	Please specify the average time to degree for bachelor students over the last three years
4.6	Average time to degree for master students	Please specify the average time to degree for master students over the last three years
4.7	Bachelor graduation rate	Please specify the percentage of a cohort of bachelor students who graduated within five years after entering the programme
4.8	Master graduation rate	Please specify the percentage of a cohort of master students who graduated within three years after entering the programme
4.9	Percentage of graduates working in the region three years after graduation	Please specify the number of the graduates from 18 months ago, who work in the region, as a percentage of the total number of graduates from 18 months ago. This question refers to all levels combined.
4.10	region used	What a region is is not always clear. Often used definition are the NUTS2 regions and the regions as described in the IRE network. Please specify what region you used in this item.For listings of regions see http://www.innovating-regions.org/network/whoswho/regions_search.cfm or http://ec.europa.eu/eurostat/ramon/nuts/codelist_en.cfm?list=nuts
4.11	if no exact data are available please indicate what percentage range applies.	Please tick the range you think applies to you institution
4.11	International graduation rate	Please specify the number of graduates employed abroad or in an international organization 18 months after graduation
4.12	Graduate employment	Please specify the total number of graduates employed 18 months after graduation
	comments	

Section 5: staff data

5.1	number of academic staff (fte)	Academic staff includes personnel whose primary assignment is instruction, research or public service. These staff include personnel who hold an academic rank with such titles as professor, associate professor, assistant professor, instructor, lecturer, or the equivalent of any of these academic ranks. The category includes personnel with other titles (e.g. dean, director, associate dean, assistant dean, chair or head of department), if their principal activity is instruction or research. It does NOT include student teachers or teaching/research assistants.
5.2	Number of post doc positions	
5.3	number of academic staff with foreign nationality	The number of academic staff (headcount) with a foreign nationality
5.4	number of doctoral students with foreign nationality, counted as academic staff	
5.5	Number of fte staff working in international office	
5.6	Number of employees (FTE) working in Technology Transfer Office	
5.7	Presence of technology transfer activities as part of the performance appraisal system	Does the performance appraisal scheme include criteria related to technology transfer activity?
5.8	Presence of research performance as part of the performance appraisal system	Does the performance appraisal scheme include criteria related to research output performance?
	comments	

Section 6: income

6.1	Total income	Please specify the total income of the institution, in million euros
		Please specify a breakdown of total income by activity related source:
	Income from teaching:	
6.2	Direct government funding for teaching	Please specify the amount in million euros
6.3	Tuition fees from students in degree programmes	Please specify the amount in million euros
6.4	courses organised within the framework of continuing professional development	Please specify the amount in million euros
	Income from research:	
6.5	Direct basic government funding for research	Please specify the amount in million euros
6.6	European research programmes	Please specify the amount in million euros
6.7	Other international competitive research programmes	Please specify the amount in million euros
6.8	Research councils	Please specify the amount in million euros
6.8	Privately funded research contracts	Please specify the amount in million euros
	Income from other activities:	
6.9	licencing agreements	If a patent is given, the owner of the patent may grant a permission to a licensee to use the invention protected by the patent. In the license agreement the financial compensensation the licensor will receive from the licensee is specified. Here we ask for the income your institution has received as licensor of the patents it holds.
6.10	privately funded knowledge transfer contracts	Income from competitive or non-competitive public research funding is to be excluded here.
6.11	copyrighted products	Please specify the amount in million euros
	Comments	

Section 7: expenditure

7.1	Total expenditure	Please specify the total amount of euros (in million) spent in the reference year. Expenditure on university hospitals should be excluded.
	Breakdown by costcenter:	Please indicate what percentage of expenditure is dedicated to the activity mentioned
7.2	teaching	expenditure on teaching activities, CPD activities excluded
7.2	research	Expenditure on university hospitals are excluded
7.3	Knowledge transfer	refer to activities including knowledge transfer and business, cultural and social engagement.
7.4	other	
7.5	Are all staff on the pay roll of the institution?	Yes/no
7.6	Are all building owned by the institution?	Yes/no
	comment	

Section 8: research and knowledge transfer

8.1	number of peer reviewed publications	
8.2	Number of international networks the institution participates in actively	
8.3	The number of international prizes and scholarships won for research work	
8.4	Total number of collaborative research projects	
8.5	The number of research projects with regional firms	
8.6	The number of licence agreements	
8.7	The number of patents awarded to the higher education institution or its employees	
8.8	(Co)-funded chairs by industry	Please specify the number of chairs (co)-funded by industry
8.9	Chairs	Please specify the number of chairs at your institution
8.10	Count of all relevant research-based tangible outputs	Please specify the number of all relevant research based tangible outputs
8.11	The number of new patent applications filed by your institution	A patent is a set of exclusive rights for a fixed period of time in exchange for a disclosure of an invention. The exclusive right granted is the right to prevent of exclude others from making, using, selling or offering to sell or importing the invention. In order to be patented an invention must be novel, useful and not of an obvious nature.
8.12	Number of cultural awards and prices won	
8.13	The average annual number of start up firms established in the last three years	A start-up firm is a company that initially was the result of a licensing/transferring of technology process from your institution. Spin-off companies are also considered to be start-up firms.