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FINAL REPORT

**The National Framework for Doctoral Education in Ireland:
Report on its Implementation by Irish Higher Education Institutions**

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Table of Contents

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Foreword

Higher education and research have been national priorities in Ireland for several decades. This is evident for all cycles, including postgraduate research degrees, where the focus has been placed on ensuring quality and increasing research capacity, in part by increasing postgraduate enrolment.

Doctoral education has received particular attention, including through the publication of a range of documents, amongst them the *National Framework for Doctoral Education*, which is the topic of this report.

The Higher Education Authority, the Irish Universities Association, the Technological Higher Education Association and Quality and Qualifications Ireland commissioned the EUA Solutions service managed by the European University Association (EUA) to establish a team of external experts who were asked to examine the extent to which the National Framework for Doctoral Education is effectively embedded in Irish higher education institutions and how to enhance its implementation and, ultimately, the quality of provision. Its findings are presented in this report.

By providing a European perspective on the third cycle, we hope that the findings and recommendations identified in this study will be useful to the Irish higher education sector as a whole.

Tia Loukkola
Director, Institutional Development, EUA

Acknowledgements

The Team is deeply grateful to the institutional staff members, students and other representatives of the Irish higher education sector for taking the time to submit answers to the survey that was developed for this study and for sharing their experiences during interviews conducted by the Team. The insights provided through the survey and interviews have been invaluable in contributing to the Team members' understanding of the functioning of Irish postgraduate research degree provision in Ireland in general and the implementation of the Irish National Framework for Doctoral Education in particular.

The findings from the survey and the interviews were complemented by a targeted analysis of data from the 2019 Irish Postgraduate Research Student Survey and a benchmark exercise. The Team would like to thank Technological Higher Education Association staff Sean O'Reilly, Data Analyst, for the former and Jennifer Brennan, Director of Research Development and Innovation, for the latter.

The Team is particularly grateful to Professor Lisa Looney, Vice President for Academic Affairs at Dublin City University, for providing essential background information on the recent history of postgraduate research provision in Ireland and on the development of the National Framework for Doctoral Education.

Special thanks are due to the Project Steering Committee for the confidence they placed in EUA Solutions and for their guidance at the launch of the study and during the process of drafting this report. The committee included representatives from the Higher Education Authority, the Irish Universities Association, Quality and Qualifications Ireland and the Technological Higher Education Association.

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Andrée Sursock
Team chair

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List of Acronyms

CDE	Council for Doctoral Education
ECTS	European Credit Transfer and Accumulation System
EUA	European University Association
HaSS	Humanities and Social Sciences
HEA	Higher Education Authority
HEI	Higher education institution
IoT	Institute of Technology
IRC	Irish Research Council
ITN	Innovative Training Network
IUA	Irish Universities Association
NFDE	National Framework for Doctoral Education
NFQ	Irish National Framework of Qualifications
PGR	Postgraduate research
QA	Quality assurance
QE	Quality enhancement
QQI	Quality and Qualifications Ireland
SFI	Science Foundation Ireland
STEM	Science, technology, engineering and mathematics
THEA	Technological Higher Education Association
TU	Technological University

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Part I: Introduction

DOCTORAL EDUCATION IN IRELAND

This report is focused on the Irish *National Framework for Doctoral Education* (HEA et al., 2015; hereafter the "Framework" or NFDE). Published in 2015, and drawing inspiration from the Salzburg Principles (EUA, 2005 and 2010), the Framework has four main purposes:

1. To facilitate consistent excellence in the quality of research postgraduate education and training, including research undertaken at Master's level.

2. To enable and encourage HEIs to work more closely in the delivery of an improved learner experience and outcome.

3. To maximise the employability of doctoral graduates across a broad range of employment sectors by ensuring that the acquisition of discipline-specific knowledge is complemented by the development of transferable skills.

4. To underpin the international standing of the Irish doctoral award and research degree provision more generally.

The fundamental rationale behind the creation of the Framework is best understood in the context of the higher education sector's longstanding efforts to support the transition of Ireland into a knowledge-based economy. At the beginning of the 21st century, these efforts were manifest in the level of national investment in postgraduate research (PGR) education (at least until the onset of the 2008 financial crisis) and in a drive to support a more structured and harmonised approach to PGR degree provision across the sector, one that would be in line with European developments.

The central motivation behind the Framework was to support institutions in providing PGR programmes of comparable quality and with comparable conditions across the country. While the Framework does not explicitly mention "structured" PGR programmes (i.e., taught courses covering a pre-defined number of credits, alongside other educational elements), it should be considered in that context. The emergence of a structured student experience, especially in doctoral studies, illustrates a widespread European trend of moving away from the master-apprentice model of doctoral education toward an institutional responsibility for delivering the doctorate. This trend has had profound implications for supervision, student assessment and the use of internal quality enhancement and assurance mechanisms to monitor student progression and completion.

In Ireland, these efforts included the creation of (funded) thematically focused, cohort-based doctoral programmes, in parallel to those occurring with the United Kingdom Research Councils and in the European Union, particularly with the Marie Skłodowska-Curie Innovative Training Networks (ITNs). These funding programmes have been a vehicle through which an increasingly structured doctoral provision has been developed. Eventually, the increase in structured programmes revealed a need for a set of common qualitative descriptors to ensure a high-quality student experience and support a successful completion of the degree, in line with students' expectations and needs, and irrespective of individual disciplines and funding situations.

The Irish higher education system has expanded quickly over the past decades. According to Hazelkorn, Gibson and Harkin (2015):

> Higher education has been one of Ireland's success stories. From 3,200 students at the beginning of the nineteenth century, today there are around 170,000 students, which is

estimated to rise to approximately 182,000 by 2020 and 211,000 by 2028. Through a combination of planned investment and targeted policies, participation rates have increased from twenty per cent in 1980 to forty per cent in 1998 to over fifty per cent today [2015] making it amongst the highest in Europe. (Hazelkorn et al. 2015, p. 235)

The system is also in the process of being reshaped, with a substantial impact expected on the development of Irish PGR provision. Available graduation numbers suggest that, currently, the bulk of research Masters degrees are awarded by the institutes of technology (IoTs) and doctorates by universities. Figure 1 below illustrates the profile of the different types of institutions in Ireland. Over the years, however, as the relatively recently established IoTs gained in maturity (Thorn, 2018), they have become increasingly interested in developing their third cycle.
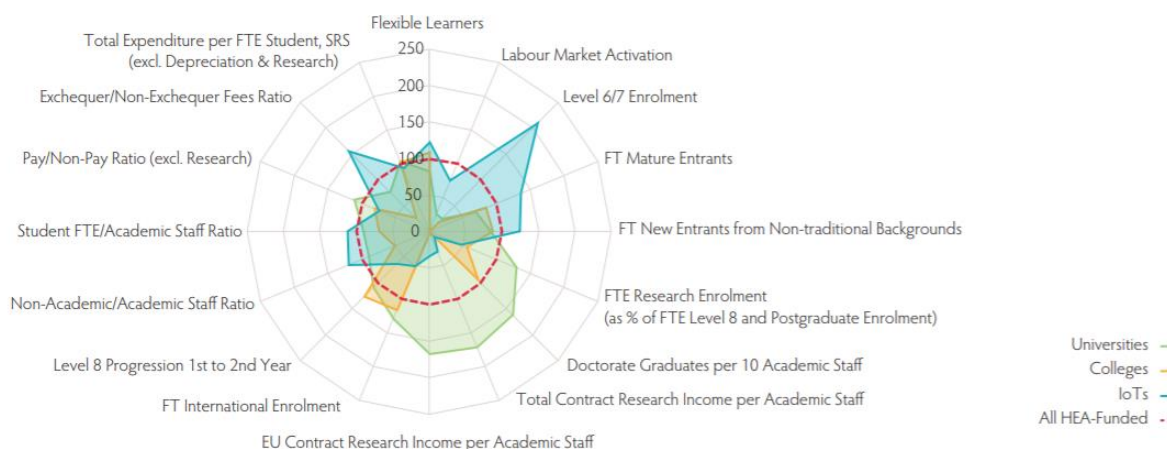

Figure 1: Institutional profiles. Source: HEA, 2018

Up until 2019, only the universities and the Dublin Institute of Technology had full authority to deliver doctoral awards. The other IoTs must apply to Quality and Qualifications Ireland (QQI) for either validation or, as another option, delegated authority to gain the right to deliver awards at NFQ Level 10 (i.e., doctoral degrees). A significant step was taken when the Technological Universities (TU) Act was passed in 2018, incentivising the merger of IoTs to form TUs and providing them with the full authority to deliver doctoral research degree awards. This process of transformation was spearheaded by the merger of the IoTs in Blanchardstown and Tallaght with the Dublin Institute of Technology to create Ireland's first TU, TU Dublin, in 2019. Munster TU (the result of a merger between the IoTs in Cork and Tralee) followed in January 2021. More IoT consortia are awaiting the results of their applications for TU status or are due to submit their applications in the next years.

The 2018 TU Act requires the merged IoTs to increase their research productivity and supervisory capacity and sets down quantitative indicators for both the number of research students and the proportion of doctorate holders amongst the staff. This process and its ramifications for PGR, especially at the doctoral level, can be seen across the technological higher education sector currently. Whereas IoTs have traditionally focused on undergraduate and taught Masters-level education, the majority of them are now pursuing the ambitious objective of increasing the numbers of their PGR degree candidates and graduates over the next decade. These candidates may, to an increasing degree, have to be recruited from abroad to meet target numbers. Additionally, many IoTs have overhauled or are overhauling and formalising their supervisory and support frameworks for PGR students. For example, the common practice of admitting all postgraduate students on a research Masters degree track, with the option of eventually transitioning to the doctoral level, has allowed many of the smaller IoTs to offer

personalised programmes to their research degree students – an approach that may be difficult to maintain as postgraduate student numbers increase.

Moreover, whilst there has been enthusiasm amongst the IoTs for achieving TU designation, there have been delays in coming to a national agreement about academic staff workload and aligning it with the university sector.[1] The lack of such a national agreement implies that local ones must be reached to ensure the development of IoT staff's research and supervisory skills, support their career pathways, and recognise their workload and achievements. This is critically important to ensure that the current and future TUs comply with the requirements set by the 2018 TU Act.

Many IoT staff members are currently in the process of obtaining their doctoral degree in order to qualify as supervisor, since the eligibility criteria for applications to become a TU require a minimum of 45% of full-time academic staff holding a doctoral degree. This percentage must be further increased to at least 65% in the ten years following TU designation. These requirements might lead to more IoT staff registering at universities to get their doctorate, which, in turn, would lead to an increased demand on the universities.

Some interviewees from the IoTs were concerned about the knock-on effect on teaching as the institutes increase PGR enrolment. They are aware that the funding model, the staff contracts and institutional quality enhancement and quality assurance (QE and QA) arrangements should be reviewed to ensure that they are supporting the TU aspirations.

Concerns were expressed that the TU development might add to already existing funding pressures in the higher education sector. Ireland's core funding model is based on student numbers, which encourages institutions to grow their enrolment, but within a fixed envelope.

A proportion of the core funding for higher education institutions is informed by research and innovation metrics. An allocation for Ireland's technological HEIs was only introduced in 2019, and at €5m represents 1.3% of core funding, whereas the top slice for the universities corresponds to 10% of core funding and has been in place for many years already, although no additional funding was provided for this purpose. The weighting used to calculate the per-capita core funding for PGR students differs between universities and institutions in the technological sector. This is informed by the differences in scale in the standard resource in both sectors (Government of Ireland, 2018, pp. 47-48).

Alongside core funding, a substantial number of students also receive programmatic funding through Science Foundation Ireland (SFI), Ireland's largest research funder (which is focused on science, technology, engineering and mathematics (STEM) research), the Irish Research Council (IRC, which funds a broader set of disciplines including the arts and humanities), Teagasc (for agriculture) and the Health Research Board for health-related research. The differences across these funding streams are reflected in different conditions for PGR students, depending on their discipline. For instance, IRC funding had been stagnating over the past 15 years and was only raised to match the traditionally higher SFI funding as of January 2021 (Government of Ireland, 2021). Whether this step will suffice to alleviate concerns over unequal student experiences and professional development opportunities remains to be seen, since at the same time a recently published *Higher Education Research & Development Survey 2018-2019* (Department of Enterprise, Trade and Employment, 2020, p. 18) showed that up to 40% of

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[1] The IoT staff are represented by the Teachers' Union of Ireland and the focus of their contract is on the teaching workload. Within the university sector, in contrast, academic contracts are not defined nationally and there is an expectation that staff will pursue scholarly activity and research, which almost inevitably will include the supervision of PGR students.

students in Ireland are self-funded. Prior to this survey, self-funded students had not been captured as a category in similar statistics.

The strategic objectives and challenges outlined above form the background for the development of the Framework and a number of complementary, more practice-oriented documents, most notably *Ireland's Framework of Good Practice for Research Degree Programmes* (QQI), but also the *Framework for Quality in Irish Universities* (IUA and Irish Universities Quality Board, 2007), the *Technological Higher Education Quality Framework* and in particular its third part about internal QA and QE of research (THEA, 2017), as well as the *Statutory Quality Assurance Guidelines Developed by QQI for Providers of Research Degree Programmes* (QQI, 2017), the latter of which stipulate minimum requirements. Another key reference document on academic standards and international academic recognition is the Irish National Framework of Qualifications (NFQ). Universities and IoTs are responsible for establishing and maintaining the academic standards of their PGR degrees. In doing so, they are expected to use the NFQ as a principle national reference point. The NFQ is aligned with the Qualifications Framework for the European Higher Education Area, thereby facilitating the international academic recognition of Irish research degrees.

THE STUDY: AIMS AND METHODOLOGICAL APPROACH

This study was conducted between October and December 2020 by a Team commissioned by EUA Solutions and carried out on behalf of a Steering Committee that included the Higher Education Authority (HEA), the Irish Universities Association (IUA), the Technological Higher Education Association (THEA) and QQI.

EUA Solutions was asked to conduct a systematic mapping of the implementation of the Framework across Ireland's higher education institutions (HEIs) offering PGR degree programmes (research Masters and Doctorates), in order

- To gain a deeper understanding of:
    - The operation of PGR provision in Ireland to date;
    - The present implementation of Framework Principles by HEIs and how it might advance existing national policies;
- and to identify:
    - Exemplars of good practice and the impact of such practices on graduate outcomes;
    - Whether system-level issues can be identified that could deliver a material – and measurable – improvement in PGR provision in Ireland in terms of its effectiveness and its efficiency.

One central component of the study was a survey among Irish HEIs offering PGR programmes about their implementation of the Framework. The survey (Annex 3) developed by the Team enquired into individual institutional practices with regard to each of the nine Framework Principles. Responses were received from the seven public universities, the Royal College of Surgeons, eight IoTs, one TU and one college. The open question format led to answers that varied in both length and detail, and are thus neither quantifiable nor strictly comparable. They do illustrate, however, the variety of institutional approaches across the sector, whether in the implementation of PGR degree provision or the Framework in particular, and allowed for a number of generalisations as well as the identification of examples of good practice.

