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RESEARCH ARTICLE

Impact and evaluation report of the DTA3/COFUND programme

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Abstract

Background

This report evaluates the outcomes and effectiveness of the DTA3/COFUND doctoral fellowship programme, which ran from 2019 to 2023. Funded by the Horizon 2020 Marie Skłodowska-Curie PhD Fellowship programme, DTA3 aimed to foster interdisciplinary, international, and industry-focused research across 15 UK universities.

Methods

The programme supported 71 international fellows from diverse countries, emphasising inter-sectoral skills and post-doctorate employability. A mixed-methods study design was employed, involving online surveys, focus groups, and interviews with fellows, supervisors, and university programme leads.

Results

Key areas of evaluation included research activities, employment outcomes, wellbeing, doctoral training experiences, and institutional impact. The data revealed that 72% of fellows had submitted their PhD theses, with 66% having completed their viva by the report's conclusion. The programme also recorded a high employment rate, with 55% of fellows in the final stages of their PhD already employed. The DTA3 programme featured an enhanced training component, including annual summer schools, spring refresh events, autumn schools, and residential writing retreats. These events focused on enhancing employability, academic skills, research impact, and intersectoral collaboration. Despite challenges such as visa

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complications, COVID-19 restrictions, and international supervisor movements, the programme maintained a strong completion rate.

Conclusions

The report highlights the programme's success in providing fellows with significant international mobility opportunities, with many securing employment in their home countries or abroad shortly after completing their PhD. The DTA3 legacy includes ongoing cohort tracking, an alum network, and a dedicated legacy fund to support further international collaboration and knowledge exchange. Overall, the DTA3/COFUND programme demonstrated substantial impact in training and developing skilled researchers, promoting international collaboration, and enhancing employability in diverse sectors, thereby contributing positively to the global research community.

Keywords
doctoral training, transferable skills, student wellbeing, international, interdisciplinary

This article is included in the Marie-Sklodowska-Curie Actions (MSCA) gateway.

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Introduction

DTA3/COFUND offered funding for international, interdisciplinary, and industry-focused research across 15 UK professional and technical universities, connected by an enhanced cohort-based PhD training programme. The Doctoral Training Alliance has been running since 2015 and is one of the largest multi-partner national doctoral training initiatives in the UK. With the support of a €6.5 million grant from the Horizon 2020 Marie Skłodowska-Curie PhD Fellowship programme (European Commission, 2024a), the DTA3 programme extended its existing doctoral training, bringing researchers together under an interdisciplinary umbrella programme, specifically in the areas of (i) Applied Biosciences for Health, (ii) Energy, and (iii) Social Policy.

DTA3 aimed to develop independent researchers with intersectoral skills and experience, ensuring they were ready for post-doctorate employment. To meet this aim, the DTA3 programme had five unique features: (1) interdisciplinary research environment, (2) enhanced training programme such as entrepreneurship, communication, and employability training, (3) collaboration with commercial organisations, (4) recruitment of non-UK residents, and (5) opportunity for international placement/secondment. DTA3 developed 71 international fellows, with successful candidates moving to the UK from countries like New Zealand, India, Ethiopia, Brazil, Iran, and Iceland. The programme promoted transnational mobility by leveraging an extensive network of international associate partners worldwide to offer recruitment and placement opportunities abroad.

Overview of grant

The Marie Skłodowska-Curie Actions (MSCA) are the European Union's reference programme for doctoral education. Co-funding of regional, national, and international programmes (COFUND) supports new or existing doctoral programmes (European Commission, 2024a). The aim of the action is to spread best practices of the MSCA including international, inter-sectoral, and interdisciplinary training, as well as international and cross-sectoral mobility of researchers at all stages of their career (European Commission, 2024b). For applicants to be eligible for the fellowship, they were required to move to the UK to complete their PhD. The specific objectives of the action are to train researchers and innovators in academia and beyond, help researchers grow their networks and share knowledge to carry out cutting-edge research, provide researchers with new knowledge, skills, career development perspectives, and employability, and boost researchers' creativity and entrepreneurship.

Method

Full ethical approval for this research, investigating the impact of the DTA3 doctoral fellowship programme, was sought and approved by Coventry University (reference P162773, approved on 14th Sep, 2023). All fellows provided written informed consent prior to participating in any aspect of the research. Participants received a £30 gift card for completing the survey, and a subsequent £30 gift card if they took part in a focus group.

Surveys

A 60-item online survey was sent to all DTA3 fellows (62% response rate). The survey took approximately 15 minutes to complete and consisted of questions categorized into five groups: research activities, employment, wellbeing, doctoral training experience, and demographics.

A separate 20-item online survey was sent to all supervisors (23% response rate), collecting information on collaborations during the doctoral training, differences of DTA3 training compared to traditional training, and suggestions for improvement. The survey took approximately 15 minutes to complete.

