

**How to measure internationality and
internationalisation of higher education
institutions!
Indicators and key figures**

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I. Contemporary situation

International references and international exchange form part of the core thinking of modern higher education institutions (HEIs). The influx of students from all over the world and the movement of researchers both leave their marks on German HEIs, German students are more mobile than ever. Internationality currently plays a key role in nearly all HEIs and within the overall context of higher education politics (excellence initiative, accreditation process, intra-institutional assessment, target agreements etc.). International research cooperation is gaining more and more weight. Furthermore, graduates are increasingly having to find their way and present themselves in a global job market. In addition, the proliferation of global budgets and targeted use of resources also raises the need to find ways of measuring the international arena.

On the other hand, this area has until now barely been shown to be measurable using valid and comparable indicators. We often content ourselves with easily attainable or already available process-generated key figures such as the number of Humboldt scholarship holders or the number of partnership agreements, without addressing the significance of key figures as an indicator for internationality of HEIs, or questions concerning construction validity, objectivity and reliability¹. This applies to the very heterogeneous and individualised approaches of individual HEIs that try to determine their own degree of internationality with the help of key figures; on the other hand, it also applies to most of the existing rankings making comparisons at international level (e.g. the Shanghai Ranking and the World Ranking of the *Times Higher Education Supplement*). At the same time, in target-settings and target agreements ministries demand that HEIs foster an international approach and document it appropriately.

¹ Even within the context of this paper the three quality criteria could not yet be checked. Interested parties are most likely to assess this area properly if they are provided with the relevant data. When using indicators, HEIs should take care to measure only what needs to be measured (construct validity). In addition, when repeating measurements as often as is required and the basic data has not changed in the meantime, the measurements should always give the same results (reliability). Also, the results have to be independent from the person who carries out the measurement. (objectiveness).

Not least due to missing indicators, which should be available nationwide and comparable for all German HEIs, the CHE has to date deliberately avoided the quantitative assessment of internationality and internationalisation in its University Ranking.

As a result of these findings, at the start of 2006, four German HEIs, represented by the heads of International Offices or similar institutions, came together under the supervision and methodical support of the CHE to create a project with the following main goals:

1. To measure internationality and/or internationalisation (3), a comprehensive set of instruments of possible indicators should be developed², which offers all German HEIs, independent from their individual target settings and profiles, a sufficient base to allow these areas to be discussed in upcoming internal and external debates.
2. Any HEI taking part in the working group can take away an individual and relevant set of indicators that help the institution visualise its own ideas of internationality and internationalisation.
3. Our intention was to develop a set of overall indicators that can also be used as the basis of a nationwide ranking of HEIs.

In order to achieve these goals, taking into account the different situations at the start, we invited sufficient HEIs to form a heterogeneous group, taking part:

² The two terms are defined in the following chapter.

1. **Ludwig-Maximilians-Universität München (LMU)**, to represent the large public university sector,
2. **Technische Universität Berlin (TUB)**, to represent technical universities,
3. **Fachhochschule Oldenburg/Ostfriesland/Wilhelmshaven (OOW)**, to represent *Fachhochschulen* (universities of applied sciences) on more than one site,
4. **Katholische Universität Eichstätt-Ingolstadt (KU)**, to contribute the experience and expectations of a small, private university.

Before we describe and explain the individual indicators, it is necessary to define terminology and set out the context in which the findings can be interpreted.

Definition of internationality and internationalisation

If you look at the different target agreements, announcements and publications of HEIs and ministries on the topic of internationalisation and internationality, it is easy to see that the terms are often mixed up or used synonymously. They often speak about “internationalisation” in cases where key figures or indicators barely show the current level of “internationality” (e.g. the number of international students enrolled on a certain date X). We need to be able to tell the two terms apart in order to evaluate indicators appropriately with respect to target-setting and significance. Moreover, in order to achieve a useful measurement it should clearly be determined in advance what can be assessed as measurable “internationality” and “internationalisation” and under which conditions this takes place. In most cases, this can only be developed by institutions themselves in individual cases within the context of their strategy process.

Internationality and internationalisation can be classified as follows:

***Internationality** describes either an institution's current status or the status discernible at the date of data acquisition with respect to international activities.*

*In contrast, **internationalisation** describes a process in which an institution moves, in a more or less steered process, from an actual status of internationality at time X towards a modified actual status of extended internationality at time $X+N$. In this instance, in the event of proper planning, the actual status is set against an expected target status. The result is then the difference between the actual situation after expiration of the period n and the desired situation after expiration of the period n .*

In the latter case, the time period within which this change of situation will be observed, must be determined.

II. Methodology and premises for the selection of indicators

The development of useful indicators that avoid the generation of “dead” data demands that every individual HEI has a clear idea of what internationality means in the different performance areas. Thus, the situation in which indicators emerge by chance in the decision-making process or merely from existing data can be avoided. Experience has shown that people often start to look for indicators on the basis of availability, which rules out innovative approaches from the outset.

In the following, we intend to provide a tool set to reveal the performance of HEIs within a coherent system of key figures and indicators with respect to their internationality. It should be noted that the strategic outlook of the HEI must in no way be secondary to the short-term improvement of individual key figures and indicators.

To make terminology simple, we will henceforth use the term **indicator** even if we are talking about key figures. Indicators and key figures differ in definition: a key figure represents a value without any reference to other values (e.g. the number of international doctoral candidates), whereas an indicator describes such a key figure in relation to another figure (e.g. the proportion of international doctoral candidates in relation to the total number of doctoral candidates at an HEI).

In terms of higher education practices, it seems wise to split indicators into **input indicators** and **output indicators**. Factors contributing to the creation of findings (such as staff structures, curricular questions, allocation of resources) are subsumed under input indicators whereas output indicators measure findings at the end of academic processes (e.g. graduates or research findings).

