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## Doctorate in Transition

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# Doctorate in Transition



## Greeting

The doctorate is the prerequisite for an academic or academic-based career.

It is a particular concern of the science academies to plea the case for keeping the doctorate as a documentation of an individual's first independent research. It is not the continuation of education in a third phase of studies, since its intellectual aspiration extends well beyond that. An adequate institutional framework ensures the quality of the doctorate. It should go without saying that every doctorate must be the proof of independent and original academic research. Yet, in view of the organisational developments that today jeopardise the quality and function of the doctorate, the importance of this self-evident fact must be specifically ensured.

With the present statement, the National Academy of Sciences Leopoldina, acatech – National Academy of Science and Engineering, and the Union of the German Academies of Sciences and Humanities offer scientific and political actors in this field a grounded analysis of the current situation in Germany in comparison with other countries. Based on this, deficits are identified and recommendations for reform are submitted. This shows that scientific institutions and politics must collaborate so that the doctorate retains its function in the scientific system.

We would like to express our thanks to the speaker and to all those who contributed in the workgroup, to the expert reviewers as well as to the staff of the offices who developed and commented on this statement over the past two years.



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## Foreword

The doctorate is the independent realisation of an academic project, documented by the awarding of a doctoral degree. In Germany, the institutional right to award doctorates is regulated by federal state laws and stipulates that universities, equivalent higher education institutions or correspondingly accredited institutions should be the institutions awarding the title. A doctorate is based on an independent research achievement, the result of which is made public in written form as a dissertation.

The understanding of what a doctorate is and the procedures towards obtaining a doctoral degree are currently undergoing a period of transition.<sup>1</sup> This is evident in recent developments and discussions in higher education policy in Germany, for instance with regard to the doctorate in medicine or to granting the right to award doctorates to universities of applied sciences or to non-university research institutions, and also with regard to the EU-wide standardisations in the context of the Bologna Process, and the adoption of procedural models from other academic traditions. In these debates, it is always important to recall the doctorate's structural role, both for innovation in the sciences and for the public (society, economy). Current trends and problems must be made explicitly, and they must be taken into consideration within the development of the doctorate. Especially since the public debate on plagiarism scandals, the question concerning adherence to ethical and scientific standards and hence concerning quality assurance has taken centre stage. The doctorate is still the prerequisite for the academic career of a young scientist; its prestige may also be useful elsewhere (professionally), namely in promoting a career outside of academia and research.

This current transition has repercussions not only for the opportunities of individuals, but also for the scientific system as a whole. Not least because of the growing importance of third-party funded research, the number of people with temporary contracts in projects is rising. They are offered the prospect of a further degree following the Master's degree or a comparable degree. This trend is amplified by the tendency, implicitly promoted by the Bologna Process, for the doctorate to become the third phase in a system of tiered study programmes. Furthermore, one can observe initiatives in certain federal states in Germany, in addition to the already established procedures of the cooperative doctorate, to grant by law certain organisational units of universities of applied sciences with an *autonomous right to award doctorates*.<sup>2</sup> This means that the implementation and quality control of the

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1 Since linguistic formulations of conceptual distinctions exhibit indissoluble regional and discipline-specific differences, pertinent reading aids have been added to footnotes and the Glossary. In Austria, which, like Switzerland, is tied to the German university system in a special way, the word *Promotion* (here translated as "doctorate"), for example, does not designate the entire procedure leading up to obtaining the doctoral degree, as has become commonplace in Germany, and as defined by the convention of speech used in this paper. Since the present paper is not concerned with any juristic recommendations, the language will not be adjusted everywhere to fit in with legislative texts.

2 The expression "autonomous right to award doctorates" stands here consistently for a legal regulation,

procedures would no longer reside solely with (the faculties of) universities. Questions concerning the *uniformity of the doctorate* and its *scientific standard*, but also concerning effective means of *assuring the quality*, are thereby intensified. At issue in general is the status, role and purpose of the doctorate, but especially also its *international recognition*.

In principle, two reform paths with their possible consequences should be considered:

1. A cross-disciplinary harmonisation of standards and admission requirements, also through doctoral committees at universities, and a strengthening of the principle of joint supervision by at least two equal-ranking professors from different academic institutions, together with a reform of the examination system, could greatly advance the quality assurance of the doctorate. In particular, if a scientific project at a university of applied sciences or at a non-university research institution is defined such that it can be co-supervised as a doctorate project by colleagues at a university from a relevant discipline, then no additional bureaucratic cooperation contracts would be necessary. Cooperative doctorates would thus acquire, as it were, the status of the normal case. Consistent with such a harmonisation of standards would then be to differentiate between current doctorates in medicine; they could be either research-based or profession-oriented, whereby the title of Dr. med. would probably need to be redefined and perhaps a new title MD (Medicinae Doctor) could be introduced. This new title could have a lower significance, becoming a mere professional degree, similar, for example, to a DBA (Doctor of Business Administration).

2. By contrast, to enlarge the circle of institutions with the right to award doctorates would mean that not only universities, university-status institutions or institutions accredited by the German Council of Science and Humanities (*Wissenschaftsrat*, WR) would be granted the right to award doctorates, but also, for example, organisational units of universities of applied sciences, which have been declared to be just as strong in research. This would result in foreseeable changes to the evaluation and recognition of doctoral degrees, which would be coupled with the inconsistent esteem or reputation of the conferring organisation or supervising professors and also perhaps be made dependent on some kind of ranking. The status of the doctorates would then probably also be divided, like in Great Britain today, into mere *professional degrees* with purely nominal titles on the one hand, and scientific doctorates on the other. Since such differentiations are made in an informal practice of recognition both by the educated public and by the international competition, they are not in the hands of the state legislators, who grant universities with the right to award doctorates.

In view of the possible consequences outlined in the mentioned options, the question concerning the meaning and importance of the doctorate, its uniformity, quality, recognition, and its institutional parameters, should be raised anew. Which regulations should be upheld in the interest of safeguarding its functionality for scientific innovations, its quality and its international recognition? Which ones should be reformed? Which ones redefined?

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according to which cooperation with a (faculty at a) university in implementing both the procedure and the quality assurance is no longer necessary (see also the Glossary).

This paper argues in favour of the first path of reform. Against the backdrop of a diagnosis of the current state and a general analysis of the institution and function of the doctorate, recommendations will be offered concerning its further development in Germany, with the aim of raising awareness with regard to the role of independent work and research inside and outside academic institutions and of strengthening it according to the rules of good scientific practice.

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## Summary

In Germany, the doctorate and especially the dissertation, the written work towards obtaining the doctoral degree, are currently in transition. This is mainly due to the following six developments:

**First to be mentioned is the Bologna Process.** This aims at a formal harmonisation of academic degrees in European countries. Ever since the Berlin Communiqué (2003), this process stipulates that the doctorate phase should be integrated in academic education as the “third cycle”. The aim of this measure is “to promote closer links between the EHEA (European Higher Education Area) and the ERA (European Research Area)”.<sup>1</sup> Even though the doctorate was not included in the Bologna resolutions, there is the danger arising from the Bologna Process, that the doctorate at German institutions of higher education will fail to fulfil its so far generally recognised purpose – demonstrating the capacity for independent research – and will therefore lose its status and international reputation. A person working on a dissertation is an “Early-Stage Researcher”, and no longer a student.<sup>2</sup> Only when a doctorate documents the competent implementation of an independent scientific research project does it acquire

significance. This applies both to their significance in academic research as well as in the social and international context. A simple continuation or deepening of a study, or merely collaborating on a project, would thus not fulfil the requirements of a doctorate. This also pertains to the cumulative dissertation, when the independent research achievements of the doctoral researcher are not sufficiently discernible in the publications submitted for the doctorate, which have been written by numerous authors.

**The second development concerns the rising number of research projects financed through third-party funds.** This is closely connected to increased pressure on institutions of higher education to seek such funding for projects. In general, people working on these projects are postgraduate assistants who, after having completed a second university degree equivalent to a Master’s, often expect to successfully complete a doctorate by collaborating on projects. Thus the tendency arises for a portion of the doctorates to be transformed into *professional degrees*. If this occurs in the context of the lawful right to award doctoral degrees, it is possible that the result is merely a new professional doctorate.

Moreover, in the fields of the natural and life sciences the number of graduates who, upon completing their studies, aspire after a doctorate is already so high in Germany that here too a gradual transformation of the doctorate into a professional degree cannot be ruled out. There is a fundamental difference between Ger-

<sup>1</sup> Berlin Communiqué 2003, 7. In the London Communiqué from 2007, the identification of the doctorate with the third cycle is already assumed (cf. London Communiqué 2007, point 2.15).

<sup>2</sup> According to the international standard, emerging researchers are designated as “Early-Stage Researchers” in the first four years of their scientific career, i. e. for most of the doctoral phase. The concept “Nachwuchswissenschaftler”, commonly used in German, is, strictly speaking, not an adequate translation of this status. Cf. also BuWiN 2013, 78–87, or Birsl 2008, 96.

many and the Anglo-Saxon countries: In Germany, research is carried out largely by doctoral students, whereas in the USA and Great Britain it is carried out mainly by postdocs. In Germany, doctoral students are preferred to postdocs for carrying out third-party funded projects for financial reasons. To make use of the potential of postdocs, it would first be necessary to improve not only their social situation, but also their academic supervision as well as the framework conditions.<sup>3</sup>

**The third development concerns the tendency towards inflating grades,** leading towards ever better grades and at the same time to a rise in the number of graduations. This is often accompanied by a drop in quality standards.<sup>4</sup>

**A fourth development concerns the possible decline in ethical standards.** Ethical standards are constitutive for scientific research that is at the same time competitive and cooperative. In cooperation, science builds upon trust in a scientific ethos, and thus on the personal morality of the researchers. Competitive research places high demands on those supervising and those being supervised, in terms of both scientific competence and responsibility in the free scientific culture. This demands, beyond the necessary trust, clear regulatory rules and controls, with a view both to the achievements of the doctoral researchers and to the supervisors.

**The fifth development concerns the ever growing criticism of the traditional model of a doctorate that is individually supervised by experienced scientific mentors.** The criticism speaks of a

(German) “Master-Apprentice” model.<sup>5</sup> While a doctorate certainly requires scientific supervision by experienced representatives of an academic discipline who give advice on the work, it nonetheless remains an independent project. To be reliant on just one supervisor can result in problems, such as making the project too dependent on this supervisor and the related risks for doctoral students to receive appropriate supervision and sustainable support. Replacing the classical model with a larger supervisory collective, however, may likewise have problematic side effects. Although the administrative supervision and the long-term quality assurance must lie with the appropriate commissions, experience has shown that in most cases supervisory groups are not particularly suited to supporting highly specialised doctoral projects in a likewise thematically specified way; they may even encourage the superficiality of the projects and its transformation into a third phase of education. The individual doctorate enables individual research beyond programmes and doctoral studies. In the interest of an innovative development of science, the quality of this form of doctorate should be ensured in the future as well.

**A sixth development concerns the doctoral opportunities for graduates from universities of applied sciences.** For this purpose, two possibilities have been provided in

5 The English translation of the German word “Geselle” in the expression “Meister-Gesellen-Modell” is misleading. In English there is no word for a fully educated, independent assistant, but only for trainees or apprentices. For this reason, the expression that is unfortunately already established internationally is hardly suitable for characterising the supervision relationship of doctoral projects that are carried out autonomously. But the familial German designations “Doktorvater” and “Doktormutter” are also slightly misleading. Since there is still no suitable designation free of context, connotations and judgements, it is suggested that one speaks of “research projects supervised by mentors” wherever possible.

3 Leopoldina 2013, 31 ff.

4 Hornbostel/Johann 2017.

the higher education acts of the federal states. First, a graduate may transfer to a university, in which case a Master's degree is generally the prerequisite; further stipulations are laid down, where appropriate, in the doctoral degree regulations. Second, there is the cooperative doctorate, which allows graduates from a university of applied sciences to do a doctorate at such a university in cooperation with a doctorate-granting institution of higher education, which then awards the doctoral degree. The background of both paths is the institutionally based right to award doctorates, which is held only by universities, university-status institutions or institutions of higher education that are accredited accordingly by the German Council of Science and Humanities.<sup>6</sup> By contrast, **granting organisational units of universities of applied sciences the right to award doctorates** – as, for example, recently in Hessen<sup>7</sup> – is based explicitly not on putting an institution on equal footing with universities or on an accreditation given by the Council of Science and Humanities, but is based rather on individual and formal indicators of research-oriented achievement (e. g. amount of third-party funding, number of publications) of the participating professors. Granting the right to award doctorates is thus made dependent on accidental circumstances and merely formal criteria, that is, criteria that are not necessarily scientific. By fulfilling these criteria, appropriate organisational units of a university of applied sciences should then obtain –

according to some politicians – the right to award doctorates. It should be noted here that waiving an assessment of the existing institutional conditions for conducting quality-assured doctorates amounts to a significant change of the previous state and is a serious reduction in the evaluation criteria for granting the right to award doctorates.

6 The formal criteria for an institutional accreditation were developed by the German Council of Science and Humanities (see WR 2010b). Subject to the evaluation are the areas of (1) guiding principles, profile and strategic planning; (2) governing structure, organisation and administration; (3) performance in the area of teaching and study as well as services for students and further education; (4) performance in the area of research; (5) personnel and material facilities; (6) funding; (7) quality assurance and quality development; (8) cooperations (ibid., 18, cf. also the question catalogue for the individual areas, 37–49).

7 Dokumentation Promotionsrecht Hessen 2016.

## Recommendations for science

1. In view of the increasing number of doctoral researchers, there is a need for long-term quality assurance of the doctorate. The main addressees are the universities. They are responsible for institutionally securing the doctorate, especially with regard to evaluating research achievements with the help of established expert scientists. Universities must fulfil this major responsibility for assuring the quality of doctorates nationwide and comprehensively.

2. The quality assurance of the doctorate must remain related to the essential aim of science. It is concerned with the exploration of new, long-term, reproducible knowledge, which, as the result of research, is scientifically evaluated and published. A dissertation presenting the results of a first independent scientific research project must therefore comply with the scientific standards. For this reason, also within the framework of structured doctorates, a modified model of individual supervision is recommended, which retains the advantages of a project autonomy that is overseen by mentors. For the quality assurance of the doctorate, the following regulations would have to be embedded in all the institutions involved in doctorates:

2.1. Supervision agreements should be a formal component of the admission to a doctorate.

2.2. In the supervision agreement, the involvement of a second supervisor should be specified early on (joint supervision). This person should be selected from among the best experts in the coun-

try or even internationally with a view to the specific theme – a standard that is unfortunately no longer practised everywhere or in every discipline.