An 18-item online survey was sent to all university programme leads (25% response rate), seeking information on recruitment rates, collaborations, and the impact of the DTA3 programme on the institution. The survey took approximately 15 minutes to complete

Focus groups

Focus groups and interviews were conducted by the DTA3 project manager (a trained qualitative researcher). Groups consisted of 2–4 fellows and lasted approximately 45 minutes (n = 17 total participants). Fellows were asked about their favourite and most challenging memories of their doctoral training and the value of having a PhD in 2023. Common themes were identified using Reflexive Thematic Analysis (Braun & Clarke, 2019; Braun & Clarke, 2024).

Findings and discussion

DTA3 enhanced doctoral training programme

Throughout the DTA3 programme, four residential events were held annually to bring together all DTA3 fellows from Energy, Bioscience for Health, and Social Policy. Each event focused on different aspects of doctoral training and was co-organised/delivered with a university partner. Fellows were supported to attend the events using their DTA3 training bursary. Spring Refresh was typically a 1-day event and was held in London at the British Academy and the Birmingham City University STEAMhouse. Themes centred on collaboration, multidisciplinary working, and transferable skill development during the PhD.

Annual Summer Schools were a 3-day event hosted by different partner universities, including University of Central Lancashire, University of Brighton, and University of Greenwich. Themes included employability, academic writing, and research impact. Each year, fellows were given an opportunity to present and receive audience feedback. Autumn Schools were typically held over 2-days and were hosted by Coventry University and Leeds Beckett University. Due to COVID-19, two of the schools were held online. The events focused on researcher connections, the PhD journey, and managing supervisory relationships. Writing retreats were 2–4-day events and were hugely popular as they provided a protected space for fellows to write. Retreat locations included Gladstone's Library, Missenden Abbey, and North Yorkshire. Writing retreats were held online during COVID. Further, a comprehensive and structured non-residential events schedule was provided to

ensure continuous development and progress for the fellows. A sample of training workshops is provided in Table 1.

DTA3 fellows

The data presented has been collected from fellows and host universities. Data is missing on eight fellows. Alum will be continued to be tracked for two years following the end of the project (i.e., until November 2025) and a second data collection will take place in quarter autumn of 2024.

Demographics. Fifty-five percent of fellows were women and the average age fellows started their PhD was 28 years old. Fellows were of twenty-six different nationalities, with 75% coming from European countries.

Early leavers. Six of the seventy-one fellows left the DTA3 programme prior to completing their PhD. This was primarily due to international visa complications, international movement of supervisors, and COVID-19 travel restrictions. Fellows completed between 6–36 months of their fellowship prior to leaving. Two additional fellows finished their fellowship contracts early as they were successful in gaining employment in their given fields. They completed their doctorates during their new employment.

Completion rates. 72% of fellows have submitted their PhD thesis at the time of report writing, with 43 fellows (66%) having also completed their viva. It is expected that by autumn 2024, 86% of fellows will have submitted their thesis within their required timeframe. Currently, of the fellows who are in the final thesis write-up stages or awaiting viva examination, 55% are employed.

Post-PhD Employment. Of the 46 fellows who have submitted their PhD thesis, there is currently employment data for 30 fellows. The average time between PhD completion and fellows starting their first job was 2.5 months. Over half of fellows (46%) had secured their first job prior to finishing their PhD. Ten fellows left the UK to return to their home country, relocate to the USA or relocate to other EU countries. Almost half (46%) of fellows in employment were working in non-academic sectors (including industry, governmental, or non-profit organisations) and 48% were earning between >£30,000. 48% of fellows were considering or are currently in postdoctoral researcher roles.

Thirteen fellows have since moved onto a second job. For these fellows, the average time spent in their first job is eleven months. For this second job, 70% of fellows had returned to their home country. These data suggest that fellows enter "bridging" short-term contracts (usually in the PhD host universities) immediately after finishing their PhD. The second job appears to be more planned (for example, postdoctoral or senior researcher roles) and comes within one year of finishing the PhD programme. Most of these positions are outside the UK, in fellows' home countries. Case study 1 presents an example of employment tracking of a fellow from Ireland who graduated from her PhD in 2022.

Case study 1.

"I moved from Ireland to Liverpool in 2019 for my PhD having never even been to the city! I loved studying and living there. The university was incredible, and I built great relationships with my supervisors and fellow PhD students. Through DTA3 training and events, I developed my professional skills, including learning how to grow my network. I think this massively helped me secure a postdoc in the States after I finished my PhD. These types of transferable skills are not often taught as part of traditional doctoral training and so I really valued this focus of the DTA. I also think there is a certain prestige that comes with Marie-Curie funding. Although I didn't appreciate it enough at the time, now working in research I am very proud to be part of the global MSCA alumni community".

