

# 7 **Disciplinary Communities of Practice for a greater gender equality in physics & life sciences**

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## **Introduction**

The ACT project<sup>1</sup> has supported eight very different Communities of Practice (CoPs) to foster gender equality in research and innovation (R&I) and the majority of these CoPs have been either regionally based or thematically organised. Two of the CoPs however, were disciplinary based: the Life Sciences CoP and the GENERA CoP, which focused on physics. Whilst the aim of all CoPs was to some degree to work together to promote institutional change to further gender equality in R&I, the different focal points of each CoP have provided a rich source of experience about what works well and what does not work well, in collaborative, inter-organisational attempts to foster gender equality in R&I organisations. Whilst, it was impossible to directly compare the experiences of the regionally and thematically based CoPs with those that have taken a more disciplinary approach – this chapter aims to document the experiences of these two CoPs particularly looking at how they have been able to advance gender equality in their members’ institutions – whilst reflecting on the advantages and disadvantages of taking a disciplinary approach to CoPs for institutional change.

In the following section, we will briefly describe the two CoPs that this chapter will discuss, regarding the member institutions, the shared vision and the basic organisational framework.

The GENERA CoP “Gender Equality in physics and beyond” originated from the EU-funded GENERA project (2015–2018) and its’ vision is to support, coordinate and improve gender equality policies in physics research organisations in Europe and world-wide. A growing number of institutions joined forces to collaborate on institutional change. Currently, 40 Research Performing Organisations (RPOs), Research Funding Organisations (RFOs), and Higher Education (HE) member institutions are working together on the sex- and gender dimension in physics, career development for early career researcher, data collection, sustainability and outreach activities. Online meetings for the GENERA CoP happen on a monthly basis. Twice a year, the GENERA CoP meets face-to-face to set and monitor the

yearly defined agenda. Additional meetings take place within the Working Groups (WGs) dedicated to the action points for each year.

The main objective of the ACT – LifeSciCoP is to find practical solutions to change institutional culture towards gender equality. The Life Science CoP – builds on the work carried out in the European Union funded LIBRA project (2015–2019). The members of the CoP identified various topics they would be interested in working on, reflecting the whole “ecosystem” of gender-based discriminations. Nevertheless, the group agreed to tackle what they identified as the main bottleneck, i.e., systemic and personal gender biases, which are also reflected in the evaluation processes of researchers. The 15 partners of the LifeSciCoP are European research centres and university departments with a focus on life sciences. The professional roles of the individual members are very diverse, they occupy strategic positions such as head of human resources and director of operations as well as more implementation-based roles, like equality officers and principal investigators. In practical terms, the CoP members agree on specific actions and coordinate the work in individual WGs. The concrete topics the CoP is currently working on are diversifying institutional change agents (such as the gender equality committees), increasing institutional commitment, and providing guidance on institutional policy implementation and follow-up.

This chapter briefly identifies the relevant literature for considering a disciplinary based CoP for institutional change towards a greater GE in R&I and HE to frame the experiences and main findings of our two disciplinary based CoPs. It then discusses the methodological approach followed by the main findings which are structured by the following three concepts, domain, community, and practice. We then present some concluding reflections.

### **Literature review: Disciplinary-based CoP for gender equality in R&I**

Discipline matters for gender equality in higher education, R&I in Europe and beyond. For example, the latest edition of *She Figures 2021* highlights how the proportion of women among doctoral graduates varies according to fields of education. Women are over-represented in education (67%) but severely under-represented in the field of information and communication technologies (22%) and the fields of engineering and manufacturing and construction (29%). Career progression may also differ according to discipline, on average in the EU-27, in 2018, women represented 48% of doctoral graduates, which decreased the higher up the academic ladder – so to 47% of Grade C, 40% of Grade B, and 26% of Grade A. This gap however was wider in STEM – whilst women made up only 37.9% of doctoral graduates – less than 20% of Grade A academic positions were held by women (European Commission, 2021, p. 180). It has also been highlighted that available data across the broad STEM field could camouflage disciplinary specific causes of gender imbalances in career progression. There are many different facets

to the relationship between career progression and disciplinary specific facilitators or obstacles for career progression. For example, the life sciences has been highlighted as one area where despite the fact that “women make up the majority of graduates up to doctoral level, they are less successful than men in obtaining research grants,” especially in European Research Council (ERC) starting grants with 4.5% lower success rate (ERC, 2018, p. 57) whilst their numbers decrease the higher up the academic ladder (European Commission, 2021, p. 115). Interestingly, in Physical Science and Engineering, the report states that women have 0.9 higher success rate but make up only about 25% of applicants.

