CAREER PATHS FOR DOCTORAL CANDIDATES

FUTURE PROSPECTS FOR DOCTORATE HOLDERS IN EUROPE

INTERVIEW: HOW CAREER CENTRES ASSESS DOCTORAL CANDIDATES

CAREER TRACKING SURVEYS IN EUROPE AND BEYOND
EDITORIAL

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There are different reasons to undertake a doctorate. While some doctoral candidates consider it an important step in their academic career that leads toward a professorship, others consider it a qualification that helps them pursue a successful career outside of academia. Still others hold both options open and decide at the end of the doctorate, taking into consideration their professional interests and assessing career opportunities in academia. While a career outside of academia was once considered a sign of failure, in recent years there has been widespread recognition that it can be in the best interest not only of the doctoral candidate, but also for universities and society as a whole. Personal interests of doctorate holders range widely and are not limited to the life of a lecturer. Universities not only benefit from the scientific work of doctoral candidates, but can count on them as ambassadors, promoting the perspective of higher education in society. By employing doctorate holders in management, universities can count on professionals who are familiar with the challenges of research from their own experience. The same applies to society, which can count on professionals who are trained in dealing with complex issues and leading important projects.
However, as obvious as the potentials of doctoral education are, there is still a difference between the perceived and real career prospects of doctoral holders. At least in some European countries the stereotype persists that doctorate holders find they are overqualified or have the wrong qualifications and generally have problems finding a job after ending the doctorate. The current issue of the EUA-CDE Bulletin tackles the question of doctorate holders’ career paths, and provides an overview of what they currently are and what is to be expected for the future. To this end, a variety of contributions from in and outside Europe reflect the current state of knowledge and point out where we are heading. The different articles provide an evidence base on the careers that doctorate holders pursue in Europe and address the mobility of doctorate holders between different economic sectors. Without revealing too much, we can say: starting a doctoral programme is helpful, not only for intellectual development but, in most cases, also for professional success.

Career paths are just one aspect of the diversity that characterises doctoral education. In 2018, EUA-CDE celebrates its 10th anniversary. Over the past decade we have been able to build a diverse community in which professional and academic leaders exchange ideas and work to strengthen and improve doctoral education. Meanwhile, more than 230 institutions from 30 countries are part of the Council. This diversity makes doctoral education in Europe special and is an important contribution to its society. EUA-CDE will celebrate this anniversary at its next Annual Meeting from 4-6 June 2018 in Ljubljana, Slovenia. On this occasion, a study on the state of doctoral education in Europe will also be presented.

The 10th anniversary of EUA-CDE also involves further changes. This Bulletin will be the last in its current form as a biannual print publication. In the future, once a year, a new print publication will be published exclusively for our members. It will focus on the work of EUA-CDE and address current policy-level and doctoral-education challenges. At the same time, regular contributions by our members and guest authors will be published on the website www.eua-cde.org, giving members an opportunity to showcase their work and address important issues regarding doctoral education.

An important year for EUA-CDE lies ahead. I hope you enjoy this Bulletin.
CAREER PATTERNS FOR DOCTORATE HOLDERS IN PORTUGAL

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The number of doctorate holders in Portugal has gone up in the last decade, along with an increase in Portugal’s scientific capacity and the trend since the late 1990s of catching up with other countries. We observe changes in the career patterns of doctorate holders, especially an increase in the number of those working in private firms, which still remains low when compared with other countries. As Portugal’s higher education system matures and a lower number of new doctorate holders are absorbed, there is more availability of these qualified resources in the labour market, leading to changes in career patterns.

EVOLUTION OF DOCTORATES IN THE POPULATION

Critical mass is vital for the creation and dissemination of knowledge, and attaining that critical mass is of utmost importance both for developed and developing countries. In Portugal, the training of the working population has evolved in the last four decades, accompanied by the legal reform of the tertiary education system and a significant increase in public investment in science and technology. Science policy has been directed at attaining higher levels of critical mass, which has resulted in a significant increase in the generation of qualified human resources, and in the capacity to train individuals at the doctoral level. Figure 1 shows the yearly number of doctoral degrees that were awarded and recognised by Portuguese universities from 1970 to 2012/15. The number of new doctorate holders has increased from 23 in 1970, to 250 in 1990 and to 694 in 2000. In 2015, 2,351 obtained new doctoral degrees, of which 55.5% were female.

In 2012, there were 24,992 doctorate holders living in Portugal, which corresponds to 0.24% of the population. The share of women obtaining a doctoral degree reached that of males in 2008, and has been increasing ever since. Today more women

Figure 1. Evolution of doctoral degrees obtained in Portuguese universities and abroad, 1970-2012/15
(Source: DGEEC - Higher Education Statistics)

Figure 2. Number of doctorate holders in the population - International Comparison - 2012
(Source: DGEEC - Career Development of Doctorate Holders (CDH))

earn a doctorate than men. This increase in female representation shows a shift in the pattern of doctorates in Portugal.