III. Basic assumptions and specifications for the formation and selection of indicators

When selecting indicators, you should consider your own targets and whether or not the indicators can reasonably be acquired within time series. Indicators that require simple “Yes” or “No” answers (e.g.: “Has an internationalisation strategy been implemented?”) are acquired only once and can therefore only ever be indicators of internationality. Indicators that can reasonably be produced within time series and thus document a development (e.g. the number of international students relative to the total number of students) can be used two-fold: they depict internationality at the moment of acquisition and, on the other hand, they depict internationalisation within the reach of the time series. These time series state the development of the measured values, e.g. percentage growth, change in absolute figures over a time period, etc.

Up to now, determining internationality for evaluations and rankings has been based principally on snapshots³, either because “internationalisation” is a fresh topic on the agenda lacking both definition and target clarity, or because the focus is on improving one’s own competitive position (in terms of rankings and public funds allocated). In contrast, indicators for internationalisation (time series) have a medium- and long-term effect and are, for example, important in the context of quality assurance processes. Choosing a time series depends on the underlying strategy. Hence, our project is also designed to provide HEIs with a set of indicators that can be used over a longer period of time.

As far as the time series are concerned, these have to be considered as a whole as this is the only way to recognise long-term developments. Aggregations over a time series bear the risk of minimising differences.

Let us give an example for illustration: In 1990, the proportion of international students at an HEI was 10%. This figure developed as follows: 15% in 1995, 5% in 2000 and 30% in 2005. If you consider solely the development from 1990 to 2005 with both the starting and final values, you would record a surplus of 20%. The average value over the time series would be 15%. The collapse in 2000

would not show up at all and would therefore not be included in an analysis or cause study.

Also, the differentiation of indicators into input indicators and output indicators can be very useful. Input indicators make sense, for example, if you want to compare your type of organisation with others, or if you are aware of weaknesses and can link them to certain organisational aspects. Output indicators are helpful if you want to unveil possible trouble areas without these necessarily pointing to input areas in need of improvement. The latter has to be undertaken in a separate process. Moreover, output indicators can document developments specified in a strategy or target agreement

Before using indicators, HEIs must set themselves internationality goals and draw up a strategy of how to achieve these goals. This process consists of the following steps:

- a. definition of the internationalisation targets,
- b. development of a coherent internationalisation strategy⁴,
- c. compilation of a catalogue of short-, medium- and long-term measures ensuring the implementation and realisation of the internationalisation strategy,
- d. development of a quality management system that:
 - effectively accompanies the implementation of the measures and adjusts the measures, if necessary.
 - documents and analyses its influence on the strategy targets.

The use of indicators from the following set of instruments only makes sense if the indicators actually describe internationalisation and internationality. The process of acquisition, the pre-definition of targets and determining how the results are to be used should all be developed jointly with and carried through by all the parties concerned.

³ Often using pure identification numbers, therefore without the reference typical for indicators.

⁴ This should not lead to commonplaces such as “international university“ or “world-class university“, but has to describe targets, measures and quality assurance.

Hidden targets such as the acquisition of indicators for the determination of budget cut options jeopardise the entire process. This leads to an open discussion only in the rarest of circumstances, and the willingness to cooperate of the departments providing the data is accordingly low. We hold the view that open communication and the willingness to reach a consensus are preconditions for the success of indicator-based internationalisation processes.

The focus of interest is therefore on the internal processes in HEIs that produce the internationality or internationalisation indicators. To this end, a set of targets was developed. In a second step, these were assigned to overall aspects, research or teaching and studies. Then, thematic areas were defined – such as service, new recruits or study programmes – to which individual indicators were assigned. These indicators refer to either input parameters or output parameters. Most indicators can also be produced within time series and can thus be used for measuring internationalisation (process). For this reason, these indicators are marked by a * in the following charts.

The question whether or not data on which the indicators are based can be acquired has deliberately been factored out of the set of instruments in order to achieve, preferably, a comprehensive set of instruments for different types of HEIs. HEIs have to check for themselves whether or not an indicator makes sense for them and whether the data can be acquired. Our experience with rankings shows that there is a correlation between importance and collectibility. If the process of internationalisation as a comparison of target and actual states or the determination of the actual state of internationality is of prime interest for the HEI, it will be possible to acquire data which have so far not been available.

Requirements, however, vary for the third goal: the determination of the overall indicators applicable in rankings. As several types of HEIs were represented in our working group, it is highly probable that the suggested indicators are generally suitable for ranking. The decision on how to use these indicators is up to the interested party.

IV. Indicators for internationality and internationalisation

The indicators in our list allow for several interpretations of internationality and internationalisation. For every aspect, we draw your attention, if necessary, to special characteristics and possible difficulties. Whether these refer to overall aspects or the areas of research and studies, the general view of the CHE is that indicators shall only be used for comparative rankings if they are assigned to scientific disciplines. Indicators stating the internationality or internationalisation of an HEI in toto should play only a descriptive role in rankings. They are rather being used within an HEI or for comparison with other HEIs.

As far as the time series are concerned, we usually recommend observations over a period of 5 to 10 years to receive useful comparable values and set a limit to data acquisition.

As a matter of principle, the suggested key figures and indicators refer to actual values, not to target values, i.e. scholarship funds are the funds actually distributed (expended costs) and not the budgeted funds.

1. Overall aspects

A number of indicators for internationality and internationalisation are located at the level of the overall university and/or other structural units such as the faculties. This quite naturally produces overlapping areas with the areas of research and teaching so that some indicators can be used twice at the input level⁵.

The indicators listed in this paper can be applied to both the overall university or to smaller structural units.

⁵ For the following considerations hospital staff has been examined separately, as otherwise it is not possible to reasonably compare HEIs with hospitals and such without.