The women to men ratio of authorship and the percentage of scientific publications that integrate the sex and gender dimension also varies according to discipline. Within the pool of authors actively publishing, the number of men authors exceeded the number of women authors at all levels between 2015–2019 at both the European and country levels (European Commission, 2021, p. 8). She figures (2021) highlights how when the data is disaggregated by R&D fields, “gender gaps in active authorship are particularly prominent in the fields of Natural Sciences and Engineering and Technology” (European Commission, 2021, p. 8). The fields of Medical Health Sciences and Agricultural and Veterinary Sciences boasted the highest ratio of women to men authors – larger than 1.0 for both early-stage and middle-stage authors at the European level (European Commission, 2021, pp. 218–219). The integration of the gender dimension was most likely to be found in publications in the field of Medical and Health Sciences whilst publications on Engineering and Technology were least likely, followed by Natural Sciences (European Commission, 2021, p. 262).

Research has also demonstrated how disciplinary differences are important factors that must be taken into consideration for the successful implementation of gender equality interventions in R&I (Caprile et al., 2011). The European Commission has funded a raft of institutional change projects whereby consortias of between approximately 6 and 12 institutions/organisations from all over Europe and beyond come together to design, implement, monitor, and evaluate gender equality plans in R&I. Some of these projects are geographically-based TARGET, in the Mediterranean Basin, some of these are disciplinary based GENERA with a focus on physics, LIBRA with a focus on life sciences, or Equalist with a focus on ICT, or a combination of both, for example, Baltic Gender based in the Baltic Sea Region with a focus on Marine Science and Technology. This chapter builds on this work. Two of the CoPs supported by the ACT project were set up with a disciplinary focus: LifeSciCoP and the GENERA CoP. These were CoPs established to give some sustainability to the gender equality work already carried out through the LIBRA and GENERA Horizon 2020 projects. While the GENERA CoP included the majority of the project consortia members, LIBRA’s project coordinator mainly brought together those institutions that were engaged with the project’s dissemination activities

(such as hands-on GEP workshops) and those recruited through the ACT coordinated stakeholder mapping for the LifeSciCoP. This chapter therefore aims to provide some key insights into the functioning of these two CoPs, regarding their domains, their communities, and finally their practice.

Examining CoPs as a vehicle to promote gender equality in higher education and research from a disciplinary approach is interesting for a variety of different reasons: CoPs tend to arise (emerge or are cultivated) in settings where knowledge is conceived as developed by practice – this is congruent with our aim of developing a CoP of gender equality practitioners in HE and R&I but may be seen as “contradictory” in a setting where knowledge production is “formalised” i.e., qualified and quantified through the production of “scientific” outputs, namely publications. What is considered knowledge and who produces knowledge are interesting questions in the context of knowledge producing institutions that aim to further gender equality. Researchers (formal knowledge producers), often both natural scientists and social scientists, come together with practitioners (gender equality practitioners) to design, implement, and evaluate gender equality measures aiming for institutional change.

Whilst CoPs have been studied in higher education (Hezemans & Ritzen, 2005; Jakovljevic, 2013), few studies have looked at the role of CoPs in advancing gender equality in research institutions (see Barnard et al., 2016). CoPs have been predominantly conceptualised as a vehicle for change within a research institution/organisation and even fewer studies have looked at how inter-organisational CoPs can advance gender equality within research organisations (Barnard et al., 2016; Thomson et al., 2021). The ACT project supported eight different CoPs, some thematically based, some regionally based, and two CoPs which were disciplinary based which is the focus of this chapter. So what issues are specific to disciplinary based CoPs promoting gender equality and gender mainstreaming in HE and R&I institutions?