It is clear that Portugal has tremendously increased the ability to produce doctorate holders and the number of doctoral degrees. Nevertheless, when compared with most European countries, Portugal still produces a low number. Figure 2 shows the amount of doctorate holders per one thousand in the total population and in the working population for a group of countries. Here, Portugal is among the countries with the lowest number of doctorate holders in the working population.

**CAREERS OF DOCTORATE HOLDERS**

In 2012, 94% of the total doctors living in Portugal were employed, and most of them were employed in the higher education sector. The lowest share was in the business sector. This pattern is different from what is observed in other countries, such as the Netherlands, where the share of doctorate holders working in companies in 2012 was 34%, a number similar to that of Belgium and Denmark.

A growing body of literature suggests that the time when a doctoral degree almost automatically led to a long-lasting academic career is over, and researchers increasingly find themselves competing for jobs in the non-academic labour market. In Portugal, careers of doctorates have been until now centred on academia, and the number of doctorate holders in private firms is lower than in most countries. This difference may be a result of the activities and level of complexity of firms, the level of R&D activities, and the type of firms hiring doctorate holders. Accordingly, the CDH results show that a low number of doctorate holders in firms were performing R&D activities, and that many individuals move away from firms to find positions where they can perform R&D-related activities. Consequently, 52% of doctorate holders moving out of private firms go to the higher education sector.

Nevertheless, results show that Portugal has been able to attract qualified human resources in the last decade. Science policies, which emphasise the advanced qualification of human resources, democratise the access to science, and internationalise the science base, helping to build the necessary conditions to drive brain gain over time. Figure 4 shows the origins of doctorate holders, which indicates the level of brain circulation of PhDs in and out of Portugal.

In 2012, Portugal had 3,903 doctorate holders living and working in the country who obtained their degrees in foreign universities. Of these, 2,631 doctorate holders have Portuguese nationality and 1,272 a foreign nationality. In the same year, Portugal sent 1,844 doctorate holders to other countries, 937 of whom had Portuguese nationality and 907 of whom were foreigners. These data reveal that the flow between brain gain and brain drain resulted in a positive balance of 2,059 doctorate holders. This pattern is similar to what was obtained in 2009, revealing that Portugal has the capacity to attract talent and employ doctorates.

**CONCLUSION**

In Portugal the number of doctorate holders has increased significantly in the last 20 years. However, the number of doctorates in the population is still lower than in most European countries. Most doctorate holders work in the higher education sector, and there is a low penetration of these highly-qualified human resources in private companies. Nevertheless, Portugal has managed to retain capacity and have a positive flow of doctorates despite the crisis. Given this perspective, there is still room for increasing and diversifying career patterns of doctorate holders in Portugal. Observation of this process is key for the definition of public policy.

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2 Leveque, K., Baete, S., & Anseeuw, F., 2013, Junior researchers in Flanders 2013: on dreams and realities. ECOOM – Centre for R&D Monitoring, Belgium.
A JOINT CAREER TRACKING SURVEY OF DOCTORATE HOLDERS

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Universities and non-university-based research performing organisations want to better document the career trajectories of doctorate holders in order to analyse practices aimed at the development of research careers. Decision makers and science stakeholders are thereby provided with an evidence base and metrics for analysing research careers. Together with eight universities and research performing organisations, European Science Foundation (ESF)-SCIENCE CONNECT launched its second career-tracking survey of doctorate holders. The survey, focusing on doctoral graduates of the years 2010 to 2016, was launched in March 2017 and collected more than 2,000 replies, with a response rate of 23%.

BACKGROUND AND OBJECTIVES

This project built on the work of the ESF Member Organisation Forum “European Alliance on Research Career Development” (EARCD)9 and on an ESF pilot study “Career tracking of Doctorate Holders” (2014)9 completed in 2015. The aims were to further develop the pilot questionnaire and enable participating organisations to better understand the occupational and mobility patterns as well as satisfaction levels of their doctorate graduates. Participants collected this data for their own monitoring and planning purposes with the intention of improving their doctoral education and career advice. The following universities and organisations joined the consortium: University of Maastricht, Technical University of Munich, Goethe Research Academy for Early Career Researchers (GRADE) at Goethe University Frankfurt, University of Bucharest, University of Split, University of Luxembourg, Institute of Science and Technology, Austria, and the AXA Research Fund, France.

The survey had a “bottom up” methodology which included a strong involvement of participants during the phases of design and implementation. The deliverables provided to each participant included individual reports (with a statistical analysis and an anonymised data set) and a global final report.6

MAIN OVERALL OUTCOMES AND CONCLUSIONS

Our findings report a very high employment rate of doctorate holders (95%). A clear majority (80%) are working as researchers. The overall unemployment rate (4%) diminishes over time. Doctorate holders in humanities have, however, a significantly higher level of unemployment (9%). Doctorate holders experienced a relatively smooth transition into the job market, with 40% of them already having a job at graduation, and those without, on average, having found one within four months. One notices a major difference between academic and non-academic sectors in terms of permanent employment, which indicates a persistent structural problem within academic: only 50% of those working in universities are permanently employed compared to the majority of those working in industry. Sixty per cent of respondents are currently working in the academic field. With the progression of careers and the corresponding search for employment stability, many may leave: nearly 40% of researchers are planning to change to a non-research career in the next three years.