Output metrics

Collectively, 157 manuscripts were published, including articles published in Nature, Cells, and Cochrane. Fellows presented at 116 conferences, with several winning best presentation awards and international travel bursaries. Specifically, one fellow received the ICFP Youth Trailblazer award, another

Table 1. Sample overview of non-residential DTA3 training events.

Workshop	Host
Project management for research	University of Portsmouth
Get media savvy	Liverpool John Moores University
Engaging with UK Parliament	Parliamentary Office of Science and Technology
Virtual thesis bootcamp	Coventry University
Emotional labour in research	Sheffield Hallam University
Developing a strategic approach in public engagement	University of Greenwich

was awarded Inspiring Researcher of the Year, and one earned the Henry Royce Institute Beamtime award. 93% of fellows had multidisciplinary supervisory teams, 50% collaborated with the public and or private sector including local authorities, and 16 fellows had placements including Biocant, EuroMov, and Karolinska Institute.

Regarding satisfaction with the programme, 88% of supervisors and programme leads would engage in the DTA3 again. When fellows were asked about the best aspects of the programme, the most recently cited responses were quality of supervision and guidance, personal development opportunities, and academic experience. 59% of fellows felt prepared for employment after doctoral training, and many fellows believed that having good transferable skills was the most important quality needed to gain their first post-PhD job. Specifically, the top four transferable skills identified were good communication, time management, ability to prioritise, and effective project management.

Benefits of the DTA3

According to fellows. Residential events were a key element of DTA3, particularly the opportunities they afforded to network, learn from alumni, and present ideas in a supportive environment. The enhanced training programme of the DTA3 was recognised by fellows as being an important part of their development with one fellow highlighting the importance of cross-disciplinary learning "*DTA3 gave me access to different workshops/training and the chance to meet students working in completely different fields to my own*". The social aspects of the DTA3 cohort model were important for fellow mental wellbeing. An alum reported "*DTA3 played a pivotal role in fostering a profound sense of belonging among us. Through initiatives like virtual coffee mornings, it bridged the physical gap and provided valuable connections"*. MSCA/COFUND provide fellows with financial stability during their training, and this was vital to fellows' success. During focus groups, one fellow said, "*the funding was hugely significant, as it meant I had a reliable income which gave me stability to focus on my researc*h."

According to supervisors and programme leads. Supervisors and university programme leads joined the DTA3 project as they wanted to gain opportunities in networking, sharing best practice, tackling joint problems and fostering interdisciplinary collaborations. Within surveys, supervisors and programme leads reported that the DTA3 were effective in all these areas and met their expectations. Regarding support for doctoral students, it was reported that the DTA3 provided ideas for local training sessions and approaches, and that the programme was "*good for researchers to have a sense of belonging"*. Specifically in relation to recruitment, the DTA3 programme increased recruitment rates by 67%, and it provided a greater emphasis and importance of recruiting to a cohort-based model. When asked about the network and collaboration aspect of DTA3, one programme lead reported "*it's been great to have a network of trusted colleagues in similar roles that can be approached on a range of issues relating to doctoral education, not just DTA3"*. A supervisor said, "*I have established overlapping areas of interest and have maintained professional relationships with other DTA3 supervisors"*.

The PhD experience

When fellows were asked about the importance of completing a PhD in 2023/24, 89% said they wanted to pursue a career in research and therefore a PhD was essential. They also believe that having a PhD gives candidates a competitive advantage in job applications and when progressing in non-academic careers. The PhD journey was also seen as protected time to develop specific skills and knowledge and support individuals to immerse themselves in research for a given time period.

When asked why they chose an MSCA/COFUND programme that required international mobility, 61% of fellows perceived there to be more job opportunities post-study with an international PhD, 56% reported there to be limited opportunities for doctoral study in their home country, and 43% wanted to study internationally to experience another culture.

As DTA3 ran during the time of COVID-19 and associated university lock-down restrictions, a high proportion (82%) of fellows required extensions. The average fellowship extensions were 5 ± 2 months. The three most cited barriers to not completing the PhD within three years (the original fellowship duration) were financial barriers due to COVID-19 (68%), personal issues (57%), and lack of clarity on steps needed to complete the degree (55%).

PhD supervisors. Supervisors were reported to either "*make or break"* the PhD journey. For many fellows, the Director of Studies was absent, and fellows came to rely on their second supervisor or external advisors for support and mentorship. Fellows reported that supervisors were often a significant barrier to their progress and unintendedly misguided them by not having a thorough understanding of the university policies around annual reviews or MPhil transfer processes, or they set unrealistic expectations and research designs. When asked what the top qualities fellows valued in a supervisor, they reported someone with experience of supervision, friendly personality, academic excellence, and had availability for regular meetings. The top causes of poor student-supervisor relationship were power imbalance and unclear professional boundaries, cultural differences, lack of training for supervisors, and lack of safeguarding for PhD students. When asked about negative experiences or barriers to effective student-supervisor relationships, students reported "*everything felt like bargaining, and I felt I was working for them rather than working on my project*", "*if you want a career in this topic, you better shut up follow what they say" [when fellow asked for mediation support]*", "*my supervisor publicly criticized my work at an international conference, so it was a very difficult relationship"* and "*I was afraid to email my supervisor because every time I emailed I felt like a fool"*.