CoPs work at the level of practice. So, those CoPs that function outside the realm of higher education – predominantly in the private sector see CoP members developing their “craft” through an apprentice form of learning – one could argue that whilst it is not “disciplinary” specific (in the academic field of science term) – it is practice specific – so for example early work on CoPs included ethnography of xerox workers or car manufacturer workers (McDonald & Cater-Steel, 2017, p. vi). These were CoPs that were established to improve the practice of workers through peer-to-peer learning. In the case of promoting gender equality in RPOs – this focus on practice highlights the relevance of gender equality practitioners. Interestingly, in the field of higher education, CoPs have been established within institutions to innovate in pedagogy (Maher, 2019). “Disciplinary practices” have, however, been highlighted as spreading beyond the realm of the specific institution fostering “disciplinary” collaboration (McDonald and Cater-Steel, 2017, p. vii) beyond institutional boundaries. However, the majority of CoP literature in higher education speaks of CoPs enabling an “interdisciplinary”

approach – across boundaries of discipline (Fraser et al., 2017.; Kensington-Miller, 2017).

Morton, (2012) looks at a CoP in higher education – and highlights those disciplinary challenges associated with architecture. Lave & Wenger, (1991) saw that the success or failure in learning were characterised by mutual engagement, and therefore of great importance to them were those conditions that facilitated joint participation. Morton (2012) highlights how a “shared language” is a key resource for joint participation – which could be argued is aided by taking a disciplinary focus to inter-organisational CoPs. This may be particularly true for disciplines in the natural sciences like physics or life sciences where a specific vocabulary has been developed – so the sharing of this vocabulary can be seen to ease communication and understanding. Academic career development has also proven to be linked to broader disciplinary fields (e.g., STEM) – this is particular relevant for gender equality in academia and R&I (EC, 2019). Disciplinary CoPs for gender equality can work on tailored measures to ensure that disciplinary specific gender biases can be tackled whilst fostering professional development measures. Blanton & Stylianou in their 2009 paper “chart some directions for professional development that purposely use the content of a discipline to leverage issues of practice, recognising that the faculty will not be able to meet the goals of reform without the support to help them deal with the challenges presented...within their discipline in new and unfamiliar ways.” (Blanton & Stylianou, 2009, p. 80). Hanrahan et al (2001) develops this line of thinking and states that “professional development that is discipline-specific and located in a community-of-practice is more likely to be relevant and productive than a centralized, decontextualized approach.” Trends in the research systems are also often triggered by individual disciplines e.g., early adopters of pre-print publications are Physics and Economics, followed by Mathematics, and more recently by Computer Science and Biology (Morton, 2012). In terms of knowledge production, integrating the gender dimension into research content is structured, organised, and presented according to disciplines (European Commission, 2020).

## **Methodology**

After identifying a gap in the literature looking at disciplinary CoPs for gender equality and institutional change, we developed the following research questions:

- What are the advantages and disadvantages of a disciplinary CoP approach?
- How should advantages be maximised and how can we overcome disadvantages?
- What are the similarities and differences between the two disciplinary CoPs?

- To what extent can the successes of the COP work be attributed to past initiatives?
- What enables joint learning?
- Does disciplinary homogeneity enable a more effective Community of Practice?
- How has collaboration in the CoP been aided by taking a disciplinary focus?
- How has collaboration in the CoP been hampered by taking a disciplinary focus?
- What are the main learnings and recommendations that we can take from physics and life science CoPs?

This chapter is based on a range of methodological approaches including a brief literature review, participant observation, as two of the authors facilitated the Life Science and GENERA CoPs and 10 semi-structured interviews with CoP members. The interviews were conducted by the CoP facilitators ( $n = 2$ ) whereas the LifeSciCoP facilitator conducted the interviews with GENERA CoP members ( $n = 5$ ) and the GENERA CoP facilitator conducted the interviews with the LifeSciCoP members ( $n = 5$ ). The GENERA CoP facilitator has a background in business administration and business psychology and works as a project manager at a physics institute in Germany. The LifeSciCoP facilitator holds a doctoral degree in biochemistry and works in Spain as a senior scientific project manager.

The interviews took place in May 2021 and were conducted via video call (zoom). Each interview was approximately 30–45 minutes long. The CoP members were selected to create a diverse picture in terms of their gender, country, etc. However, of the interviewees chosen, only 30% were men since the majority of CoP members are women. The interview questions targeted the personal background of the CoP members and their perspectives on the benefits of the disciplinary focus of the CoP. The above research questions were operationalised into the following questions in the semi-structured interview guide:

- 1 Please explain a little a bit about your job role.
- 2 Please explain how you came to be involved in the GENERA/Life Sciences CoP.
- 3 How long have you been involved in this collaboration?
- 4 Can you explain a little bit about how the CoP works?
- 5 What benefits have you gained from your participation in the CoP? (Specific advantage of CoP approach?)
  - a To what extent do you think that the disciplinary focus has been an important element in the functioning of the CoP and its relevance for you?
  - b What other factors have facilitated the functioning of the CoP?