2.3. As a rule, doctoral degree regulations should stipulate the involvement of external supervisors.<sup>8</sup>

2.4. Internal and external supervision should be evaluated as having equal status, particularly with regard to supervision achievement, for instance in the context of target agreements.

2.5. Although it seems *prima facie* reasonable to separate supervision and evaluation for all doctorates, this may be detrimental to a specialisation of the themes and thus to the role of the doctorate in the innovative research process, and may also entail considerable effort. For this reason, as a realistically implementable measure, we recommend the joint supervision described above in cooperation with external institutions. That the assessments ought to remain, as before, of equal value, so that there are no so-called first and second assessments, is taken as given.

2.6. In light of inflationary tendencies in Germany of awarding the best grade, the credibility of quality control is questionable. This should definitely be counteracted through a more differentiated grading, whereby the award of the highest grade (e.g. *summa cum laude*) should, where neces-

<sup>8</sup> External means that the two supervisors do not teach at the same institute.

sary, involve a third, external evaluating authority.

2.7. Transparency in awarding grades, which is reviewed beyond the individual institution and which requires a shared understanding of discipline-specific standards of scientific quality within the disciplines and across faculties, is particularly important for the competition in one's own country, but also for the international recognition of German doctorates. Statistical compilations and the publication of all doctorate grades at universities should thus be improved beyond the current level.<sup>9</sup>

2.8. The character of the doctorate as a qualification phase aimed at independent research should not be undermined by a strong curricular orientation. Introducing a programme of *doctoral studies* would only extend or repeat the phase of graduate studies with a Master's or diploma degree (M. A. or M. Sc.) above a B. A. or B. Sc. Generally useful curricula that are not required for a specific doctoral project should be reviewed with regard to their relevance to the scientific work. They belong in principle to the training phase of a Master's or diploma degree programme, as is the case, for example, in the PhD programmes at US-American universities. If curricular elements are to be included in the doctorate, they must not restrict the space for individual research.

3. In medicine, a debate on structure is due, not least because of the lack of international recognition of the German Dr. med. Until now, the question of obtaining an independent doctorate for the Dr. med., in contrast to awarding merely a professional doctorate following the fi-

nal examination at the end of the studies as is customary in other countries, has been discussed only in its first stages. This is particularly true for the question concerning the introduction of a doctorate on the same level as in other sciences. Medical faculties and legislators at state level are both called on to address the problems of the current medical doctorate by means of reforms in dissertation practice. This reform should take into consideration the whole system of medical education, medical practice, scientific research and the recruitment of professors. Together with the Medical Faculty Association (*Medizinischer Fakultätentag*, MFT), the faculties could develop a model that allows on the one hand a multi-year integrated scientific doctorate that, if necessary, is developed parallel to medical specialist training, and on the other hand the classification of the regular final degree in the field of medicine as a professional doctorate with the international designation of MD ("Medicinae Doctor", or "Medical Doctor"). In this way, the Dr. med. would become a scientific doctorate with a value (well) above the MD (corresponding to the diploma, *Magister* or Master's in the field of medicine), even above a medical doctorate that is not done alongside the studies and for which some recommendations reckon a dissertation period of nine months or, like in Switzerland, of one year.

4. In the field of law, the standards for doctorates should be aligned better than in the past, both within the field itself and in relation to other fields. This means that in some cases appropriate instruments for quality assurance should be implemented within the faculty and across institutes. Differences in quality standards of doctorates in law at different institutions and locations can already be minimised if a faculty committee oversees the procedures and monitors them administratively. In particular, the involvement of external examiners

<sup>9</sup> Hornbostel/Johann 2017; one should note that with the so-called small disciplines with little personnel, the statistics should not allow any conclusions to be drawn concerning people holding a doctor's title.

should be recommended in the interest of a general universal quality assurance of doctorates in law.

5. In the economic sciences there are also discrepancies between the various institutions and locations regarding the quality standards of doctorates. One reason for this is the wide range of themes (economics, business economics, business informatics, engineering economics and business education), from which quite diverse demands are made on the doctorate. The different grades awarded for a doctorate (Dr. rer. pol., Dr. phil., Dr. rer. oec., etc.) also play a role. Here it would be appropriate to first make an attempt at standardisation. The same applies for other disciplines in which there is a similar need for standardisation.

6. Highly qualified graduates of universities of applied sciences, who put forward an independent scientific research project, should be permitted to do a doctorate. If it is not possible to transfer to a university, then the cooperative doctorate is essentially the right instrument to give prospective researchers the opportunity to carry out a scientific research project in a qualified research environment, especially since finding a cooperation partner is itself already part of quality assurance. However, suitable collaborations must be more actively promoted, especially by the universities, and also encouraged perhaps by special incentives. Regulations that are already in place should be developed to such an extent that *cooperative supervisions* of suitable doctorate projects can be carried out non-bureaucratically. Legal stipulations against discrimination must be implemented quickly. Cooperation partners operate on equal footing, especially when not only the assessments but also the supervision is recognised in all respects to be of equal rank, e.g. also with respect to performance assessments and target agreements. The ombudspersons

for good scientific practice, appointed at the universities, should also be able to oversee cases of discrimination.

7. Cooperation in teaching and research as well as the academic collaboration between universities of applied sciences, universities and equivalent institutions of higher education should be systematically expanded. Recommendations by the German Council of Science and Humanities to the federal states and universities should be implemented as quickly as possible.

8. A solution has to be found for the persistent practical problem faced by highly qualified graduates from universities of applied sciences when looking for supervisors at universities. This problem is essentially the same as finding a second supervisor in every other case, especially since finding this person is part of the quality assurance of the project from the very beginning.

9. If professors from universities of applied sciences have the academic prerequisites (*Habilitation* or equivalent qualification), a corporate-based legal status could be conferred to them, for instance, through co-optation at a university faculty (e. g. as provided for in the Baden-Wuerttemberg Higher Education Act) or through extraordinary/unscheduled professorships, although the proposed equal-ranking joint supervision would not require a statute of this kind for cooperative doctoral studies.

10. The doctoral degree is considered as evidence of competence in independent research and of an appropriate educational background. Only on this basis is the doctorate's special social status justified in the public eye. Even if the young scientists' reliability and the innovation and scientific quality of the results from an independently developed project cannot always be fully verified by the super-

vising institution – for this is ultimately decided by the scientific community as a whole – the universities should ensure, through institutional quality control, that the general public's trust remains warranted.

11. It would be expedient if a critical awareness towards good scientific practice were aroused in all those involved. Institutions that grant doctorates are encouraged to do everything possible to guarantee and improve good scientific practice.

12. To strengthen the public's esteem and trust in science, doctoral researchers should also always be taught how to communicate science and to present the results of research in a comprehensible way.

## Recommendations for politics

1. A doctorate is awarded to someone after a first phase of independent research, the quality of which is deemed sufficient to meet scientific standards. In the interest of assuring and improving the quality of the doctorate, politics is called upon to avert the danger of devaluation, as it occurs, for example, when the doctorate is envisaged as a “third circle”, a “third stage of education”, a “third phase of studies” or as pure “doctoral studies” subsequent to the second degree at MA level. The individual doctorate that is overseen by mentors must not be supplanted by these tendencies.

2. The formal right to carry out doctorates and to award doctoral degrees, as granted by law in the German federal states, is not sufficient on its own to confer quality and recognition to the doctorate, and to maintain the quality and recognition one expects of the doctorate within and outside science. While doctorate projects generally profit from supervision that is overseen by mentors, the professional supervision and evaluation in the research environment requires an institutional basis, i.e. appropriate infrastructures (libraries, laboratories, etc.), adequate diversity in research, and teaching that enables research in the respective field – including the neighboring related fields – as well as a critical plethora of established scientists. Especially with regard to the so-called small disciplines, which only rarely attain critical mass, it is essential that they be embedded in the field as a whole, both nationally and internationally, and that there be cross-disciplinary options to reflect on the diverse methods

and cross-disciplinary quality standards. It is taken for granted – also in the laws of higher education – that universities are institutions with such networks and conditions. These prerequisites must be taken adequately into account if organisational units of universities of applied sciences are to obtain the right to award doctorates.

3. It is a legitimate ambition and in the interests of science to give highly qualified persons at universities of applied sciences the opportunity to do a doctorate after completing an MA degree. Up to now, the right to award doctorates has been granted as an institutional right – that is, in order to obtain the right to award doctorates in the sense of a doctoral degree, an institution had to fulfil specific institutional prerequisites, e.g. in the areas of infrastructure, in addition to standards of teaching enabling research and standards of research that are nationally and internationally respected. This right is regulated by law (of the federal states). Until now, the German Council of Science and Humanities has been primarily involved in the institutional procedures of accreditation, for example, for private institutions of higher education. In granting the right to award doctorates to organisational units of universities of applied sciences, this right is now for the first time no longer based on a qualitative evaluation of the scientific achievements of the awarding (faculty of a) university. Instead, it is replaced by a purely indicator-based granting of the right to award doctorates to sub-institutions of a technical college. In these cases, the criterion is a purely quantita-

tively measured “research strength” of single persons and groups of persons, and no longer the entire institutional framework in which teaching and research are embedded. What counts are indicators of achievement connected to individuals, such as third-party funding, number of publications etc. Granting the right to award doctorates in the sense of doctoral degrees is thus made dependent on the achievements of individual persons, on whose qualifications even a whole organisational unit at a university of applied sciences (e.g. a doctorate centre) can obtain an autonomous right to award doctorates. While a legal regulation of this kind stipulates who is allowed to award a doctorate degree and administer it legally, it cannot specify whether the awarded degree should be regarded or recognised as documentation of a scientific doctorate or merely as a professional doctorate. At any rate, here one should note a significant change in the previous conditions and a serious narrowing of the evaluation criteria for granting the right to award doctorates, which waives the review of institutional prerequisites in realising doctorates and assuring their quality. For this reason, it is recommended that a scientifically-based procedure be established on the question of the right to award doctorates for universities of applied sciences. The German Council of Science and Humanities should also be involved in this procedure. An autonomous right to award doctorates for universities of applied sciences is not endorsed by the academies.

4. In this context, a discussion should be held on the performance indicators that are considered highly controversial in science and that underlie the practice of granting the right to award doctorates. One should keep in view the impact of basing the decision to grant this right on such indicators and of lowering the demand on individual scientific achieve-

ments for the future employment and hiring policy at universities of applied sciences.

5. To safeguard and improve the quality of doctoral projects in the long run, incentives would be sensible (e.g. in target agreements) promoting the model of the individual doctorate with joint supervision and the participation of external examiners.

6. New degrees on the level of professional doctorates tend to lead to an expansion in awarding formal doctoral degrees, affecting the general status of the doctorate. There are nevertheless good reasons for legislators of higher education acts to introduce a professional doctorate for medicine (clearly distinct from a scientific doctorate). It is not recommended, however, that professional doctorates be introduced beyond medicine. Should, as in medicine, both a professional doctorate and a scientific doctorate be introduced, the difference between the two must be clearly and explicitly conveyed in policy, science and to the public.

# 1 Introduction

This statement inquires into both the institutional prerequisites of the doctorate as well as its internal organisation, i.e. the institutionalised regulations for admission, supervision and assessment. Here the demand for high quality always sets the frame for consideration. This focus presupposes quality standards against which doctorates, along with their general institutional conditions and procedural rules, must be measured.

What justifies these quality standards? They arise from the scientific status of the doctorate as an academic degree, through which independent scientific research achievements are documented in an autonomously executed project. Only on the basis of its scientific status can the doctoral degree fulfil its function within today's knowledge-based society.

In the following, this statement will describe various upheavals and will attempt to depict their causes and implications. The aim and scope of the statement (Chapter 1 Introduction) are derived from the ensuing questions. Next, the role of the doctorate in the education system will be highlighted, both in general and in the comparison of specific fields and of the federal states (Chapter 2). This will be the basis for deriving conclusions and recommendations for prerequisites, structures, methods (Chapter 3) and institutional responsibilities (Chapter 4).

## 1.1 The doctorate in transition

If one looks at the doctoral process in German-speaking countries, it presents itself as heterogeneous. First, the different academic disciplines have different traditions and customs with regard to the aims, emphasis and implementation of the doctorate. What is more, in some areas even partial cross-disciplinary processes of change have been triggered. The doctorate in German-speaking countries finds itself in transition. How does this transition manifest itself?

### 1.1.1 Quantitative shifts

The number of completed doctorates is on the rise. In 2014 in Germany, 28,147 doctorates were completed, which is almost 5,000 more than in 2004. This increase cannot be explained merely with the corresponding rise in the number of other degrees, for the increase is visible also in relation to the number of Master's degrees.<sup>10</sup> As a comparison: In the same period in Switzerland, the number of doctorates completed per year rose from 2,806 to 3,849.<sup>11</sup> In both countries, the rate of doctorates – at 2.7% (Germany) and 3.2% (Switzerland) – lies significantly higher than the OECD average.<sup>12</sup>

<sup>10</sup> CF. StaBu 2015, 10; OECD 2015a, 62; OECD 2015b, 77. Since 2011, one can no longer speak of stagnating figures, in contrast to the period leading up to 2010, for instance, in BuWiN 2013, 155f. More precise information for Germany is expected as from 2017 when the amendment to the law on the statistics of higher education is enacted.

<sup>11</sup> StaBu 2015, 10; SHIS 2015.

<sup>12</sup> In the OECD procedures, the rate of doctorates designates the percentage of doctoral graduates in relation to the population of the same age,

The increase in the number of doctor degrees is ascribed, among other things, to the growing importance of third-party funded research. Thus between 1998 and 2009, third-party funds raised at universities doubled, in some cases constituting more than half of the revenue achieved by universities.<sup>13</sup> Often, temporary positions in research projects are made attractive through the prospect of a doctoral degree.<sup>14</sup>

Furthermore, the proportion of doctorates evaluated as “very good” is rising. Exact reasons for this grade inflation are difficult to determine, yet on the whole it is accompanied by the tendency towards a drop in evaluation standards. Thus, more and more people would prefer – as already the case with the *Habilitation* and in other countries – to forego awarding a grade that lacks significance anyway. Others propose grading more strictly in order to highlight special research competence, for instance in doctorates of medicine or law. This, however, takes for granted a corresponding acceptance of responsibility among those supervising and assessing.