Insights gained from the survey were complemented by semi-structured interviews (Annex 4) conducted with representatives of a selected sample of HEIs, consisting of three public and one private university, three IoTs, and one TU. Three groups of individuals in each institution were interviewed separately. They included (i) senior management staff, usually the postgraduate dean and the chief QE officer; (ii)

supervisors; and (iii) PGR students. In addition, the Team conducted interviews with research funders, experts and special interest groups in Irish higher education. The interviews queried participants on their awareness of the Framework, the extent to which it was used as a reference in their institution and the ways in which doctoral education and training was delivered. This allowed the Team to contrast the norms set in the Framework with the actual practice.

The Team's findings are presented below. In these findings, notable differences between IoTs and universities are highlighted wherever such differences could be identified. Otherwise, all types of institutions in Ireland (IoTs, universities, TU) are covered under the term "HEIs".

The Team was also cognizant of the European reforms of the doctoral cycle and Ireland's interest in participating in international benchmarking. Annex 2 provides an historical overview of the policy reforms, which have gained momentum across Europe since 2005. This Annex, authored by Jennifer Brennan, benchmarks the Irish doctoral cycle in relation to these European developments.

The Team acknowledges that there are limitations to this study. Firstly, the study was carried out within a very tight timeline. The Team designed the survey in October and interviewed participants in the short span of four weeks (26 November to 18 December 2020). Meetings were relatively short and not all issues could be examined. Secondly, because the interviews were conducted online, the number of participants in each meeting was limited to a maximum of six. Although interviewees shared the challenges they face openly and took the time to explain their practices and reflect upon them, the possibility of generalising from these accounts was weighted by the Team and the information collected was used carefully to complement the results of the survey, which could be generalised with a greater degree of certainty.

The next section, Part II, presents the findings from this study. Unless stated otherwise, the findings draw on results of the survey and interviews. The Team also drew on other sources of information for the purpose of contextualisation and comparison, notably the Irish PGR Student Survey data (HEA et al., 2019) and the European benchmarking of the Irish doctoral cycle (Annex 2).

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Part II: Implementing the National Framework for Doctoral Education

The Framework includes nine principles, each of which is the focus of the following nine sections. Each section opens with the original text of the Framework Principle (in italics), followed by a discussion based on findings from the survey, complemented with information gathered through the interviews and, when applicable, with the Irish PGR Student Survey data (Annex 1) and the European benchmarking analysis as it pertains to some of the principles (Annex 2).

A list of good practice examples concludes each of the sections. The Team would like to highlight that these examples were selected among practices highlighted by one or more institutions, in either the survey or the interviews, and do not necessarily represent common practice across the whole sector. The main selection criteria were that examples should have the potential of leading to a positive impact on the student experience, be scalable and easily transferable to other institutions, and be useful to the different constituencies interested in PGR education (e.g., students, staff, institutional leaders, funders, employers, international partners, representative bodies, government agencies).

It should be noted that some aspects of the doctoral cycle – notably supervision, the research environment and QE/QA – are of critical importance to the quality of the student experience and the standard of the awards. This is why some elements are repeated across several Framework Principles and, as a consequence, some examples may be applicable to several Framework Principles.

FRAMEWORK PRINCIPLE 1

The core of doctoral education is deep engagement with a question, problem or hypothesis at the frontier of knowledge, and advancement of this frontier under the guidance of expert and committed supervision. To be awarded a doctoral degree, the candidate must have made an original contribution to knowledge.

The survey results revealed that documentation from all institutions refers to "an original contribution to knowledge" as a condition to award a doctoral degree.[2] Institutions generally acknowledged that this contribution is not always easy to define. Ultimately, it is based on the judgement of the examination team, but the judgement of the supervisors is key in determining when a candidate is ready to submit their thesis. Some institutions have mechanisms of "supervisor sign-off" prior to submission. It was acknowledged across the sector that research students should not be allowed to approach a viva examination without a high chance of a successful outcome (i.e., passing with or without corrections).

The distinction between the Masters and the doctoral levels is clear to all HEIs to the extent that research Masters theses are expected to demonstrate engagement with a research question, substantial engagement with research training, a sustained literature review and a limited amount of original research, but not a substantial contribution to knowledge.

IoTs register all their students onto a Masters track in the first year and then progress them to the doctorate after a substantial progress review. However, a large number of students exit with a Masters degree, particularly if they cannot find funding for their doctoral years and/or the IoT does not have approval from QQI to deliver doctoral degrees in their research area. Most of the universities register their research students directly onto the doctorate in the first year but retain the right to exit a student at a lower degree level (Masters) if they do not progress sufficiently well with their research, as judged

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[2] A recent European doctoral survey (Hasgall et al. 2019), from which selected findings are summarised in Annex 2, reveals that 95% of responding institutions indicated that their doctoral students "always" (47%) or "to a great extent" (48%) spend the bulk of their time on research activities.

by periodic reviews. This concerns a relatively small number of students (circa 1-2%) who exit with a Masters degree.

All HEIs pay considerable attention to their PGR supervisors and it is an expectation that they are suitably "expert" in the subject and aware of the frontier of knowledge in their discipline. Institutions have various mechanisms to assist new supervisors in gaining experience and expertise in supervision (e.g., workshops, ongoing checks during the supervision process). The commitment of supervisors was very apparent in all of the group interviews, notwithstanding some institutional challenges, particularly around workload commitments across the sector.

As one interviewee stated to the Team, to make an "original contribution to knowledge" requires sufficient time to engage in research as well as procedures to prevent plagiarism. The first topic was raised spontaneously in many interviews, the second was broached more rarely. This does not imply, however, that no attention is paid to this important topic. Equally, to promote deep engagement in research requires adequate funding. There is, however, a widely held view among higher education staff (both academics and administrators) that PGR education is under-funded, and this poses a challenge for the near future. Students themselves often commented on the rather low stipends for doctoral degree studies and the need to get part-time jobs to boost their incomes. It was also noted that there was a high proportion of self-funded PGR students, particularly in the early years of study (i.e., at Masters level) and in Humanities and Social Sciences (HaSS) subject areas.

Good practice examples:

- A minimum of two supervisors for each PGR student, with at least one with experience to completion, leads to good supervision and mentoring.
- An open access publication policy with support for online publication fees fosters visibility and scrutiny of research results and equity of access to these results on an international scale.

FRAMEWORK PRINCIPLE 2

Successful completion and examination of the research thesis, comprising work of publishable quality, is the basis for the award of the doctoral degree. The thesis can be presented in a variety of formats.

The submission of a research thesis is still a predominant requirement in all HEIs, although occasionally a portfolio is mentioned in regulations. This accords with most international HEIs. The judgement of "publishable quality" is routinely a judgement call required of the examination teams and laid down in regulations and guidelines, yet few institutions stipulate publication in the public domain prior to thesis submission. Several institutions have exceptions to this generalisation, especially where "doctorate by prior publication" is permitted. In institutions with a broad spectrum of academic disciplines (from the sciences to the performing arts and music), a single set of regulations must cover all subject areas whilst allowing some flexibility. In those cases, a doctoral thesis can be presented in a variety of formats. In institutions with a narrower research base there is more of an expectation that the thesis presentation will be similar across the institution.

In STEM subjects there is a widespread expectation among supervisors for doctoral candidates to have published at least some of their findings prior to submission of their doctoral thesis, thus ensuring early engagement with the academic peer review process. Publication prior to submission is less of an expectation in HaSS subjects for understandable reasons (e.g., the entire research undertaken during the doctoral studies may not be ready for publication until the research is complete, and after examination).

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It was widely acknowledged across the institutions that the Covid-19 pandemic had led to some changes that were beneficial and would be maintained for the future. Two of these are relevant to Principle 2: e-thesis submission and e-viva voce (defence). Both of these developments have advantages: for the PGR degree candidate, an e-thesis facilitates both the submission of the thesis from a distance and the maintenance of an online e-library of all theses at the institution; e-viva voce enables timely examination following submission, and reduces both the carbon footprint for examination and the travelling time for examiners. E-viva voces also provide the supervisors with the opportunity to engage more international examiners. One shortcoming of a wholescale move to e-viva voces mentioned by some academics would be the missed opportunity for visiting external examiners to present a seminar to the research group, although e-seminars are still possible. Also, the opportunity to support PGR students during and just after the viva voce is somewhat lost if it is carried out by videoconference and institutions need to consider procedures to support the PGR student in the case of a particularly challenging viva voce.

Some of the issues that were not discussed during the interviews or submitted in answers to the survey, but were communicated in writing to the Team, include the need to consider the use of recognition of prior learning to make an award, matters related to joint and transnational awards and inappropriate delays of thesis submission by the principal supervisor for any reason, including contractual arrangements with industry.

Good practice examples:

- Where the discipline allows, the publication of research findings in high-quality peer-reviewed journals prior to submission of the thesis demonstrates early engagement with the academic peer review process and adds strength to the thesis during the examination process.
- Electronic submission of a thesis enables a cataloguing of the theses at HEIs and facilitates easier distribution to examiners.
- Conducting a viva voce remotely by videoconference facilitates expediency in completing the examination process, widens the pool of potential external examiners from further afield and reduces costs (e.g., for travel and accommodation) to institutions.
- Engaging external examiners from institutions with a longer or deeper experience of PGR degrees enables those institutions and subject areas that are new to PGR awards to be confident in the judgment on the quality of their candidates for doctoral awards.
- Published guidelines for the thesis format and availability of previously submitted theses in the subject area facilitate transparent evaluation criteria and awareness of expectations.

FRAMEWORK PRINCIPLE 3

Doctoral education increases significantly students' depth and breadth of knowledge of their discipline and develops their expertise in research methodology which is applicable to both a specific project and a wider context. It provides a high-quality research experience, training (including a formalised integrated programme of personal and professional development) and output consistent with international norms and best practice.

Through the survey and during interviews, all participating HEIs demonstrated a high degree of professionalism applied to PGR degree education, including documentation for regulations and codes of practice for supervisors and PGR students alike. It is clear that PGR degree education has moved on from a master-apprentice model. The institutions consider PGR students to be an integral part of the "research machine" and afford them elevated status above other students at the institution (i.e., undergraduate and taught Masters students), although this does not always translate into continuous or privileged access to laboratories and workspaces, especially during the pandemic.

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The institutions have an excellent grasp of components contributing to a "modern" doctoral education as espoused in most progressive global leading research institutions including in Australia, Canada, the European Union, New Zealand, the United Kingdom and the United States of America. Both doctoral and research Masters graduates coming out of Irish institutions would be recognised as qualified researchers and be able to maintain a research programme in the right environment. This is testament to the quality of their supervisors working in a facilitative regulatory institutional environment which is well supplied with the appropriate equipment and facilities.

The institutions generally approach the idea of a "doctoral programme of study" by breaking it down into key elements, some of which can be identified as components of the ongoing process of research endeavour and others which are structurally arranged to train and upskill PGR students. These are then supplemented with training in personal and professional development attributes in either a formalised or a "pick and mix" manner. This trend is consistent with institutional approaches across Europe, as highlighted in the section on Framework Principle 3 in Annex 2, which refers to findings from a European study (Hasgall et al., 2019), showing that transferable skills training is primarily offered in a complementary manner to the much more central research knowledge and skills training.

Personal and professional development frameworks for PGR students are mentioned in all participating HEIs' documentation, showing that they have embraced the transferable skills agenda. However, the interviews with students suggest that among IoT students there is greater awareness of research career options outside of academia, especially in the industry sector, although across all institutions and interview groups there was an agreement that research career paths, especially of doctoral degree holders were evermore diversifying. The issue of engaging with employers and alumni in defining the professional skills that would be appropriate for non-academic careers was not raised during the interviews.

Most supervisors endorsed and welcomed these changes during the interviews, but occasionally were concerned that more time was needed to fulfil these additional requirements. Many supervisors acknowledged that four- rather than three-year doctoral programmes were becoming the norm and this often excluded the writing period. Most interviewed students were aware of the need for personal and professional skills development and the opportunities made available to them by the institution, but acknowledged that they (and their supervisors) tended to prioritise research upskilling over personal and professional upskilling. This finding might serve to add nuance to the results of the PGR Student Survey, according to which less than 30% of respondents (across all academic disciplines) stated to have received training in entrepreneurship and innovation and less than 40% (across all academic disciplines) advice on career options. Where institutions have adopted a structured, credit-bearing (i.e., ECTS-awarding) approach to ensure that students engage with the skills agenda, this is not universally embraced as helpful and leads some students to take the least onerous credit-bearing course in order to fulfil the credit requirement, rather than the most useful course. Sometimes, this was claimed to be related to the absence of a relevant course at the institution.

The interviews validated and complemented the survey results with abundant evidence to show that all institutions understand the need for an active research culture in which doctoral education can develop and thrive. The research environment in Ireland is expanding, with more HEIs developing research cultures and training PGR candidates. The relatively new TU legislation is encouraging this. During interviews the Team learned that researchers from the established research training institutions were gaining academic positions at the newer research training institutions, thus helping to widen the research expertise and expand the research culture.

Furthermore, the open access policy for international students, including the "right to stay" opportunities for international graduates, is assisting in a "brain gain" for Ireland, which is contributing to its international research status. Several HEIs have spotted and reacted to the opportunities presented by

Brexit whilst others have expanded their transnational research collaborations and accentuated international PGR student engagement.

Good practice examples:

- A training needs analysis and personal development portfolios ensure that PGR students' skills development is addressed in a targeted, student-centred way.
- Compulsory research integrity courses for supervisors and PGR students support the development of an institutional community of practice in research integrity and the integration of this community on an international level.
- Analytical and statistical analysis workshops provide PGR students with the appropriate tools for advanced analysis of their research data.
- Experience in different research environments, (e.g., in the form of internships in other laboratories, universities, industry or commerce) supports the PGR students' skills development. Engagement with industry ensures a widened research base and increased opportunities for PGR graduates.
- Graduate deans and graduate administrators engage with the doctoral support communities outside of their home institution and outside of Ireland (e.g., at the EUA-Council for Doctoral Education (CDE), Universitas 21, or the United Kingdom Council for Graduate Education), which support sharing of good practice on a national and international scale.

FRAMEWORK PRINCIPLE 4

Doctoral education is conducted in a learning community where sufficient critical mass of internationally recognised research activity exists to allow students to gain access to a training programme of appropriate breadth and to interact with peers engaged in their field, nationally and internationally.

One important issue addressed by Framework Principle 4 is that of critical mass, even if the Framework does not attempt to define it. The survey and the interviews queried institutions about their own definition, revealing differences in how the universities and the IoTs approach this concept.