- 6 How has the CoP helped in your day-to-day work?
- 7 How has the CoP helped you to promote gender equality in your institution?
- 8 From your point of view, how could the CoP be improved?

Interviews were recorded and transcribed. Max QDA was then used to code the interview data. All authors independently coded some of the material in order to agree on the basic codes.

## **Main findings**

The collected qualitative data were clustered according to the three dimensions of a CoP: domain, community, and practice, and we chart the benefits and challenges of choosing a disciplinary focus for a CoP throughout these three dimensions.

### ***Domain***

The domains of the LifeSciCoP and GENERA CoP – place different emphases on the three-gender equality and mainstreaming ERA objectives (representation of women in research careers, gender balance in decision-making and integrating the gender dimension into research content). The fact that the members of the two CoPs belong to a specific research discipline can be seen to influence the domain two-fold. First, the specific objectives of the CoPs can be discipline specific (e.g., attracting more women into physics or decision-making positions in the Life Sciences), and second, the CoPs' output and achievements are discipline specific and have the potential to have a greater impact not only on the stakeholders of the same discipline but also on the knowledge produced itself (e.g., guidelines for including gender dimension in research). Whilst both the Life Science and GENERA CoPs – placed most emphasis on creating institutional measures to deal with the first two objectives – GENERA did look at integrating the gender dimension into the research content of physics.

Diverging viewpoints existed as to the extent to which gender equality challenges pertained specifically to the discipline or could be linked to STEM disciplines more generally. One CoP member states, “we do not discuss science actually. We discuss the policies of the institutes and my institute is mainly an institute of life sciences but the problems are the same,” whilst another LifeSciCoP member states:

I think it is useful because the gender balance situation is very difficult... Different in different sciences and for example, in bio-science there are a lot of women and at the lower levels it is completely women heavy. In our institute for example. 70% of employees are women... But that is very specific to Life Science and that would be very different if we were mixed with chemists, physicists where the situation is quite different.

*(LifeSciCoP Member 2)*

This feeling was echoed by a GENERA CoP member as part of the reason to join the GENERA CoP in the first place, “it just sort of fascinated me... Physics which I think will be one of the toughest nuts to crack.”

*(GENERA CoP Member 3)*

It is claimed that the life sciences is a particularly competitive research discipline, “hyped as the leading sciences of the 21st century, the life sciences have been very successful in attracting public money in recent decades. However, the almost explosive growth of third party-funded pre- and post-doctoral temporary job opportunities has not been matched by the number of new faculty positions (Stephan 2012).” (Fochler, 2016). Increased competition has been bolstered by the evaluation system of researchers mainly using quantitative bibliometric indicators. The research culture then adapts to this evaluation system, which encourages competitive behaviour, undermines open collaborations, and penalises researchers who commit to community services (such as institutional committee work, caring for, and teaching of students, etc.). The LifeSciCoP members shared the interest in changing this culture, which is reflected in one of its main objectives in developing guidelines for considering gender aspects in evaluating research performance. The presumed “meritocratic” approach in life science as well as in other disciplines has strengthened inequalities and disadvantages, especially for women who usually take over caring responsibilities in both professional and private life. An overall change in how research is evaluated including the consideration of gender aspects would definitely benefit from being piloted in an individual discipline, supported by a CoP.

In the GENERA CoP, integrating the gender dimension into physics was seen as particularly interesting:

I think we are really focusing, which I find very interesting ... in asking the hard questions in Physics ... we realised that we need to think a little bit wider because our borders between different subjects are artificial. so we usually say the maths intensive fields...and we talk about exploring the maths dimensions there. So it's like when we look at the gender innovation project for example, and then we realised that there is a ... a wealth of information, and very interesting when it comes to any topic that has a natural sex agenda dimension but very little on when it does not...and therefore that is what we are focusing on.