### 1.1.2 Structural changes

Some changes are connected directly or implicitly with the Bologna Process. Thus a general classification of the doctorate as the “third cycle” following the Bachelor’s and Master’s studies has led to a discussion whether, as the first independent research phase, it does not fundamentally differ from the first two cycles, so that one would do better not to speak of a

“third” phase of education. Such a phase is not really desirable, especially since in the end it merely extends the time spent in the higher education system.

Moreover, a variety of thematically oriented research training groups (*Graduiertenkollegs*) and structured doctorate programmes are already to be found in the third-party funding of the German Research Foundation (*Deutsche Forschungsgemeinschaft, DFG*) – in fact, under the title of “graduate schools” in the Excellence Initiative. Research training groups and corresponding institutional structures are thus expected to offer a guaranteed opportunity to do scientific work on an overarching theme in interdisciplinary contexts; often they are also distinguished by the opportunities for international collaboration established for the research training group. Doctoral researchers can thus profit both from methodological diversity and from having their theses internationally established. These are substantial improvements and advantages compared to an “isolated” doctorate by individual persons. Individual curricula are also expected to improve the supervision of doctoral researchers. This change in the approach to work may also, in overly supervised doctoral “studies”, bring with it tendencies towards a school-based approach.<sup>15</sup> The categorical difference between the two-tiered learning phase at an institution of higher education and the first phase of independent, professional research under the guidance of experienced scientists would then be levelled off. Moreover, the free choice and the process of carefully developing a research theme is an essential factor in

calculated by rounding up the percentages in the single age groups (OECD 2015a; OECD 2015b, Table A 3.1, 72/92). The rate of completed doctorates for 2013 was 1.7%. Denmark (2.8%), Great Britain (3.0%) and Slovenia (3.6%) also register an above-average rate of doctoral graduates. One should take into consideration in Germany the high status of the doctorate in society (cf. among others BMBF 2010, 110 f., and Meyer 2013).

<sup>13</sup> Strohschneider 2015, 37.

<sup>14</sup> WR 2011, 20; Baethge 2015, 82.

<sup>15</sup> Structured scholarship programmes were promoted with this catchword now and again in the past; see DAAD 2009, 7: “This form of the doctorate is comparatively school-based and intensively supervised at universities”; now and again especially technical universities distance themselves explicitly from this; see TU Dresden 2008: “the doctoral phase is not school-based, and is not to be understood as a third study phase, but serves already as professional practice”, or TU Dortmund 2011.

scientific innovation that should not be underestimated.

Also in transition are evaluations of the existing doctoral practice within a given field. Especially in medicine, partly also in law, there is a debate about whether or not to reform the existing practice of awarding doctoral degrees, i.e. whether a suitably qualified doctorate (with a corresponding doctoral degree) is advisable only in the case of independent scientific research. At the same time, it concerns the implementation of consistent doctorate standards that are stipulated in the doctoral degree regulations.

Added to this are the legal initiatives for the strengthening of universities of applied sciences, which seek to increase the attraction of the respective locations by granting the right to award doctorates to organisational units that show special research achievements. Up for discussion is whether granting the right to award doctorates to organisational units from universities of applied sciences would actually only mean introducing a new “professional degree” with the title “doctor”, and how this would then relate to a scientific doctorate.

## 1.2 The question of unity in the diversity of the doctoral degree

The upheavals described above give rise to general questions: Is there at all a uniform understanding of the doctorate with a single standard across different fields, also in its implementation, or do the individual fields each have different models of the doctorate? Do the upheavals visible today lead merely to variations in the implementation of an idea that itself remains constant, or do they testify to a subtle or even explicit reinterpretation of what a doctorate is, either within or across disciplines? There is reason at least to rethink the current practice.

Public and political interest in the theme “doctorate” reveals the topicality of these questions. Quality standards and quality control in German-speaking countries in the past years have shifted more significantly into the focus of public attention and political debates. On the one hand, cases of scientific misconduct that have gained publicity have unsettled the general public; on the other hand, some universities of applied sciences are demanding politically that they be granted the right to award doctorates. These developments are the reason for raising explicitly the question concerning standards and quality assurance, for analysing its existing general organisation for its potential weak points and for improving it accordingly. Only such an approach guards against scientific misconduct, ensures the quality and the reputation of the doctorate, and helps answer the question concerning the types of institutions suitable for implementing doctorates.

## 1.3 Objective and scope

In the system of science and higher education in German-speaking countries, the doctorate occupies a key position. By virtue of this key position in the structure of research and teaching, changes to a component of the doctorate result in institutional implications for the whole system. This is because, on the one hand, university research is closely tied to doctoral projects, and on the other, the doctorate is a central requirement for an academic career. Furthermore, scientific quality assurance of the doctorate is dependent on specific institutional prerequisites, e.g. teaching that enables research.

Its key position in the system of science and higher education demands that institutional and policy decisions of higher education, which affect the doctorate, be made prudently and with

caution. Proposals for institutional and policy reform in higher education face the challenge of having to take into consideration the expected systemic consequences and above all the functionality of the entire system. The problem of unintended side effects is essentially known, but it demands explicit measures to prevent undesired changes to the status of the doctorate. Changes would ensue, for example, should the doctorate be understood as the third phase of education – with consequences for the entire Bologna system of a tiered higher education. Changes would also ensue if it were necessary to establish Master’s programmes specifically for the implementation of a doctorate, in order to train a sufficient number of one’s own doctoral researchers.<sup>16</sup>

In its basic concern, the statement represented in this paper corresponds to a large extent with already existing statements.<sup>17</sup> This holds especially for the statement of acatech– the National Academy of Science and Engineering (*Deutsche Akademie der Technikwissenschaften*),<sup>18</sup> whose main results were developed with a view to technical fields at technical universities, but agree in general with the proposals presented here.

The present statement identifies upheavals in the system of education and science and recalls the definition of the status of the doctorate and of the resulting quality standards of scientific work. A broad consensus exists in the demand for transparent procedures in the admission, supervision and assessment of dissertations and doctorates, with clearly regulated and agreed responsibilities. The same holds for the demand for a clearly defined status for doctoral researchers at the university or institution of higher education, and for models of sufficient funding.

Against the background of this consensus, there are nevertheless significant differences with regard to the question concerning how these components should be drafted in detail. In relation to these themes, this statement argues in favour of concrete recommendations; priority is placed on simple feasibility and expedience. Proposals for change must not lead to over-regulation, and it should be possible to review and modify far-reaching changes within short periods of time.

This statement is methodologically conceived in such a way that it reflects prevailing arguments of existing statements on the discussed themes, and the ramifications of introducing possible measures are assessed with a view both to the quality of the doctorate and also to the consequences for the functionality of the entire system of higher education. On the basis of current facts and developments, the statement formulates recommendations addressed to science, policy and the public, with regard both to the objectives and the implementation of doctorates, and also to the institutional prerequisites for the right to award doctorates.

<sup>16</sup> This is planned, for example, for Fulda University of Applied Sciences: “In order to improve the doctorate opportunities for suitable graduates, the Master’s programme will be extended to include programmes in therapy, midwifery and nursing in addition to the research-oriented Master’s programme Public Health, which exists since 2004/05, and the cooperative Master’s programme Public Health Nutrition, which exists since 2006/07,” (Wolf 2017, 7). One reads further: “The aim: Master’s graduates of all disciplines in the area of nursing and health in Fulda should apply for admission as doctoral researchers at the Fulda University of Applied Sciences with their own research themes but also as employees in the wide spectrum of third-party funded projects” (ibid.).

<sup>17</sup> On the European level, one should mention here especially EUA 2005, EUA 2010 and LERU 2010. Important position papers in the German-speaking world are UniWiND 2011, WR 2011 and HRK 2012.

<sup>18</sup> acatech 2008.

## 2 Status and role of the doctorate

How the questions raised above are resolved is determined by the normative standards that should be referred to in identifying institutional prerequisites, in evaluating institutional circumstances and developments, and also in raising questions on quality assurance. The question concerning the very concept of the doctorate must be understood as more than merely a juristic question of legislation and court decisions; it must be understood as a question of the status and role of the doctorate in the sciences, of its scientific quality standards and the universal and individual objectives that are pursued with it. Even the mere possibility of a reinterpretation of the doctorate calls for reflection on where it should be situated in the overall context of science and society.

### 2.1 Function and its safeguarding

A doctorate leads to an academic degree (in German *Dr.*, in English PhD) that is supposed to document the ability to carry out independently a scientific project in a specific field. Awarding the title and the right to use it are regulated by law. A (scientific) doctorate is based on an independent research achievement, which was subjected to a scientific evaluation. Results are publicised in written form as a dissertation. Thus the doctorate is evidence of independence, recognised by expert scientists. It testifies the ability to carry out scientific projects autonomously (in the form of an individual work or as part of cooperating in larger working groups or re-

search associations, depending on the field).<sup>19</sup>

In most cases, the role of the doctorate relates to the academic area of the scientific system and a formal doctoral degree, the legal status of which is regulated by laws also with regard to the awarding institution. A doctorate is the general prerequisite for scientific professions, especially in academic teaching, and is essential for an academic career.<sup>20</sup> It plays an important role in the system of recruiting scientific personnel<sup>21</sup> and is therefore a central component of the scientific system. Its scientific-institutional and legal form, which is regulated by federal state laws, is crucial for the status of scientific research and academic teaching.

The doctorate also has, however, an additional and more far-reaching function: It is evidence of the ability to autonomously plan and carry out scientifically based projects and collabora-

<sup>19</sup> Cf. the representative statements and position papers on the German doctorate: “The essence of the doctorate is the individual’s independent and original research achievement, which contributes to the progress of knowledge in the respective field and is generally demonstrated by a monographic dissertation” (WR 2011, 8); “The core task of young scientists is independent and original research” (UniWiND 2011, 1); “The ability for carrying out in-depth independent scientific work is confirmed with the doctorate” (HRK 2012, 2).

<sup>20</sup> On the concept of the scientific career, cf. Kahlert 2013, 19–30.

<sup>21</sup> If organisational units of universities of applied sciences obtain an autonomous right to award doctorates only on the basis of formal conditions, it could in fact become disputable how such a specialised doctorate is to be evaluated in the appointment of a professorship at a university of applied sciences.

tions. Such evidence of competence is also meaningful in non-academic areas, in economics and management, politics and society. Social status and reputation of the doctoral degree are based on these competencies and on the expectations attached to its monitoring through a reliable quality review. Accordingly, doctoral graduates succeed earlier in making the career jump to leading positions.<sup>22</sup>

The doctorate fulfils both its academic and its non-academic role only by virtue of its scientific character. Thus everything depends on the scientific quality and independence of the research project. If these standards are undermined, and the project work cannot be evaluated as an independent research achievement resulting in new knowledge, then the achievement is no longer a (scientific) doctorate, even if the person “earns the doctorate” from an institution with the right to award doctorates, i. e. is entitled to hold the doctoral title. For this reason, quality control in science involves not merely evaluating the methodological execution and the correctness of the results, or the ability to solve predefined problems; above all, it involves attributing new ideas, the independence of the project, the quality of the research and reflection, and the capacity for criticism.

The function of the doctorate can only be preserved if it is not transformed into a third phase of education or a mere professional doctorate at the expense of its scientific quality – for instance, through federal state laws or ministerial guidelines.<sup>23</sup> Precisely as evidence of scientific independence, the doctorate is also meaningful outside of academia.<sup>24</sup>

Successful participation in a project led by other researchers is not a sufficient doctoral achievement, if it does not involve any scientific research of one’s own but only supportive services.<sup>25</sup> Status and reputation of the German doctorate would generally be devalued if it were transformed in this way into a means of carrying out third-party funded research at any institution with staff employed on a temporary basis.

Furthermore, it follows from the scientific status of the doctorate that every effort towards its quality assurance must be related to science’s inherent aim of exploring what is new. The scientific requirement of the doctorate demands from doctoral researchers a high degree of specialisation in combination with theoretical competence. The doctorate is an academic degree, through which independent and original scientific research achievements must be displayed *de facto* and not merely *pro forma*. A dissertation must at the same time conform to scientific standards. The intrinsic purpose of these standards is the systematic expansion of general knowledge, and not direct usefulness or economic applicability. This holds even when knowledge opens up new opportunities for action, thereby serving practical purposes that differ from the aim of the systematic expansion of general knowledge.

The current quality assurance problems of doctorates may be depicted as the result of a three-stage historical development that has taken place since the 19<sup>th</sup> century, starting with the unsatisfactory situation of the doctorate system at that time. Deficient control mechanisms had led to dissertations of questionable quality. The practice of

<sup>22</sup> Cf. OECD 2015a, 27.

<sup>23</sup> A guideline of the ministry of science in Lower Saxony characterises the doctorate explicitly as a *third phase of education* (cf. Leitlinien 2015).

<sup>24</sup> See also the position paper of the German Mechanical Engineering Industry Association

(*Verband Deutscher Maschinen- und Anlagenbau*; VDMA 2015, 2).

<sup>25</sup> See also the joint declaration of numerous presidents of the European rector conferences (Joint Declaration 2014, 1).

awarding the doctorate *in absentia* led to an inflation in degrees.<sup>26</sup> In reaction to this, instruments for quality assurance were introduced, for instance the obligation to publish the dissertation or holding oral examinations in the form of a “Rigorosum” and a defence, either of additional theses or of the doctoral thesis itself, which is called “Disputation” in Germany and “Defensio” in Austria.

Questions and problems are currently arising from a large quantitative expansion on the one hand, and a functional transformation of the system of higher education on the other. The number of doctorates continues to rise, not least because of the increase in third-party funded projects, for which staff is mainly recruited through the prospect of attaining a doctorate. This quantitative expansion was also a consequence of the rise in projects and third-party funding co-sponsored by the federal government, and of the resulting competition. This competition will continue in the future due to target agreements between states and universities, as well as between professors and universities (W pay scale professorships). These incentives will allow the number of doctorates in Germany to continue to rise, even though at 2.7% it already lies much higher than, for example, in the USA at 1.5%.<sup>27</sup>

A consequence of this high number of doctorates is that existing mechanisms for quality assurance no longer function smoothly, *inter alia* due to the increased burden from other tasks on those supervising and assessing. In addition to a strengthening of the supervisory body and the collective responsibility for quality assurance, greater awareness of one’s own responsibility and of scientific ethos is required. In the case of the doctor-

ate, this requirement concerns both the committees in the faculties as well as the candidates. While the doctorate’s uniformity, average quality, and public and international esteem depend substantially on general regulations defined in part by the legislator, they depend equally on informal (and especially moral) factors such as the personal competence and integrity of the persons involved.<sup>28</sup> Here accidental cases should be distinguished from the general run. Cases of individual persons breaking a rule, which as such do not necessarily immediately entail or justify a change in procedures, are to be treated differently from rules and laws lacking expediency.