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9 European Science Foundation, 2012, Developing Research Careers in and Beyond Europe: Enabling – Observing – Guiding and Going Global, a report by the ESF Member Organisation Forum “European Alliance on Research Career Development”.
6 Published in November 2017, the latter can be downloaded at http://www.esf.org/esf-services/career-tracking/career-tracking-of-doctorate-holders-2017/
While the vast majority of positions in universities/research organisations require a doctorate, or even a post-doctorate, a Master’s level degree is by far the most required for those in government, services or healthcare. In industry, equally large shares of respondents (45% each) worked in positions that require a doctorate or a Master’s level degree. This may not necessarily mean that doctorate holders are working in jobs that do not sufficiently utilise their capacities and knowledge: doctorate holders are mostly satisfied with their jobs, with researchers being more content with the intellectual challenge of their position than non-researchers, but less so with job security, salary and work-life balance. At universities, doctorate holders are least satisfied with job security.

In terms of gender issues, not surprisingly, male doctorate holders prevail in natural sciences, engineering and agricultural sciences, and women in medical and health sciences, social sciences and humanities. Similarly, high shares of men and women work as researchers, and similar proportions of men and women work in senior academic posts and other position levels. Women work more often at universities as well as in government and the public sector, while men are significantly more represented in industry and other business sectors. There are no major differences in satisfaction levels or levels of staff management responsibilities.

The reform of doctoral education has been high on European policy agendas for a number of years. It is now widely understood that doctoral students cannot remain narrowly educated within disciplinary boundaries, and with skills geared mainly towards academic teaching and research. The need for training doctoral researchers in professional or transferable skills has been mentioned by EUA, the ESF and the European Commission. Looking at our findings, we can say that, in general, doctorate holders have acquired the necessary skills for their current jobs during their doctoral research. The only notable discrepancies concerning what can be defined as professional or transferable skills such as communication, networking, or project management.

It appears that doctorate holders looked for a job largely on their own or with the advice of their academic supervisor or peers. That non-researchers – who are mostly concentrated in non-academic sectors – felt less aware of the various career options available for them after graduation, does suggest that there is a need for specific university career services.

The level of geographical mobility was relatively high with 40% having lived in a foreign country for more than three months after graduation. Not surprisingly, the highest amount of mobility happened within Europe, North America being the next most popular destination. Nearly 60% of employed researchers conducted research with researchers based in another country/region, while the level of cross-sectoral collaboration was relatively low in comparison.

CONCLUSIONS AND FUTURE PLANS

The study again demonstrated the feasibility and appropriateness of the selected approach and instrument to study the careers of diverse groups of doctorate holders in a cross-sectional or longitudinal manner. There is a clear benefit in continuing and scaling up this study in the future, which would allow for the study of larger groups of organisations, and provide more possibilities for continuous benchmarking for participating organisations. ESF-SCIENCE CONNECT will conduct similar surveys with interested universities and other research performing or funding organisations. Universities that wish to consider joining this initiative should write to ctpo@esf.org.

REMARKS AND LESSONS LEARNT BY A PARTICIPANT

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The Technical University of Munich (TUM) has invested considerable efforts to assure the quality of doctoral research and provide career-oriented training for doctoral candidates in the past decade. The TUM Graduate School is the university's central structure for organizing its more than 5,000 doctorates, promoting top-level research, fostering international and interdisciplinary networks and kick-starting the careers of doctoral graduates.

Taking part in the ESF-SCIENCE CONNECT survey as a cooperative effort allowed for multiple discussions and reflections on standards, measures and intended outcomes of doctoral training schemes and career development. The results paint a highly-differentiated picture of graduate careers and enable us to improve targeted support for doctoral candidates. For example, over half of TUM's doctoral alumni work in industry, services, and the public sector. Nevertheless, about 40% of those who leave academia are still engaged in some form of research, implying that training contents need to go beyond simple dichotomies such as "academic" and "non-academic" careers.

It also became obvious to us that, in view of the diversity of doctorates in different European countries and across disciplines, there is a need to further refine the survey methodology and to develop a comprehensive, institution-specific evaluation strategy. Therefore, TUM plans to subsequently install an extended and sustainable monitoring of alumni's careers and engage in continuous benchmarking with partner universities.
PROFESSIONAL CAREERS AND MOBILITY OF RUSSIAN DOCTORATE HOLDERS

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Mobility of highly-qualified personnel has a direct impact on their professional careers. The view of mobility as a social process along with a physical relocation implies the study of an individual's positional changes in the social hierarchy. Data about the mobility of Russian doctorate holders was collected in a dedicated panel survey.¹⁰

THE IMPACT OF MOBILITY ON RESEARCHERS' JOB SATISFACTION

The results showed a substantial link between the respondent's overall social mobility over the last ten years and the set of variables linked to labour conditions and job satisfaction. The most substantial positive correlation was observed between social mobility and satisfaction with wages and bonuses. Similar results have already been obtained in OECD surveys.¹¹ Mobility and satisfaction with opportunities for international collaboration are closely interconnected. More mobile respondents also consider their job as more prestigious and are more satisfied with the work as a whole.