Factors that facilitated good student-supervisor relationships included having regular meetings, with timely and constructive feedback. Reducing power imbalances by getting to

know each other on a more personal level was also important. Lastly, students appreciated supervisors who advocated, supported, and protected their students. One fellow said, "*I had one supervisor who was very understanding and someone I could go to with concerns. I'll be forever grateful to that supervisor for the support they offered, it was well beyond what I thought a supervisor was for, that supervisor was very generous with their time.*"

Fellow wellbeing

Based on survey results, 55% of fellows sought help for mental health during their doctorate, 34% took a break from studies due to mental health, and 43% worked more than 46 hours per week. Although there was a high rate of mental health concerns reported by the survey respondents, during focus groups and interviews, several practices were highlighted by fellows as being vital for maintaining positive wellbeing during the doctorate. These included having distinct focused working hours and protecting evenings and weekends for non-work activities. Having a network of peers and mentors who can relate to PhD distress and failures was important for feelings being validated. However, also having a wider community of non-PhD friends was equally as important to give greater perspective on life, away from the stresses of academia and research. Lastly, maintaining hobbies outside of research, most notably being active, were identified as consistent stress relievers.

Completing a PhD during COVID posed significant challenges to fellows and their mental health. Given the international mobility mandate of MSCA/COFUND projects, all fellows were international and so were living in a new country. As many fellows were living alone, in focus groups they discussed how during COVID-19 they worked "*24/7*" and let their work blend into all hours of the day, with no scheduled rest time. This was primarily due to fellows being isolated in small flats or bedrooms without friends or family or knowing anyone in a new university and city. COVID-19 also caused lasting delays, even was universities reopened, due to part-time working hour restrictions, supply chain issues, and high staff turnover. Many fellows relied heavily on the DTA3 cohort and their supervisors to create online networking opportunities and social events. The pandemic also caused serious complications for some fellows and international visas. Fellows spoke of feeling stranded, and in some cases being unable to remain in the UK but also unable to return to their home country due to border closures.

Social interaction. Social interaction was highlighted across survey responses, focus groups and interviews as being a crucial part of their doctoral experience. When asked what their favourite part of their PhD was, fellows responded saying "*interactions literally saved me during the lockdown*", "*the possibility to collaborate with other people was really enriching*", "*during COVID, we had 5 o'clock cocktails on Fridays, Halloween fancy dress, table quizzes, birthdays online, celebrated vivas*", "*I started to build a really fantastic community within my neighbourhood, so many cups of tea in the front garden*", and "*I loved the [DTA] programme, having the chance to go and meet other PhD students*". Specific highlights include (i) the multidisciplinary nature of the DTA3 programme and fellows valuing the opportunity to learn about other disciplines and universities, (ii) hearing about doctoral alum career journeys and learning about specific processes (for example alum's experience of defending their PhD thesis and applying to postdoctoral programmes), (iii) expanding their professional networks and learning about new job and collaborative opportunities, and (iv) the ability to gain peer support through a supportive cohort-based community.

Programme legacy

Although the DTA3 programme has ended, it was only the first step in the fellows' career paths. A vibrant global network of highly skilled professionals working across academic, industrial, and public sectors has now been developed. It is a priority of the Doctoral Training Alliance to continue fostering this community through a range of initiatives (Table 2).

Table 2. DTA3 legacy initiatives.

Initiative	Details
DTA3 website profiles	On the DTA website, each fellow has their own profile page outlining their academic path and post-PhD career. It also details fellow highlights e.g., publications and awards. Fellows can log into their account and add details so that it can be used as an iterative online CV.
DTA3 legacy fund	This fund gives DTA3 alumni an opportunity to spend 2-8 weeks thinking and learning from international experts and innovators, with the aim to use this new knowledge to benefit the health and wellbeing of UK society.
"Lessons learned" manuscript	In collaboration with two other European MSCA/COFUND programmes, this reflective manuscript outlines 10 lessons learned during the development and implementation of projects to support future applicants.
DTA3 award	During the annual University Alliance 2024 Awards, the DTA3 alum will be celebrated through the telling of inspiring fellow stories, information on the sustained success of the programme, and the presentation of the prestigious DTA3 Alum Award.
DTA3 alumni network	"DTA Connect" is a global network of DTA alumni. Fellows have opportunities to join local chapters and special interest groups, engage in annual events and training, and contribute to 'Career Spotlight' quarterly news articles.