In addition to the increasing numbers of doctorates, a currently visible transformation of the system of higher education is a source of new challenges for scientific quality assurance. There is a tendency – also intended by science policy – for universities of applied sciences to increasingly develop their own application-oriented focal points of research; this goes hand in hand with the demand for the right to implement doctoral processes and to award corresponding doctoral degrees.

At the same time, the question arises whether universities of applied sciences are institutionally a suitable research environment with the required breadth and requisite high specialisation, offering teaching that enables research and is research-oriented. In view of their institutional structure, the question is also whether opportunities are available for carrying out quality control independently, as required by the scientific status of a doctorate, being the exploration of what is scientifically new.

<sup>26</sup> Cf. Rasche 2007.

<sup>27</sup> OECD 2015b, Table A 3.1, 92.

<sup>28</sup> Cf. the following papers on scientific integrity and good scientific practice: DFG 2013, HRK 2013, LERU 2014, WR 2015.

How can one adhere – amidst changing parameters – to the universally recognised spirit and purpose of the doctorate depicted here? By no means should degrees be awarded merely on the basis of a state’s legal regulations; the specific meaning of the degrees would then depend heavily on the awarding institution. In this way, the universal prestige of the doctorate would be questioned, especially from an international perspective. Academic degrees of a country or of a scientific system are understandably evaluated according to mainstream experience.<sup>29</sup> Nevertheless, the demand for a unified value for the doctorate also faces other demands and practices, depending on the different fields. In spite of the diversity of academic disciplines, which will become clear in the following chapters, the common and general expediency must be determined.

## 2.2 The role of the doctorate in the special disciplines

Whenever an institution is reformed that preserves universal experiences in its traditional forms as, for instance, the doctorate, it is advisable to recall the special circumstances of the disciplinary areas and their historically distinct paths. The scientific disciplines of the natural sciences and humanities, including mathematics and the social sciences, did not separate from the philosophical faculty as the encompassing area of theoretical sciences until the last century. Later, in turn, the application-oriented disciplines of the technical sciences emerged from the scientific disciplines of the natural sciences and the humanities. Origin-

nally, only the higher faculties, namely, the faculties of law, medicine and theology, awarded doctoral degrees. These can look back on a international tradition of specific professional fields extending back to the Middle Ages – with a relatively short doctoral study period (not least because of the necessary and presumed span of basic knowledge and an accordingly long period of preceding education). Dissertations in these fields had and for this reason still have the scope of smaller scientific works, at least in comparison to the doctorates that arose from the “Doctor Philosophiae” (*Dr. phil.*)<sup>30</sup> – such as *Dr. rer. nat.*, *Dr. rer. pol.* or *Dr.-Ing.*

That doctorates of different research areas are no longer comparable has more to do with the expanding demands on specialised scientific doctorates over the past 100 years and less with a creeping drop of standards in certain academic disciplines. Demands for a “reform”, for example, of the dissertation culture in medicine and of the establishment of a “correct Dr. for the (medical) doctor” are meanwhile setting the standard higher by orienting towards the doctorates in the fields of the natural sciences (the *Dr. rer. nat.*). In view of the differentiations of the academic disciplines and of the different emphasis of practical experience, the challenge consists in avoiding inconsistencies in the aims and institutional regulations. Potential side effects of formally equating scientific achievements in diverse fields are to be weighed against the special demands of the individual disciplines. The question concerning which measures one ought to employ when intervening in an established practice should essentially be worked out in a broad professional debate between

<sup>29</sup> Often generally perceived experiences or so-called prejudices are decisive for the prestige and reputation of an institution, since ultimately they guide judgments and actions. Even valid empirical statistics and other indices often function in this context only as correctives, and they are not always suitable as direct criteria.

<sup>30</sup> The abbreviation “phil.” signals originally, as does the abbreviation PhD (“Philosophiae Doctor”) today, a *scientific* doctorate, in contrast to the professional doctorates of the higher faculties, which is nowadays often forgotten.

the academic disciplines and faculties themselves, especially where it concerns details. In the following, specific aspects of the doctorate in the fields of medicine, law and theology will be depicted, and reform proposals currently in public discussion will be identified. This statement will address separately the doctorate in economic sciences and chemistry, since holding a doctorate in these fields is in high demand on the job market, and the rate of doctorates is accordingly high.<sup>31</sup>

### 2.2.1 Medicine

In 2014, 6,322 people obtained a Dr. med., which is 22.5% of all the doctorates for that year. Although the degree of a Dr. med. in Germany may not be awarded without the completion of one's own scientific research work, the submitted work does in general not correspond, either in terms of scope or in terms of depth, with the level of a specialised scientific dissertation. This is one of several reasons why the European Research Council (ERC) does not take German doctorates of medicine into consideration in its funding programme. From an international perspective, evaluation of the Dr. med. corresponds much more closely with the British or American MD ("Medical Doctor"), though the latter is awarded automatically with the final examination and thus counts only as a professional doctorate. In a modified form, there is a growing number of physicians ("doctors") in Germany and likewise in Austria<sup>32</sup> and Switzerland who lack a

formal doctoral degree. Medical practitioners often forego a doctorate since it is not necessary for the professional career of a licensed physician intended in most cases. Thus a tension arises between the colloquial usage, according to which for centuries the term "doctor" has been the paradigm for a medical practitioner, and the ban on using the "title" (for instance, in a passport or on letterheads).

Certainly the distinction between a physician without a doctoral degree and a physician with such a degree is, to a certain extent, relevant. Medical practitioners without doctoral degrees do not, as a rule, have all the possibilities of additional, especially clinical, career paths. In Germany, the habilitation plays a central role in recruiting medical professors, not least because of the suitable time interval following completion of the education phase and with it the very first opportunity of acquiring autonomous experience in medical practice. The existence of numerous reform study programmes with early practical experience or the introduction of a practical year provide only a minimum of practical experience and do not solve the problems of gaining sufficient clinical experience for an academic career.

Since 2007 in Switzerland, in order to be awarded a doctoral degree in medicine and for the Dr. med., individual work of least one year spent on a dissertation in the doctoral phase has become mandatory, which is intended to strengthen the commitment of the supervising professors and deter doing a doctorate "merely in passing". The German Council of Science and Humanities recommends a farther-reaching and clearer reform for Germany.<sup>33</sup> In the fields of medicine, a distinct scientific doctoral

<sup>31</sup> For other fields, see e.g.: Alesi/Kehm 2012, 214 f. (physics); acatech 2008 (engineering sciences); Abele/Neunzert/Tobies 2004, 81–132 (mathematics).

<sup>32</sup> In Austria, the study of medicine leads to the degree of Dr. med. univ. ("Medicinae Universae"). This degree qualifies not as a full scientific doctoral degree, but rather as evidence of a professional qualification that is obtained through a diploma study. Scientific ability is substantiated through the degree PhD (for doctorates oriented to fundamental research), Dr. med. univ. et. scient. med. or

Dr. scient. med. (cf. Universitätsgesetz 2002, § 51 (2) 11, and the doctoral study plans of the medical universities).

<sup>33</sup> Most recently WR 2011, 29.

degree should be implemented, whereby it remains open whether a formal degree or title like the MD should be awarded with the state examination (i. e. a diploma, Magister or Master's).

Should one desire to adapt the requirements for a scientific doctorate in the field of medicine,<sup>34</sup> including its special disciplines, to the requirements in other fields, the following points would need to be considered: First, in cases of a scientific doctorate, the time spent at the university would be longer. Second, the start of the practical phase, which is important for each further qualification, could be delayed (too long). Third, introducing a scientific doctorate as a condition for recruiting professors in the field of medicine requires an early decision on the part of those striving for an academic career. This could mean a profound restructuring of the existing career options. The consequence is that introducing a scientific doctorate amounts to deciding in favour of an integrated doctorate of several years under the guidance of mentors in close connection with research and practical experience. Integrating a specialist training with medical research or research with medical relevance in a multi-year doctoral project would mean, however, a real reform of the recruitment of young scientists in the fields of medicine. Without the integrated model, the pre-selection of the group of people for whom the option of an academic career in the fields of medicine is a possibility would lie *before* a more in-depth, autonomous practical experience as a physician – in contrast to the models and career paths of other countries, for instance, of the USA. Whether an early scientific doctorate in the field of medicine is advisable should certainly not be deliberated merely in advisory commit-

tees such as the German Council of Science and Humanities, but also by the experts themselves in the medical faculties, and indeed with a view to the experience made with the regulations of the system as a whole.<sup>35</sup> The primary interest should be practice-oriented research on a high scientific level.

In the final analysis, much speaks in favour of introducing a multi-year integrated scientific doctorate, developed parallel to the specialist training, as a prerequisite for a scientific, especially academic, career on the one hand, and of classifying the normal completion of a study course in the field of medicine as a professional doctorate with the designation MD, on the other hand. In this case, using the short title “Dr.” may also need to be newly regulated by law. A fundamental reform of the scientific medical Dr. med. would be the consequence. With the designation as a scientific doctorate, the Dr. med. would then stand in contrast to the title of a mere MD that is awarded without a doctorate and that would only document the completion of the state examination, diploma or Magister (depending on the configuration of the medical training), and would thus be clearly demarcated as a professional doctorate.

An alternative to introducing such a title would be to simply stick to the word “physician” (*Arzt*), specifying the respective degrees, and to proceed as before with the difference between the colloquial title “Doctor” and the legally protected title. Awarding a new title of MD would accommodate, however, the general international usage and the corresponding customs. Besides, a special-

<sup>34</sup> Possibly roughly comparable with the earlier Dr. sc. of the GDR, or in East European countries, which corresponds with a *Habilitation*.

<sup>35</sup> The Medical Faculty Association currently argues in favour of retaining the Dr. med. that accompanies studies, the quality of which ought to be improved through more structuring and a phase of at least nine months for work on the dissertation (cf. MFT 2016).

ised scientific doctorate in the disciplines of the natural sciences – for instance in physiology, pharmacology or biochemistry, but also, if need be, in the natural scientific fields of chemistry, physics and psychology – is always possible and often meaningful and necessary as well.

### 2.2.2 Law

In 2014 in Germany, roughly 1,400 doctorates were completed successfully in the field of law. That is 4.9 % of all completed doctorates. In this field, requirements concerning the admission to the doctorate and the doctoral work depend to a large extent on the university, i. e. the faculty or the institute. Some universities do not demand that one passes the first law examination (corresponding to the equivalent of the first state examination) with honours. The duration of the doctorate varies between one and five years (whereby the doctoral work is often carried out parallel with half-time employment or working as a clerk). In principle, one can complete a doctorate in law with a special theme relatively quickly, much more quickly than in other fields. There is significant variability with regard to the processing times and requirements. In law, the highest scientific demands are nevertheless expected for an academic career, with the implication that the Max Planck Institutes play a special role in recruiting young scientists in this field.

Therefore, in law too, efforts should be made to devise the quality standards of a scientific doctorate so that they are as consistent and comparable as possible, and to forego awarding a doctoral degree if the achievements are at best adequate for a *professional degree*. Concretely, it is advisable to reduce the number of doctorates in law, particularly in the interest of quality assurance.

An alternative to awarding a doctoral degree that is not substantiated by independent research is, if need be, to advise persons who are interested in a special profiling for the profession to strive for a similarly sought after and often even more useful post-graduate degree following the first state examination. An example of this is the degree of LL. M. (*Legum Magister/Magistra*), which is emulated on the British degree. This additional qualification, especially in the field of international law, is already offered in many places. It can be obtained after about four semesters and a Master's thesis (*Magisterarbeit*) in the English language, for instance on European law or on special state law or sectorial legislation. The French "maîtrise en droit" also corresponds to a degree below a doctorate.

### 2.2.3 Theology

In comparison to the specialised scientific doctorates, which emerged from the philosophical faculty, the theological doctorate is older. A doctorate in this field used to be the highest academic degree for a professor, apart from the doctorates in the fields of medicine and law. Theology also always played, so to speak, the role of a general science of education, for which the "philosophical" sciences were a prerequisite.

Apart from its proximity to religious faith, there are no general features for the doctorate in this field today. Thus, no special recommendations are made here, apart from mentioning the somewhat striking number of double doctorates in the pairing of Dr. phil. Dr. theol., which questions slightly the quality standards of theological doctorates.

#### 2.2.4 Economic sciences

Almost the same number of doctorates are completed in economic sciences annually as in law, and on average relatively speedily.<sup>36</sup> In many areas of this field – even outside institutions of higher education and academic research institutions – young employees with a doctorate are preferred, for instance in the broad consulting business, in auditing or in PR management, in ministries or economic departments (of banks, for instance) and in all kinds of research institutions. Among the top managers of major German companies, roughly two thirds of those who have a degree in economic sciences also have a doctorate. Similar to other fields, the doctorate in economic sciences normally documents the ability to perform exceptionally in the independent planning and carrying out of scientifically-based projects. But as in law, the rate of doctorates is also high, specifically when compared internationally, and (indeed also for this reason) the quality standards vary.

#### 2.2.5 Chemistry

In recent years, around 82%<sup>37</sup> of university Master's graduates in chemistry commenced a doctorate. That is approximately 6.5%<sup>38</sup> of all doctoral researchers in Germany. The reason for this high rate of doctorates is that in industry the doctorate is traditionally considered a requirement for employment. One should note at the same time the intensity of research in the chemical industry, which requires a broad background of knowledge and academic specialisation. The high research intensity in the chemical industry also accounts for the fact that well-trained chemists are ex-

pected to lead and conduct projects independently. In addition, the doctorate is in fact regarded as a phase of individual, advanced scientific achievement and the acquisition of independent research competencies, which go well beyond the specialized knowledge transmitted in the main studies. Although, as in all disciplines, the rise in the number of students (after a slump around the turn of the millennium) and the adherence to an acceptable study period poses a persistent challenge in the field of chemistry, the actual duration of the doctorate is, on average similar to biochemistry and not all that far from the regular designated period of three years.