1.1. Input

1.1.1. Management in general

Management is a decisive factor for the internationality of an HEI or for the process of internationalisation. In this respect, “management” defines not only the management staff of an HEI but also comprises all tasks and structures associated with the management of an HEI.

A crucial aspect in the context of higher education management and its importance for internationality and internationalisation is the managers’ personality. We therefore want to point out that even indicators such as “degree of anchorage” cannot depict or measure to what extent the personality of the respective managers encourage internationalisation.

1.1.1.1.	Degree of anchorage in the management of the HEI (how many of the questions 1.1.1.2. to 1.1.1.10. have been answered with “yes”? All answers = “yes” corresponds to 100%)	*
1.1.1.2.	Is the person responsible for international relations directly subordinate to the management of the HEI or does he report directly to it? (yes/no)	
1.1.1.3.	Is there a member of the management of the HEI responsible for international relations? (yes/no)	
1.1.1.4.	Is internationality/internationalisation regularly a topic in management conferences? (yes/no)	
1.1.1.5.	Is internationality/internationalisation regularly an agenda item in management conferences? (yes/no)	
1.1.1.6.	Does the vice-chancellor/president regularly attend international representational events (visits of delegations, visits at partner universities)? (yes/no)	
1.1.1.7.	Does an internationalisation strategy including a defined catalogue of measures exist? (yes/no)	

1.1.1.8.	Is internationality/ internationalisation incorporated into the strategy of the HEI and does it produce measures? (yes/no)	
1.1.1.9.	Is internationality/ internationalisation incorporated into target agreements with the provider, the higher education council and other bodies responsible for target agreements? (yes/no)	
1.1.1.10.	If 1.1.1.8. and/or 1.1.1.9 have been answered with „Yes“: To what extend is it linked to funding and human resources?	*

1.1.2. Professors

1.1.2.1. Internationality of professors

1.1.2.1.1.	Number of professors who have spent at least 1 semester abroad in the last x years	*
1.1.2.1.2.	Proportion of professors who have spent at least 1 semester abroad relative to the total number of professors	*
1.1.2.1.3.	Number of international business trips per annum of professors in relation to the total number of professors	*
1.1.2.1.4.	Number of professors who gained their doctoral degree abroad	*
1.1.2.1.5.	Proportion of professors who gained their doctoral degree abroad relative to the total number of professors	*
1.1.2.1.6.	Number of professors with international professional experience outside the HEI	*
1.1.2.1.7.	Proportion of professors with international professional experience outside the HEI relative to the total number of professors	*

1.1.2.2. International recruitment of professors

1.1.2.2.1.	Number of professors appointed from abroad	*
1.1.2.2.2.	Number of professors who have been appointed from abroad relative to the total number of professors	*
1.1.2.2.3.	Number of non-German professors or professors with a migrant background	*
1.1.2.2.4.	Proportion of professors of non-German nationality or from a migrant background relative to the total number of professors	*
1.1.2.2.5.	Number of international visiting researchers (minimum duration 1 week)	*
1.1.2.2.6.	Number of international visiting researchers (minimum duration 1 week) in relation to the total number of professors	*
1.1.2.2.7.	Total number of all days of stay of all international visiting researchers (minimum duration 1 week) per annum	*

1.1.3. Young researchers

Young researchers contribute to a great extent to the reputation of the HEI through work-related migration, participation in conferences, publications or simply through their appeal to young students. Who is considered a young researcher depends on the framework of each individual HEI. For the purpose of cross-university comparisons, we define doctoral candidates and post-doctoral researchers as young researchers.

1.1.3.1. Internationality of young researchers

1.1.3.1.1.	Number of young researchers who gained their degree abroad (without doctorate)	*
1.1.3.1.2.	Present proportion of young researchers who gained their degree abroad (without doctorate) relative to the total number of young researchers	*
1.1.3.1.3.	Number of young researchers who gained their doctoral degree abroad	*
1.1.3.1.4.	Proportion of young researchers who gained their doctoral degree abroad relative to the total number of young researchers	*
1.1.3.1.5.	Number of young researchers with post-doctoral research periods (minimum duration?) abroad	*
1.1.3.1.6.	Proportion of young researchers with post-doctoral research periods abroad relative to the total number of young researchers	*
1.1.3.1.7.	Total number of young researchers who have gained at least one university degree abroad (Bachelor, Master, PhD)	*
1.1.3.1.8.	Proportion of young researchers who gained at least one university degree abroad (Bachelor, Master, PhD) relative to the total number of young researchers ⁶	
1.1.3.1.9.	Number of participations of young researchers in international conferences (with qualified contribution)	*

In small HEIs or organisational units a classification into degree types might not be very conclusive due to low case numbers. In this case we recommend using the aggregate indicators (1.1.3.1.7. and/or 1.1.3.1.8.).

⁶ Small figures in 1.1.3.1.1., 1.1.3.1.3. and 1.1.3.1.5. might in individual cases result in very low case numbers, which give no statistically relevant statement.

1.1.3.2. International recruitment of young researchers

1.1.3.2.1.	Number of young researchers recruited from abroad (doctoral candidates, post-doctoral researchers)	*
1.1.3.2.2.	Proportion of young researchers recruited from abroad (doctoral candidates, post-doctoral researchers) relative to the total number of young researchers	*
1.1.3.2.3.	Number of international doctoral candidates (international students with a non-German education)	*
1.1.3.2.4.	Proportion of international doctoral candidates (international students with a non-German education) relative to the total number of doctoral candidates	*
1.1.3.2.5.	Number of international post-doctoral researchers (international students with a non-German education)	*
1.1.3.2.6.	Proportion of international post-doctoral researchers (international students with a non-German education) relative to the total number of post-doctoral researchers	*
1.1.3.2.7.	Total number of international young researchers (doctoral candidates, post-doctoral researchers)	*
1.1.3.2.8.	Proportion of international young researchers (doctoral candidates, post-doctoral researchers) relative to the total number of young researchers	
1.1.3.2.9.	Number of doctoral candidates in double doctoral degree study programmes	*
1.1.3.2.10.	Proportion of doctoral candidates in double doctoral degree study programmes relative to the total number of doctoral candidates	*

1.1.4. Administrative staff/non-academic staff

The significance of administrative staff for successful internationalisation and therefore the significance, the personal qualifications of these university members have for the overall state of internationality, has rather been neglected

so far. The more HEIs see internationality in a holistic context, the greater is the role played by the administration.