Conclusion

In conclusion, the DTA3/COFUND programme has significantly advanced the training and development of early career research through its enhanced and interdisciplinary doctoral training model. The programme's success is evidenced by high thesis submission and employment rates, despite challenges such as the COVID-19 pandemic. DTA3's enhanced training programme, including residential events and workshops, improved the employability and transferable skills of fellows, fostering a strong sense of community and professional network among fellows. Furthermore, the programme's emphasis on interdisciplinary collaboration and learning has prepared researchers for diverse career paths, with many securing jobs in academic, industry and non-profit sectors worldwide. The lasting impact of DTA3 is reinforced through its ongoing alum tracking, a dedicated legacy fund, and the creation of a vibrant alum network. Thus, ensuring continued collaboration and knowledge-exchange. Overall, the DTA3/COFUND programme has succeeded in its aim to make a significant contribution to the European and global research community by developing skilled, adaptable, resilient, and well-connected researchers.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Actions COFUND grant agreement (No: 801604).

Ethics and consent

Ethical approval for this research, investigating the impact of the DTA3 doctoral fellowship programme, was sought and approved by Coventry University (reference P162773, approved September 14th 2023). All fellows provided written informed consent prior to participating in any aspect of the research.

Data availability

Underlying data

Figshare: DTA3 Impact & Evaluation Report. Data used within this manuscript can be openly accessed without restrictions. DOI: https://doi.org/10.6084/m9.figshare.26174338.v3 (Cowley *et al.*, 2024).

This project contains the following underlying data:

- DTA3_Legacy_Dataset.xlsx.
- DTA3 Impact Report.pdf

Data are available under the terms of the Creative Commons CC-BY-4.0 International attribution.

Authors' contributions

Idea conception (ESC, JE), initial writing (ESC), feedback (CW, RA, JE, LN), all authors read and approved the final submitted manuscript.

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Reference Source

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The Horizon 2020 Marie Skłodowska-Curie PhD Fellowship programme is one of the more ambitious and well-funded programs to build skills on top of the usual suite of academic research skills that universities traditional try to instil into doctoral-level students. These skills are aimed at increasing employability for the large majority of PhD graduates who cannot or will not obtain employment within the tertiary education sector. The background to the study, which the report lightly touches on, is that there is a longstanding crisis in doctoral-level completion rates and satisfaction levels.

Considering that doctoral students are elite students who have a track record of success in tertiary education and are provided with more or less personal and project- specific supervision and training towards a highly prestigious qualification, one would expect completion rates to be much higher than for (say) bachelor-level programs where the selection process are less rigorous. This is not the case.

It is truly remarkable that figures on university doctoral attrition rates are so imprecise for institutions that are government-funded and bound to a high bureaucratic standard. Universities are collectively remarkably poor in tracking this particularly important and investment-dense student population, and this study is not, surprisingly, an exception. It is estimated that if the denominator is all students who successfully enroll in a PhD program, between 40 and 50% of doctoral students to not finish their degree (Geven et al, 2018) and that those who do graduate, do so much more slowly than the 3-5 year theoretical 'full-time' pace of European and north American programs.

So a program that finds that 86% of those who entered the program are expected to complete is impressive. I had a look at the dataset to explore one important figure that was not revealed in the paper itself—the mean duration of those who had completed (at least those in the sample). I imputed dates that were missing where students had given their expected 'end date', assigning the first of the month if only a month (no day) was indicated), and in the 1st of July (midyear) when no month or day was given, but only a year. The results are a very laudable 3 years and 9 months,

particularly laudable considering the study occurred during COVID when PhD completions are believed to have slowed globally.

The results are less impressive when compared to the investment, and when compared to similar programs globally. The program is not cheap—at 91549 euros per student; this study only refers to the benefits of the program, not the costs. Spread over a theoretical program of three years it comfortably exceeds the UKRI stipend annually.

The results are also less remarkable when compared with other 'wrap around' or 'bolt-on' programs. For example, in Australia most Cooperative Research Centres (CRCs) have a doctoral program attached, funded to provide support and training in research translation to students engaged in research associated with the CRC. In many cases, such as the End Food Waste CRC where I lead the doctoral program, each funded student is additionally required to have an industry supervisor, in addition to academic supervisor(s), in their supervisory team.

Completion rates are tracked in many of these CRCs—96% in the Invasive Species CRC, 91% in the Sugar Research program, 90% for the Bushfire CRC. In the End Food Waste CRC, only one student of the 25 so far enrolled has dropped out, as we near completion of the program.

These are very high numbers, but perhaps not so high when compared to what should be the true comparator: similar industry-linked projects often with a high laboratory or team element to the research. Drop out rates in doctoral research are typically lower in laboratory-linked studies where students have a structure and support system quite different to for example, the solo research on a humanities path (Bair & Haworth, 2024).