The near unanimous response amongst universities was that critical mass does not equate to a minimum number of PGR students, but to the manner in which they are organised to promote interactions and a vibrant intellectual community. Therefore, none of them provided a definition. Instead, a number of methods are at play to ensure that all students have the opportunity to engage with peers, both within and across disciplines, and to promote regular contact amongst academics, support staff and graduate students. These include induction sessions and structured programmes that mix students from different disciplines, ensuring that all students are (co)supervised by qualified supervisors, and restructuring the institution to ensure critical mass at a higher level than that of the discipline (e.g., through merging small departments into larger units, creating research institutes and centres, or an overarching graduate research school).

When IoTs define critical mass, they are more likely to refer to quantitative measures. Thus, one institute noted that it has "a process to recognise and review the designation of 'Research Centre' and 'Research Group', one that is based on a range of indicators including input metrics (funding, number of principal investigators, etc.) and output metrics (publications, public engagement)". The focus on metrics is also evident in the QQI procedures and the TU requirements. As one interviewee stated, "critical mass is a key criteria of the rigorous QQI validation process; (it) examines supervisory qualification and capacity as well as student numbers, student pipeline and facilities."

Across all institutional types, the HEIs ensure a training of "appropriate breadth" through:

- Structured programmes and summer courses to equip students with disciplinary knowledge and soft skills (such as data management skills) and encourage cross-disciplinary engagement.

- Opportunities for expanding one's network and exchanging research ideas and perspectives via a communal PGR student lounge, workshop series, seminars and events (e.g., annual research days, three-minute thesis presentations, poster events).

- Involving students in the governance of research programmes through their representation on research boards and committees.

- Supporting attendance at national and international conferences and providing students with an opportunity to present their work to their peers or to the general public.

Beyond attendance at international conferences (which is often funded by the institutions), links to international networks of peers and researchers from other disciplines are also promoted through international guest lecture series, calling on international external examiners, hosting visiting doctoral students and researchers, requiring all academic staff to demonstrate that they are engaged and embedded in research networks and defining one of the supervisors' responsibilities as providing PGR students with opportunities to meet other researchers in the field.

Institutional support for internationalisation includes notifications of opportunities for international research collaborations and international funding schemes (e.g., Marie Skłodowska-Curie, Fulbright, Erasmus+) as well as lending technical support for collaborative agreements, joint co-tutelle arrangements and joint awards submissions.

The survey queried institutions as to how they ensure that their "postgraduate research students are taking advantage of opportunities to engage in international mobility". The responses were fairly unanimous in indicating that the institutions encourage international involvement by offering financial support, within the limits of available resources. Particular attention is paid to students whose research requires access to complex instrumentation not available on site.

All HEIs have, and collaborate with, a students' union which, depending on the institution's size, is organised either as a single union or divided into sub-unions for research and taught degrees, respectively. The rationale behind the latter structure is generally that PGR students tend to be fewer in number and have different needs. Considering their role in research and teaching, they also hold a different position within the institution. In the case of single students' unions, selected representatives often hold seats in institutional-level committees. Nevertheless, during the interviews some students remarked that the specific needs and work of PGR students were not adequately communicated by their union and not sufficiently acknowledged by their institution, for example in the form of adequate training, or a financial or credit compensation for their teaching contribution.

Good practice examples:

- Induction sessions provide information on training programmes, academic regulations, research integrity, ethics, data management, intellectual property, complaints and grievance procedures, and various welfare support units.
- An "Initial Meeting Record" between students and their supervisors identifies modules that will enhance the student's research programme, includes a calendar of meetings, and ensures that the student is aware and signs up to the university regulations. This is filed in the Graduate School.
- Arrangements in which a senior (e.g., doctoral) PGR student mentors a junior one from the same research field or within the same research group support the transferable skills

development of senior students whilst serving to integrate the junior students into the institutional and broader research community.

- The Covid lockdowns led a university to experiment successfully with an e-Induction Day and to initiate a "Q&A with the Dean", a one-hour e-session where students can pose questions directly to the Dean. A dedicated PGR Student Advisor has been hosting regular coffee morning e-sessions for students. The Advisor facilitated the establishment of college-based WhatsApp groups and specific subgroups (e.g., research students who are parents) to allow peer-support groups to come into being.

FRAMEWORK PRINCIPLE 5

Recognising that each doctorate is unique, doctoral education is also flexible so as to support students within individual disciplines or within interdisciplinary or multidisciplinary groups.

Framework Principle 5 encompasses two main concepts: a personalised and flexible approach to the doctorate, and support for inter- and multi-disciplinarity. All survey respondents answered positively to both.

Structured degree programmes are adapted to the needs of each student and can be based on the discipline or the research theme. Flexible delivery and assessment are key features of structured doctoral modules.

Some of the larger institutions, whether universities or IoTs, offer interdisciplinary research opportunities through their interdisciplinary research institutes, collaborative agreements with industry, and joint awards with institutions abroad. Co-supervision is the rule to support students who are working astride disciplinary and institutional boundaries.

While most universities mention their close ties with industry, they tend to describe their international collaboration more frequently than do the IoTs. One university noted that it has adopted the recently developed *IUA National Guidelines for Collaborative Research Degree Programmes*, in line with the university's international strategy and its goal to maximise European funding opportunities for doctoral students. Another mentioned that "a small number of strategic inter-institutional Memoranda of Understanding have been signed to facilitate institutional level research collaborations. These high-level agreements are supported by the International Desk in the Office of the Vice-President for Research."

The strength of the IoTs in working with industry is demonstrated by multiple examples that illustrate how collaborative research is embedded in their activities. One IoT mentioned that working with external partners starts already at the undergraduate level and is carried through the PGR cycle. Other institutions promote mobility between sectors by encouraging students to avail of internships in related industries. The relatively small size of IoTs' PGR provision provides an opportunity to promote multi-disciplinarity, for instance by co-locating research students in one building. More significantly, however, the IoTs' research orientation toward solving concrete problems is described as being "inherently multidisciplinary, solutions-focused and organized around multidisciplinary teams." One IoT noted "our research institutes and groups tend to be defined by their application area, rather than their disciplinary area".

Good practice examples:

- Special support services – such as those dedicated to funding, grant writing, or coaching for interviews – provide additional support to multidisciplinary projects in multidisciplinary settings.

- One university reduced the number of research centres to promote interdisciplinarity and provide the critical mass for interdisciplinary approaches to societal challenges.
- Institutions encourage the establishment of supervisory teams that comprise all relevant supervisors (e.g., lead, advisory, associate, external from industry or another HEI). Where research work is inter- or multi-disciplinary, involving possibly more than one school and/or collaboration with an external organisation, an additional supervisor may be appointed.
- An internet platform provides students access to online support material and webinars from others in the PGR community.
- The "Practitioner Doctorate" allows experienced professionals to translate their industry expertise into a degree.
- A "Policy on Collaborative and Transnational Education Provision" sets out a university-wide approach to collaborative and transnational arrangements in line with the institution's strategic plan. This policy and its associated procedures provide direction to the university staff in evaluating complex proposals, drafting agreements and developing new and existing collaborations, thereby encouraging consistency, transparency and good practice across the university and beyond.

FRAMEWORK PRINCIPLE 6

Doctoral education is conducted in a research environment with a high degree of academic quality and infrastructure and where it is consistent with institutional strategies. Academic quality includes quality supervision and training for supervisors.

Across all institutions responding to the survey, the "high degree of academic quality and infrastructure" addressed by Framework Principle 6 is interpreted in various manners that are linked to (formal and informal) interactions between students, supervisors and support staff and depends on institutionally defined indicators. Looking at the way in which the institutions aim to ensure an adequate research environment, a minor distinction is noticeable: (i) those institutions with more experience in providing PGR education tend to work on complementing existing regulations and procedures with more informal components (e.g., annual research days where candidates present their projects); (ii) those institutions that are increasing enrolment in their PGR degrees focus on developing their frameworks further and defining the formal components that they consider essential for a high-quality academic environment and infrastructure.

Most institutional approaches described in the survey comprise a dedicated focus on developing open research environments, and fostering innovation, originality and intellectual curiosity. In practice, this is implemented at many institutions in the form of supervisory teams supported by a graduate research committee consisting of members from various disciplines, the establishment of research centres, peer-learning seminars, and annual reviews of the PGR student's progress. At all institutions participating in the survey, relevant training is provided to (at least first-time) supervisors, whereas some institutions also have a training offer for administrative and support staff.

Apart from these QE measures, the regulations of many institutions also specify minimum input indicators, such as a minimum of two hours of consultation per week between the main supervisor and the PGR student.

Based on responses to the survey and provided during interviews, the Team formed the impression that all institutions have clearly set criteria on who qualifies for the role of (main or co-) supervisor. The interviews with the supervisors and the students generally revealed a high level of personal dedication on the supervisors' part, and a high level of satisfaction with their supervisor on the students' part. This finding is supported by results from the PGR Student Survey, according to which the majority (more than 80% across all disciplines) of respondents indicated that their supervisor provided an appropriate

level of support for the research undertaken (Annex 1). Moreover, the interviews with student groups revealed that for many students the supervisor is the primary source of information and support, also on non-research related matters.

All institutions reported having various types of support services available to students for non-research related issues, such as career development centres, student ombudspersons, and travel and financial offices. However, not all students the Team interviewed were equally aware of the existence of such services and, in some institutions, most of the students were unaware of them. This picture is also reflected in the results of the PGR Student Survey, with less than 50% of students across all disciplines stating that they are aware of the various student supports available (Annex 1).

HEIs have adequate infrastructures to support ongoing research projects and admission procedures to ensure that the requirements of the proposed projects do not exceed institutional resources. The staff and students at some institutions, however, expressed a concern over increased competition for conference funding, and workspace in the laboratories, offices, and library. In particular, laboratory access and technical support outside business hours (i.e., in the evenings, during holidays and weekends) were sometimes limited in those institutions. This challenge is amplified by the restrictions imposed during the pandemic.

Procedures for approving or appointing supervisors are common across HEIs. In many cases, the responsibility for approval or appointment decisions falls within the remit of either the head of school or a research committee. In the decision-making process, typical factors taken into consideration are employment status, academic qualifications, level of research activity, workload and experience in supervision.

Most institutions offer training to first-time supervisors, which is compulsory in some cases. At several institutions, academic staff have the possibility of developing their supervision skills through a varied number of courses that are conducted by either experienced supervisors and or international guest lecturers. Smaller institutions tend to offer training less frequently than larger ones, due to limited resources. To alleviate such pressures, some institutions have established training modules with other institutions from the same city or region. At most institutions, however, there is no continued formal supervisory training beyond the initial training workshop but practices such as co-supervision with an experienced supervisor on the team leading to ongoing mentoring is common. This finding is in line with the situation across Europe, where institutions increasingly have regulations in place to provide oversight of doctoral supervision, especially for appointments of supervisors but less so for supervisor training (Framework Principle 6, Annex 2).

Most institutions reported that they ensure oversight of supervision through annual or bi-annual reviews of PGR students' progress. These reviews are also an opportunity for students to provide feedback on their supervisors. In contrast, only a few institutions have implemented measures to acknowledge and promote good practice such as awards for outstanding supervisors or annual review meetings inviting all supervisors to discuss indicators of good supervision and share good practice.

During the interviews, the deans of graduate studies (or equivalent) at most institutions recognised the central importance of supervision for both the progress of the research and the completion of a successful doctoral thesis. This is reflected in promotion criteria in the more research-established institutions but is yet to be developed in many IoTs where promotion is generally seen to be possible through academic management portfolios rather than a fuller set of promotion criteria.

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Good practice examples:

- Formal supervisory training courses, supervisor handbooks, charters/codes of practice for supervisors articulate the responsibilities of supervisors clearly and help to share good practice. Online training and virtual handbooks support efficient dissemination and increase participation rates.
- An institutional register of approved supervisors provides prospective students with up-to-date information on their supervisory options whilst also having the potential to foster cross-institutional co-supervision and collaboration. Registers that contain clearly agreed expectations for academics to remain on the approved list ensure that they stay engaged with the expectations of the supervision process.
- Bestowing an annual award for outstanding supervision (nominated by PGR students) encourages the sharing of good practices across the institution.
- Cooperation in supervisory training amongst HEIs located in the same city or region creates opportunities to share experience and good practice.

FRAMEWORK PRINCIPLE 7

The admission of doctoral students takes into account preparedness of the applicant, the availability of qualified, competent and accessible supervision and the resources necessary to conduct the research.

All participating institutions have a dedicated policy on admission criteria and procedures, including regulations ensuring that the number and needs of admitted students do not exceed the institution's resources. Equally, all institutions have measures in place to ensure that admission processes are transparent, for example by making such information publicly available on the institutional website. These apply equally to students applying for scholarship positions and to self-funded students.

The institutions also ensure accessibility of manuals and brochures on scholarships and other funding options, support structures, and partnerships with industry (e.g., for student placements). This benefits not only students in search of specific information, but also potential external partners seeking collaboration.

All institutions have measures in place to verify the applicant's qualifications and feasibility of the applicant's research project before a decision on admission is taken. Apart from the two basic requirements for admission to a PGR degree – a Bachelors qualification and evidence of English language proficiency in the case of non-native speakers – applicants are required to submit a research proposal (of varying length and degree of detail) as part of the application process across all institutions. This approach is in line with the most common European practice of taking into account the applicants' potential – rather than their past achievements (e.g., previous grades) – as a basis for judging their application (Framework Principle 7, Annex 2).

Across the Irish institutions, the availability of resources to ensure the successful implementation of the proposed research project is typically verified by the head of the school that would oversee the applicant's research project. In some cases, the evaluation of the applicant's documentation is complemented by an interview with the applicant.

In many cases, the applicant's research proposal is expected to contain the name of the prospective (main) supervisor and many of the students who were interviewed stated that they had chosen their particular institution based on their selection of a supervisor. For other students, however, the search for a suitable supervisor proved to be a challenge, especially in the absence of a publicly accessible register or other information on potential supervisors (see also Framework Principle 6).

Admission mechanisms across all institutions generally take into account the applicant's background and needs, especially if the applicant is seeking admission on a part-time basis. Special needs, such as those resulting from a disability, are generally taken into consideration in student recruitment, induction and other processes. Approximately half of the surveyed institutions confirmed their involvement in equity and equality projects, whilst some also deliver compulsory staff training on equity matters.

Some issues that are pertinent to this Principle but were not discussed during the interviews or submitted as answers to the survey, were communicated in writing to the Team. They include the rigour and exhaustiveness of the admissions process (e.g., assessing English proficiency or foreign awards) and how such processes are managed when they involve a partnership, whether inter-sectoral or inter-institutional.

Good practice examples:

- Following the principle "Completion begins at Admission", structured admission procedures looking at research proposals and proposed methodologies of candidates lead to good progress and successful completion.
- Online events gathering prospective PGR students and staff with supervisory qualifications provide an opportunity to meet potential supervisors and contribute to the student's final decision.

FRAMEWORK PRINCIPLE 8

Doctoral education is supported by established structures with:

- *Supervision by a principal supervisor(s), normally with a supporting panel approved by the institution;*
- *Formal monitoring of progress to completion against published criteria, supported by institutional arrangements;*
- *Clearly defined examination processes, involving external examiners, assessment criteria and declared outcomes.*

Results from the survey and interviews indicate that HEIs have established structures, policies and processes for supervision, formal monitoring of progress to completion against published criteria, and examination, with clear and well-communicated criteria articulated for each of these steps.