We include in this category all persons who are university employees and cannot be included in the staff categories listed under 1.1.1. to 1.1.3.

1.1.4.1. General administrative staff/non-academic staff

1.1.4.1.1.	Number of non-academic staff/ administrative staff with foreign language skills as a precondition for employment (including secretaries)	*
1.1.4.1.2.	Proportion of non-academic staff/ administrative staff with foreign language skills as a precondition for employment (including secretaries) relative to the total number of administrative staff	*
1.1.4.1.3.	Number of non-academic staff/ administrative staff who have taken part in international administration exchange programmes	*
1.1.4.1.4.	Proportion of non-academic staff/ administrative staff who have taken part in international administration exchange programmes relative to the total number of administrative staff	*
1.1.4.1.5.	Number of non-academic staff/ administrative staff who have taken part in internationally-oriented further training programmes ⁷	*
1.1.4.1.6.	Proportion of non-academic staff/ administrative staff who have taken part in internationally-oriented further training programmes relative to the total number of non-academic staff/ administrative staff	*

⁷ E.g. foreign languages, intercultural training, internationalisation etc.

1.1.4.2. International office and equivalent institutions

1.1.4.2.1.	Number of posts (full time equivalent=FTE) in the international core business (international strategy and basic questions, scientific cooperation, counselling and tutoring of students, alumni, admission)	*
1.1.4.2.2.	Number of posts (full time equivalent=FTE) in the international core business (international strategy and basic questions, scientific cooperation, counselling and tutoring of students, alumni, admission) in relation to the total number of administrative posts	*
1.1.4.2.3.	Number of posts (full time equivalent=FTE) in the international areas of counselling and tutoring of students and admission in relation to the total number of students	*
1.1.4.2.4.	Number of posts (full time equivalent=FTE) in relation to the degree of coordination (1.1.4.2.13.)	*
1.1.4.2.5.	Number of employees with foreign language skills as a precondition for employment	*
1.1.4.2.6.	Proportion of employees with foreign language skills as a precondition for employment relative to the total number of administrative staff	*
1.1.4.2.7.	Proportion of FTEs with international experience as employment criterion relative to the total number of FTEs	*
1.1.4.2.8.	Number of employees with international experience (minimum 3 months)	*
1.1.4.2.9.	Proportion of employees with international experience (minimum 3 months) relative to the total number of international office administrative staff	*
1.1.4.2.10.	Number of employees of international office who have taken part in international administration exchange programmes	*
1.1.4.2.11.	Level of coordination Reciprocal value of the number of organisational units performing international core business tasks (international strategy and basic questions, scientific cooperation, counselling and tutoring of students, alumni, admission) (1/n))	*

1.1.5. Resources

In addition to staff, financial resources, the equipment of the relevant organisational units and activities play also a role in the evaluation of internationality. A distinctive level of internationality cannot realistically be achieved if sufficient infrastructure is lacking.

1.1.5.1.	University budget for international cooperation	*
1.1.5.2.	Proportion of the budget for international cooperation in relation to the total budget	*
1.1.5.3.	Number of posts (full time equivalent=FTE) for counselling on international applications (e.g. EU projects, double degrees etc.)	*
1.1.5.4.	Proportion of posts (full time equivalent=FTE) for counselling on international applications (e.g. EU projects, double degrees, etc.) relative to the total number of posts for administrative staff	*
1.1.5.5.	Special service offers for international researchers (descriptive)	

1.1.6. International networking

Ostensible indicators occasionally brought into play such as the number of partner universities or ERASMUS agreements are, from our point of view, not significant in terms of the quality of the partnerships and their influence on exchange numbers or similar. We can here at best use descriptive indicators that state the degree of international networking.

As long as university networks – in contrast to professional networks such as the AACSB Group⁸ - do not provide clear and measurable admission criteria, they cannot be used as distinctive features. Membership in networks, however, can

⁸ The Association to Advance Collegiate Schools of Business (AACSB): <http://www.aacsb.edu>

well be included in strategic planning within the HEI and in terms of target-oriented partnership selection (joint study programmes etc.).

1.1.6.1.	Participation in international networks (COIMBRA, EUA, LERU, etc.) (yes/no including presentation facilities)	*
1.1.6.2.	Membership in international benchmarking initiatives/clubs (yes/no including presentation facilities)	*
1.1.6.3.	Active partnerships: Number of partnerships in which at least one mobility has taken place	*
1.1.6.4.	Active SOKRATES-ERASMUS partnerships: Number of SOKRATES-ERASMUS partnerships in which at least one mobility has taken place	*

2. Academic research

Traditionally, research is given special significance for the quality of an HEI. Academic research plays also an important role concerning internationality and internationalisation. Approaches to evaluation and ranking have to date almost entirely been limited to specific aspects of findings, such as publications and citations, or to a few and statistically mostly insignificant indicators at the input area, such as the number of scholarship holders from the Alexander von Humboldt Foundation⁹ or the number of publications. In our compilation we try to offer more indicators to do justice to the variety of research aspects. The indicators that will be used in the end will depend on the goals of the HEI.