It turns out that the most mobile doctorate holders are employed in industries currently not linked to the area of their doctoral research. Those who have withdrawn from the academic sector and moved into the business sector often win in terms of wages, but lose out in social status and in scientific capital.

MAIN MOBILITY TRENDS OF RUSSIAN DOCTORATE HOLDERS

The professional mobility of Russian doctorates is quite low, but it is increasing: about a quarter have changed their jobs at least once during the last ten years. Changes mostly involve a move from one organisation to another within the same sector, i.e., intrasectoral mobility dominates. The main area of job-to-job mobility is the higher education sector. Mobility of Russian researchers to industrial or service companies is also increasing, which on the whole is in line with trends seen in other OECD countries.

Russian doctorates in social sciences and humanities (SSH) change jobs far more frequently than in STEM (Science, Technology, Engineering and Mathematics) disciplines, and this situation has remained stable over the last 15 years. Young doctorate holders are significantly more job-to-job mobile than their older colleagues. The gap between the mobility of men and women is decreasing: the share of men was 63% in 2010, and in 2017 it decreased to 60%.

The survey results show that only 15% of Russian doctorates have stayed abroad to study or work for more than three months during their career. This share of internationally mobile doctorates is relatively stable and shows a significantly higher representation of physicists and mathematicians than SSH doctorates.

About 80% of Russian doctorates are involved in different modalities of international collaboration. The most common forms are research conferences, seminars, forums and joint publications. The least intensive forms of collaboration are the most common ones. Respondents involved in international links have a significantly larger number of publications both in Russian and in international journals.

CONCLUSION

Job-to-job mobility of Russian doctorate holders has witnessed a steady increase while their international mobility level remains stable. Among the main factors influencing professional careers are: development of informal contacts between universities and companies, and joint participation in research projects and other modalities of academic activity. Internationally mobile doctorates accumulate a great variety of different skills and experiences, professional recognition and prestige. Ultimately, they form a professional body that can consolidate and develop the modern Russian academic community.


What is the main focus of your work as a manager of a career advisory service?

A very important part of our job is to raise awareness of career-related issues. One question that doctoral candidates should first ask themselves is whether they envisage a career inside or outside academia. We particularly focus on the fact that a career outside academia does not always mean a non-academic career. In many cases they can remain academics even after they stop working as researchers at university. At the same time, we work on developing the skills necessary for their future careers.

What kind of skills are you addressing here?

If I may give an example: in biochemistry, many doctoral candidates are looking for a position in academia and may plan on becoming lecturers. In this case, research skills are of course important, but so are teaching skills. If the candidate aims at working in industry – like working on patents as a patent attorney – other skills are required. Role models play an important part in identifying skills that are truly needed and in providing information on the work in different industries. Then there are practical elements, like how to apply for a job or how to present yourself – the bread and butter business of a career centre.

Many of these issues also apply to students pursuing a Master’s degree. What advice do you offer specifically for doctoral candidates?

In principle there is no difference in the advice we offer. The idea of encouraging people to reflect on their career ambitions, values and skills etc. is the same. However, after having a close look, you will find some differences. There is a longer time frame to consider: typically three to four years. So, there is also room for experimentation. At the same time, the skills a doctoral candidate brings are more advanced than those of a Master’s student. One challenge for us is to determine the reasons for entering a doctoral programme. Some years ago, we were sure that in most cases a doctoral candidate was looking for an academic career. Supporting doctoral candidates meant supporting them in their search for an academic career. Today, surveys like the Postgraduate Research Experience Survey (PRES) and the Careers in Research Online Survey (CROS) tell us that the reasons for seeking a doctoral degree have become much more diverse.

Do you have the feeling that doctoral candidates are confidently confronting the question of building their careers or are they scared about their career prospects?

There are different approaches. Some doctoral candidates know from the first moment what they want. These doctoral candidates focus on getting professional experience or networking at conferences and taking opportunities to gain work experience. Other doctoral candidates start to deal with questions related to their career much later. What is certain is that a doctorate is neither a golden key nor a golden ticket.

How do you assess the usefulness of a doctorate in relation to furthering a professional career?

In this regard, too, there is no easy answer. Much depends on the background of the candidate and the discipline. An important factor is whether the candidate had a previous career. In the physical and biological sciences for instance, there are many doctoral candidates who come straightaway from a degree and follow through with their studies. In the social sciences and humanities – especially in disciplines where many doctoralates are self-funded – many candidates start their doctorate with remarkable previous work experience, whether as teachers, social workers or in business roles. So the choice of discipline is very important.