#### 2.2.6 Humanities and the social sciences

Since the late 1960s, the duration of the doctorates and the age of graduates has risen on average more strongly than in the natural sciences, not least due to increasing competition. Adhering to an acceptable age of the graduates and to an acceptable duration of the doctorate remains a special challenge in these fields.<sup>39</sup>

#### 2.2.7 Art and music colleges

Almost all the laws of higher education in Germany grant art and music colleges the right to award doctorates. Technically, the same prerequisites apply as for other scientific disciplines in the area of aesthetics and art history. Nevertheless, a certain tension arises between an academic research doctorate and, as it is called in Austria, a “scientific-artistic or artistic doctorate”. In practice, there is in particular the danger that, in spite of formal conditions, the status functions of the doctorate are extended to artistic achievements that lie outside of scientific research. Yet, an academisation of teach-

<sup>36</sup> For 2014, the Federal Statistical Office counted 1,371 doctorates (StaBu 2015, 15).

<sup>37</sup> GDCh 2015, 8.

<sup>38</sup> StaBu 2015, 24.

<sup>39</sup> For the social sciences, see also Baur/Münch/Bach 2008.

ing at art colleges is not at all desirable. In the final analysis, therefore, much speaks in favour of regarding autonomous doctorates at art and music colleges rather as exceptional cases.

### 2.3 Status and role of the doctorate compared internationally

A comparison with the situation in other European countries shows that the basic problems are similar everywhere: In addition to assuring the function and quality of the doctorate, there is an interest, given the course of the Bologna reforms and with a view to internationally comparable values and for the sake of global mobility, to keep the duration of studies and doctorates within an acceptable range. Traditionally, the number of doctorates in most other countries is lower than in Germany.

#### 2.3.1 Austria

In Austria, following the most recent position papers by the Universities of Austria and also the Austrian Science Board (*Österreichischer Wissenschaftsrat, ÖWR*),<sup>40</sup> the right to award doctorates should remain a feature unique to universities; while there are supposed to be cooperative doctorates with technical colleges, universities select their collaboration partners according to their research interests and focus areas. A commitment in general or in principle to collaborate with certain institutions or types of institutions is rejected. Even if the number of cooperative dissertation projects carried out is still small, this will also rise in Austria in accordance with the international trend.

Doctoral candidates are designated as “early-stage researchers”, which

stands in a certain conflict with the demand for more rigidly structured doctoral “studies” at university encompassing at least three years. One joins a trend that leads away from individual supervision towards supervision by teams of scientists. One is also confronted, however, with the financial and structural limits that are placed on introducing comprehensive and functional doctoral programmes. In criticism of the classical model of the doctorate that is overseen by mentors, and in the interest of an objectification of the evaluation, it is demanded that the role of supervision and assessment be separated, and that there be a public *defensio* with the participation of external scientists. With regard to organisation, doctoral centres should be formed. Quality assurance should be improved by means of dissertation agreements, progress reports and forming cohorts with peers, taking into account the distinct character of the respective fields in promoting a goal-oriented scientific qualification, “without constraining the individual research impetus and creativity”.<sup>41</sup> The “artistic-scientific doctoral studies” and the “artistic doctoral studies” constitute a special characteristic; they follow a postulate of the equal status of art and science, according to which the research component is less in the foreground than the social status of the doctorate.<sup>42</sup>

The distinction provided by Austrian law between a “normal” doctorate and a PhD, for which, in contrast to the “normal” doctorate, there can be special qualitative admission conditions, reveals a certain degree of uncertainty with regard to the quality of a “normal” doctorate. This also contrasts with the clear stipulation in Switzerland, according to which a doctorate is evaluated as equivalent to a British

<sup>40</sup> UNIKO 2015; ÖWR 2014; ÖWR 2015, 9 f., 22 and 47.

<sup>41</sup> UNIKO 2015, 12.

<sup>42</sup> Ibid., 16 f.

or US-American PhD and thus should be or become comparable to it in terms of achievement and quality standards.

### 2.3.2 Switzerland

In their “Position paper on the doctorate”,<sup>43</sup> Swiss universities focus on excellence through research. The independent scientific work of a doctorate distinguishes it from Bachelor’s and Master’s degrees, which are based mainly on teaching. They also state that by giving tutorial guidance on how to make an “original contribution to research”, the doctorate is a “specific task of university-level education and research.”<sup>44</sup> “They reject extending the Bologna Model – understood as a harmonisation of the doctorate – to the doctoral level.”<sup>45</sup> “Collaboration with other types of higher education and research institutions” is recommended, “depending on the research areas and competences of the institutions concerned.” “The doctoral degree grants candidates the right to use the title *Dr* [...], which corresponds to the English usage *PhD*.”<sup>46</sup> Thus a distinction between a doctorate and a separate PhD study programme, as in other German-speaking universities, is clearly rejected; the doctorate is defined strictly in accordance with the international equivalent.

### 2.3.3 The Netherlands and Belgium

In the system of higher education of the Netherlands, there is, similar to Germany but in the meantime different from Great Britain, a relatively clear distinction between universities and “Universities of Applied Sciences”, the title these institutions also hold in Germany.

Normally, doctoral researchers have a relatively well-paid position at a university (on average approx. 30,000 Euro p.a.). Their performance is evaluated after 18 months. The regular duration of a doctorate is three years. As a rule, at least four publications (in English) in “peer-reviewed journals” in the specialist field are expected, but this cannot always be adhered to in the designated time-period, in face of the competition for such publications. In the Netherlands, moreover, there are special reviews of the rights of university institutes and doctoral schools to award doctorates. This is connected with competition concerning the right to award doctorates, since this depends on the institution’s corresponding accreditation. Apart from this, doctorates are mainly carried out based on the model of a graduate project overseen by mentors. In Belgium supervision and assessment is separated, but given the resulting high workload of the teaching personnel, they often forgo written scientific evaluations. Thus the assessment and committee evaluation are combined without retaining their distinct functions. A similar situation applies in Spain and Italy.

### 2.3.4 Scandinavian countries

In Scandinavia, the doctorate in some fields comes close in terms of its value to the habilitation or the “Dr. sc.” of the eastern European tradition, not least because of the overall length of the doctoral work and a traditional orientation to a doctorate supervised by mentors. However, as in Germany, there is a discussion about whether and how the model should be modified. Here the orientation is on the Bologna three-cycle model of the BA and MA studies and a final PhD phase, whereby the research component in particular is emphasised. However, there are also warnings against over-regulation in view of the problems to be expected with a dissertation supervised by several people

43 CRUS 2014.

44 CRUS 2014, 1.

45 Ibid., 2.

46 Ibid.

or by a committee. Here the institutionally envisaged BA, MA and PhD phases vary between three and four years (as in Denmark), whereby an MA phase (also entitled “licentiate” or “candidature”) has now been inserted everywhere, so that the regular duration from the beginning of the studies up to obtaining a PhD amounts to ten years – two years longer than the European ideal model of 3–2–3. Yet these stipulated time periods are by no means always adhered to. At around 37 years, the average age of the doctoral graduates is quite high.<sup>47</sup>

The proximity of the Scandinavian doctorate to the habilitation is evident from the regulations in Sweden. Here the doctorate is funded through permanent positions, i.e. one has an appointment at the university over a period of four years. Doctoral positions are only advertised if the funding is ensured for four years (mostly project funds). There is a supervision contract, which stipulates the intensity and plan of the supervision (which can vary), and which is checked mid-term by a kind of intermediary disputation (with external opposing speakers). A corresponding *disputatio* is also scheduled for the final graduation assessment, for which the opposing responses are made by external scientists who bear no supervisory relation to the candidates and have no private relationship to the supervisors. In addition, there is a three-person evaluation committee. Its members too may not have any connection (for instance, through joint publications) to those involved in the examination. The supervisor has no vote. Incidentally, not a single politician in Sweden has a doctoral degree; here the doctorate is relevant only for a career within academia.<sup>48</sup>

### 2.3.5 United Kingdom

Not least due to the transformation of the academic degrees into a “commodity” (a product on offer with international demand), doctorates in the United Kingdom split up into the “true” doctorates of the PhD, the “mere” degree of MD (“Medical Doctor”) without a dissertation, so-called Higher Doctorates, a “PhD by published works”, a “Professional Doctorate” and a “Practice-based Doctorate”. The diversification of the possibilities and the perceived value of the degrees vary drastically.<sup>49</sup> Over the past decades, a progressive decline in the competencies of the graduates has been observed along with a rise in both their average age and success rates.<sup>50</sup> It has been attempted to improve this through a “Quality Assurance Agency” and the introduction of a one-year Master’s Degree. This is awarded following a three- or four-year BA studies upon graduating from high school at the age of 17 or 18, whereby the British model 3(4)–1–3 is pitted against the “Bologna ideal” of 3–2–3 for the BA, MA and doctorate phases. Due to the widely disjunctive “markets” for graduations in continental Europe and the United Kingdom, the doctoral degrees, which document only a *professional degree*, still do not play an essential role in the general international recognition of the British PhD. However, a unified idea and a universal perceived value behind the many different British doctoral degrees can hardly be spoken of. In any case, beyond the classical universities the Humboldtian notion of a scientific subproject carried out independently under the guidance of experienced scientists is not always practised. This has consequences for the different value that a doctorate has for the academic career, which depends

<sup>47</sup> Nerad/Heggelund (Ed.) 2008, 79. See also ACO 2015; SCB 2015, 42; NIFU 2015, 20.

<sup>48</sup> Hermerén/Lahusen 2015, 326–328.

<sup>49</sup> Nerad/Heggelund (Ed.) 2008, 36, 42 f.

<sup>50</sup> Ibid., 37, 44.

greatly on the university.<sup>51</sup> Doctorates that lead only to a *professional degree* with the title of “Dr” serve careers in research or professions outside the academic field. By lowering the research demands on the graduating institution and by generously awarding the title “university”, the close relation that traditionally existed between the doctorate and graduating at a traditional university has been largely severed. Meanwhile, it is not uncommon to hear talk of “fake titles”.<sup>52</sup>

The United Kingdom thus has highly liberal rules for the general authorisation to award doctorates – the “Graduate Studies”, which have been partly created by the university institutions themselves, are at best qualified by means of doctoral funding. Apart from that, the model is successful precisely for professions outside the academic field due to the international demand for British degrees. This is due not least to the outstanding reputation of Oxford and Cambridge, which allows the enormous differences in quality of graduate studies at different locations and institutions to take a backseat. As a consequence, the perceived value of the doctoral degree is far more dependent on the awarding institution and the type of doctorate than in other countries.

### 2.3.6 USA

Like in Scandinavia, the doctorate in the USA also serves mainly to recruit young scientists in academic fields. There are also specific features of the respective systems of higher education that should be considered, for instance those of the college system in the USA with its uni-

versal educational BA degree, for which the Major is in fact on the level of former German diploma interim examinations. If one sets aside anecdotal comparisons, the forms and durations of education in Europe and the USA are definitely comparable, in spite of all their differences. Statistically, the average age at the start of graduate studies in the USA – after twelve years of school with an earlier enrolment no later than the age of six and after three to five years of college – is very close to the average age of a European BA graduate. The first two or three years of the doctorate phase correspond to MA studies; in the past, they corresponded with the main studies in a diploma programme. A US-American doctorate consolidates both stages of a European study program, i.e. MA studies and the doctoral phase. Anyone intending to do a doctorate in the USA without losing time will thus have to apply after the first stage, i.e. after the BA examination.

Normally, following the BA phase, a nation-wide qualifying examination and the acceptance procedures of individual departments, doctoral researchers are funded as “graduate students” with doctoral positions. The duration varies between four and seven years. An early completed Master’s Degree is also possible (without a doctorate), if certain requirements of the phase of knowledge acquisition have been met. Only then does the actual doctoral project begin. Career paths show most clearly that very good European doctorates are equivalent to the degree of the PhD in the USA, and that is practically in all fields. This applies in spite of the occasional assessment of a US-American PhD as being equivalent to the habilitation. Nevertheless, the doctorate in the USA serves more strongly than in Europe as a prerequisite for academic teaching at colleges and universities. The doctoral degree, obtained on the basis of research

<sup>51</sup> Thus, for example, the London School of Economics and Political Science (LSE) has a very high proportion of foreigners and a high prestige, and similarly also the University of St. Andrews in Scotland.

<sup>52</sup> Nerad/Heggelund (Ed.) 2008, 46 ff.

achievement, is not to be confused with the profession-oriented study degrees (“professional degrees”) that are likewise designated as “Doctor” such as “Doctor of Dental Medicine” and “Juris doctor”.<sup>53</sup>

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<sup>53</sup> Cf. here in detail Meyer 2011, 25–30.

## 3 Prerequisites and implementation of the doctorate

### 3.1 Prerequisites on the part of candidates

The capacity to carry out a doctoral project presupposes on the part of the candidates a broad education in the respective field and the ability to define and elaborate scientific questions independently. Reproductive capabilities alone are not sufficient, whether on the level of knowledge of facts and rules or on the operative level of mastering techniques.

For doctoral admission, one should always distinguish procedurally between acceptance as a doctoral candidate and the opening of the doctoral process. In both cases, there should be formalised procedures for admission. Formal prerequisites for the doctoral status are the completion of a course of study evaluated with above-average grades and an achievement that demonstrates the fundamental capacity to do scientific work as well as the necessary prior knowledge.<sup>54</sup> In some circumstances, acceptance as a doctoral candidate can depend on the approval of the doctoral theme. Here the supervisor is responsible for evaluating the innovative character of the doctoral project and also its feasibility within a limited time period, which, as a rule, must be reviewed and, if necessary, approved by the faculty or a committee appointed by the faculty.

### 3.2 Prerequisites for supervision in the research environment

For supervision in the research environment, the following is required:

- research close to the theme, so-called „cutting-edge research”, in order to maintain both the internationally high level and the content-related innovative results required;
- a critical mass of specialised research;
- the appropriate wide range in the discipline and its neighbouring disciplines;
- opportunities for interdisciplinary reflection on different methods;
- a multi-disciplinary canon of methods.

### 3.3 Prerequisites for assessment, review and procedural control

In order to be able to assess a dissertation reliably, the person doing the assessment should belong to the forefront of those conducting research in the respective specialised area. Moreover, this person must have collected sufficient experience in carrying out research projects independently. This is classically documented by awarding a “*venia legendi*” or (in Austria and Switzerland) a “*venia docendi*”, that is, the permission to teach that is awarded on the basis of one’s own teaching experience and research achievements (*Habilitation*). Meanwhile, the right to supervise and evaluate a doctorate individually is also exercised by junior professors. The status and role of the junior professorship and group

<sup>54</sup> How these conditions are specified can vary from faculty to faculty.

leaders of young scientists are currently being discussed from diverse perspectives. Here one may simply point to the latent conflict between the trust shown in the independence and competence of young researchers and the demand for increased control through experienced scientific supervisors. Boards, committees, formal procedures and quantitative figures cannot be a substitute for evidence of individual scientific competence and written scientific assessments, which themselves are open to critique from the specialist field of science. At best, they serve as a necessary prerequisite for scientific quality in checking the adherence to universal norms of the scientific procedure. Science demands, firstly, a competence that is qualitatively assessed and thus, secondly, an individual scientific ethos. Administrative regulations should take precisely this into consideration and preserve the necessary freedom for experienced judgment.