⁹ Scholarships by the Alexander von Humboldt Foundation

2.1. Input

2.1.1. Professors

2.1.1.1. Internationality of professors

2.1.1.1.1.	Number of Professors having spent at least 1 study semester abroad	*
2.1.1.1.2.	Proportion of professors having spent at least 1 study semester abroad relative to the total number of professors	*
2.1.1.1.3.	Number of business trips professors have taken abroad relative to the total number of professors	*
2.1.1.1.4.	Number of professors who have acquired a doctoral degree abroad	*
2.1.1.1.5.	Proportion of professors who have acquired a doctoral degree abroad relative to the total number of professors	*
2.1.1.1.6.	Number of professors with professional experience abroad	*
2.1.1.1.7.	Proportion of professors with professional experience abroad relative to the total number of professors	

2.1.1.2. International recruitment of professors

2.1.1.2.1.	Number of professors appointed from abroad	*
2.1.1.2.2.	Proportion of professors appointed from abroad relative to the total number of professors	*
2.1.1.2.3.	Number of non-German professors or professors with a migrant background	*
2.1.1.2.4.	Proportion of professors of non-German nationality or from a migrant background relative to the total number of professors	*
2.1.1.2.5.	Number of international visiting researchers per annum	*
2.1.1.2.6.	Number of international visiting researchers per annum in relation to the total number of professors	*
2.1.1.2.7.	Total number of all days of stay of all international visiting researchers per annum	*

2.1.2. International networking in research

In connection with international networking there is particularly one significant question: how can academic research, as an activity that reaches beyond the national context, reasonably be acquired and presented? This can relate to funds procured externally in an international context or activities that ensure a high degree of international visibility of the HEI in the respective discipline that go beyond the individual, such as, for example, co-editorships of renowned journals. Additionally, international doctoral training courses or graduate schools – active in the cross-over area between teaching and research and input and output – may be included.

2.1.2.1.	Procured third-party funding from international sponsors per annum	*
2.1.2.2.	Amount of procured third-party funding from international sponsors in relation to the total sum of third-party funds per annum	*
2.1.2.3.	Third-party funding for international projects with international cooperation partners per annum	*
2.1.2.4.	Amount of third-party funding for international projects with international cooperation partners in relation to the total amount of third-party funding per annum	*
2.1.2.5.	Amount of third-party funding for international projects with international cooperation partners in relation to the total university budget per annum	*
2.1.2.6.	Number of committee activities in international professional associations	*
2.1.2.7.	Number of co-editorships in international trade journals	*
2.1.2.8.	Number of international doctoral training courses/International graduate schools (To define these, criteria that, for example, have been developed by the DFG-German Research Foundation or DAAD – German Academic Exchange Service may be used.)	*

2.1.3. Resources

A continuous process of internationalisation cannot be achieved without the effective use of budgets by the HEI and the respective departments. In the same way, the corresponding procurement of resources for maintaining the status quo of internationality is of major importance as the costs for the on-going execution of activities are rarely less than an activity's start-up costs. Accordingly, the amount of funds may be used comparatively on a centralised or decentralised level for measuring internationality or internationalisation.

2.1.3.1.	Budget for international research cooperation (initiation, carrying out) and scholarship funds for international doctoral candidates	*
2.1.3.2.	Proportion of budget for international research cooperation (initiation, carrying out) and scholarship funds for international doctoral candidates relative to the total budget	*
2.1.3.3.	Number of available scholarships from university funds for international doctoral candidates (international students with non-German education)	*
2.1.3.4.	Number of available scholarships from university funds for international post-doctoral researchers	*

2.1.4. International research projects

Besides indicators relating to individuals and resources, the field of cooperative international research projects should be given equal consideration.

2.1.4.1.	Number of international research projects with international cooperation partners	*
2.1.4.2.	Number of researchers who are involved in international research projects with international cooperation partners	*
2.1.4.3.	Number of internationally funded (e.g. EU and other) research projects	*
2.1.4.4.	Proportion of internationally funded (e.g. EU and other) research projects relative to the total number of research projects	*

2.1.4.5.	Third-party funding procured in international research projects with international cooperation partners	+
2.1.4.6.	Third-party funding procured in internationally funded (e.g. EU and other) research projects	*

2.2. Output

2.2.1. Research findings

Evaluating research findings in connection with the internationality or internationalisation of HEIs often proves difficult because a particular research performance cannot always be awarded a certain level of international significance. This makes it more important not only to use the mere “citations-per-paper” (CPP) indicators but to relate them to a global standard.

2.2.1.1.	Number of international publications per researcher	*
2.2.1.2.	Number of international citations per paper CPP	*
2.2.1.3.	Number of international publications per researcher and number of international citations, measured by global standard according to CWTS ¹⁰ (to be used only for each discipline separately, comparable indicators may possibly be available for non-natural scientific disciplines in the future)	*
2.2.1.4.	Number of Highly Cited Authors (HiCi) according to Thomson ¹¹ (subject-related)	*
2.2.1.5.	Proportion of HiCis relative to the total number of researchers (subject-related)	*
2.2.1.6.	Number of international conference contributions per professor/researcher	*
2.2.1.7.	Number of international patents per professors/researcher	*

¹⁰ The citations per paper (CPP) are calculated first, then the mean Field Citations Score (FCSm) is calculated. Then the CPP is related to the FCSm. $CPP/FCSm$. If the result is 1, then the citation frequency corresponds to the global standard. If the result is less than 1, this means it is worse than the global standard; if the result is above 1, this means it is better than the global standard. For details see: <http://www.cwts.nl/cwts/AvR-ShanghaiConf.pdf>

¹¹ See also <http://hcr3.isiknowledge.com/>

2.2.2. Young researchers

Do young researchers belong to the input or output area? We chose the latter for our study because the international quality and significance of an HEI may often be seen in the number of young researchers originating from it. In this context, it should be taken into account that the number of doctoral candidates may differ clearly from the average number at an HEI in some disciplines or in the event of a regional – in the sense of a region in the world such as Europe – focus (for example in an extended cooperation with partners in France, as the doctorate has a different status there, and the number of doctoral candidates is therefore considerably lower). This could, if necessary, be balanced out by an intra-institutional weighting procedure.