The appointment of supervisors follows a formal procedure and is based on set criteria such as the prospective supervisor's academic qualifications and research activity, with possibly more specific criteria defined by each institution.

The Team found that co-supervision was becoming the norm, with an increasing number of institutions stipulating that each PGR student must have at least two supervisors – principal and secondary. Some (larger) institutions stipulate supervisory teams. In many cases co-supervisors from other institutions or non-academic partners (such as the industry sector) are allowed. The interviews revealed that shared supervision was generally welcomed and found to support junior supervisors, unburden individual supervisors and ensure quality and cross-disciplinary supervision with continuous support to students. In this aspect, Ireland and the United Kingdom are spearheading a European trend, which is pointing in the direction of supervisory teams yet with single supervision still remaining a dominant supervisory model (Framework Principle 8, Annex 2).

Interviews revealed that new supervisors valued the mentoring input of experienced co-supervisors and, in general, research students saw merit in a team supervision approach in contributing to their sustained and deep engagement with the research programme.

Formal monitoring of progress generally takes place through annual or bi-annual meetings between the student and the supervisor(s), with many institutions stipulating more frequent meetings or communication through other means. At least once a year, the findings from progress review meetings are typically submitted by the (main) supervisor to a research committee for an evaluation. This evaluation is transmitted to the head of school for a final decision. The interviews indicate that interventions at this level are rarely deemed necessary. In some institutions (bi-)annual progress reviews are delivered orally to the research committee. Research days, with presentations delivered to a larger circle of supervisors and PGR students, can serve as an informal way of incentivising and assessing progress.

Survey results indicate that all institutions have support services in place to provide unbiased and individualised information and guidance on student progress and any potential challenges, such as a conflict with a supervisor. The Team found no indication that such conflicts would occur frequently. On the contrary, the Team formed the general impression that across all institutions the relationships between supervisors and their students were harmonious (see also Annex 1). However, the interviews also suggested that many students depend on their supervisor for information and are not always aware of other information provision services and support structures.

Examination processes typically consist of a formalised procedure to appoint examiners based on well-defined criteria, the assessment of the final thesis and a viva voce examination at which the student defends the thesis. Examination teams are generally composed of a minimum of one internal (i.e., from within the institution) and one external examiner.

Some of the issues that were not discussed during the interviews or submitted as answers to the survey, but were communicated in writing to the Team, included shared oversight and provision (in inter-sectoral and inter-institutional partnerships), training support for examiners, and complaints and appeals procedures.

Good practice examples:

- Graduate research committees composed of experienced academics from different disciplines can provide support to supervisor(s) and their students at an overarching level.
- Bi-annual orientation sessions, research degree society assemblies, induction sessions and weekly coffee meetings support the dissemination of relevant news and promote exchange amongst peers.
- Frequent (i.e., at least bi-annual) progress review meetings support exchange and close monitoring of progress, thus helping to detect and prevent potential issues before they escalate.

FRAMEWORK PRINCIPLE 9

A robust quality assurance system underpins all doctoral provision.

The survey results confirmed that all institutions are concerned about the standards of their awards and the quality of the students' experience across the whole life cycle. However, apart from the use of external and internal examiners and the review of teaching modules, quality assurance (QA) processes and mechanisms are often different between universities and IoTs. The differences are linked to the larger PGR student enrolment in universities and their institutional autonomy with respect to NFQ Level 10 awards and should fade as more IoTs gain TU status.

Much like 89% of European HEIs participating in the 2019 EUA-CDE survey (Hasgall et al., 2019), all the Irish universities tend to have an extensive set of QE/QA activities and collect quantitative data more frequently than do the IoTs (Framework Principle 9 in Annex 2). These data result from internally developed surveys, external examiners' reports and the use of the PGR Student Survey, which was more frequently referenced by universities. Their quality system is rooted in a set of policies for research degrees. As an example, these policies address (i) the colleges' responsibilities of arrangements for supervisory, students' progress reviews, examination arrangements, and assessment outcomes; and (ii) the institutional responsibility for the approval of examiners, the assessment process, the ongoing monitoring of progression and completion and the periodic review of doctoral programme structures. Universities' survey responses also refer to their strategic priorities, which include PGR degrees and their QE.

Although some IoTs have developed extensive internal QA/QE processes for the doctoral cycle on the basis of the Framework or predating it, these are notable exceptions. The small enrolment size of PGR students mean that many IoTs have not always felt the need for very formal processes. These institutions compensate by being student-centred and ensuring the quality of the doctoral student experience, one student at a time. One IoT, for instance, noted that the process consists in monitoring student progression; this is in line with European results showing that 72% of respondents to the EUA-CDE survey use the completion rate as the main quality indicator (Principle 6, Annex 2). One observer from the IoT sector noted: "The delegated authority to award PhDs is a very rigorous albeit process-driven procedure, which might have led to a neglect of structural thinking about the broader needs of doctoral education." Talking about a specific IoT, a senior IoT officer echoed this concern by stating that the institute had grown and will soon reach the tipping point where the small scale of a tight-knit community can no longer provide the basis for quality.

Where internal QA/QE policies exist, the scope of internal quality processes is often broad and embedded in governance, thus ensuring that feedback loops are closed. Therefore, many institutions describe the regular reviews of their PGR regulations and the academic roles associated with PGR degrees. They explain how they use the results of internal and external reviews to enhance their activities and speak of providing the pertinent information to PGR committees and boards and ultimately to academic councils. As an example, one institution's QE committee meets monthly to develop and progress QA/QE in relation to the institution's priorities, mission and vision. As a constituent of the Academic Council, the QE committee reports monthly on its progress. In another example, every external examiner report is presented to the Academic Council Standing Committee for approval or request for corrections.

Two critical factors that determine the quality of PGR are the research environment and the quality of supervision. The research environment is evaluated by (at least) some universities, by the Department of Further and Higher Education, Research, Innovation and Science (hereafter the "Department") when it grants TU designation and by QQI when IoTs submit an application for delegated authority in a specific field. Furthermore, the PGR cycle is part of CINNTE, the QQI institutional review process.[3] The institutional review reports of the past five years show that the research environment is addressed by all review panels and that the universities receive commendations for aligning the postdoctoral level to

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[3] "Each CINNTE [institutional] review evaluates the effectiveness of the QA procedures of each institution. The review measures each institution's compliance with European standards for QA, its regard to the expectations set out in the QQI QA guidelines or their equivalent and adherence to other relevant QQI policies and procedures. CINNTE reviews also explore how institutions have enhanced their teaching, learning and research and their QA systems and how well institutions have aligned their approach to their own mission, quality indicators and benchmarks." (Foreword to the institutional review reports)

their research strategy and their research environment.[4] Of note, 62% of respondents to the EUA-CDE survey reported that they are subject to external evaluations (Principle 9 in Annex 2).

With respect to supervision, whilst monitoring its quality is not often referenced in the survey answers, the group interviews revealed that supervisors have the opportunity to hone their skills through formal training and co-supervision (see also Principles 1, 6 and 7). They have access to regulations, policies and supervisory handbooks. Although these documents do not frequently reference the Framework, the latter has been embedded or reflects existing practices. Supervising is a promotion criteria in universities although some institutions noted that quantity (number of supervised students) is easier to capture than supervisory quality. The team is not in a position to ascertain the extent to which the institutions across the sector are monitoring the quality of supervision. However, a few QQI institutional review reports include explicit references to monitoring supervision in the universities.

In closing this section, two points are worth making. Firstly, Principle 9 is the one with the least details in both the Framework itself as well as in the QQI *Framework of Good Practice for Research Degree Programmes*, even though it is of crucial importance. This might be linked to the fact that, according to several interviewees, solid internal QE/QA processes are in place and the Framework is but one of the documents that provide institutions with guidance rather than serve as the basis for external or internal QA, notable amongst them are the *Statutory Quality Assurance Guidelines Developed by QQI for Providers of Research Degree Programmes*. As evidence of the overall quality, the students' responses to the PGR Student Survey reveal a large consensus on the strengths of their experience as compared to the elements that students identify as needing improvement (see also Annex 1 and Principle 2).

Secondly, it is difficult to speak of QE/QA without defining quality. The quality of research has been traditionally measured with the help of input and output metrics, as is evident, for example, in QQI's delegated authority process and the TU requirements. While this is an adequate approach and in line with standard practice in Europe and elsewhere, the Team would like to raise the following questions for critical reflection and consideration: Are input and output metrics sufficient to evaluate the research environment? What about research impact or the management of research activities? Should all types of research be measured with the same gauge? How might Open Science affect traditional metrics (EUA, 2018 and 2019)? Should Ireland develop an equivalent to the United Kingdom's Research Assessment Exercise? However important these questions are, they were not raised spontaneously in the interviews.

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[4] One university detailed how its strategic goals for the doctorate align to the Framework as follows:
- We will further develop the doctorate as a transformative educational experience, developing students' advanced research and intellectual skills and preparing them to contribute significantly to society in a wide variety of roles and careers (Aligned to Principles 1,3,4,5,6).
- We will show international leadership in ensuring the doctoral degree adapts to meet the changing needs of students and society (Aligned to Principle 4).
- We will refine and enhance our approach to the structured doctorate, ensuring the effective and efficient provision of taught elements, developing specific arrays of skills, enhancing graduate employability throughout the programme, and explicitly preparing graduates for a wide range of challenging careers (Aligned to Principle 3).
- We will support an expansion of interdisciplinary, engaged, industry, practitioner and professional doctorates, including new arrangements for co-funded doctorates (Aligned to Principle 5).
- We will ensure excellent and consistent supervision of research students across the University (Aligned to Principle 8).
- We will increase doctoral student numbers towards a target enrolment of 600 (Aligned to Principle 7).
- Quality assurance and quality enhancement are central to all our work, a key enabler of development and success, and intrinsically linked to strategic planning (Aligned to Principle 9).

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Good practice examples:

- Sharing good practice is promoted through national engagement (e.g., via the National Academic Integrity Network and the IUA deans' group) and engagement at the European (e.g., EUA-CDE, LERU) or international level (e.g., Universitas 21).
- Examples of foci for periodic internal reviews are listed below:
  - PGR policy and regulations (subject to regular enhancement review via a subcommittee of the academic council) and benchmarking policies against other universities in Ireland and internationally. One institution noted that an international panel reviewed its regulations for PGR degrees.
  - Monitoring PGR students' learning experience (via the PGR Student Survey, or internally generated surveys) as well as trends in student recruitment, retention, scholarship applications, funding, progression and completion rates and times, conferring, social inclusion, internationalisation, research output and impact metrics, employability data from the first destination survey, supervisory activity.
  - The periodic reviews of the graduate studies function, including the committee in charge of PGR degrees.
  - International peer review of research across six research activity indicators, two of which are relevant to the enhancement of PGR provision: research-related activities and PGR education.
  - The quality of the research environment (staff and candidate qualifications, staff and candidate publications and presentations, and competitive funding awarded).

Part III: Main findings and Recommendations

Part III includes two sections. The first discusses the impact of the Framework on PGR degree provision and the extent to which it has achieved the aims that were set for this document. The second summarises views collected via the interviews on whether the Framework should be revisited.

THE IMPACT OF THE FRAMEWORK ON THE DOCTORATE

In order to measure the impact of the Framework, participants in the interviews were queried about the added value of the Framework. Some noted that the Framework was useful as a lever for change externally (e.g., with some research funding agencies, to facilitate inter-institutional cooperation) and internally (e.g., to introduce a new admission process, enhance supervision). Others mentioned that it has been useful in supporting communication with external stakeholders at the national and international levels and enhanced the value of the doctorate in the employers' eyes.

These responses suggest difficulties in assessing the impact of the Framework and must be linked to the fact that the Framework was developed in consultation with the sector and, as such, reflects existing practice in those institutions that, at the time, had most experience with the doctoral level whilst providing guidance for those institutions interested in growing their PGR provision.

The Framework has been used as a checklist to ensure that relevant aspects were addressed in their policies and embedded in the documents that set down their policies, regulations and processes. The embedding of the Framework into institutional documentation explains why only those who serve or have served in senior administrative posts in PGR programmes knew of its existence. Not surprisingly, the bulk of supervisors and all the students who were interviewed were not aware of the document until they were invited to meet the Team. However, those who had read it ahead of their interview reported that they recognised the Framework in their institutional approach to PGR.

Ascertaining the impact of the Framework is all the more challenging because the Framework is one of many other documents available to frame doctoral education and training in Ireland. As mentioned earlier, these include *Ireland's Framework of Good Practice for Research Degree Programmes,* the *Framework for Quality in Irish Universities*, the *Technological Higher Education Quality Framework* and the *Statutory Quality Assurance Guidelines developed by QQI for Providers of Research Degree Programmes.* Although this study focuses on the *National Framework for Doctoral Education* alone, the Team found that it is rarely used in isolation by institutional actors, but rather in combination with these other frameworks and guidelines.

Nevertheless, and however difficult it is to isolate the impact of the Framework from other documents, the survey and the interviews provide clear answers in relation to each of the four purposes that were set down for the Framework. As stated in Part I, the Framework has the following four main purposes:

1. To facilitate consistent excellence in the quality of research postgraduate education and training, including research undertaken at Master's level.

2. To enable and encourage HEIs to work more closely in the delivery of an improved learner experience and outcome.

3. To maximise the employability of doctoral graduates across a broad range of employment sectors by ensuring that the acquisition of discipline-specific knowledge is complemented by the development of transferable skills.

4. To underpin the international standing of the Irish doctoral award and research degree provision more generally.

This section examines systematically whether the four purposes of the Framework have been achieved. What has been learned about the strengths and weaknesses of the doctorate in Ireland? What recommendations can be given to institutions and the sector as a whole?

1. To facilitate consistent excellence in the quality of research postgraduate education and training, including research undertaken at Master's level.

As the discussion in Part II shows, there is a large consensus on the characteristics of doctoral education and how it is distinct from the research Masters.

At an administrative level, all institutions across the board have developed all the necessary documentation, including strategies and policies at various levels. Implementation, however, is ongoing in some institutions, reflecting the current ambitious phase of development to increase enrolment of PGR students in Ireland. For instance, established procedures to address potential conflicts with supervisor(s) will require attention in some institutions.

The study revealed that there is a clear trend towards an enhanced establishment of structured doctoral studies across the sector, even if the term "structured" is not commonly used. Most prominently, this includes taught courses worth a predefined minimum number of credits as well as more formalised supervisory and progress review arrangements. However, there is a great variety in the minimum number of credits PGR students need to obtain as part of their degree. This varies depending on the institution and, within institutions, on the discipline and is in keeping with European trends (Hasgall et al., 2019). Moreover, according to a recent European-wide survey of doctoral education, about 71% of respondents use ECTS in most or all their doctoral programmes, whilst the rest do not use it at all or only in a few programmes (ibid., p. 14). Only one of the Irish institutions that was part of the small interview sample indicated that it plans to assign ECTS to the whole doctorate (taught and research elements).