In the following, possible approaches will be sketched of how to fulfil the prerequisites mentioned above.

### 3.4 Supervision and levels of structuring

“Many paths lead to a doctorate”: This holds all the more since versions of the structured doctoral programmes have been developed in the context of the excellence initiative. Whether a less or more strongly predefined path to the doctorate is the better path for doctoral researchers depends on the field, the theme and the individual prerequisites of the persons doing the doctorate. Each model has its own advantages and disadvantages. It is important to identify them.

#### 3.4.1 The individual doctorate

The dissertation project that is supervised by experienced mentors is the usual case

in many academic disciplines,<sup>55</sup> whereby one traditionally speaks of “doctoral supervisors”. The form of the individual doctorate can currently be found also in larger collaborative project groups under an experienced project leadership, for instance, in the empirical, the experimental and the technical sciences. One variant of this model consists in separating the functional roles of those supervising and those assessing the doctorate. This separation has the advantage of averting conflicts of interest; on the other hand, hardly anyone knows the specific field better than those supervising the doctoral project, at least in general. Conceptual work, which is always necessary in scientific projects, must first be individually drafted and developed; only later does it enter a collective collaboration.<sup>56</sup>

In the interest of the doctoral researchers, also of scientific quality assurance, at least a second equivalent co-supervision by an external colleague should be secured as early as possible. Support of a doctoral process and the external assessment of a dissertation mean an additional burden for university professors. It is therefore advisable to nominate, if possible, the external persons for supervision and assessment already when commencing work on the dissertation. Supervision agreements, already common in many faculties, are advisable as an integral formal part of doctoral admission.<sup>57</sup> They regulate clearly

<sup>55</sup> Cf. VDMA 2015. In this paper, the VDMA speaks in favour of strengthening the classical assistant doctorate in the areas of mechanical and electrical engineering. For the engineering doctorate, cf. acatech 2008.

<sup>56</sup> The conflict between demands for greater curricular elements and the need for necessary space in the individual research project finds expression in many recommendations. Thus, for example, the Austria Science Board speaks of a “doctoral training” and says that this must not, “likewise turn into a process of school-like instruction through the institution of doctorate colleges” (ÖWR 2015, 31).

<sup>57</sup> Supervision agreements are also recommended by UniWiND 2011, WR 2011 and HRK 2012. The DFG has developed a recommendation for drawing up

the responsibilities in the relationship between doctoral researchers and their supervisors, stipulated in writing the supervisors involved and the form of supervision. Doctoral degree regulations of the universities should make the appropriate regulations binding. In the course of the doctoral project, the examiners should also be stipulated, not least in the interest of transparency of the procedures for the candidates as well. Here the principally desirable separation between supervision and assessment is less important than receiving a written scientific assessment – which is not possible at all foreign universities – that is monitored by a doctoral committee at a university.

If all supervisors have an equal status, there is no need to grant the right to award doctorates to universities of applied sciences or their organisational units. According to our recommendation for joint supervision of doctorates by an internal and an external mentor, the procedure for cooperative doctorates between universities and universities of applied sciences would be the same as for all other doctorates at universities and other institutions of higher education that are authorised to award doctorates: One must find specialised colleagues at a university who take responsibility for the procedure and co-supervise, i.e. assess it, just as all university professors themselves must also find external supervisors and examiners in order to carry out a doctorate. That is precisely part of the quality assurance of the doctoral project. The incentive to participate in a supervision would be considerably strengthened by fully equating, i.e. by not distinguishing between internal and external supervision by all institutions, also in view of target agreements and similar procedures. In light of the increasing importance in documenting achievement, it should always be possible to find co-su-

supervisors for good projects. Contracts between universities, faculties or institutes – for instance, according to the model of bi-national doctoral processes (*Cotutelle*) – would no longer be necessary for the supervision of the doctorate. Nonetheless, the essential problems would be solved in an efficient manner. The same applies for the desired co-assessment through an external examiner.

### 3.4.2 The structured doctorate

The main reasons for introducing structured doctorates may be summarised as follows:

“Lack of transparency in admission, supervision, guidance through the doctorate and support in acquiring additional knowledge was one of the driving forces for introducing the structured doctorate: Collective decisions concerning the acceptance of doctoral researchers based on selection procedures, team supervision, mentoring, exchange forums, structured further education opportunities, support for publications and participation at conferences, registration of the doctoral researchers and a secured funding were the cornerstones of such programmes.”<sup>58</sup>

The personal relationship between project supervisor(s) and doctoral researchers is thus replaced by an institutional framework. The college system has advantages, for instance being embedded in interdisciplinary and international contexts, which should not be overestimated, however. Regulations in structured doctoral programmes harbour dangers, especially when they contain too many well-meaning curricular provisions that transform the doctorate into a third phase of education, which is precisely what it should not be. What is decisive

supervision agreements: DFG 2014.

<sup>58</sup> Hornbostel/Tesch 2014, 607.

is the concrete form of supervision, the clear responsibility and commitment of scientifically experienced mentors (the traditional “doctoral supervisors”) for the sustainable quality assurance of the supervision, the degree of structuring through curricula, the extent of the research’s autonomy and the possibility of consulting experienced scientists.

#### **Training, school, studies, doctorate:**

Whoever works on a dissertation does not take part in a study programme. The commonly used expressions “doctoral studies” and “graduate school” are misleading and not suitable for describing the doctoral status and doctoral institutions. More suitable are designations such as “graduate college” or “graduate academy”. The Bologna reform’s classification of the doctoral phase as a “third cycle” results in the misleading characterisation of the doctoral phase as “doctoral training”. This would change the status of the doctorate fundamentally, namely, in the direction of a “professional degree”.

gna model into two parts: A “third cycle” amounts just to an extension of the studies by duplicating the educational contents of the Master’s phase. By no means should the “European Credit Transfer and Accumulation System” (ECTS) be applied to research achievements in the doctoral phase. A third “study phase” is simply not sensible.

With regard to the kind of supervision, one may distinguish between the following: a) classical supervision by mentors, which always includes taking part in colloquia; b) supervision in specialised graduate colleges as a variant of the model of guided research groups with an overall theme or target project; and c) supervision in interdisciplinary graduate academies, whereby designating them as “graduate schools” is nonetheless misleading for the reasons mentioned above. In every case, the scientists at the (faculties of the) universities remain responsible for the supervision and evaluation of the scientific accomplishments that have been achieved or still have to be achieved.

The demand for more structuring, which accompanies the tendency towards classifying the doctoral phase as a “third cycle” of academic training, is usually defended by pointing to transparency and clearly regulated responsibilities in admission, supervision and assessment, and, on the other hand, by the necessity for quality assurance of merely the degree – instead of the scientific achievement! – and by the doctoral researchers’ right to appropriate supervision. Often curricular components are introduced into the doctoral phase under the catchword “structuring”. Here one must warn emphatically against the tendency towards a school-based approach in the doctoral phase, especially since this would go against the meaning of the division of the training phase in the Bolo-

#### **3.4.3 Other doctorate models (enterprises, external)**

Doctoral researchers who work on research projects and thus usually in a team with colleagues are integrated into the university network and can, in addition, often gain teaching experience. External doctorates in conjunction with exercising the profession may have a financial attraction. Nonetheless, it must be ensured that an individual contribution is made to researching something innovative. Even when one does not aspire after an academic career, it is necessary that there be not only applicable scientific standards, the opportunity for discourse within the field and between disciplines, and a variety of methods; one’s own results also have to be represented and made visible in the field internationally,

not just at a local university. For this, being integrated into a research environment at a university parallel to one's profession would be indispensable, particularly in the area of applied sciences: "It is essential for the quality of a doctorate that the doctoral researchers be integrated in an active research context."<sup>59</sup> For this reason, the external doctorate, i.e. the completion of a doctorate outside the university context, often pursued part-time, is the most challenging model. In cases where this model is recommended, it should be intensively monitored and supported where appropriate, whereby here too supervision agreements are helpful.

### 3.5 Assessment and grading

Submission of at least a second evaluation is set out in all the regulations on the assessment of dissertations as a necessary minimum condition. In view of the concerns depicted in reference to possible conflicts of interest with doctorates that are supervised by mentors, a separation between supervision and evaluation is commonly recommended, for which a minimum condition is the appointment of an external examiner, i.e. someone not belonging to the institution in which the doctorate is carried out. This is to be welcomed for the purpose of quality assurance and harmonizing the standards across faculties and universities. However, it is advisable, in keeping with the demand for a good supervision of the candidates, that the external examiner be nominated and bound in early on in the procedure. To this end, the doctoral degree regulations should include the rule that at least one external person should participate in the supervision and assessment part of the doctoral process.

In light of the relatively high number of doctorates in Germany, a differentiated grading should be endorsed. Despite diverse nomenclatures, the function of overall grades may be classified, for example, as follows: "rite" and "cum laude" signalise that candidates have carried out their projects decently, but have not thereby qualified for a scientific career; "magna cum laude" is indication of one's suitability for a scientific career; "summa cum laude" is a distinction which must be substantiated and which should be awarded only in exceptional cases of excellent research achievement.

The practice of grading doctoral achievements is currently of only limited informational value. This is due above all to the strongly varying local standards, but also to the clearly recognisable trend in the past years towards an increase in the number of good and very good evaluations.<sup>60</sup> Causes of this grade inflation vary greatly: They extend from economic factors like the approval of subsidies for printing costs or appointment conditions, up to individual motives like avoiding conflict, or having an alleged increase in one's own reputation by having graduates with good grades. To avoid changeable local grading standards, it is helpful to have transparency beyond the individual institution,<sup>61</sup> along with having interdisciplinary and interfaculty communication processes on scientific standards specific to a field. The concept of external evaluation of dissertations recommended here could prove to be positive in the long term, even if this procedure, like any other, can be circumvented by objectionable practices.

<sup>60</sup> IFQ 2014; IFQ 2012, 26–35; SZ 2015, 1; WR 2011, 9, 25.

<sup>61</sup> An example is the annually published statistics of the *Gesellschaft Deutscher Chemiker* (cf. GDCh 2015).

<sup>59</sup> Hornbostel/Tesch 2014, 607.

### 3.6 Funding

A decisive prerequisite for carrying out a doctorate successfully is the funding. Proposed amendments to the Act for Temporary Contracts in the Sciences (*Wissenschaftszeitvertragsgesetz*) allow for limited contracts for the duration of the qualification phase. It is a welcome development that scholarships and forms of social coverage for doctoral researchers guarantee funding for three years. A review after one year has now become general procedure in order to determine whether the project is well on track and that the funding may be continued. In the interests of doctoral researchers, supervisors and donors, this practice should be adhered to.

## 4 The right to award doctorates and the cooperative doctorate

After depicting the objectives of a scientific doctorate and the corresponding tasks of supervision and assessment, the following raises the question concerning the types of institution that satisfy the prerequisites for implementing doctorates institutionally and assuring their quality.

### 4.1 Premises of the debate concerning the right to award doctorates

A distinguishing feature of the German scientific system, and also one of its strengths, is its varied research landscape: More than 900 publicly financed research institutions pursue research and teaching in its full thematic and methodological breadth.<sup>62</sup> Added to this is a research-intensive economy. Clearly defined task areas with regard to the type and organisation of research are assigned to different institutions.<sup>63</sup> Consequently, in Germany – in contrast, for example, to the USA, where there are relatively few “beacons” for conducting cutting-edge research and for training elites – research and teaching are conducted at a high level, with a great spectrum and at many institutions.

Yet the existing division of tasks and labour appears – especially in the course of the Bologna reform – to be

slowly dissolving. Less horizontal and greater vertical differentiation is being observed.<sup>64</sup> More and more profession-oriented education is demanded of universities; cutting-edge research is outsourced to research institutions outside the universities or is promoted in clusters of excellence at only a few universities. Research funds for universities of applied sciences have quadrupled in the past ten years.<sup>65</sup> In view of the challenges facing the German science system – globalisation, acceleration, complexity, demography, capacity for innovation, and the need for investment<sup>66</sup> – bridging existing institutional borders is not only sensible but in fact imperative. Interdisciplinary and inter-institutional work has become an indispensable prerequisite for the competitiveness of German science.

The decline in horizontal differentiation processes and the increase in vertical differentiation processes are not without implications for the doctorate. An academic career should be made accessible to all capable young scientists – especially if they work in top-class research – regardless of whether they

<sup>64</sup> Banscherus/Engel/Spexard/Wolter 2015.

<sup>65</sup> BMBF Forschung an Fachhochschulen (BMBF research at universities of applied sciences). Nonetheless, there exists a great difference in the extent of the research funds for universities and universities of applied sciences (cf. DFG Förderatlas 2015, 25). Due to the tendency of differentiation, there are also major differences between different universities of applied sciences. Also the composition of research funds is changing, which come less from industry and the economy, but increasingly from EU funds (cf. Hornbostel/Simon 2010, 20–23).

<sup>66</sup> See WR 2013, 18.

<sup>62</sup> Cf. DFG Förderatlas 2015, 53f.

<sup>63</sup> This system arose in the 1960s and 1970s, especially with the introduction of technical colleges with practical and professional education. Cf. on this and its further development: Hornbostel/Simon 2010, 20–23; WR 2010b, 22.

commenced their studies at a university or at a university of applied sciences. At the same time, it is necessary to ensure a consistent quality of the doctorate. University faculties, along with institutions of higher education authorised to award doctorates, are the institutional authorities for carrying out and supervising doctoral processes as well as monitoring their quality. This does not mean that doctoral projects cannot be carried out at other institutions, but the institutional responsibility lies with the universities and the institutions authorised to award doctorates. Evidence that this is working is the rising number of doctorates at external university research institutions. In 2014, there were 3,000 completed cooperative doctorates.<sup>67</sup> There are efforts, especially on the part of universities of applied sciences, to abolish this division of responsibilities. In conjunction with the development of structured doctoral programmes, a drastic differentiation of the doctorate is taking place along with a latent transformation of the doctorate into a third phase of studies. In principle, the diverse ways of approaching the doctorate and its diverse configurations are to be welcomed. This must not lead, however, to different standards of quality being applied to the doctorate or to the generation of “second-class” doctorates, unless these are clearly demarcated as mere professional degrees. For this reason, it is necessary that tasks, responsibilities, possibilities and limitations concerning the doctoral process be defined clearly (and institutionally) and with a view to scientific achievement.