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12 For more information, please see https://www.heacademy.ac.uk/institutions/surveys/postgraduate-research-experience-survey (PRES) and https://www.vitae.ac.uk/impact-and-evaluation/cros (CROS).
faculty and to better accommodate the realities of family life for all faculty. These are long-term issues, however, for which there are no easy solutions.

HOW WILL UBC USE THIS INFORMATION?

Increased awareness of these outcomes is crucial, and UBC has shared this information with current students and programs. Career outcome data has also been embedded in programme listings on the graduate student website. Alumni stories are shared widely through the graduate studies website and social media feeds.

While it is important that individual students understand their career prospects, this study also illuminates larger questions. What programmatic and strategic directions can universities take to better prepare students for 21st-century realities?

Some graduates suggested that more applied coursework would be useful, and several referred to the value of broadened experience and of forming connections to those outside of academia. UBC has a variety of professional development and career readiness programmes to address these issues, but more could be done. As we continually re-examine the purposes of the PhD in the face of a changing world, we also need to re-examine the single “master-apprentice” model of doctoral education. At the very least, students need to feel supported and encouraged by their programmes and supervisors in their career exploration and preparation.

The survey used in this project was intentionally short, with little in-depth questioning about how graduates were using their skills and knowledge, or what was or would have been helpful to enhance their career paths. This was primarily to encourage an (achieved) high response rate. We also felt an online survey would have substantial limitations for these rather complex questions, and believe interviews and focus groups with the graduates (and potentially the employers) would provide a much richer understanding. We will consider supporting such research over the coming years.

CONCLUSION

These data present the current state of doctoral employment, and not necessarily the full potential of career pathways. Receiving a PhD indicates the achievement of profound intellectual growth and abilities in critical and synthetic thinking, clear attributes that are essential for the 21st-century knowledge economy. As we continue to carefully watch the ways in which doctoral graduates are contributing to society, and continue to reflect and act on ways to enhance their formation as scholars relevant to today’s world, we can envision even more diverse and impactful outcomes in the future.
PHD OUTCOME TRACKING: A UBC CASE STUDY

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The research PhD was created to support the development of individuals able to use the power of rigorous scholarly inquiry to advance society. If the academy is committed to ensuring the relevance of the degree for the 21st century, it is vital to understand how PhD graduates are, or could be, contributing to the world today.

In order to understand the career paths taken by our students, the Faculty of Graduate and Postdoctoral Studies at the University of British Columbia conducted a study of the career outcomes of 3,805 PhD students who graduated between 2005-2013. The results are available in a report and an interactive microsite at: outcomes.grad.ubc.ca

PHDS PURSUE MYRIAD CAREER PATHS

The high-level trends we found are similar to those revealed in many other studies. Ninety-seven per cent of survey respondents are working or doing postdoctoral fellowships. Fifty-one per cent of graduates are employed or doing postdoctoral fellowships in higher education, 26% are employed in the private sector (including at least 60 who founded their own companies), and 13% are in the public or not-for-profit sectors.

Outside of academia, the major industries of employment are healthcare, professional and scientific services, manufacturing, and public administration. Almost all graduates employed outside of academia have professional or management positions. Of survey respondents, 1.6% are unemployed and 1.7% are out of the workforce.

Roles within higher education change significantly by cohort year. Research-intensive faculty positions are held by 16-20% of graduates three to five years after graduation, and this grows to 34% for those who graduated 11 years previously. Nine per cent of graduates hold teaching-intensive faculty positions, and 18% have other roles in academia.

As anticipated, outcomes vary significantly by discipline. Business, humanities, and social sciences graduates are most likely to be employed in higher education, and engineering graduates in the private sector. There are also some gender-associated differences, most notably women's underrepresentation in the private sector and higher likelihood of staying in Canada.

In all years, 60% of employed graduates are located in Canada, with 41% in British Columbia. Canadian citizens are the most likely to stay (75%), with international student graduates divided somewhat evenly between Canada, the US, and their home region. One quarter of those from the least developed nations returned to their home country.

Over 91% of the 1,800 employed graduates who responded to our survey indicated that their job is a useful step along a desired career pathway, and many said they loved their work and were well-prepared for it. Some, however, felt they had no choice but to accept a less desirable career than they had hoped for or expected.

Overall, the survey shows good news: UBC graduates have very high employment rates, and are making diverse contributions within all sectors of society. They are researchers, analysts, administrative and scientific leaders, writers, professionals, and more in the private, public, and not-for-profit sectors. They are faculty, researchers, and administrators in higher education. They are consultants and entrepreneurs. They have made a remarkable impact, and many express deep fulfillment in being able to use their knowledge and abilities along their career paths.

But there are also some concerning findings. A not-insubstantial number have been unable to engage in the careers they had hoped for. Some felt they had to retrain, some are employed in positions for which they feel overqualified, and some feel they have no choice but to continue for many years in positions that provide little stability or advancement potential. In evaluating outcomes, it is also clear that many factors play into career choices, especially personal circumstances, location restrictions, and personal values.