In the context of this finding, it is worth noting that in 2016 an expert panel appointed by QQI published a report about the *Quality Assurance of Research Degree Programmes in Irish Higher Education Institutions*. In this report, the panel recommended that "[t]here should be an agreement between HEIs on the calculation and assignment of ECTS units for generic skills and related training courses for research degree students, and on normal maxima" (QQI, 2016, p. 45). To follow up on this recommendation, QQI might consider reinforcing discussions about this issue within the sector. The work on the Irish qualifications system via the *Green Paper on the Qualifications System* (QQI, 2020), which is planned for 2021, might be a suitable forum to revive such discussions.

The mechanisms for QE and QA are generally very good, particularly in the institutions that have enjoyed full responsibility for their PGR awards. At a time when Ireland is aiming to increase the number of doctorate providers, doctoral candidates and doctoral holders, it is important to find a way of ensuring the overall quality of the system. This could be achieved by defining quality in a diverse manner, taking into account output, input, processes, and impact, whilst ensuring parity of esteem across different research activities and supporting the enhancement of quality rather than emphasising quantity. In short, quality will not be achieved simply through metrics and requirements.

One pivotal element of any internal QE/QA system is the student voice, which is strong at the undergraduate level across Irish HEIs, but not consistently so at the PGR level.

⇒ *It would be useful to map out the differences in the use of ECTS and their weighting. A national agreement on the spectrum of ECTS in structured doctorates would be desirable.*

⇒ *Building on ongoing efforts such as by the National Student Engagement Programme,[5] a clear vision of PGR student representation and their involvement in governance should be developed across all institutions to optimise their impact on quality.*

2. To enable and encourage HEIs to work more closely in the delivery of an improved learner experience and outcome.

Cooperation around PGR provision is strong within the university sector; there is an intention to promote the same in the IoT sector. Local cooperation across the two sub-sectors is good in some places, weaker in others. The National Advisory Forum on the Framework provides a natural home for a comprehensive national approach, but it has been dormant until recently. The current transition to TUs implies that a sizeable portion of IoTs need to draw on the expertise of universities (e.g., to qualify their staff to the doctoral level).

Funding pressures, however, stand in the way of cooperation. As mentioned earlier, universities are allocated a higher amount of core research funding, whilst the TUs receive additional funding to pursue their development beyond the designation phase. The system is in transition and each institution experiences different funding pressures depending on its type and position within the system.

⇒ *Whilst the TU designation procedure is accentuating competition, once the process is stabilised, cooperation and competition will have to be rebalanced, and cooperation strengthened.*

3. To maximise the employability of doctoral graduates across a broad range of employment sectors by ensuring that the acquisition of discipline-specific knowledge is complemented by the development of transferable skills.

All institutions are committed to maximising the employability of their graduates, including PGR graduates, by addressing their (research and transferable) skills. This has been made abundantly clear in Part II.

The institutions have enhanced and expanded their support services, including career advising and professional development opportunities although, in a number of institutions, the burden for career advising is falling on the supervisors' shoulders. These services and opportunities are highly appreciated by students, as the interviews revealed, and this finding is especially relevant when considering the general awareness among interviewees that the professional paths of PGR graduates, notably of doctorate holders, are diversifying and moving away from academia. However, employers and alumni are not always consulted for the development of non-academic skills. Furthermore, aside from providing students with modules to prepare them for both academic and non-academic careers as well as career advising, systematic tracking of doctoral holders' employment destinations and career development is a challenge to all institutions.

⇒ *Career development opportunities and consultations should be expanded in a way that takes pressure off individual supervisors.*

⇒ *Employers and alumni should be consulted about the soft-skills modules.*

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[5] The National Student Engagement Programme aims to strengthen student engagement in decision-making across Irish higher education.

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⇒ *Building on already ongoing data collection,[6] career tracking should be further developed.*

4. To underpin the international standing of the Irish doctoral award and research degree provision more generally.

As explored in the interviews, the international standing of the Irish doctorate is good. The trend away from the master-apprentice model toward institutionalised responsibility for the doctorate is an asset in reaching out to international partners.

International students constitute a sizable share of the PGR student population in the universities and the feeling was expressed that Ireland is in a "brain gain" position. International students appreciate the funded scholarships, the use of English as the language of study, and the opportunities for employment in Ireland after graduation. A number of international students interviewed by the Team came to Ireland through the United Kingdom as a "gateway". A non-structured canvassing of opinion of the Irish doctorate from outside of Ireland showed that it was valued in equal measure to many European doctorates, as further shown by the number of Irish graduates accepting postdoc positions in continental Europe, the United Kingdom and the United States of America. However, recent developments might hold implications for international student recruitment in the future. The Team was told that international student numbers are currently uncertain because of the Covid-19 pandemic but might eventually rise again due to Brexit, and the departure of the United Kingdom from the Erasmus+ Programme.

One interviewee highlighted that the Framework is particularly useful when communicating externally the value of PGR awards (e.g., internationally or with non-academic stakeholders such as employers). This points to the value of addressing international partners and other stakeholders and promoting the value of the Irish PGR as a cohesive sector with commonly agreed procedures and approaches. Reputation in a small system such as Ireland is a collective responsibility. The current transition to the TUs calls for 'all hands on deck' to ensure that the quality of doctoral education continues to be recognised internationally. Furthermore, the attractiveness of the doctorate in Ireland is linked, in part, to the reputation of Irish research.

⇒ *Doctoral education and training in Ireland would benefit from a systematic campaign to raise international awareness of Irish research.*
⇒ *There should be a stronger focus on building a community of practice via the National Advisory Forum. The Forum could also be used to strengthen communication to funders, government agencies and the Department about the importance of the doctoral pipeline. It would also be a good platform to promote the Irish doctorate internationally.*

CONCLUSION

During the interviews, the Team asked participants their views on the Framework and whether it was time to revisit it. Contrasting views were expressed:

- Most interviewees advised against changing the Framework. They argued that the current version is the result of a lengthy consultation process and its true value lies in how it is implemented by individual institutions and how it fits in a bigger framework. This refers to the other related documents that have been mentioned above and to the QQI reviews, which examine PGR provision, notably in the light of the Framework. One person summarised this

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[6] The Central Statistics Office (CSO) in collaboration with the Higher Education Authority (HEA) maintains a database of graduate outcomes. In addition, the European Science Foundation has been active in graduate tracking, an activity that is yet to be developed to its full potential in Ireland.

view by stating that "The Framework is just that, a framework; the nuts and bolts are spelled out in the QQI document."

- Others mentioned that adding to the Framework should be limited to a few points. Aggregating such points, however, ends up with a rather long list that includes *inter alia* more emphasis on ethics; graduate outcomes; student wellbeing; practice-based PGR degrees; the diverse career paths that PGR students can take after their studies and how to prepare them; conflicts of interest between research centres/commercial supervisors/academic supervisors and between supervisors and students; the use of recognition of prior learning to make an award; matters related to joint and transnational awards and inappropriate delays of thesis submission by the principal supervisor, including because of contractual arrangements with industry.

- With respect to the level of details, the institutions most experienced with the doctorate noted that the Framework should remain flexible and open to diversity while others observed that it should offer more details.

Whilst there are gaps in the Framework that would merit attention, in the Team's view, it is more important to channel joint efforts into strengthening cross-institutional collaboration, sharing of resources and exchange of practice, particularly at a time when the higher education landscape in Ireland, and elsewhere in the world, is in flux.

The study of the Framework's implementation provides a good illustration that broad consultation and the provision of a coherent set of guidance documents have allowed the Irish HEIs to reform their doctoral education in line with developments in continental Europe and the United Kingdom. Based on the data collected in this study, the Team concludes that the Irish HEIs have professionalised the delivery of the doctorate, and ensured both the quality of the student experience and the standard of awards. The Framework, amongst other key documents, has provided a foundation for a common approach that reflects the practices of the doctorate-awarding institutions in Ireland and those seeking to develop their PGR provision further.

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Annex 1: 2019 PGR Student Survey results

The Team examined relevant data from the National PGR Student Survey based on a tailor-made analysis conducted by Sean O'Reilly from THEA. It should be noted that all percentage figures presented below and in the PGR Student Survey report represent the mean average (rather than the median) values of non-blank responses. Whilst there is a high degree of granularity in the data relevant to each institution, the data are aggregated across the country. These aspects limit the interpretation of some of the survey results. This survey represents the responses from 29.9% of PGR students in Ireland, which is a strong response rate for an online survey and, in particular, the first non-pilot iteration. Furthermore, the results can be regarded as representative of the target group as illustrated by the national report on the survey results (p. 19), which provides percentage responses for multiple subgroups of the target population.

The table below presents the students' agreement with statements provided by the questionnaire regarding elements provided or ensured by their institution.

Understanding of procedures	70 - 85%
Adequate supervision	80 - 90%
Opportunities to engage with the research community	50 - 70%
Conference participation	75 - 85%
Research skills training	75 - 85%
Transferable skills training	50 - 70%
Entrepreneurship training	5 - 25%
Training for teaching/demonstration	45 - 55%
Opportunities for internships	10 - 25%
Collaborative working opportunities	20 - 35%
Opportunities abroad	15 - 25%
Awareness of other support	40 - 45%
Networking & Contacts	65 - 75%
Feeling that students' feedback is valued and responded to by the institution	35 - 45%

The survey data were supported, albeit partly, by the Team's interviews with a small sample of students. Whilst most students reported that they are well briefed about their studies and have confidence in their supervisory teams, a smaller portion of them agreed that sufficient opportunities are available to engage with their research environment. Most again are happy with their research training but less happy with their transferable skills training and relatively few have had the opportunity to develop entrepreneurial skills or had opportunities to work collaboratively or abroad as part of their research degree. A good proportion value the opportunities for networking and developing contacts. Less than half of PGR students feel that their feedback is valued and addressed by their institution.

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Reflecting this back to the Framework it would appear that, from a PGR student perspective, HEIs have provided good support for the core elements of PGR education including procedures and practices, good supervision and research skills training, but that there is scope for further enhancement of the research environment and transferable skills training. More alarming, there appears to be only patchy provision of collaborative working including overseas opportunities, internship opportunities, entrepreneurship training and teaching training. Moreover, many PGR students do not believe that their institution values or responds to their feedback. Conversely, however, 56.1% of PGR students definitely or strongly agreed that there is someone in their institution they can talk to about their day-to-day problems. This image largely corresponds with the overall impression the Team gained during the interviews with students during which several of them stated that they do not feel properly acknowledged or represented at the institutional level, whilst having an overwhelmingly positive position on their personal relationships at their institution, most notably with their supervisor/s.

Interestingly, there were few significant distinctions between subject groupings or between full-time vs. part-time or distance students nor among groupings associated with different accommodation location (e.g., campus, private or home).

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Annex 2: Doctoral Education in Europe – A Benchmarking Exercise

By Dr Jennifer Brennan, THEA

1. Policy in European Research Education

The recognition of a shift in the organisation of doctoral programmes at European level began in the United Kingdom at the end of the 1990s with the *QAA Code of Practice on Research Degrees* in 1999 followed by the United Kingdom Research Councils *Joint Skills Statement* in 2001 and the Roberts Review, *Set for Success* in 2002. Discussion then spread more widely across Europe when the third cycle became integrated in the Bologna Process. These developments and the results of an EUA project entitled "Doctoral programmes for the European knowledge society" fed into the *Salzburg Principles,*[7] which were published in 2005. The principles covered a range of topics identified during the project and by participants in the seminar, including the centrality of original research to doctoral education, the recognition that doctoral training must meet the needs of the wider labour market and that doctoral candidates should be considered as professionals, the importance of incorporating appropriate professional development and structured training opportunities into doctoral programmes, the central role of appropriate supervision and assessment, and the increasing importance of geographical, inter-sectoral and interdisciplinary mobility in the doctoral experience.

In 2010, the EUA published the *Salzburg II Recommendations*.[8] The Recommendations were intended as a step towards developing a common framework for European doctoral education. They reflected progress which had been made since the publication of the original Salzburg principles, including several communiqués by EU Ministers which had arisen from the Bologna Process and which referred to doctoral education.[9] The three main messages of the Recommendations are:[8]

> First of all, doctoral education has a particular place in the European Research Area and the European Higher Education Area. It rests on the practice of research, which makes it fundamentally different from the first and second cycles.

> Secondly, doctoral candidates must be allowed independence and flexibility to grow and develop. Doctoral education is highly individual and by definition original. The path of progress of the individual is unique, in terms of the research project as well as in terms of the individual professional development.

> Lastly, doctoral education must be developed by autonomous and accountable institutions taking responsibility to cultivate the research mindset. Institutions need flexible regulation to create special structures and instruments and continue advancing European doctoral education.

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[7] https://eua.eu/component/attachments/attachments.html?task=attachment&id=1881
[8] https://eua.eu/resources/publications/615:salzburg-ii-%E2%80%93-recommendations.html
[9] For example a) EHEA (2007) London Communiqué: Towards the European Higher Education Area: responding to challenges in a globalised world.
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The Report of Mapping Exercise on Doctoral Training in Europe: Towards a common approach of 27 *June 2011*(final),[10] produced by the European Research Area Standing Group on Human Resources and Mobility (ERA-SGHRM), led to the publication of the *Principles for Innovative Doctoral Training* (PIDT).[11] The authors state that the PIDT take into account the Salzburg II Recommendations, good practice in Member States (as seen in the mapping exercise) and experience from the various iterations of the Marie Curie actions in the EU's Framework Programmes for Research and Innovation. The PIDT were endorsed by the EU Council of Ministers in the *Council Conclusions on the Modernisation of Higher Education*, 28 and 29 November 2011.[12]

The PIDT covers seven areas:

1. Research Excellence
2. Attractive Institutional Environment
3. Interdisciplinary Research Options
4. Exposure to industry and other relevant employment sectors
5. International networking
6. Transferable skills training
7. Quality Assurance

Subsequently, the ERA-SGHRM published *Using the Principles for Innovative Doctoral Training as a Tool for Guiding Reforms of Doctoral Education in Europe*.[13] The purpose of the report was to provide guidance on how to use the Principles "…as a tool for guiding the European discussion on doctoral education and its development…". When the Horizon 2020 Framework Programme began in 2014, the PIDT were embedded in the "Innovative Training Networks" Call for Proposals under the Marie Skłodowska-Curie actions.[14]

In subsequent years, several European publications addressed good practice in doctoral education. These include *Good Practice Elements in Doctoral Training*, published by the League of European Research Universities in 2014,[15] and the 2012 *Erasmus Mundus Quality Assessment 2012: Handbook of Excellence – Doctoral Programmes*,[16] which examined good practice in the Erasmus Mundus Joint Doctoral Programmes described later in this document. These reports can be taken as evidence of an increasing interest in aligning practice in doctoral education across Europe with the policy ambitions of Salzburg I/II and the PIDT. During this time there have also been several studies and surveys on doctoral education in Europe; for an overview, see Section 1.3 of *Doctoral education in Europe today: approaches and institutional structures*.[17]

In 2015, the EUA published a new set of recommendations *Taking Salzburg Forward – Implementation and New Challenges*.[18] These were based on a two-year consultation with over 200 universities from 39 countries. While providing further guidelines for the doctoral reform catalysed by the Salzburg

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[10]

https://cdn3.euraxess.org/sites/default/files/policy_library/report_of_mapping_exercise_on_doctoral_training_final .pdf

[11] https://euraxess.ec.europa.eu/sites/default/files/policy_library/principles_for_innovative_doctoral_training.pdf

[12] https://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/educ/126375.pdf

[13] https://cdn5.euraxess.org/sites/default/files/principles_for_innovative_doctoral_training.pdf

[14] See page 5 of https://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/main/h2020-wp1415-msca_en.pdf

[15] https://www.leru.org/publications/good-practice-elements-in-doctoral-training

[16] https://eacea.ec.europa.eu/sites/eacea-site/files/handbook_of_excellence_2012_doctoral_en.pdf

[17] https://www.eua-cde.org/reports-publications/809:doctoral-education-in-europe-today-approaches-and-institutional-structures.html

[18] https://www.eua-cde.org/downloads/publications/2016_euacde_doctoral-salzburg-implementation-new-challenges.pdf

Principles and Salzburg II Recommendations, this document also dealt with newer issues such as research ethics and integrity, globalisation in higher education and the challenges of digitalisation. More recently, in September 2020, the European Commission published a Communication on a revamped European Research Area (ERA) called *A new ERA for Research and Innovation*.[19] While the Communication does not specifically reference doctoral training, it emphasises an increasing closeness between the ERA and the European Education Area, including a goal to develop a "roadmap of actions for creating synergies between higher education and research".