In the DTA3 program, the social element that is often present in laboratory studies was clearly present here: the students were involved in annual 3-day summer schools and 2-day autumn schools, which while no doubt interrupted by COVID, still clearly was appreciated by participants. Camaraderie and peer support appears to be important for students in doctoral-level programs to cope with the motivational struggles of a large, relatively unstructured task.
This study has the strengths of drawing on a full definable population, rather than a sample from a large almost borderless pool. However, it has the weaknesses that comes from drawing from a very specialised population, and lacking an effective control to gauge the impact of the intervention. In fact the study seems to fail to draw on the strength of the design, capturing only a minority of the voices in what is a highly motivated and captive pool of potential participants. Considering the stake each of the Fellows has in the program, and the benefits they derived, a response rate of 62% of fellows is disappointing. This disappointment, as noted at the outset of this commentary, is not rare: universities typically fail to track doctoral students closely; it's also possible that doctoral students aim to be elusive, particularly if they drop out of programs.

Those designing the project would have rightfully expected a near-universal participation in the impact assessment project. That 23% of supervisors, and 25% of university program leads participated in what was just a 15-minute survey each is also surprising; the study does not mention the sending of reminders, but again, keeping in mind the context, the response rates are disappointing. Like all studies tracking human performance longitudinally, this study suffers from an almost unavoidable additional weakness: those who drop out become invisible. Just one 'early leaver' was successfully canvassed in the survey. It's clear that quite a number of participants, despite the investment made in their development, disappeared. Their voices are missing here;

their voices are missing in most studies. Generally, perhaps reined in by ethical concerns, scholars generally have expended insufficient effort to make sure those the voices of those who do not complete their doctorates are heard.

The lack of effective control is also a little inexplicable in a project that is (in a titular sense at least) described as an impact and evaluation report. Normally finding a good, matched control group for a study such as this would difficult, but this is not some naturalistic study based in the complex 'real world' but a study in the highly artificial, neatly bounded world of tertiary education and there is a bounty of secondary data that could have been used to provide a context or even a benchmark to the raw impact numbers. Again, at least in theory: universities either hold their data very close when it comes to sharing it with researchers from outside the institution, or do not in fact effectively store or structure the data that they hold. There is no doubt data is being collected, but that data is collecting dust.

Nevertheless, there are comparison numbers available. Let's take the completion rate. Numbers from UK-doctoral completion studies suggest the completions of above around 71-73% within 7 years of enrolment in the UK. While a PhD in the UK is traditionally designed to be completed in 3 years, the projected completion rate of full-time doctoral students within 7 years sits somewhere around the 70% in 2005-2013 (HEFCE, 2015; 2013). The authors of this study could have taken these numbers, or even more ambitiously pulled together numbers that were a more like-for-like control for this cohort, and done an analysis that would have exposed the return on investment for the DTA3/COFUND programme.

The programme high rate of 55% of fellows in the final stages of their PhD already employed is also something that could have been compared with similar programs. Students with industry-relevant studies are in high demand with few unemployed, although many are employed in positions that are only loosely matched to their disciplinary background, or commensurate with their level of education (Muurlink et al, 2024).

The use of 360-degree data—drawing not just on student perceptions and data but also the views of supervisors and programme leads—and the employment of a thoroughly mixed methods approach is to be applauded. It's clear that some secondary data, collected as part of the program, was used, but the extent of that use is unclear in the report. Perhaps unfortunately, all focus groups and interviews were conducted by the DTA3 project manager, a trained qualitative researcher but also an insider to the program with a stake in the delivery of the project as well as the assessment.

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Is the work clearly and accurately presented and does it cite the current literature?
Partly

Is the study design appropriate and does the work have academic merit?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Yes

Are all the source data underlying the results available to ensure full reproducibility?
Partly

Are the conclusions drawn adequately supported by the results?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: I've conducted, published and supervised research in the field of undergraduate and postgraduate student success and attrition, including examining the impact of scholarships on student retention. I'm a social psychologist with an interest in performance under pressure, and an interest in research methodologies.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 10 December 2024

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Emilio Delgado López-Cózar
Universidad de Granada, Granada, Spain

A report is presented evaluating the results achieved by the DTA3/COFUND Marie Skłodowska-Curie Horizon 2020 PhD Fellowship programme implemented between 2019 and 2023 to train 71 fellows at 15 universities in the United Kingdom. The main goal of the program is to educate in skills and competencies that allow doctoral students to develop international, interdisciplinary and

industry-oriented research.

To evaluate the impact of the program, surveys have been carried out that have answered:

- 43 of the doctoral fellowship trained (response rate of 62%)
- 14 supervisors (23% response rate)
- 3 university programme leads (25% response rate)

Additionally, discussion groups of 2-4 members were organized in which 17 doctoral students participated.