Many of the comments and data reflect known concerns about the academic workforce, including the long periods of time needed to obtain permanent employment (especially in the sciences), the insecurity and low pay of term appointments, and the challenges of tenure-track faculty employment with respect to work-life balance and accommodation for parenting responsibilities. Many institutions, including UBC, have made concerted efforts to enhance the working conditions of term
INTERSECTORAL MOBILITY OF RESEARCHERS DOES NOT HAPPEN ALONE

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Universities train tomorrow’s highly skilled workforce. Many students and researchers will work in jobs outside academia that currently do not even exist. It is therefore important that they have a notion of other sectors and that their training equips them with flexible skills. Intersectoral mobility is a way to stimulate such flexibility and can take a variety of forms:

It is difficult to know how many researchers are mobile between sectors in Europe. One of the few data sources in this regard has been the EU’s MORE2 Study. According to the results published in 2013, only 12% of the respondents from academia had been intersectorally mobile to private industry. The EU just launched a survey in July 2017 to collect more recent data: https://eureaxx.ec.europa.eu/eureaxx/news/survey-intersectoral-mobility.

Figure 1 – Intersectoral mobility measures by type of personnel and policy intervention

Stimulating intersectoral mobility of researchers has become one of the priorities of the European Research Area (ERA) and the Innovation Union. In the monitoring of the Lisbon strategy, the EU published a report in 2006 with twelve key recommendations to promote intersectoral mobility of researchers, a report that is still very relevant.

The EUA Doc-Career Projects I and II, carried out between 2006 and 2012 in different European regions, found that successful intersectoral mobility depended on an environment of trust through long-term relationships at the regional level between higher education and industry.

At the level of Science Europe, an umbrella organisation of research funders and research performing organisations in Europe, a survey was carried out in 2015 to assess existing support measures for intersectoral mobility. The findings suggested that few member organisations considered intersectoral mobility a strategic priority in 2015 but that there was a trend towards an increase in the number of support schemes and the strategic relevance of the topic in the future.

The EU’s Steering Group on Human Resources published a report in 2016 where the main obstacles to researchers’ intersectoral mobility were identified. A lack of R&D development in certain European regions, legal and administrative barriers, the absence of appropriate Intellectual Property Rights (IPR) frameworks, and a lack of business-relevant skills among researchers were identified as some of the key obstacles. On the other hand, industry was keen to collaborate with academia to gain access to talent and early research results.

Intersectoral mobility in research does not happen alone, in particular due to cultural gaps between sectors. It needs specific promotion. Academia and business should collaborate to develop frameworks and opportunities for intersectoral mobility available to researchers at all career levels with appropriate funding and training. FNR Luxembourg has introduced a series of tailor-made schemes since 2014 that successfully promote intersectoral mobility of researchers.

However, there is no unanimous support for this type of measure. There is also a justified concern that promoting intersectoral collaboration might increase the pressure on higher education institutions to become more commercial. Umbrella organisations such as EUA can play a role to ensure that opening up collaborations with industry does not compromise the original role of universities as knowledge institutions. Both sectors are complementary and should be enabled to use their strengths: academic institutions to develop new fundamental knowledge and the business sector to transfer research results into marketable products and services.
UNIVERSITY AUTONOMY IN EUROPE

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University governance and the relationship between the state and higher education institutions are issues that have generated intense debate and reflection over the past decade. Institutional autonomy is widely considered an important prerequisite for universities to develop institutional profiles and to deliver efficiently on their missions. In a context of transformation of doctoral education in Europe, clarity on the scope of responsibilities and prerogatives of universities is paramount. Institutional autonomy provides the framework for the development of institutional support to doctoral education, allowing universities to set up structures and funding in an integrated, strategic fashion.

Discussions around university governance and autonomy arose across Europe in different contexts as a response to diverse challenges; as a result, the need emerged to develop a common terminology and structure to address such an important topic, with an increasing demand for comparability and benchmarking across borders. To enable university practitioners and regulatory authorities to do so, the European University Association collected a broad set of data on university autonomy and published the results in the report "University Autonomy in Europe". This study compared 34 European countries and provided a framework allowing stakeholders to approach the complex and multi-layered topic of "autonomy" via four thematic dimensions, themselves broken down in a series of concrete indicators. These included organisational autonomy (covering academic and administrative structures, leadership and governance), financial autonomy (covering the ability to raise funds, own buildings and borrow money), staffing autonomy (including the ability to recruit independently, promote and develop academic and non-academic staff) and academic autonomy (including study fields, student numbers, student selection as well as the structure and content of degrees).

On this basis, EUA subsequently developed the "Autonomy Scorecard", released in a second report. The Scorecard offers a methodology to collect, compare and weigh data on the institutional autonomy of universities. To take account of the constantly evolving legal framework for universities across Europe, EUA undertook a full-scale update of the Autonomy Scorecard, released in 2017.

EUA's Autonomy Scorecard is primarily designed as a tool to support and structure the policy dialogue on university governance and autonomy between universities and public authorities. By laying out a set of common indicators and improving comparability, the Scorecard enables governments and policy makers, individual universities and representative bodies to benchmark their policies, processes and structures vis-à-vis other European higher education systems and encourages the cross-border transfer of good practices.