2. EU Flagship Research Training Programmes

Two European Commission funding programmes have been at the forefront of the changes to doctoral education in Europe. These include the Marie Skłodowska-Curie actions (formerly Marie Curie Actions)[20] and the Erasmus+ programme and its previous iterations. In this section of the report, an overview of these programmes is provided.

Marie Skłodowska-Curie actions

Since the First Framework Programme (FP) for Research and Technological Development, the European Union has invested in programmes to support the training and mobility of researchers. The Marie Curie actions were established during the Fourth Framework Programme (1994-1998).[21] During the 4th and 5th FPs, the programme supported activities to enhance training and mobility for doctoral candidates, including Marie Curie Training Sites, which offered doctoral candidates the chance to spend 3-12 months in a different European country. The Marie Curie actions in the 6th Framework Programme (2002-2006) offered funding calls for Marie Curie research training networks":[22]

> These networks provide the means for research teams of recognised international stature to link up in the context of a well-defined collaborative research project. The aim is to formulate and implement a structured training programme for researchers in a particular research field. Networks will provide a cohesive, but flexible framework for the training and professional development of researchers, especially in the early stages of their research career. Networks also aim to achieve a critical mass of qualified researchers, especially in areas that are highly-specialised and/or fragmented and to contribute to overcoming institutional and disciplinary boundaries, notably through the promotion of multidisciplinary research.

These research training networks were essentially a form of European "structured PhD". They consisted of a consortium of research-performing organisations, delivering a doctoral training programme in a specific research area to a cohort of doctoral candidates. Researcher mobility between consortium members was an essential part of the programme, as was the provision of specific training courses in research and transferable skills. Versions of these Marie Curie research training networks have featured as a key element in both the FP7 Marie Curie actions (2007-2013 as "Initial Training Networks")[23] and in the Horizon 2020 Marie Skłodowska-Curie actions (2014-2020 as "Innovative Training Networks").[24] As stated above, applicants to the Horizon 2020 "Innovative Training Networks" were required to incorporate the Principles for Innovative Doctoral Training into the design of their networks. The new Horizon Europe programme, commencing in 2021, will include Calls for Proposals for "MSCA Doctoral Networks".

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[19] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0628&from=EN
[20] The name of the programme was changed at the start of Horizon 2020 in 2014, to acknowledge the scientist's nationality.
[21] https://cordis.europa.eu/programme/id/FP4
[22] https://cordis.europa.eu/programme/id/FP6-MOBILITY
[23] https://cordis.europa.eu/programme/id/FP7-PEOPLE
[24] https://ec.europa.eu/research/mariecurieactions/actions/research-networks_en

Looking more closely at the Horizon 2020 'Innovative Training Networks', the networks involved the following elements:

- A consortium approach, involving typically 6-10 organisations from across Europe, drawn from the academic and non-academic (e.g. industry, charities, civil society organisations) sectors;

- A research training programme for up to 14 researchers (doctoral or Masters by research candidates) centred around a core research theme, with each researcher having their own Individual Research Project within that core theme;

- A structured training programme in advanced research and transferable skills, typically offered via a 'Summer School' format, but also utilising training courses typically on offer within each consortium member;

- The use of supervisory teams/committees, including both representatives from the academic and non-academic sectors, with rules/regulations about frequency and content of supervisory meetings, and participation by the committee in the researcher's career planning activities;

- Mandatory international and intersectoral mobility periods of typically 3-12 months' duration for each participating researcher;

- Strong involvement of the non-academic sector through e.g. training provision and hosting researchers for the full duration of their research programme and for shorter mobility periods;

- Governance structures covering all aspects of the programme (e.g., Supervisory Board, External Advisory Groups, Research Committee, Training Committee).

Additionally, consortia can choose to form their network as a European Joint Doctorate, which involves all elements in the list above, with the additional requirement that the doctoral degrees awarded are joint, double or multiple degrees. Similarly, consortia can form as a European Industrial Doctorate, where the elements in the list above are adhered to, along with the requirement that each researcher splits their duration of study (typically 50/50) between the academic and non-academic sector.

The table below provides a summary of how the various aspects of the Horizon 2020 'Innovative Training Networks' (ITN) align with the Framework Principles in the Irish *National Framework for Doctoral Education* (NFDE). Overall, the table shows a strong degree of alignment between the Framework Principles in the NFDE and the requirements that the European Commission has set down for ITNs. Conversely, as ITN could be considered as a flagship European research training programme, it is positive that there is such strong alignment between it and the Framework Principles.

NFDE Framework Principle	Horizon 2020 'Innovative Training Networks'
1 – The core of doctoral education is deep engagement with a question, problem or hypothesis at the frontier of knowledge, and advancement of this frontier under the guidance of expert and committed supervision. To be awarded a doctoral degree, the candidate must have made an original contribution to knowledge.	Each researcher in an ITN has an Individual Research Project within the overall core research theme of the network.
2 – Successful completion and examination of the research thesis, compromising work of publishable quality, is the basis for the award of the doctoral	The delivery of research degrees is a core element of ITNs. The format of the thesis is a matter for the individual consortium members

degree. The thesis can be presented in a variety of formats.	and may differ depending on the norms in the particular country and/or institution. Communication of the results of the network is a mandatory requirement, which would include peer-reviewed research outputs such as journal articles, conference papers etc.
3 – Doctoral education increases significantly students' depth and breadth of knowledge of their discipline and develops their expertise in research methodology which is applicable to both a specific project and a wider context. It provides a high-quality research experience, training (including a formalised integrated programme of personal and professional development) and output consistent with international norms and best practice.	The experience for researchers in an ITN includes the following: - An advanced research training programme comprising an individual research project and structured, module-based training in advanced research skills - A programme of transferable skills training including e.g. Intellectual Property Management, Communication Skills, Research Integrity etc. - Individual career development planning, supported by an inter-sectoral supervisory team.
4 – Doctoral education is conducted in a learning community where sufficient critical mass of internationally recognised research activity exists to allow students to gain access to a training programme of appropriate breadth and to interact with peers engaged in their field, nationally and internationally.	All ITN applications are subject to international peer-review. The evaluation criteria includes an assessment of the quality of the supervisors, the research facilities, the support that the consortium can offer for training and career development planning, and the level of international experience offered to the researchers.
5 – Recognising that each doctorate is unique, doctoral education is also flexible so as to support students within individual disciplines or within interdisciplinary/multidisciplinary groups.	The inter- and multi-disciplinary aspects of the proposed research training programme are evaluated during the peer-review process. Individual Research Projects can be inter-/multi-disciplinary, or single-discipline within an overall inter-/multidisciplinary research theme in the network.
6 – Doctoral education is conducted in a research environment with a high degree of academic quality and infrastructure and where it is consistent with institutional strategies. Academic quality includes quality supervision and training for supervisors.	All ITN applications are subject to international peer-review. The evaluation criteria includes an assessment of the quality of the supervisors, the research facilities, the support that the consortium can offer for supervision, training and career development planning. Training for supervisors is not specifically mentioned.

7 – The admission of doctoral students takes into account preparedness of the applicant, the availability of qualified, competent and accessible supervision and the resources necessary to conduct the research.	The recruitment processes to be used by the network are evaluated as part of the peer-review process. Open, transparent, merit-based assessment is a requirement. Any admission requirements specific to a particular institution would, where possible, be merged into the network-level admission criteria. The availability of quality supervision and the necessary research resources are evaluated during the peer-review process.
8 – Doctoral education is supported by established structures with: • supervision by a principal supervisor(s), normally with a supporting panel approved by the institution; • formal monitoring of progress to completion against published criteria, supported by institutional arrangements; • clearly defined examination processes, involving external examiners, assessment criteria and declared outcomes.	Each researcher in an ITN has a supervisory team/committee, which includes both representatives from the academic and non-academic sectors, with rules/regulations about frequency and content of supervisory meetings, and participation by the committee in the researcher's career planning activities. Procedures for formal progress monitoring are aligned at network-level – although these may be in addition to the requirements within an individual institution. The examination processes is carried out in accordance with local/disciplinary/country norms.
9 – A robust quality assurance system underpins all doctoral education.	This aspect is not evaluated as part of the peer-review. However, it would be expected that all degree-awarding members of a network align with to their national/local QA systems.

Erasmus

While the concept of pan-European research training programmes was being developed and implemented via the Marie (Skłodowska-) Curie actions, a parallel stream of activity was occurring within the various iterations of the Erasmus programme (now Erasmus+). However, there was one important difference: the Erasmus schemes were focused on developing joint degree programmes, specifically Joint Masters and Joint Doctoral Degree programmes. Between 2004 and 2015, 328 such programmes were funded, offering a total of around 18,600 masters scholarships and 1,400 doctoral fellowships. While the Joint Masters programmes included a research element, they are not equivalent to the Masters by Research degrees in the Irish system, so are not further considered here.

Erasmus Mundus Joint Doctorates (EMJD) were established within the Erasmus Mundus programme following a European Commission proposal adopted by the European Parliament in 2008.[25] A comprehensive summary of the core elements of EMJDs is provided in *Erasmus Mundus Quality Assessment 2012: Handbook of Excellence – Doctoral Programmes.*[16] There were many similarities

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[25] https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:204:0085:0088:EN:PDF

between EMJD and the Marie Curie research training networks, including mandatory international mobility, provision of an integrated research and training programme within an overall research theme, a focus on employability and so on. However, EMJD differed in that programmes tended to recruit a cohort of researchers each year for several years, whereas Marie Curie research training networks recruited a single cohort of researchers at the start of the project. A second difference was the requirement for the EMJD researchers to receive a joint, double or multiple doctoral degree. Finally, the participation of non-European higher education institutions as researcher host organisations was easier to achieve in EMJDs. Due to the similarity between the two programmes, the European Commission proposed that when Horizon 2020 commenced in 2014, that the EMJD be merged into the Horizon 2020 Marie Skłodowska-Curie actions 'Innovative Training Networks'. This was approved by the Member States and the European Parliament. Since 2014, the 'Innovative Training Networks' Call has included an option for European Joint Doctorates, as described above. This option will be retained in the 'MSCA Doctoral Networks' Calls under Horizon Europe, which will commence in the first half of 2021. It is worth noting that despite the transfer of a dedicated joint doctoral degree Call for Proposals from Erasmus to Horizon 2020, the new Erasmus+ European Universities Alliances[26] are encouraged to include joint doctoral provision in their cooperation plans.

3. NFDE Principles and the European experience in research education

In January 2019 the EUA Council for Doctoral Education (EUA-CDE) published *Doctoral Education in Europe Today: Approaches and Institutional Structures*,[17] the results of a survey of EUA-CDE members carried out during 2018. The survey was carried out in the context of the 10th anniversary of the EUA-CDE and was designed to gather information about the current European landscape in doctoral education. 311 valid responses (including from seven Irish institutions) were received from 32 European countries – responses were limited to one per institution. The results of the survey provide an opportunity to examine whether the Principles in the *National Framework for Doctoral Education* are reflected in practice in the European higher education institutions who responded to the survey. Overall, the survey results provided insights in relation to Framework Principles 1, 3, 6, 7, 8 and 9. Information relevant to Framework Principles 2, 4 and 5 could not be identified. Note: where the word respondent is used in the section below, it refers to a response from an institution, not from an individual.

Framework Principle 1 – The core of doctoral education is deep engagement with a question, problem or hypothesis at the frontier of knowledge, and advancement of this frontier under the guidance of expert and committed supervision. To be awarded a doctoral degree, the candidate must have made an original contribution to knowledge.

The results of the survey (Section 2.2) show that doctoral candidates in the responding institutions spend the majority of their time performing research, with 95% of institutions indicating that 47% "always" or 48% "to a great extent" spend their time on this aspect of their research degree. This is significantly higher than the reported time spent on the other reported activity categories (research-related administration, teaching, science communication, internships or workplace experience/training, teaching-related administration) – see Figure 1. The report authors conclude "The survey results clearly indicate that doctoral candidates are early-stage researchers and predominantly spend their time on research activities". This result is in strong alignment with Framework Principle 1.

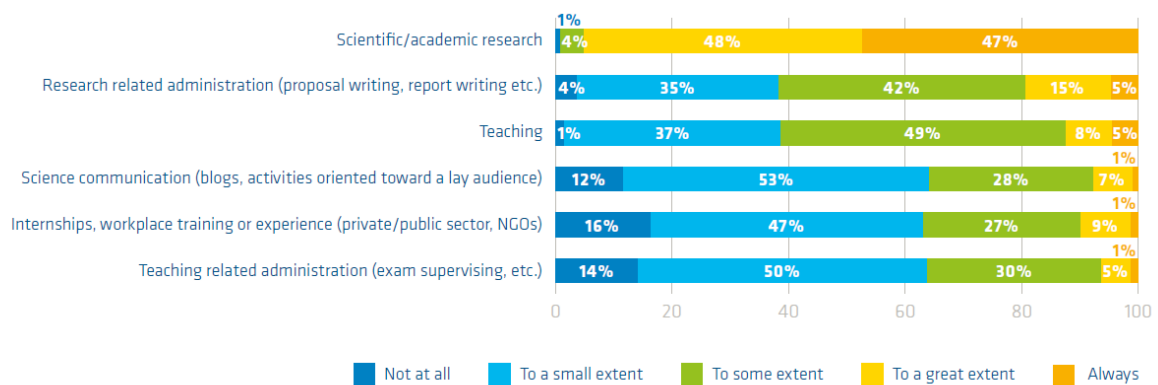[26] https://ec.europa.eu/education/education-in-the-eu/european-education-area/european-universities-initiative_en

Figure 1 – How do doctoral candidates spend their time? Reproduced from "Doctoral education in Europe today: approaches and institutional structures"

Interestingly, the authors interpret the data gathered on completion rates and time to completion (Section 2.6) in the context of the important distinction between the many changes in the organisation of doctoral education in Europe (new policies/structures/procedures) and the actual process of carrying out research. They remind the reader that while there have been many changes in the organisation of doctoral programmes "the process of advancing knowledge through original research will still have to follow its own, time-consuming, often non-linear path" (Section 2.10).