2.2.2.1.	Number of completed doctoral degrees by young researchers from abroad or of those with a university degree from abroad	*
2.2.2.2.	Proportion of completed doctoral degrees by young scientist from abroad or of those with a university degree from abroad relative to the total number of doctoral degrees	*
2.2.2.3.	Number of double doctoral degrees	*
2.2.2.4.	Number of international double doctoral degrees in relation to the total number of doctoral degrees	*
2.2.2.5.	Number of doctoral degrees in international research cooperation projects	*
2.2.2.6.	Proportion of doctoral degrees in international research cooperation projects relative to the total number of doctoral degrees	*

3. Teaching and studies

When measuring the performance of internationality and internationalisation, the areas of teaching and studies are often given less importance than the area of research. If at all measurable, indicators in this area are restricted to values that can be easily obtained such as the proportion of international students of the total number of students. However, in the overall context, the explanatory value of such indicators is often limited and detached from actual study conditions. You can compile a balanced mix of indicators that considers many aspects: the quality of teaching and the teaching conditions as well as the composition of the body of students.

3.1. Input

3.1.1. Lecturers

The degree of international orientation of an HEI is to a great extent associated with the input. The internationality of lecturers and their commitment to and in the process of internationalisation are of fundamental significance. Without an internationally-oriented teaching body, it is difficult for other aspects such as a very international student body to make any essential contribution to internationalisation. Participation in visiting lectureships abroad, acquisition of visiting lectureships for the own HEI, a lecturer's own international experience (stays abroad, study programmes) are some of the possible aspects according to which the body of lecturers can be assessed with respect to internationality and internationalisation.

3.1.1.1. Internationality of professors/ lecturers

3.1.1.1.1.	Proportion of lecturers who teach technical disciplines in a foreign language (e.g. engineering taught in English) relative to the total number of lecturers	*
3.1.1.1.2.	Number of lecturers who have spent at least 1 semester abroad	*
3.1.1.1.3.	Proportion of lecturers who have spent at least 1 semester abroad relative to the total number of lecturers	*
3.1.1.1.4.	Number of lecturers who have held a visiting lectureship abroad	*
3.1.1.1.5.	Proportion of lecturers who have held a visiting lectureship abroad relative to the total number of lecturers	*
3.1.1.1.6.	Number of lectureship stays abroad in relation to the total number of lecturers	*
3.1.1.1.7.	Number of lecturers who gained their doctoral degree abroad	*
3.1.1.1.8.	Proportion of lecturers who gained their doctoral degree abroad relative to the total number of lecturers	*
3.1.1.1.9.	Number of lecturers with international work experience	*
3.1.1.1.10.	Proportion of lecturers with international work experience relative to the total number of lecturers	*

3.1.1.2. International recruitment of lecturers

3.1.1.2.1.	Number of lecturers appointed from abroad	*
3.1.1.2.2.	Proportion of lecturers appointed from abroad relative to the total number of lecturers	*
3.1.1.2.3.	Number of non-German lecturers of nationality or lecturers from migrant background	*
3.1.1.2.4.	Proportion of non-German lecturers of nationality or lecturers from migrant background relative to the total number of lecturers	*
3.1.1.2.5.	Number of international visiting lecturers	*
3.1.1.2.6.	Number of international visiting lecturers in relation to the total number of professors	+

3.1.1.2.7.	Total number of days of stay of all international visiting lecturers in relation to the total number of visiting lecturers	*
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3.1.2. Students (Bachelor/Master handled separately)

3.1.2.1.	Number of international students with non-German education	*
3.1.2.2.	Proportion of international students with non-German education relative to the total number of students	*
3.1.2.3.	Number of incoming international exchange students	*
3.1.2.4.	Proportion of incoming international exchange students relative to the total number of students	*
3.1.2.5.	Number of outgoing exchange students	*
3.1.2.6.	Proportion of outgoing exchange students relative to the total number of students	*
3.1.2.7.	Number of students in joint or double/multiple degree programmes	*
3.1.2.8.	Proportion of students in joint or double/multiple degree programme relative to the total number of students	*
3.1.2.9.	Number of students in study programmes with an obligatory stay abroad of a minimum duration of 3 months (ERASMUS standard)	*
3.1.2.10.	Proportion of students in study programmes with obligatory stay abroad of a minimum duration of 3 months (ERASMUS standard) relative to the total number of students	*
3.1.2.11.	Number of students with an international internship	*
3.1.2.12.	Proportion of students with an international internship relative to the total number of students	*
3.1.2.13.	Number of outgoing exchange students (3.1.2.5.) and of students with an international internship (3.1.2.11.)	*
3.1.2.14.	Proportion of outgoing exchange students and of students with an international internship relative to the total number of students	*

3.1.3. Service and administration

The service environment is of major importance especially in the area of teaching and studies. Nevertheless, when defining key figures for internationalisation, it is often considered merely – if at all – as rudimentary. We think that many efforts will remain fruitless without an internationally-oriented administration that is indicative of the international momentum in an HEI and the international attitude of the staff, and which is incorporating this in everyday work. We have examined staff conditions in the overall aspects, and our intention here is to focus on faculty- or institute-specific aspects. For intra-institutional measurements, it seems wise to use more rather than less indicators in the event of any doubt to present to a reliable picture.