#### 4.2 The current state of the debate

Against this background, a debate is taking place concerning giving universities of applied sciences the right to award doctorates. One must distinguish here

between the fundamental right of a professor to participate in doctoral processes and the right (of an institution), on a statutory basis, to award a doctoral degree on the basis of a doctoral process for which the institution is accountable.

The question whether universities of applied sciences or some of their individual organisational units should receive the right to award doctorates is a source of controversy. The German Council of Science and Humanities and the German Association of University Professors and Lecturers (*Deutscher Hochschulverband*, DHV) are opposed to this,<sup>68</sup> while the German Rectors' Conference (*Hochschulrektorenkonferenz*, HRK) abstain from voting for structural reasons.<sup>69</sup> The Union of University Lecturers (*Hochschullehrerbund*, HLB) endorses such a right to award doctorates.<sup>70</sup> Depending on the federal state, the subsequently developed concepts range from a limited right to award doctorates that is restricted to areas strong in research, to an unlimited right that extends to the whole institution of higher education. The demand is substantiated by the equal status of institutions of higher education in the context of the Bologna Process, the differentiation of subject areas and study programmes, the research achievement of universities of applied

<sup>68</sup> DHV 2014, WR 2010a, WR 2010b. The Austria Science Board (ÖWR) aligns itself substantially with the position of the German Council of Science and Humanities (cf. ÖWR 2014 and ÖWR 2015).

<sup>69</sup> The HRK is composed of member groups of universities and universities of applied sciences. Both member groups take up different positions with regard to the independent right to award doctorates at universities of applied sciences (see HRK 2015); this situation remains so far unchanged (see HRK 2017, 21). The somewhat more heterogeneously composed Austrian conference of higher education (*Österreichische Hochschulkonferenz*), which includes people from ministries, the Science Board, private universities etc., finds itself in a comparable situation (cf. HSK 2015). In addition to the HSK, there is an *Österreichische Universitätenkonferenz* (Universities Austria) and a *Fachhochschulkonferenz* (Conference of Universities of Applied Sciences)

<sup>70</sup> HLB 2010.

<sup>67</sup> GWK 2015, 73.

sciences, the competitiveness (national and international) and the higher qualification requirements coming from the economy. In addition, universities of applied sciences emphasise the difficulty in recruiting young researchers in their own projects without the prospect of a further academic degree.<sup>71</sup> All the parties are in agreement that, in their current form, the existing instruments for the cooperative doctorate must be improved.<sup>72</sup>

While there is far-reaching consensus with regard to the status and function of the doctorate and its accompanying quality criteria and institutional prerequisites, the institutional responsibility for the doctorate and the scientific organisation of its quality assurance remains a source of controversy. There is consensus that, for quality assurance and control, there is need for a critical mass and diversity in researchers for a research environment that is sufficiently broadly arranged with regard to the subject area; there is also need for teaching that enables research and is in close contact with research, and for research that is innovative within the discipline. There is disagreement, however, about whether universities of applied sciences meet these criteria,<sup>73</sup> about how meeting these criteria is to be monitored, how the awarded degrees in the end are rec-

ognised or classified, and whether there should be an opportunity for the development of institutions of higher education of a new type,<sup>74</sup> which could in selected fields implement independent doctorates that are more than mere professional doctorates.

With regard to an independent right to award doctorates for universities of applied sciences, some sceptics see a threat to the landscape of higher education and research that is differentiated according to institutional tasks and that has been proven very reliable. In this landscape, universities and universities of applied sciences take on different and complementary functions.<sup>75</sup> Thus the German Council of Science and Humanities links the right to award doctorates with the institutional mandate to train future researchers, which is directed at universities but not at universities of applied sciences.<sup>76</sup> With a view to the allocation of limited funding resources, representatives of universities of applied sciences plead in favour of more competition instead of a legally regulated institutional mandate, which is perceived as constraining them to a specific type.<sup>77</sup> They thereby invoke the recommendations of the German Council of Science and Humanities on the differentiation of institutions of higher education.<sup>78</sup>

Current laws of higher education have so far not permitted granting universities of applied sciences the right to award doctorates in general. There is, however, the idea of entrusting the right to sectors in accordance with certain criteria. Thus one finds an advancement clause in an amendment to the Higher Education Act of the state of

<sup>71</sup> HLB 2010, LRK 2014a, LRK 2014b, HLB 2015.

<sup>72</sup> According to statistics, of the graduates from universities of applied sciences, more are switching to a doctorate at a university than are participating in a cooperative doctorate process. Between 2012 and 2014, at least 1,245 graduates from technical colleges and universities of applied sciences completed a doctorate, though only 376 of them were in the process of a cooperative doctorate. This means that ca. 2/3 of the graduates (869 people) transferred to a university or an institution of higher education that is authorised to award doctorates (see HRK 2017, 5).

<sup>73</sup> The HLB emphasises that universities of applied sciences meet the criteria, which the German Council of Science and Humanities drew up in its "Empfehlungen zur Vergabe des Promotionsrechts an nichtstaatliche Hochschulen" (cf. HLB 2010 and WR 2009).

<sup>74</sup> Geisenheim University, for example (cf. WR 2012).

<sup>75</sup> DHV 2014; DHV 2015, 2; ÖWR 2014.

<sup>76</sup> WR 2010a, 126; WR 2010b, 85.

<sup>77</sup> FH Köln 2011.

<sup>78</sup> WR 2010b.

Baden-Wuerttemberg, in effect since April 2014, according to which the right to award doctorates may be granted, temporarily and in relation to a theme, to consortia of universities of applied sciences following an evaluation process. (This clause is only supposed to take effect, however, if the implementation of the preferred cooperative doctorate proves to fail.)<sup>79</sup>

The Higher Education Act of Schleswig-Holstein pursues a different path. There, the possibility of founding a cross-university scientific institution for carrying out doctoral processes has been provided under the title “Schleswig-Holstein doctoral college” (*Promotionskolleg Schleswig-Holstein*). Research teams including at least three professors from a technical college and one university professor must be established. In addition, the special scientific qualification of the technical college professors must be ensured along with the separation of supervision and evaluation.<sup>80</sup>

In November 2015, the parliament in Hessen passed a new Higher Education Act, according to which the temporary right to award doctorates may be granted to universities of applied sciences for research-intensive disciplines.<sup>81</sup> On the

basis of this law, a university of applied sciences can apply for the right to award doctorates for one of its organisational units, e.g. a doctorate centre. Three indicators of the research strength of its scientists are decisive in granting the Hessian right to award doctorates: A certain number of them must demonstrate their research strength individually through a certain level of third-party funds, a certain number of peer-reviewed publications or, if necessary, through patents.<sup>82</sup> These indicators are categorically identical with the criteria for the acceptance of a research focus (FSP) at technical colleges/universities of applied sciences on the research map of the German Rectors’ Conference.<sup>83</sup>

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reviewed.

<sup>82</sup>At least twelve professors must be involved, who must demonstrate their individual research strength by means of peer-reviewed publications (three publications in three years) and third-party funds (150,000 € within three years) (see Hessisches Ministerium für Wissenschaft und Kunst 2016).

<sup>83</sup>In two different data banks, the research map records the research foci of universities on the one hand, and of technical colleges/universities of applied sciences on the other (see [www.forschungslandkarte.de](http://www.forschungslandkarte.de), accessed: May 24, 2017). Different criteria are used: For a university’s research focus to be accepted, it must be represented by 25 cooperating professors. For technical colleges/universities of applied sciences, the following criteria apply: 5 professors for each research focus; 150,000 € research budget/year for a social science, humanities and health science research focus and 500,000 € budget/year for a research focus of other subject fields; 15 scientific publications and/or patent applications per year. The criteria were specified separately by the respective HRK membership groups of the academic universities on the one hand and by the technical colleges/universities of applied sciences on the other hand (written communication of the HRK office from May 24, 2017). In the *Zielvereinbarung 2016–2020 zwischen dem Hessischen Ministerium für Wissenschaft und Kunst und der Hochschule Fulda*, the right to award doctorates is sought for areas that are strong in research. For the development of research structures, the Fulda University of Applied Sciences orients itself explicitly to the indicators of the research map (see *Zielvereinbarung 2016–2020*, 13), which was defined by the research commission of the technical college member group of the HRK. With a view to this context, a joint discussion by the membership groups of academic universities and technical colleges/universities of applied sciences about the criteria would be strongly recommended.

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<sup>79</sup>LHG 2014.

<sup>80</sup>HSG 2016, § 54a.

<sup>81</sup>HHG 2015, § 4 (3); see also Dokumentation Promotionsrecht 2016. On October 10, 2016, Hessen’s minister of science granted the independent right to award doctorates to the doctorate centre of social sciences of the Fulda University of Applied Sciences. Since then, two more doctorate centres have been created (<https://www.hs-fulda.de/forschen/promovieren/>, accessed: May 24, 2017) and a further two are being planned ([https://www.hs-fulda.de/fileadmin/user\\_upload/Abt.\\_Forschung\\_und\\_Transfer/Promotionsfoerderung/Infovortrag\\_Promovieren\\_an\\_HFD\\_2017\\_05\\_03.pdf](https://www.hs-fulda.de/fileadmin/user_upload/Abt._Forschung_und_Transfer/Promotionsfoerderung/Infovortrag_Promovieren_an_HFD_2017_05_03.pdf), accessed: May 24, 2017). Should all subject fields of the Fulda University of Applied Sciences be gradually covered by these doctorate centres, the autonomous right to award doctorates would exist for the entire institution, although neither an institutional right to award doctorates would have been granted nor the conditions for granting such a right would have been

In granting the right to award doctorates to organisational units of universities of applied sciences, there is, then, in Hessen the new development that the right to award doctorates is no longer based on the institution but on indicators instead. The criterion is the research strength of single persons and groups of people, and not the entire institutional context in which teaching and research are embedded. Granting of the right to award doctorates is thus tied to the achievements of individual persons, through whose qualifications an organisational unit of a university of applied sciences, for instance, a doctorate centre, may obtain the right to award doctorates. Here one should note a significant change in the previous conditions and a serious narrowing of the evaluation criteria for granting the right to award doctorates, which waives the review of institutional prerequisites in realising doctorates and assuring their quality. It is thus recommended that a scientifically-based procedure be established to deal with the question concerning the right to award doctorates for universities of applied sciences.<sup>84</sup> The German Council of Science and Humanities should be involved also in this procedure. An autonomous right to award doctorates for universities of applied sciences is not endorsed by the academies.

In this context there should be a discussion on the highly controversial and meanwhile highly researched performance indicators, which underlie the granting of the right to award doctorates to universities of applied sciences. This also concerns precisely the selection of the three indicators mentioned above for

granting the right to award doctorates in Hessen – for it may be that the criteria that allow a research focus of technical colleges/universities of applied sciences to appear on the research map of the German Rectors' Conference are still not sufficient for an autonomous evaluation of the scientific character of a research project or a doctorate. That these indicators are regarded as a sufficient basis for granting the right to award doctorates without further discussion is therefore a very problematic development.

Moreover, in light of the need to assess whether the conditions of a (scientific) doctorate are met or only a professional degree is awarded, one should bear in mind the repercussions for future hiring and appointment policies at universities of applied sciences if the right to award doctorates is granted merely based on indicators. According to previous practice, here a mere professional degree would not be sufficient.

### 4.3 Quality and recognition

Demands that a right to award doctorates be granted to universities of applied sciences overlook that we are dealing here with an institutional right.<sup>85</sup> The question whether universities of applied sciences or their organisational units, to which the right to award doctorates has been granted, meet the institutional prerequisites for appropriate quality assurance has not been answered. In particular, it is questionable whether universities of applied sciences are internationally networked in such a way that the scientific originality of a doc-

<sup>84</sup>A university of applied sciences' assesment of itself – that it too meets the criteria by the German Council of Science and Humanities for granting the right to award doctorates to non-state institutions of higher education (see Hochschule Fulda 2016, 36) – is not even sufficient in the interest of fair competition between institutions of higher education.

<sup>85</sup>In contrast to what one reads on the webpage of Fulda University of Applied Sciences, a professor's individual right to award doctorates does not exist: "In these three doctorate centres, a total of 36 of the 150 Fulda professors have been granted an independent right to award doctorates" (<https://www.hsfulda.de/forschen/promovieren/>, accessed: May 24, 2017).

toral achievement may be ascertained with sufficient certainty. In pointing out that some doctorates from universities of applied sciences were possible by collaborating with foreign universities, one easily overlooks that we are often dealing with – for example, in Great Britain – the awarding of Dr. titles on the level of professional degrees situated below a PhD and thus below the standard of a scientific doctorate. With autonomous doctorates at universities of applied sciences, i.e. without quality assurance through universities or institutions of higher education that are authorised to award doctorates, the international recognition of the German doctorate as evidence of a scientific research achievement is now hanging in the balance more than ever. It would be unfortunate if the doctoral degree depended in its value on the awarding institution or the special legal provisions of individual federal states. While the individual institution awarding the degree can have a certain influence on the degree's recognition by ensuring high quality (whereby the institution must always face an evaluation by the international scientific community), it too, along with the perceived value of its degree, will always remain dependent on the general reputation of the general standards and quality assurance of the entire country.

Committee judgements and evaluation indices alone cannot thereby judge the “sufficient research strength” of a person or research group, since here too judgements on quality are necessary, which must arise from an international reputation in an academic discipline that has not been too narrowly tailored. An uncontested definition of “research strength” cannot be reached merely by means of certain features and formal criteria for excellence or via legal decisions.

In light of changes in society and the economy, more and more areas of

knowledge and skills, which in the past were developed not in the context of scientific institutions but rather in practice in a controlled manner, will become themes of scientific disciplines – hence the demand for greater differentiation of universities and likewise of universities of applied sciences. On the other hand, even in such specialised areas like midwifery and oenology, scientific methods remain tied to canonic fields. One thinks here, for example, of the fields of gynaecology, pediatrics and ecotrophology. In end effect, each differentiation is still oriented to a canon of methods and knowledge from the respective overarching disciplines, such as mathematics, as well as informatics, the natural sciences, psychology, history, political and social sciences, or of the meanwhile classical technical sciences. What makes it difficult for graduates of universities of applied sciences to find suitable qualified supervisors at universities is not the organisation and the specialised theme, but rather the necessary reference to these specialised methodological foundations.