Framework Principle 3 *– Doctoral education increases significantly students' depth and breadth of knowledge of their discipline and develops their expertise in research methodology which is applicable to both a specific project and a wider context. It provides a high-quality research experience, training (including a formalised integrated programme of personal and professional development) and output consistent with international norms and best practice.*

In the area of training offered to doctoral candidates, the results presented in Section 2.2 of the report – see Figure 2 – show that institutions focus most strongly on Research Competence Training (e.g., advanced methods, up-to-date data knowledge, new techniques); 75% of respondents reported this area to be "Extremely important" with 22% reporting it as "Important".
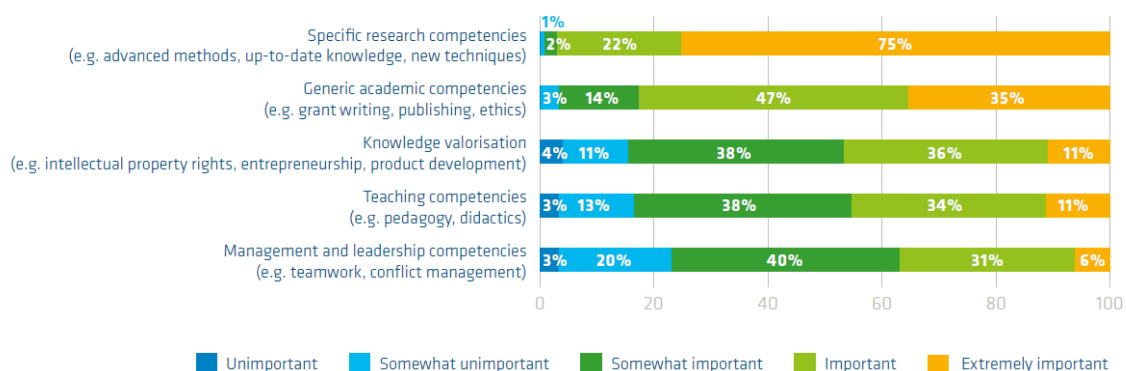

Figure 2 – In your institution, how important are the following elements of doctoral training? Reproduced from "Doctoral education in Europe today: approaches and institutional structures"

The second highest ranked competency area was Generic Academic Competencies (35% "Extremely Important", 46% "Important"), followed by Knowledge Valorisation (11% "Extremely Important", 36%

41

"Important)", Teaching Competencies (11% "Extremely Important", 34% "Important"), and Management and Leadership Competencies (6% "Extremely Important", 31% "Important"). The importance of the research experience is also emphasised in the assessment of how much time doctoral candidates spend on different activities, as outlined above. This survey result shows that practice in doctoral education around Europe is similar to the objectives in Framework Principles 1 and 3 – with the acquisition of research knowledge by the doctoral candidate complemented (to a lesser extent) by training in transferable skills.

Framework Principle 6 – *Doctoral education is conducted in a research environment with a high degree of academic quality and infrastructure and where it is consistent with institutional strategies. Academic quality includes quality supervision and training for supervisors.*

The survey report provides some insights into the main indicators used in European institutions to measure the quality of doctoral education, which could be related to the "research environment with a high degree of academic quality and infrastructure" referenced in Framework Principle 6. The main indicators include the academic outputs of the doctoral candidate (e.g. publications), time-to-completion and completion rates, doctoral candidate satisfaction, participation rates by international students (level of internationalisation) and ability to attract external funding. The results show that 76% of respondents "always" or "to a great extent" use the academic outputs of doctoral candidates as the main quality indicator, with 72% of respondents using completion rates as a main indicator. Among the other indicators mentioned in the survey;

- 66% of respondents use staff qualifications (e.g. habilitations)[27]
- 54% of respondents use doctoral candidate satisfaction rates
- 54% of respondents use qualitative indicators (e.g. peer review, evaluation committees)
- 53% of respondents use level of internationalisation
- 47% of respondents use the level of external funding received.

In relation to the link with institutional strategy, the results presented in Section 2.1 of the report illustrate a strong trend towards the development of institutional strategies in doctoral education (albeit with diversity of policy and practice at individual institution level). For example, 64% of respondents stated that doctoral education is never led by individual supervisors without institutional oversight. The authors conclude that the establishment of formal structures around doctoral education is clear evidence of an aim to enhance the institutional role in the delivery of doctoral education, with institutions taking on more responsibility for the support of doctoral candidates e.g. through the provision of transferable skills training and formal policies in areas such as supervision and reporting. This evidence of practice in institutional doctoral education strategy aligns well with Framework Principle 6.

Section 2.7 of the report presents the results of the survey in relation to supervision, with the overall conclusion that across Europe there are regulations in place that cover the majority of important aspects of doctoral supervision, including appointment of supervisors, reporting, feedback, supervisor training, management of conflicts, agreed number of supervisory meetings etc. The results are shown in Figure 3 below. Appointment of supervisors is the area where rules/regulations are most prevalent, with 89% of responding institutions having them in place (with 81% having them in place for 'all doctoral programmes'). 86% of respondents reported having rules/guidelines for formal reporting by the doctoral candidate on their activities. This result provides some evidence of the "quality supervision" practice referred to in Framework Principle 6.

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[27] Habilitiation is a post-doctoral qualification required to secure a university-level teaching post in several European countries (e.g., Germany, Austria).

Figure 3 shows that the area which is less regulated is that of training for supervisors. Just 43% of respondents stated that rules/guidelines regarding voluntary training were present in "all" or "most" doctoral programmes. Rules/guidelines on obligatory training for supervisors are even less prevalent; just 17% of respondents stated that these were present in "all" or "most" doctoral programmes. In fact, 68% of respondents stated that there were no rules about obligatory supervisory training in their doctoral programmes. This result suggests that while Framework Principle 6 implies that supervisory training should be provided, there is less of a focus on this in practice.
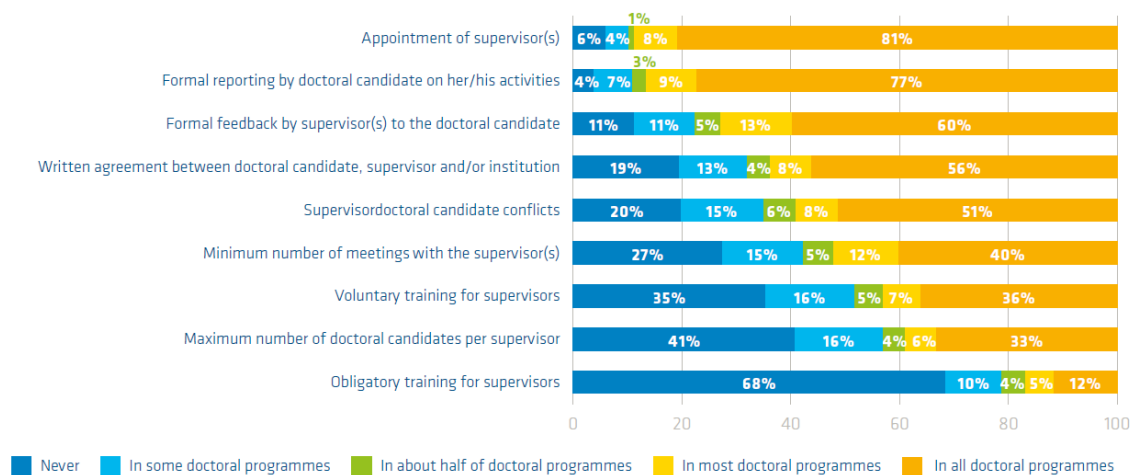

Figure 3 – *In your institution, are there rules or guidelines regarding the following aspects of doctoral supervision? Reproduced from "Doctoral education in Europe today: approaches and institutional structures"*

Framework Principle 7 *– The admission of doctoral students takes into account preparedness of the applicant, the availability of qualified, competent and accessible supervision and the resources necessary to conduct the research.*
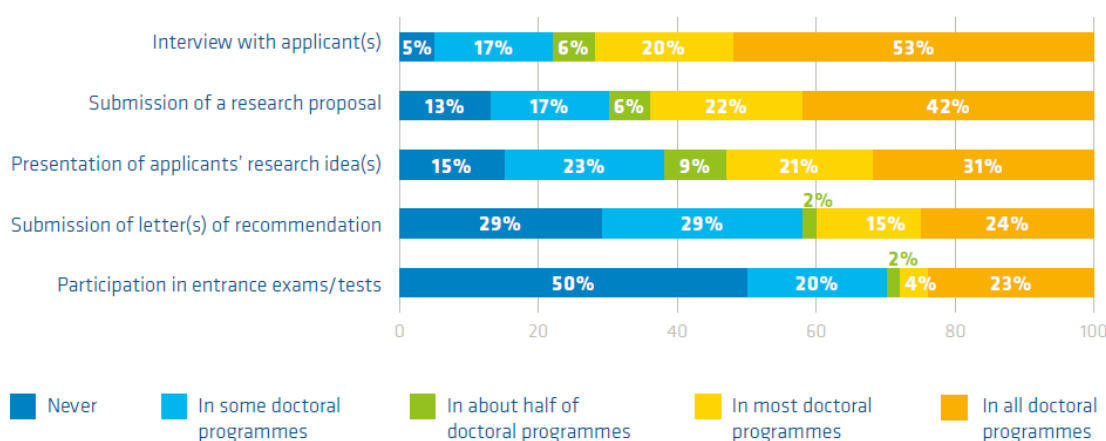

Figure 4 – *In your institution, which of the following steps are used in the admission procedure for doctoral candidates? Reproduced from "Doctoral education in Europe today: approaches and institutional structures"*

Overall, the survey results (Figure 4) show that the European institutions use the future potential of the applicant, rather than their past achievements, to judge their preparedness.

Admission procedures include an interview (used in "all" or "most" doctoral programmes by 73% of respondents), submission of a research proposal (64%), presentation of the applicant's research ideas (52%), submission of letters of recommendation (39%) and participation in entrance exams/tests (27%). The survey results (section 2.9) indicate that the bulk of decision-making on admissions rests with institutional sub-units (e.g. schools/departments) rather than at the institutional level. These results demonstrate a potentially stronger focus across Europe on the characteristics of the applicant, rather than the availability of supervision and resources outlined in Framework Principle 7. Of course, this question was not specifically asked of the survey participations, so it would be sensible to avoid overinterpreting these results.

Framework Principle 8 – *Doctoral education is supported by established structures with:*

- *supervision by a principal supervisor(s), normally with a supporting panel approved by the institution;*

- *formal monitoring of progress to completion against published criteria, supported by institutional arrangements;*

- *clearly defined examination processes, involving external examiners, assessment criteria and declared outcomes.*

In relation to supervision, the report authors state "Doctoral supervision has become a collective effort shared by the academic supervisor, other qualified members of the supervisory team and various structures put in place by the university". The survey results show that single supervision and supervisory teams (with members internal to the institution) are the dominant supervision mechanisms: single supervision was indicated by 49% and supervisory teams by 47% of respondents for "all" or "most" doctoral programmes. The use of supervisory teams including members from other universities was less prevalent, with 56% of respondents stating that this was only used in "some" doctoral programmes. The results then are well-aligned with Framework Principle 8, which allows for single and team supervision, although somewhat encouraging the latter.
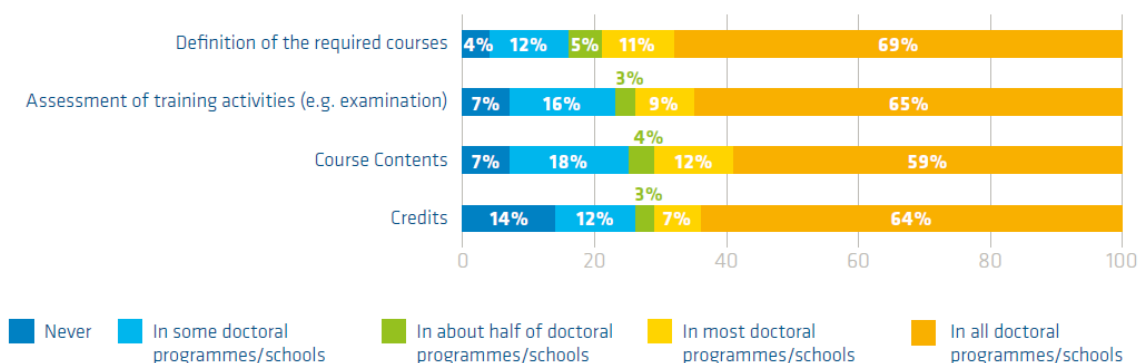

Figure 5 – *In your institution, are there rules or guidelines regarding the following aspects of doctoral training? Reproduced from "Doctoral education in Europe today: approaches and institutional structures"*

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Looking at formal progress monitoring and examination processes, the survey results (Section 2.1) show that the large majority of respondents have rules/regulations in place for many aspects of doctoral education. For example, 80% of respondents indicated that they have rules/regulations for definition of required courses (69% in "all" and 11% in "most" doctoral programmes), 74% for assessment of training activities (e.g. examination – 65% in "all", 9% in "most"), 71% for course content (59% in "all", 12% in "most") and 71% for credits (64% in "all", 7% in "most"). As mentioned earlier, in Section 2.7 of the report, 86% of respondents reported having rules/guidelines for formal reporting by the doctoral candidate on their activities. However, the survey does not interrogate in detail the actual monitoring and assessment processes used, so it is impossible to say if these aspects of Framework Principle 8 (i.e., completion against published criteria, use of external examiners and declared outcomes) are in use widely across Europe.

Framework Principle 9 – *A robust quality assurance system underpins all doctoral education.*

Looking at academic quality, 89% of responding institutions stated that "all" or "most" doctoral programmes were subject to an internal quality assurance system. 62% of respondents were also subject to evaluation by an external agency. The report authors noted that several respondents brought up issues with parallel internal and external evaluations. They posed an open question around how "to find the right balance of co-existing evaluation systems, that is, how evaluation processes can be used as effectively as possible by different organisations while providing added value aiming at improving the doctoral education system." The results are clear evidence of the use of quality assurance systems in doctoral education across Europe, in line with Framework Principle 9.