3.1.3.1.	Administrative posts in the faculty for mentoring international students, doctoral candidates and visiting lecturers in relation to the total number of students (per faculty)	*
3.1.3.2.	Internationally-oriented Career Center (yes/no)	
3.1.3.3.	Proportion of staff with foreign nationality of the non-academic staff relative to the faculty/institute	*
3.1.3.4.	Number of international professional qualification offers with or without credit points in relation to the total number of students	*
3.1.3.5.	Lectures on intercultural learning (yes/no)	
3.1.3.6.	Information on countries/cultures/societies (yes/no)	

3.1.4. International networks for teaching and studies

While research is today acknowledged as an international activity, this is not necessarily the case in terms of teaching.

Due to the Bologna process and the globalisation of the education market, teaching networks at the international level are gaining in importance. Still, it is very difficult to find quantitatively obtainable and unambiguously allocable indicators for this area.

3.1.4.1.	Number of incoming international exchange students in relation to the number of partnership agreements (ERASMUS and others)	*
3.1.4.2.	Number of outgoing exchange students in relation to the number of partnership agreements (ERASMUS and others)	*
3.1.4.3.	Number of incoming international exchange students in relation to the number of partnership agreements (ERASMUS and others) for the 10 partnerships with the highest exchange rate	*
3.1.4.4.	Number of outgoing exchange students in relation to the number of partnership agreements (ERASMUS and others) for the 10 partnerships with the highest exchange rate	*
3.1.4.5.	Number of students enrolled on special academic courses at the summer university and its proportion relative to the total number of students	*
3.1.4.6.	Active membership in international specialised networks and associations (e.g. BWL: AACSB, AMBA, EQUIS) (yes/no with optional explanation)	*

3.1.5. Resources

Whilst research often has access to external funding, especially in international contexts, in the case of teaching and studies, this is possible only to an extremely lesser extent or with enormous administrative efforts. Intra-institutional allocations therefore play an important role as does the ability of the HEI to procure external funding.

3.1.5.1.	Total sum of scholarship funds for stays abroad in relation to the total number of students (own funds of the HEI)	*
3.1.5.2.	Total sum of scholarship funds for stays abroad in relation to the total number of students (externally procured funding)	*
3.1.5.3.	Total sum of scholarship funds for stays abroad in relation to the total number of students (3.1.5.1. and 3.1.5.2. aggregate)	*
3.1.5.4.	Budget for international higher education marketing in relation to the total budget	*
3.1.5.5.	Proportion of the HEI's own funds for international visiting lecturers in relation to the total budget for academic staff	*
3.1.5.6.	Funds for supporting self-organised stays abroad in relation to the total number of students	*

3.1.6. Study programmes/Curricula

In addition to lecturers, students and resources, study programmes and curricula are of central importance for the recognition of internationalisation and internationality in teaching. There are several ways for HEIs or faculties to adopt new focuses or raise the existing international profile. Correspondingly, there are numerous indicators that may be useful. Here too, it seems wise not to restrict oneself to one or two indicators but to make a list of those indicators that help measure the internationality of study programmes in the long term.

3.1.6.1. Course offers

3.1.6.1.1.	Proportion of courses taught in a foreign language in relation to the total course offers	*
3.1.6.1.2.	Proportion of courses taught in a foreign language that are institutionalised in the respective curriculum in relation to the total course offers	*
3.1.6.1.3.	Proportion of credit points for foreign language courses in relation to the total number of credit points (compulsory or optional)	*
3.1.6.1.4.	Number of foreign languages offered at the HEI	*

3.1.6.1.5.	Number of foreign language teaching hours per week (all languages) in relation to the total number of students	*
3.1.6.1.6.	Mobility windows incorporated into the respective curriculum	*
3.1.6.1.7.	Number of lecture stays abroad of university teachers (Teaching Staff (TS) Mobilities) in relation to the total number of lecturers (Outgoing=Incoming) ¹²	*
3.1.6.1.8.	Number of places in study programmes exclusively set aside for international students (Master) in relation to the total number of students	*
3.1.6.1.9.	Proportion of credits acquired abroad and recognised by the HEI in relation to the total number of credit points	*

3.1.6.2. Measures for international professional qualification

3.1.6.2.1.	Number of places offered in programmes for intercultural learning in relation to the total number of students	*
3.1.6.2.2.	Number of places offered in programmes for international application training in relation to the total number of students	*
3.1.6.2.3.	Number of places offered in programmes providing information about countries/cultures/societies in relation to the total number of students	*

3.2. Output

3.2.1. Graduates (Bachelor/Master/doctoral candidates to be handled separately)

As far as teaching is concerned, the allocation of funds is often input-oriented. Especially in international contexts, it makes sense, however, to factor in the output area.

¹² We can only measure funding for lecturers travelling abroad. The figure for incoming lecturers to an HEI does not have to be obtained in most cases, but the ratio between the two mobility streams usually balances itself out, so incoming = outgoing.

3.2.1.1.	Number of graduates with joint or double/multiple degrees	*
3.2.1.2.	Proportion of graduates with joint or double/multiple degrees relative to the total number of graduates	*
3.2.1.3.	Number of graduates of foreign nationality (international graduates with a non-German education)	*
3.2.1.4.	Proportion of graduates of foreign nationality (international graduates with a non-German education) in relation to the total number of graduates	*
3.2.1.5.	Ratio between international first-year students (international graduates with a non-German education) and graduates of a given starting year of studies	*
3.2.1.6.	What percent of graduates of foreign nationality (international graduates with a non-German education) are tutored/included in the alumni paper after 3 years? (a target number should be agreed here)	*
3.2.1.7.	Is there information about the whereabouts and professional development of the graduates? (yes/no)	

3.2.2. International reputation

Most international rankings leave the impression that it is possible to define a “world-class university“. This leads increasingly to political decisions as regards funds allocations based on rankings, and therefore to an acceptance of these assumptions as facts. An international reputation is particularly difficult to measure.