#### 4.4 The cooperative doctorate

In consideration of these circumstances, the demand by universities of applied sciences for experimental competition should be seen ambivalently. Success in competition is revealed first of all in the results. Some of these results can be anticipated, particularly if they are made institutionally, e.g. when the study system is extended to a third phase or titles are awarded that need to be weighted differently. In contrast, the cooperative doctorate relies on proven structures in quality control.<sup>86</sup> It makes it possible to

<sup>86</sup> Because of the doctorate's function in the areas of mechanical and electrical engineering as a qualification for professions in industry outside of academia, in which independent project leaders are sought, the VDMA also pleads against interpreting the doctorate as a third phase of studies, against an excess of school-like instruction and

provide young researchers from different institutions with the opportunity of obtaining a further scientific qualification in a qualified research environment. It brings together two valid interests: the interest of highly qualified graduates from universities of applied sciences in a doctorate on the one hand, and the interest of universities or equivalent institutions of higher education in assuring the quality of the doctorate on the other.

In practice, with regard to cooperative doctorates that involve universities of applied sciences, much better prerequisites and possibilities for carrying out a doctorate need to be created in the interests of doctoral researchers. In its „Recommendations on the role of Universities of Applied Sciences in the higher education system“ (*Empfehlungen zur Rolle der Fachhochschulen im Hochschulsystem*) (2010), the German Council of Science and Humanities has already recommended that collaborations in teaching and research be expanded between universities and universities of applied sciences, for example, in the form of collaboration platforms.<sup>87</sup> In particular, structures should be created that enable cooperative research,<sup>88</sup> which is an essential prerequisite for the practical realisation of cooperative doctorates. Cooperative doctorates can thus reinforce the interconnections, already existing between top-performing universities of applied sciences, with the university system. But cooperative doctorates should not be a prerequisite for good candidates with outstanding scientific projects. It is sufficient if competent supervisors in the respective discipline are found at a university. Then it will hardly still be necessary to establish organising structures

to form supervisory teams composed of representatives from the university and the university of applied sciences. Nonetheless, models such as the NRW graduate institute, which was founded in December 2015, may be helpful. As a collective scientific institution of the technical colleges of North Rhine-Westphalia, it promotes cooperative doctorates in a structured context.<sup>89</sup>

With regard to the feasibility of cooperative doctorates, the administrative problems are much less serious than generally feared. Geographical proximity today no longer plays a fundamental role in institutional quality control and assurance, not even in the supervision of projects. Professors at a university of applied sciences can participate in a doctoral process by supervising or assessing, or as a member of a doctoral committee.<sup>90</sup> Especially in the interest of a smooth collaboration in research and supervision, a corporate-based legal status could be conferred to professors from universities of applied sciences – for instance, through co-optation at a university faculty – if they have the academic prerequisites (habilitation or equivalent qualification). Additional support for the doctorate in the form of coordination centres offering information and consultation on the cooperative doctorate at universities of applied sciences, or on funding the doctorate and applying for funding, and on hosting cross-university colloquia, may likewise be suitable instruments.

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structuring, against a right to award doctorates for universities of applied sciences, and instead in favour of universities' obligation to cooperate and improve cooperative doctorate practice (cf. VDMA 2015).

87 WR 2010a, 40 f.

88 Ibid., 70.

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89 Cf. HG 2014, § 67a (2).

90 See also HRK 2015.

## 5 Methods

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## 5.5 Expert Reviewers

The present statement was assessed by the following seven scientists:

Prof. Dr. Dr. Matthias Lutz-Bachmann  
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Prof. Dr. Wolfgang Löwer  
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Prof. Dr. Erich Runge  
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The academies would like to thank the expert reviewers for their proposals for improvement, which were discussed by the working group and adopted as far as possible. They would especially like to thank Dr. Constanze Breuer for her great commitment, and likewise all the dialogue partners who have accompanied the statement from its inception with their comments and advice.

## 6 Appendix

### 6.1 Glossary

#### Autonomous right to award doctorates

A legal regulation that deems it no longer necessary that quality control lies with the (faculties of) universities when implementing the → Doctoral Process.

#### Bachelor's Degree

First academic degree and completion of a course of study following a three- to four-year higher education, imparting scientific foundations, methodological competences and practical qualifications. It is considered a professional qualification. An additional designation specifies the rough specialisation (Bachelor of Arts, Bachelor of Science, Bachelor of Engineering etc.). The Bachelor's Degree is a prerequisite for acceptance into a subsequent Master's programme.

#### Bologna Process

Also known as the Bologna reform. Attempts at a Europe-wide reform of higher education since 1998, named after the declaration signed in Bologna in 1999. Intended is the creation of a common European higher education area with comparable study structures and degrees. Its goals include increased mobility, competitiveness and employability, better collaboration and better international awareness. In the course of the reform, the study programmes were rearranged and tiered accordingly. See → Bachelor's Degree, → Master's Degree.

#### Disputation

A form of final examination in the → Doctoral Process, in which the → Dissertation is "defended" publicly before a board of examiners. It serves as additional evidence of the scientific capacity of the candidates. Details on the arrangement and procedure of this examination are regulated by the → Doctoral Degree Regulations of the respective university faculties; see also → *Rigorousum*.

#### Dissertation

Scientific work in written form for obtaining the → Doctorate Degree. It is the main component of what is to be achieved in the → Doctoral Process.

#### Doctoral Admission

The official admission as a doctoral researcher at a university. Normally, an application must be filed, and the necessary qualifications and confirmation of supervision must be presented. Details on the procedure and the prerequisites are regulated by the → Doctoral Degree Regulations of the individual → Faculties.

#### Doctoral Degree

The highest academic degree, which is awarded following the successful completion of the → Doctorate and is abbreviated with *Dr.* An additional designation specifies the specialisation (*Dr. med.*, *Dr. phil.*, *Dr. rer. nat.* etc.). Not to be confused with the → "Professional Degrees" designated with "Doctor", which are awarded in the Anglo-American world but which denote only a first degree (e.g. *Juris Doctor*).

#### Doktorat

In Austria and Switzerland the entire procedure and the result of the → Doctorate.

#### Doctoral Board

A permanent committee appointed by the department, i.e. by the → Faculties of the university, that conducts all the → Doctoral Processes. It reviews the doctoral prerequisites of the candidates, makes decisions concerning → Doctoral Admission, opens the → Doctoral Process and settles special cases. Occasionally identical with the faculty council, designated especially in the faculties of medicine as the → Doctoral Committee.

#### Doctoral Committee

Not a clearly defined concept. Mostly and also in this statement it means the examination board individually appointed by the → Doctoral Board, which conducts the

→ Disputation – also sometimes called the examination committee. Especially in the fields of medicine, another term for → Doctoral Board. In structured → Doctoral Programmes, also the designation for the supervising group.

### Doctoral Degree Regulations

Set of regulations issued by a faculty, in which the elements that belong to a doctorate, including acceptance to the → Doctoral Status, admission to the → Doctoral Process, supervision, assessment, examination and evaluation are regulated.

### Doctoral Intensity

See → Rate of Doctorates

### Doctoral Process

Process of assessing a dissertation, including oral examinations, at which point the doctoral phase comes to an end. Commences with the approval of an application to open the doctoral process and with the submission of the dissertation.

### Doctoral Programme

The framework within which structured doctorates are carried out. Doctoral programmes are thematically restricted and characterised by acceptance procedures, curricular components and team supervision.

### Doctoral Status

A separate classification, so far not regulated on a uniform basis, of doctoral researchers as members of the university at the start of the → Doctorate.

### Doctoral Supervisor (*Doktormutter and Doktorvater*)

Designates the main supervisory person for doctoral researchers. The intensity of the supervision depends on the model of supervision, the field, the particular supervisor, and on the requirements of the → Institution of Higher Education. Generally he or she supports the doctoral researcher in selecting the theme, provides assistance during the development of the → Dissertation and writes the initial assessment (*Erstbegutachtung*). Increasingly, details are stipulated in a → Supervision Agreement.

### Doctoral Work

See → Dissertation

### Doctorate (*Promotion*)

Signifies promotion in the most general sense of being promoted. In German, the word designates, strictly speaking, the awarding of the → Doctoral Degree. Generally the concept is defined so broadly that it includes the whole phase of the doctorate from start to finish. See also → Doctoral Process.

### Early-Stage Researcher

An internationally established designation for emerging researchers in the first four years of their scientific career, thus mostly for the time period of the doctoral phase. The term commonly used in German as a synonym → Young Scientist (*Nachwuchswissenschaftlerin or Nachwuchswissenschaftler*) is, strictly speaking, not an adequate translation of this status.

### Faculty

An organisational and administrative unit of a university. Historically there are four faculties: the philosophical as the “lower” yet scientific (artist) faculty of the “theoretical” *artes liberales*, and then the faculties of law, medicine and theology as the “higher” faculties, which offer, first of all, practical training as qualification for a profession. Over the course of the differentiation of the system of higher education, the philosophical faculty has separated into further faculties, for instance, faculties of natural sciences and philology or humanities, which nowadays often re-organise themselves into various layouts, re-naming themselves accordingly as schools or departments. If the spectrum of a university encompasses “all” the classical faculties, one speaks of a full university. Traditionally, the faculties award the → Doctoral Degree and exercise the university’s → Right to award doctorates.

### Habilitation (post-doctoral lecturing qualification)

Designates (in Germany, France, Liechtenstein, Austria and Switzerland) the examination procedure for formally granting the authorisation to teach (*venia legendi, venia docendi*) at a (faculty of a) university and has been considered for a long time a prerequisite in applying for a professorship at a university. Required is first of all a completed → Doctorate, second, a written habilitation thesis (*Habilitationsschrift*) or an equivalent achievement, evidence of further previous scientific achievements and a certain amount of teaching experience. Details are regulated by the habilitation regulations of the respective → Faculty. In the meantime, the → Junior

Professorship and the evidence of achievement equivalent to a habilitation are considered qualifications for a university professorship.

### **Institutions of Higher Education**

An unspecified blanket term for tertiary educational institutions, i.e. universities of applied sciences/technical colleges, art and music colleges, universities.

### **Junior Professorship**

A personnel category at German universities, introduced in 2002 and anchored in the federal states' laws of higher education. It refers to a temporary professorship, which enables → Early-Stage Researchers, as an alternative to the → *Habilitation*, access to a career as a professor, while providing them with greater (research) autonomy.

### **“Master-Apprentice” Model**

An internationally established term for the classical form of doctoral supervision, with a tendentious critical connotation.

### **Master’s Degree**

Second academic degree. A prerequisite for a Master’s programme is a successfully completed first degree (→ Bachelor’s). Generally, the content of the Master’s programme builds upon the previous studies and may be either research-oriented or practical. An additional designation specifies the rough specialisation (Master of Arts, Master of Science, Master of Engineering etc.).

### **Professional Degree**

A degree, established in the USA, from an institution of higher education in studies that qualify one for a profession (e.g. engineering, architecture, agriculture, education). Obtained at “professional schools” and may be completed with a → Bachelor’s Degree, → Master’s Degree or “Doctor”.<sup>91</sup>

### **Professional Doctorate (*Berufsdoktorat*)**

A doctoral degree that is in demand for non-academic careers, yet which does not always correspond to the standards of scholarly independence in such a way that it would be sufficient for an academic career. Included here are e.g. → “Professional Degrees” in the USA and Great Britain, some of which are completed with a formal “Doctor” degree, which lies below the level of a

scientific doctorate of a PhD, but also some doctor titles here in Germany.

### **Post-Doc**

Scientists who have obtained a → Doctoral Degree and are pursuing an advanced scientific career, e.g. the → *Habilitation*.

### **Rate of Doctorates**

Also called doctorate intensity, indicating – depending on the basis of calculation – the percentage of doctorates in relation to the total population, age groups, or university degrees. While the Federal Statistical Office takes the total population as a reference value, this present paper orientates itself on the values of the OECD procedure – i.e. the percentage of doctorates is recorded in relation to the population of the same age group.

### **Research Degree**

Also called “academic degree”, designating in the English-speaking world a research-focused degree from an institution of higher education. Can encompass both the → Master’s Degree as well as the → Doctoral Degree.

### **Right to Award Doctorates**

The right of an institution of higher education to award the → Doctoral Degree. Generally, it is the right of universities. In Germany, the laws of higher education in the individual federal states stipulate who may exercise the right to award doctorates.

### **Rigorousum**

A form of final examination in the → Doctoral Process, in which the specialised knowledge of the candidate is tested. Details on the arrangement and procedure of this examination are regulated by the → Doctoral Degree Regulations of the respective university faculties; see also → *Disputation*.

### **Supervision Agreement**

A written agreement between doctoral researchers and supervisors at the commencement of a doctorate, concerning the plan and realisation of the doctorate. It stipulates among other things the content, time plan, and mutual aims and responsibilities. Whether a supervision agreement is obligatory (e.g. for the → Admission to the doctorate or acceptance in a → Doctoral Programme) or voluntary, is stipulated by the → Doctoral Degree Regulations of the respective → Faculties.

<sup>91</sup> See also Meyer 2010, p. 25.

### **Technical College (*Fachhochschule*)**

The designation used so far in the German-speaking world for a → University of Applied Sciences (*Hochschule für Angewandte Wissenschaften*).

### **Tenure Track**

The opportunity, following a temporary probationary period, to acquire a lifelong professorship. In Germany, a tenure-track option is provided with some → Junior Professorships.

### **Third-Party Funding**

Temporary financial support for scientists or scientific institutions to carry out research projects (provided e.g. by a foundation or by public research sponsors). Third-party funding has to be applied for.

### **University of Applied Sciences (*Hochschule für Angewandte Wissenschaften*)**

This expression designates → Institutions of Higher Education that carry out application-oriented tasks of teaching and research, especially in economic, technical and social fields. The concept of “technical college” (*Fachhochschule*), which has been common in Germany up to now, is being increasingly substituted with the new term.

### **Young Scientist (*Nachwuchswissenschaftlerin/Nachwuchswissenschaftler*)**

Persons who, following a first degree, obtain further qualifications (doctoral researchers, post-docs, junior professors, or seeking a *Habilitation*, through scientific work at an institution of higher education or a non-university research institution,). The concept is controversial; suitable substitutions have been proposed, such as → Early-Stage Researcher or emerging researcher – distinguishing between researchers in the doctoral phase and after the doctoral phase.

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