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Annex 3: Survey questions

Survey on the implementation of the Irish National Framework for Doctoral Education

This survey is undertaken by the EUA Solutions implementation team entrusted with conducting a review of the level of implementation of the Irish National Framework for Doctoral Education (NFDE) and potential good practice therein. The team has been commissioned to conduct this review by the Higher Education Authority, Quality and Qualifications Ireland, the Irish Universities Association, and the Technological Higher Education Association.

The survey is aimed at all Irish higher education institutions offering research postgraduate education. Due to the broad scope of the survey questions, it is recommended that answers are submitted in a team effort, including staff of various categories and students. However, participating institutions are requested to submit only one overall response per institution.

It is important to highlight that this survey reflects the scope of the NFDE, which covers all research degree provision both at the Master's and the Doctorate level.

By completing this survey, you agree to EUA Solutions processing the results in a way that may identify your institution. However, data on individual institutions or the individuals completing this survey will not be published.

Once you have submitted your response, you will be able to download a copy for your own records.

The deadline for responses is **23 November 2020**. In case of questions, please send an email to helene.peterbauer@eua.eu.

Privacy policy

By answering this questionnaire, you acknowledge, and where necessary agree, that EUA Solutions collects and processes certain personal data related to you, in compliance with the applicable data protection legislation. Such personal data could include your surname and first name, email, telephone number, institution, position and recorded answers to the questionnaire. It will be used for the sole purpose of performing, implementing, executing and completing the EUA Solutions review of the level of implementation of the Irish Framework for Doctoral Education.

EUA Solutions will treat all personal data as confidential and will not process it for other purposes than those mentioned above. Your personal data will not be transferred to any other third party.

Steps will be taken to ensure that your personal data is accurate, kept up to date and not kept for longer than is necessary. Measures will also be taken to safeguard personal data against unauthorised or unlawful processing and accidental loss or destruction or damage to the data. You may access your personal data, as collected and processed by EUA Solutions, and request the modification or suppression of your personal data if it is incorrect or unnecessary.

To exercise these rights, please send a written and signed request to EUA c/o Helene Peterbauer at Avenue de l'Yser 24, 1040 Brussels, Belgium or helene.peterbauer@eua.eu together with a copy of your ID card or another identification document. The general privacy policy of EUA Solutions is available on the EUA Solutions website.

I. Institutional Information

Name of institution: */ Text field /*

Institutional website: */ Text field /*

Name of contact person: */ Text field /*

Position: */ Text field /*

Email address: */ Text field /*

Please pick your institutional type:

- o University
- o Technological University
- o Institute of Technology
- o Other
- o

How many current postgraduate research students does your institution have (headcount)?

/ Text field /

How many postgraduate research students graduated from your institution in the past five years?

	Masters	Doctorates
2015		
2016		
2017		
2018		
2019		

II.   Framework Principles

This section explores the nine Framework Principles. Where possible, please provide a link to a relevant webpage and/or attach a relevant document, and indicate whether the described policies and procedures pre-date the introduction of the NFDE in 2015 or were introduced or enhanced in response to it.

Please note that although the Framework Principles refer to "doctoral education", the NFDE applies to all postgraduate research degree programmes offered by higher education institutions.

In addition, it is important to note that the framework is geared towards enhancement and respects diversity in approaches to achieving it. As a result, there may be various approaches in use at your institution. You will be prompted to list your approaches and comment on whether this diversity is considered useful or detrimental in ensuring consistent quality in the provision of research degree provision.

In this survey you will be asked to explain how your institution implements the principles of the NFDE.

Has your institution systematically addressed the Framework Principles? If not, were there any particular reasons for that?

/ Text field /

Framework Principle 1: *The core of doctoral education is deep engagement with a question, problem or hypothesis at the frontier of knowledge, and advancement of this frontier under the guidance of expert*

and committed supervision. To be awarded a doctoral degree, the candidate must have made an original contribution to knowledge.

1.a. Please direct us to a published policy statement that confirms the centrality of research for research degrees.
/ Text field /

1.b. Please explain how your institution develops the research skills of postgraduate research students.
/ Text field /

1.c. Please explain the stages that students need to go through before they will be allowed to defend their work.
/ Text field /

1.d. Please describe any other measures with regard to this Principle that have not been addressed above.
/ Text field /

Framework Principle 2: *Successful completion and examination of the research thesis, comprising work of publishable quality, is the basis for the award of the doctoral degree. The thesis can be presented in a variety of formats.*

2.a. How does the final assessment process consider the originality of the contribution of the research project?
/ Text field /

2.b. How does the institution ensure that the thesis, irrespective of format, is held to a consistent standard across disciplines?
/ Text field /

2.c. Are there any clearly stated and communicated criteria which define whether a research thesis is of publishable quality and comment on any discipline differences?
/ Text field /

2.d. Please describe any other measures with regard to this Principle that have not been addressed above.
/ Text field /

Framework Principle 3: *Doctoral education increases significantly students' depth and breadth of knowledge of their discipline and develops their expertise in research methodology which is applicable to both a specific project and a wider context. It provides a high-quality research experience, training (including a formalised integrated programme of personal and professional development) and output consistent with international norms and best practice.*

3.a. How does your institution ensure that its postgraduate research programmes cover a variety of knowledge and skills, including discipline and research-specific, generic research, academic and transferable knowledge and skills?
/ Text field /

3.b. How does your institution (i) define and (ii) ensure the quality of the research and training experience provided to postgraduate research students?
/ Text field /

3.c. To what extent do your institution's research degree programmes address the personal and professional development of the postgraduate research student and provide specific opportunities for such development?
/ Text field /

3.d. How does your institution ensure the quality of the research environment and the supervision provided to postgraduate research students?
/ Text field /

3.e. How does your institution benchmark its research degree programmes to ensure consistency with international norms and best practice?
/ Text field /

3.f. How does the institution ensure academic integrity among postgraduate research students, supervisors and examiners?
/ Text field /

3.g. Please describe any other measures with regard to this Principle that have not been addressed above.
/ Text field /

Framework Principle 4: *Doctoral education is conducted in a learning community where sufficient critical mass of internationally recognised research activity exists to allow students to gain access to a training programme of appropriate breadth and to interact with peers engaged in their field, nationally and internationally.*

4.a. How does your institution define "critical mass" with regard to the learning community in which research education is provided?
/ Text field /

4.b. How does your institution ensure that any cohort of postgraduate research students as well as the staff engaging with them has the critical mass needed to ensure "a training programme of appropriate breadth"?
/ Text field /

4.c. How does your institution ensure that all postgraduate research students engage with the research community present at the institution?
/ Text field /

4.d. How does your institution ensure that its postgraduate research students and their supervisors maintain appropriate links to international networks of peers and researchers from other disciplines and periodically engage in exchange or collaboration?
/ Text field /

4.e. How does your institution ensure postgraduate research students are taking advantage of opportunities to engage in international mobility?
/ Text field /

4.f. Please describe any other measures with regard to this Principle that have not been addressed above.
/ Text field /

Framework Principle 5: *Recognising that each doctorate is unique, doctoral education is also flexible so as to support students within individual disciplines or within interdisciplinary or multidisciplinary groups.*

5.a. How does your institution grant flexibility to its postgraduate research students by allowing, helping or even encouraging them to conduct their studies and/or research as part of a group (e.g. their own discipline or across disciplines, in collaboration with other institutions or the non-academic sector)?
/ Text field /

5.b. Does your institution have a strategy for attracting partners (e.g. institutions, companies or the public sector) to engage in collaborative research training models?
/ Text field /

5.c. How does your institution promote multidisciplinary projects and projects in multidisciplinary research environments?
/ Text field /

5.d. Please describe any other measures with regard to this Principle that have not been addressed above.
/ Text field /

Framework Principle 6: *Doctoral education is conducted in a research environment with a high degree of academic quality and infrastructure and where it is consistent with institutional strategies. Academic quality includes quality supervision and training for supervisors.*

6.a. What kind of procedures are in place that ensure that the research environment for each project and student is intellectually stimulating and supportive?
/ Text field /

6.b. How does your institution ensure high quality education of postgraduate research students through the provision of adequate support systems and resources?
/ Text field /

6.c. How are the supervision competences of academic staff taken into account when you approve supervisory teams?
/ Text field /

6.d. What structures and processes does your institution have in place to provide an oversight of good supervision?
/ Text field /

6.e. How does your institution take into account supervision skills in promotion procedures?
/ Text field /

6.f. How does your institution ensure that the staff providing postgraduate research supervision enhance their supervisory skills on a regular basis?
/ Text field /

6.g. Please describe any other measures with regard to this Principle that have not been addressed above.
/ Text field /

Framework Principle 7: *The admission of doctoral students takes into account preparedness of the applicant, the availability of qualified, competent and accessible supervision and the resources necessary to conduct the research.*

7.a. Please direct us to a published policy on each step of the admission procedure and requirements, including selection criteria, for your postgraduate research programmes.
/ Text field /

7.b. How does your institution communicate to prospective students what it means to undertake a research degree programme, the challenges of research and the wide range of possible and most likely career paths?
/ Text field /

7.c. What kind of provisions are made to ensure that individuals from diverse backgrounds and disability status are not disadvantaged by recruitment, application, registration processes or induction activities and are supported equally to their peers throughout their studies?
/ Text field/

7.d. How does your institution ensure that appropriate, adequate and up-to-date information is available to help prospective students make informed choices (e.g. on supervisors and scholarships) when choosing their research project? Please also address any relevant disciplinary differences.

/ Text field /

7.e. How does your institution ensure that the roles and responsibilities of postgraduate research students and supervisors are clear to everybody involved?
/ Text field /

7.f. How does your institution ensure that accepted postgraduate research students match the institution's and programme's research, supervisory and financial capacities?
/ Text field /

7.g. Please describe any other measures with regard to this Principle that have not been addressed above.
/ Text field /

Framework Principle 8: *Doctoral education is supported by established structures with:*
- *Supervision by a principal supervisor(s), normally with a supporting panel approved by the institution;*
- *Formal monitoring of progress to completion against published criteria, supported by institutional arrangements;*
- *Clearly defined examination processes, involving external examiners, assessment criteria and declared outcomes.*

8.a. Please direct us to a published policy covering
- the selection and appointment of supervisors,
- the monitoring of progress in the postgraduate research studies,
- the elements of examination processes including assessment criteria and outcomes,
- and the selection and appointment of external examiners.

/ Text field /

8.b. What kind of support services are available to postgraduate research students to provide unbiased and individualised information and guidance on their progress and any potential challenges, such as a conflict with a supervisor?
/ Text field /

8.c. Do your postgraduate research students have a recognised collective voice (e.g. in the form of a students' union) at your institution?
/ Text field /

8.d. Please describe any other measures with regard to this Principle that have not been addressed above.
/ Text field /

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Framework Principle 9: *A robust quality assurance system underpins all doctoral provision.*

9.a. Which key aspects are taken into account by your quality assurance system with regard to research degree programmes?
/ Text field /

9.b. To what extent is your institutional quality assurance system geared towards the continuous enhancement of your institution's postgraduate research provision, in line with the Framework and with your institution's strategic priorities?
/ Text field /

9.c. Please describe any other measures with regard to this Principle that have not been addressed above.
/ Text field /

III.   Additional questions
Does your institution use qualitative or quantitative indicators or have examples of good practice that demonstrate the measures described above have contributed to achieving the postgraduate research outcomes defined by the Framework?
/ Text field /

If your institution has any structured research degree programmes, please provide a description or web reference.
/ Text field /

Additional comments:
/ Text field /

Interviews with representatives of a selected sample of institutions will be conducted after the survey. Please indicate a suitable contact, including full name and email address, for such an interview.
/ Text field /

/ Send /
Thank you for your time!

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Annex 4: Interview schedule

The panel conducted three group interviews in each HEI: with (1) the Dean of Graduate Studies and the Head of Quality (or equivalent) lasting 90 minutes, (2) a group of six supervisors and (3) a group of postgraduate research students/doctoral candidates, the latter two lasting 60 minutes each.

Date	Interviewee
26 November	Irish Universities Association
	Higher Education Authority
27 November	University College Dublin
30 November	Technological University Dublin
1 December	Cork Institute of Technology
2 December	Institute of Technology Sligo
3 December	Limerick Institute of Technology
4 December	Royal College of Surgeons
11 December	University College Cork
14 December	Technological Higher Education Association
	Irish Research Council
	Quality and Qualifications Ireland
16 December	National University of Ireland Galway
18 December	Science Foundation Ireland

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Annex 5: Team members

Dr Andrée Sursock (Team chair) is Senior Adviser at the European University Association (EUA). She works on higher education policy and is particularly interested in issues related to governance, quality, internationalisation, doctoral education, and student access and success. She has been involved in a wide range of international higher education projects, including in Ireland. She sits on the board of universities and quality agencies in Europe, Latin America and the Middle East and is the chair of the Quality Board for Icelandic Higher Education. She holds a *licence es lettres* in philosophy from Université Panthéon-Sorbonne, and a PhD in anthropology from the University of California, Berkeley.

Dr Michael P. Fuller holds the post of Research Professor of Plant Physiology in the School of Biological & Marine Science, University of Plymouth (UoP) where he has supervised 40 and examined over 50 PhD research students from across the world and has published more than 200 research papers and reports in plant sciences. Michael was Head of Graduate School at UoP from 2003 to 2016 and he was also Chair of the UK Council for Graduate Education and a Member of the Steering Committee of the EUA Council for Graduate Education. On behalf of the CDE he has delivered seminal workshops on Graduate Education Reform in Uzbekistan, Russia, Georgia and Croatia. He also has experience of working with HEFCE, QAA and RCUK in the development of Graduate Education documentation in the UK.

Damian Michalik is a doctoral student at the Faculty of Physics, University of Warsaw, and scholarship holder at Łukasiewicz – Institute of Microelectronics and Photonics. His research interests are focused on information optics, in particular optical fibres, lasers and metamaterials. He currently started the last year of studies which will end with the defence of his PhD thesis, entitled "Free-form nanostructured core optical fibres". In addition, he serves as a student reviewer for ESU, ENQA and IEP and collaborates with quality assurance agencies in Poland (PKA) and Slovakia (SAAVS).

Dr Helene Peterbauer (Team coordinator) is a Policy & Project Officer at the European University Association's (EUA) Institutional Development unit. Her work focuses on EUA's Learning & Teaching activities, which includes the coordination of EUA's Learning & Teaching Thematic Peer Groups, as well as academic recognition, such as through the coordination of the Erasmus+ funded "Spotlight on recognition" project. She represents EUA in the Bologna Follow-up Group Thematic Peer Group on the Lisbon Recognition Convention and in the European Commission's Europass Advisory Group. Prior to joining EUA, Helene Peterbauer worked as a pre-doctoral researcher and teacher at the University of Vienna for seven years. She holds Master's degrees in German Studies and Scandinavian Studies as well as a Doctoral degree in Scandinavian Studies, all from the University of Vienna.