The rules and conditions under which Europe's universities operate are characterised by a high degree of diversity. This variety reflects the multiple approaches to the ongoing search for a balance between autonomy and accountability in response to the demands of society and the changing understanding of public responsibility for higher education. Indeed, the relationship between the state and higher education institutions can take a variety of forms, and it should be stressed that an "ideal" or "one-size-fits-all" model does not exist.

The Scorecard helps capture large-scale trends and developments in university governance, funding, staffing and academic matters. While the 2017 analysis shows greater autonomy for universities in some countries, it also reveals new constraints in several key areas. In fact, there is no distinguishable uniform trend towards enhanced university autonomy in Europe. Furthermore, a structured, global reform approach is still lacking as heated discussions on several aspects of university autonomy and governance take place across the continent.

The challenging economic context has had an impact on autonomy in financial management, staffing matters and organisational aspects in several countries. In addition, public authorities exert stronger steering through funding mechanisms and by fostering concentration processes among institutions.

The Scorecard collects a series of data relevant to doctoral education, from governance arrangements to tuition fees and freedom to open new doctoral programmes. The data can be accessed via the online tool www.university-autonomy.eu, in the comparative report and in the country profiles.

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21 Estermann, T., & Steinel, M., 2011, University Autonomy in Europe II. The Scorecard, (Brussels: EUA).
DOCTORAL EDUCATION, EU POLICIES, AND THE FUTURE OF EUROPE

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Do we need the European Union for doctoral education? While a valid question, it is not one that can be answered by a simple "yes" or "no". It depends on what we want from the Union, and what it can do that no one or two countries can do by themselves (European added value in Brussels-speak). These are topics that require thought, as the nature and structure of the next generation of European programmes will be decided within the next year.

Since Jean-Claude Juncker took over as President of the European Commission, research policies in general, and doctoral education policies in particular, have not been one of the main priorities. The European Research Area is rarely referred to, and the Principles for Innovative Doctoral Training launched under the previous Commission, have all but disappeared. However, doctoral education does appear in other policy areas, and funding is still in the good hands of the Marie Skłodowska-Curie Actions, which itself is referred to in relation to the Commission's vision for a European Education Area by 2025.

This year, the Directorate-General for Education and Culture (DG EAC in EU shorthand), the EU equivalent of a ministry for education, published its Renewed Agenda for Higher Education. These agendas are published about every five years. They have no legal value as the EU does not have any legal powers when it comes to education, but they are important as a basis for how the EU will spend its funding on education in the years to come.

The overall message of the document is that Europe needs to develop its higher education institutions to overcome the "skills gap" between what graduates need in the labour market and the skills they acquire through education. This is of course an important discussion, although the situation is complex across the continent (see the EUA response to the Renewed Agenda in the link below). Specifically for doctoral education, the communication strangely suggests that fewer doctorate holders in Europe are going into industry than in the US and Japan. It also points to the Innovation divide between more and less research-intensive member states and regional development as issues to be dealt with.

While doctoral education is important for all these areas, there is a risk of being over-ambitious at the European level. The EU’s main tool for doctoral education is the Marie Skłodowska-Curie Actions and in particular the Innovative Training Networks. These networks give universities the opportunity to establish programmes with partners from many different countries and sectors, something that is difficult to do without EU support. They are extremely popular and also deeply underfunded. There is so little money allocated to this action that many excellent projects are rejected. It is a pity for the research, but it is also a pity since this programme sets a high benchmark and a very good example for managing doctoral education, building on the Innovative Doctoral Training Principles, which in turn are strongly influenced by the Salzburg Principles. If this programme would also have to ensure regional development and research capacity building, there is a risk that the programme’s positive role in developing doctoral education would be diluted, and that it would be like a Swiss army knife – a tool with many functions, but not doing anything very well.

The big question for the role of the EU in doctoral education remains the size and nature of the Framework Programme for Research that will replace Horizon 2020 in the next decade. The current underfunding of research is a serious issue, and much more money would be needed, as EUA has pointed out. The EU provides a unique framework for multilateral projects, which is a huge advantage for Europe. It is also a huge advantage for European doctoral candidates who can work in truly international teams and in excellent research environments.

Looking at the European story of doctoral education, however, it is clear that EU funding alone has not achieved the reforms of the last decade. This has first and foremost been the task of universities. When thinking more broadly about the future of Europe, doctoral education is in fact an excellent example of how the formal framework of the EU and the European civil society, networks of institutions and persons – like EUA-CDE – can play together. In the spring of 2017, the European Commission launched a debate about the future of Europe in the light of Brexit and the 60th anniversary of the Rome Declaration. Here, it outlined a number of scenarios to see what direction the EU could take, from doing much more together through Brussels, to just limiting co-operation to the single market.