1. I believe that the amount of time that has elapsed since the official end of the programme (2023) is insufficient to be able to verify the real effects of the project, especially in terms of insertion in the labour market of doctoral students in international and industrial environments. Therefore, this report should be considered as a preliminary preview of results; It might be necessary to wait another year or two to see how effective the programme is in meeting the objectives set.
2. The development of the program has been affected by a crucial event such as COVID 19 that has distorted the pillars on which this program is based. The radical and widespread social disruption caused by the pandemic has harmed training, student mobility and, with it, the possibility of improving interpersonal relationships. The deepening of interdisciplinary ties and insertion in industrial environments have also been affected. The report attests to these severe interferences when it shows how there were dropouts from the program, difficulties in movement and travel, delay in the projected completion of studies, and changes in the planned training that should have been carried out online. And worst of all, the severe damage to the mental health of the doctoral students as a result of the social isolation to which they were subjected. In a hostile environment, with no connection to their families and difficulties in connecting with their supervisors and colleagues, all the skills that this program was intended to foster have been undermined.

In short, I believe that the good performance of this program has been irreversibly damaged. Although throughout the report there are direct allusions to the effects of COVID as a limiting and distorting element, I believe that this issue should be highlighted in a preferential way and as a systemic limitation on the results achieved.

The report contains significant information gaps that hinder a detailed and precise understanding of the actions taken and the outcomes achieved:

- Insufficient descriptive information on the training provided to doctoral students. Instead of offering a table with a sample of the courses offered (Table 1), a table or several should be included with complete information on: title of the course or seminar, venue, professor, duration of attendance, number of attendees. If they are very extensive, they can be inserted as annexes or supplementary material.

- The publication of the questionnaires on which the surveys are based would be highly recommended. It is the best way to judge the reliability and validity of the questions and answers. They may be inserted as annexes or supplementary material.

- A table with a detailed list of the countries of origin of the 71 scholarship recipients trained is not included. It is essential to know thesedata in detail to know the degree of internationality from the start. It is not enough to indicate in the text phrases such as these: "DTA3 developed 71 international fellows, with successful candidates moving to the UK from countries like New Zealand, India, Ethiopia, Brazil, Iran, and Iceland" or "Fellows were of twenty-six different nationalities, with 75% coming from European countries". Therefore, a table must be included that shows in detail the country of origin of the fellows, indicating the university of origin, the receiving university and the scientific field to which they are attached.

- Tables must be offered with the data of the institutions or companies in which the doctoral fellows found work. This will better clarify the degree and type of job placement achieved. It is not enough to state that "Almost half (46%) of fellows in employment were working in non-academic sectors (including industry, governmental, or non-profit organisations)" or "Thirteen fellows have since moved onto a second job". Indicate the name of the organization, the type of institution and the country. This information must be included in the text of the report in order to properly assess the achievements of the programme.

- The publications produced (articles and communications to conferences) must appear in detailed lists in the form of annexes. This matter cannot be settled by a sentence as generic as this: "Collectively, 157 manuscripts were published, including articles published in Nature, Cells, and Cochrane. Fellows presented at 116 conferences...".

With regard to the results offered in the report, the following questions and objections are raised:

A. No empirical data are provided to substantiate that the fundamental objectives of this program—fostering interdisciplinary collaboration, promoting international research, and ensuring industrial integration—have been effectively achieved.

- To detect the degree of interdisciplinarity, collaboration with industry and internationality achieved, carrying out a bibliometric analysis of the scientific production generated (articles in journals and communications at conferences) would have been a good approach. Without an analysis of co-authorship and institutional collaboration (departments involved, companies), of the thematic orientation of the publications, of the journals and conferences in which they are published, of the bibliographic referencing and co-citation, it is not possible to know if the intended level of interdisciplinarity has been reached. Not only has a bibliometric study not been carried out, but detailed data on production is not even offered.

- The data provided on the internationality of the jobs obtained by the fellows once the program has concluded show that the objective has not been achieved. The vast majority declare that they have stayed in the UK (32 fellows), the same place where they have studied, and 9 have declared that they have returned to their country of origin. Practically no one is working in a country other than their own or in the one where they studied. We do not know if a good part of the jobs are generated by the universities where they have been granted. "Case study 1" shown as an example of international mobility is not at all representative of what has happened in the programme. Surely that is what the programme aspired to. It is suggested that more representative cases of what has been the most common (staying in the UK or returning home) be included.

- Of the 34 fellows who declare the sector in which they work, only five indicate that they do so in

industry, while 27 are doing so in the academic sector and two in the Government. These figures show that the programme has not achieved the collaboration with industry that it intended to achieve. There is another very significant fact of this failure: only one fellow declares to have produced patents, a very clear indicator of innovative and potentially industrial orientation. (how many are working in industry and in what type?)