3.2.2.1.	Number of international applications for study programmes (incl. doctoral programmes) in relation to the total number of applications	*
3.2.2.2.	Number of international applications for special academic courses in summer universities (absolute number is here valid, as no capacity regulation (in Germany called Kapazitätsverordnung or KapVO) is applicable)	*
3.2.2.3.	Number of international applications for special academic courses in summer universities in relation to the number of available places	*
3.2.2.4.	Number of international applications for special academic courses in summer universities in relation to the number of courses offered	*

V. Conclusion

General

A total of 186 key figures and indicators could be determined in the project, 170 of them can be illustrated in time series. There are 162 key figures and indicators that emerge from the areas of input and process; 24 could be determined for the output area; 69 indicators refer to “overall aspects”, 45 to „research“, and 72 to “teaching and studies“. This is a firm foundation for several types of selection and strategy options.

Most of the indicators can be depicted on different levels of aggregation, starting at individual institutes via departments/faculties up to entire HEIs. However, the experience gained from the CHE University Ranking shows that a subject-specific assessment is preferable at least in the case of the key figures and indicators in research as well as teaching and studies as an overall assessment of the entire HEI blurs the differences between the individual subjects and thus the profile of the HEI.

We recommend measuring a target or a measurement with more than one indicator as indicators generally focus on a certain aspect of performance, but it is usually difficult to illustrate a broad target or a complex process with an individual indicator. Indicators have to have a sufficiently high mutual correlation, but not so high a correlation, though, that it appears as if they are measuring the same thing in the end.

Let us give an example: an HEI envisages the strategic target of offering experience in an international environment to those students who are not studying abroad. For this purpose, the number of international students and professors shall be increased. The following indicators can be used here: 1.1.2.2.4. “Proportion of professors of foreign nationality or from a migrant background in relation to the total number of professors“, 3.1.6.1.1. “Proportion of courses taught in a foreign language in relation to the total course offers“, and 3.1.2.4. “Proportion of incoming international exchange students in relation to the total number of students“.

If you have a look at the effort of data acquisition and the regular update of the data stock, it is necessary to concentrate on a manageable number of indicators. The selection should be in line with the international strategy of the HEI.

The question whether or not data can be acquired arises at the end. When compiling a set of indicators one should not start with thinking about availability of the indicators. Instead, substantive considerations should take precedence over the question about which aspects of internationality should be measured with which indicators with reference to the individual objectives of the HEI.

It can then be checked in a second step, for which of the indicators the required key figures and data are already available in the HEI, or the effort it would take to acquire them. Our list contains only those key figures and indicators for which we assume data generally available in an HEI. Nevertheless, this may result in different levels of effort, depending on the quality of an HEI's internal reporting system. This can be taken into account with reference to selecting alternative key figures and indicators for the same area of performance.

Overall Indicators

With the indicators collected in this paper we intend to offer guidance for the selection of indicators. Of course, they are not rigid. HEIs can use these indicators as a modular system in line with their own strategies.

For comparative evaluations and rankings, however, we advise you to select indicators that can be obtained in all universities by justifiable effort. We suggest the following indicators:

For overall aspects as well as teaching and studies:

1	1.1.2.2.2.	Number of professors appointed from abroad relative to the total number of professors	*
2	1.1.2.2.6.	Number of international visiting researchers (minimum duration 1 week)	*
3	3.1.2.2.	Proportion of international students with non-German education relative to the total number of students	*
4	3.1.2.4.	Proportion of incoming international exchange students relative to the total number of students	*
5	3.1.2.14.	Proportion of outgoing exchange students and students with an international internship relative to the total number of students	*

6	3.1.6.1.7.	Number of lecture stays abroad undertaken by lecturers (Teaching Staff (TS) Mobilities) in relation to the total number of lecturers (Outgoing=Incoming) ¹³	*
7	3.2.1.2.	Proportion of graduates with joint or double/multiple degree relative to the total number of graduates	*
8	3.2.1.4.	Proportion of graduates of foreign nationality (international graduates with a non-German education) relative to the total number of graduates	*

We have extracted some additional – subject-specific – indicators from the student interviews which make up the CHE University Ranking that depict aspects of the internationality of teaching and studies from the student point of view, including:

- International orientation of the course offer
- Counselling for study programmes or internships abroad
- Support by lecturers in organising stays abroad
- Importance of the opportunity of international study programmes for students

For research we suggest the following indicators:

1	1.1.2.2.2.	Number of professors appointed from abroad relative to the total number of professors	*
2	2.1.2.2.	Amount of procured third-party funding from international sponsors in relation to the total sum of third-party funds per annum	*
3	2.1.2.4.	Amount of third-party funding for international projects with international cooperation partners in relation to the total amount of third-party funding per annum	*

There are other indicators in addition to those listed that would make sense in the examination of overall aspects but cannot be used in the CHE University Ranking due to methodological aspects as they cannot be assigned to specific subjects. Here, we would suggest:

¹³ We can only measure funding for lecturers travelling abroad. The figure for incoming lecturers to a HEI does not have to be obtained in most cases, but the ratio between the two mobility streams usually balances itself out, so incoming = outgoing.

1.1.4.2.2.	Number of posts (full time equivalent=FTE) in the international core business (international strategy and basic questions, scientific cooperation, counselling and tutoring of students, alumni, admission) in relation to the total number of administrative posts	*
1.1.4.2.3.	Number of posts (full time equivalent=FTE) in the international areas of counselling and tutoring of students and admission in relation to the total number of students	

Which of the suggested indicators will be applied in which ranking is, of course, the decision of those responsible for the respective rankings.

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