EUA responded to this scenario by pointing out that we certainly like to do things together, but that we are quite good at regulating ourselves. Doctoral education is a key example: the university sector came together through the Salzburg Principles and made the basis for a reform largely carried out by universities, but very much in a European framework, with doctoral education professionals having active, European networks for discussing reform. The example shows that Europe is bigger than Brussels. Working within the EU framework is highly beneficial, with the high benchmark of European funding programmes and the possibility to work in multi-partner research groups. Nevertheless, there are limits to how much the EU can and should instrumentalise doctoral education for a wide-ranging set of agendas. Universities, given the right autonomy and resources, have shown to be extremely capable of developing doctoral education that is fit for them, their region, country, and for Europe.

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As societies in general and universities in particular explore the opportunities of digitalisation, EUA-CDE has highlighted Open Science and innovation and their potential to change established research practices as some of the most pressing issues confronting the academic community. Doctoral candidates and other early-stage researchers find themselves at the forefront of harnessing digital possibilities in this regard, adapting their work to make use of new opportunities. Universities are expected to develop coherent policies and infrastructures for online sharing and learning in doctoral education that can be used in a coherent and responsible manner across the institution.

The Annual Meeting brought together academics and other European stakeholders working to harness digital possibilities in doctoral education, illuminating the key aspects of this issue in a series of discussions and opportunities to exchange good practices. The central question in these discussions was how all institutional levels can work together to build a coherent strategy to support early-stage researchers as they lead the way in exploring the opportunities of Open Science for academic research.

In the first plenary session, two excellent speakers, Mary Ritter (Imperial College London) and Stefania Milan (University of Amsterdam), talked about the role of universities in addressing the challenges of digitalisation and the specific issues facing doctoral schools as they integrate digital approaches in order to provide doctoral candidates with the digital skills they need to advance their research and their careers. The first day’s parallel sessions covered: "Doctoral Graduate Careers and Skills Development"; "Doctoral School Data Management"; and "Doctoral Education, Data Management and Open Science". Two presentations in each session were followed by a vibrant discussion. In the plenary panel discussion, "Key Challenges for Doctoral Education and Research Training in the Digital Era", presenters expressed different perspectives on the impact of digital transformations on research and particularly on doctoral research and education. The discussion included views from academic leaders, a senior researcher and a doctoral candidate. The panelists tried to identify the key issues of the digital era and their impact on doctoral education in the future.

The second day of the Annual Meeting started with the plenary session "Digital Technology Across Disciplines: Similarities and Differences". Its aim was to address the evolution and impact of digital technologies from different disciplinary and field positions, mainly from the STEM (Science, Technology, Engineering and Mathematics) and SSH (Social Sciences and Humanities) "tribes". Two presenters, Leslie Zachariah-Wolff (Delft University of Technology) and Daniel Alves (NOVA University of Lisbon), clearly demonstrated that digital technologies significantly influence not only the STEM disciplines, but also the social sciences and humanities (for instance in the field of digital humanities), on which they have a great though different impact.

The following parallel sessions addressed two specific topics: "Doctoral Candidate Supervision and Doctoral School Data Management". Two case studies in each session, presented from different countries and institutional perspectives, were an excellent starting point for further broad discussions. The afternoon plenary session "New Skills in Doctoral Education and Research Training" brought together Fabienne Gautier (Head of Unit, Open Science and ERA Policy, DG for Research & Innovation, European Commission) representing policy makers and Oleg Shvarkovsky (Board Member and Partner, NORTAL, Estonia) representing industry. Their role was to express views on what doctoral graduates are expected to master and offer in a fast-changing society, and the place of doctoral education in preparing them for new challenges.

The annual EUA-CDE meeting was, as always, accompanied by side events. The pre-meeting for newcomers to doctoral education management was organised in the morning before the conference, and attracted a high number of attendees. The most popular part of all Annual Meetings – the social dinner – proved once again to be a special space for networking and finding new partners for collaboration. The 2017 Annual Meeting attracted more than 200 participants and gave us all an excellent opportunity to enjoy the hospitality of Tallinn University.
SAVE THE DATE:

11TH EUA-CDE ANNUAL MEETING

"EXCELLENCE THROUGH DIVERSITY: DOCTORAL EDUCATION IN A GLOBALISED WORLD"

6-8 JUNE 2018 IN LJUBLJANA, SLOVENIA

Hosted by the University of Ljubljana, Slovenia

The 11th Annual Meeting “Excellence through Diversity: Doctoral education in a globalised world” celebrates the 10th anniversary of EUA-CDE with its European membership community and all other interested stakeholders in this field.

Following a decade of Europe-wide reforms, the Meeting is dedicated to highlighting diversity as an enduring characteristic and strength of doctoral education in Europe. Hosted by the University of Ljubljana from 6-8 June 2018 in Ljubljana, Slovenia, we invite you to save the date for this event.

More information is available at http://www.eua-cde.org. Registrations and a call for contributions will be launched in early 2018. If you wish to receive updates concerning the Meeting, please do not hesitate to contact the EUA-CDE Secretariat at info@eua-cde.org.