An analysis of altmetric indicators of the publications could also help to clarify whether the programme has produced the desired impacts in terms of interdisciplinarity, internationality and industrial influence.

B. The response rates in the surveys to supervisors and university programme leads are very low (23-25%), which compromises the representativeness and validity of the results.

C. A triumphalist vision is offered in the results based mainly on the graduation rate, employability, and on the training events carried out:

- The fact that 72% of doctoral students have submitted their thesis at the time of completion of the programme is not an excessively high figure considering the generous funding and security offered by the MSC grants, as one of the fellows acknowledges: "the funding was hugely significant, as it meant I had a reliable income, which gave me stability to focus on my research". However, this graduation rate could be considered positive in the context of the harmful effects that COVID 19 produced.

- The fact that half of the fellows who are in the final stage of writing their theses or waiting for the oral exam are employed could be considered a magnificent rate if it were not for the fact that in many cases they are short-term postdoc ("bridge") contracts, usually in the same host universities.

- There is a lack of reliable empirical data to affirm that the training programs were a success. Although the fellows express a favorable opinion of the training obtained, no specific surveys were carried out to evaluate the degree of satisfaction of the scholarship holders with each of the courses received. This is a fundamental tool to check the efficiency of training as well as to detect errors and introduce improvements. Additionally, there is no data about the opinions of employers, which is essential to verify whether the interns have interdisciplinary, international, innovation- and industry-oriented skills.

Is the work clearly and accurately presented and does it cite the current literature?
Partly

Is the study design appropriate and does the work have academic merit?
No

Are sufficient details of methods and analysis provided to allow replication by others?
No

If applicable, is the statistical analysis and its interpretation appropriate?
Not applicable

Are all the source data underlying the results available to ensure full reproducibility?

Partly

Are the conclusions drawn adequately supported by the results?
No

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Scholarly communication, Research Evaluation, Bibliometrics

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

Reviewer Report 11 November 2024

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Stan Taylor
Durham University, Durham, UK

Traditionally, the doctorate was aimed at producing researchers in the so-called Mode 1 of knowledge production, i.e. academic subject specialists who would conduct the search for knowledge for its own sake in line with the traditional academic values of truth, objectivity, and universality.
But, over the past two decades or so, the purpose has been redefined in terms of producing researchers trained in the so-called Mode 2 of knowledge production, i.e. researchers inside or outside academia who are able to spot opportunities for the application and exploitation of research, bring their expertise to bear upon research problems both within and across disciplines, effectively manage research projects, place and market the final product, and so contribute to economic growth, social welfare and environmental sustainability.
Under the auspices of the Horizon 2020 Marie Sklodowska-Curie PhD Fellowship programme, the DTA3/COFUND project was designed to provide opportunities for Fellows drawn from a wide range of international backgrounds to not only gain their doctorates but to learn how to operate across disciplines, to develop commercial awareness, to work effectively with non-academic organisations, and to be equipped to follow careers in the public, private, and not for profit sectors. The project ran from 2019 to 2023 and enabled a consortium of 15 technical and professional universities in the UK to fund PhD studentships and provide individual and collective opportunities for candidates to undertake interdisciplinary, international, and industry-related research.
This report sets out the highlights of the programme in terms of fulfilling its main objectives; despite the impact of the Covid pandemic in the early years, 72% of Fellows completed on time (with the rate expected to rise to 86% in the near future); over half of completers had jobs before they graduated as did 55% of those in the final stages; and almost half of those employed were in

non-academic jobs. Moreover, during their studies, Fellows produced an impressive total of papers and several won prestigious awards for their research.

But not everything in the garden was rosy. While apparently the quality of supervision was among the most cited best aspects of the programme, it was also clearly a source of concern. Issues included the absence of Directors of Studies (principal supervisors), supervisors' lack of understanding of institutional policies and procedures for progression, their unrealistic expectations and research designs, power imbalances and unclear professional boundaries, cultural differences, lack of professional development for supervisors, and lack of safeguarding for Fellows.

It is perhaps surprising that there is no mention of these issues in relation to supervision in the conclusions. In particular, it would have been interesting to see how far these related to academic as opposed to industrial supervisors, where there can be significant differences in the quality of supervision.

Beyond this, the report could be strengthened in a few other ways:

- it would be helpful to learn about the exact numbers of doctoral supervisors and programme leaders who completed the respective surveys rather than just the response rates in order to evaluate the validity and reliability of the evidence of their perceptions of the programme.
- the label 'case study 1' leads to the expectation that there is another but there is none and the numeral could be deleted; and;
- references to 'alum' in the text need to be changed to 'alumni'.

But overall the report offers a useful description of the achievements of the project and it provides a valuable testimonial to an effective model for doctoral training in the 21st century.

Is the work clearly and accurately presented and does it cite the current literature?
Yes

Is the study design appropriate and does the work have academic merit?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Partly

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Doctoral education

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.