*(GENERA CoP Member 1).*

In the wide areas of physics and other math-intensive research, there is currently no accepted idea of how a diversity and gender perspective can be utilised. Resistance to incorporating a gendered perspective is often formulated in a form of the Haraway “God trick” argument (Haraway, 1988). In



physics, this refers to the “lack of sex/or gender” in what is observed, i.e., planets and particles do not have sex or gender, or mathematics is only what is calculated: numbers, figures and formulas again do not have sex or gender (Genera CoP). The GENERA CoP decided to organise a conference to discuss a starting point in tackling this major challenge and to help define a convincing approach to show how a diversity and gender perspective must be present in these fields of science through teaching, defining research topics, performing research and its applications.

### ***Community***

The disciplinary domain is closely linked with the community dimension of the CoPs. In our work, this was highlighted by three different phenomena. Firstly, how the disciplinary nature of collaboration, built on existing projects and networks – defined the community. Secondly, how this community – crucially provided a safe space for those working on gender equality. Thirdly, the need to include men into gender equality work – this was seen to be particularly important in those disciplines where men are severely over-represented, like physics.

Due to disciplinary context members knew each other before they joined the CoP, either on a personal level, or on an institutional level, by meeting at conferences, or working together on collaborative projects and initiatives. In GENERA and in LifeSciCoP, former members of the H2020 projects GENERA and LIBRA continued their collaboration in the newly created CoPs. This provided the opportunity to sustain the collaboration beyond project partners. Additional institutions who followed the projects before in different ways (e.g., advisory board members, participants of workshops, etc.) or those who were less connected and were looking to engage with European-wide gender equality initiatives (e.g., identified through ACT Community Mapping) also became members of the disciplinary CoPs.

Research is an international endeavour which depends on collaborations and knowledge exchange, whilst the degree of cross institution and cross-country collaborations varies by institutions and disciplines. A disciplinary CoP can build on existing scientific or professional networks and on personal relationships in the ecosystem to strengthen also gender equality efforts. Existing connections between institutions through disciplines, even between people who are not representatives in the CoP gives accountability and leverage to the CoP. Focusing on the disciplinary dimension of a European CoP is one way of creating a feeling of belonging and understanding despite the diversity of nationalities, and countries of residence from members.

The “safe haven” in the CoP is created by the shared knowledge and experiences in the discipline specific context. CoPs provide precisely the means for establishing collegial relations in a safe place that is free of hierarchical

power and politics typically observed in schools and faculties. Support from GENERA CoP was highlighted as a main benefit of belonging to the CoP:

if you work on this inside the physics department or even in the science faculty you become very vulnerable. We in the university we change leadership unfortunately every three or six years or something and yes the swap can be that...suddenly, [you].have no support or are very isolated so a lot of the discussion is also I think pure therapy... keeping each other up. I think its very important to pick people up and also listen to the stories and what is happening.

*(GENRA CoP Member 2)*

This support function of the community – proved a powerful mechanism – to enable the gender equality work of often isolated (in their own institutions) gender equality practitioners or lone scholars pushing for gender equality. In our CoPs, peers are defined as professionals who understand existing hierarchies and cultures in the represented organisations, which is often specific to disciplines, and who have either an intrinsic motivation to work on gender equality, or who have the institutional mandate to do so. This environment also attracts scientists belonging to disciplinary fields to engage with the CoP, as they feel qualified – even if they are not experts, nor are particularly experienced in the gender equality domain.

GENERA CoP members also stressed the need to create an inclusive CoP by including men. One of the main challenges was identified as follows:

Making sure to get men on board because it is the same with Athena Swan ... you cannot have women doing all the work ... it is just not fair ... if you are really serious you have got to make sure that you have men who are getting involved as well, and they are shouldering the work ... I think it shows that it is being taken seriously at the discipline level and it sends a signal.

*(GENERA CoP Member 3)*

### ***Practice***

Analysing the disciplinary aspects in the practice dimension of GENERA and LifeSciCoP, interviewees repeatedly highlighted the importance of the European dimension in terms of sharing good institutional practices. While regional or national focus can help to enhance the conditions for improving gender equality through lobbying on a policy and political level, the European dimension provides a platform to learn from different national contexts and to benefit from partners' experiences in countries with supportive legislative framework conditions. Sharing good practices is one effective way that inter-organisational CoPs can effect change at the institutional level. Since gender inequalities are often discussed on a disciplinary

level – the disciplinary CoPs can provide the umbrella and practical tools for collecting benchmarking data with the goal to inform institutional strategies, priority developments, and relevant policy makers. One of the working groups within GENERA CoP focuses on developing teaching and training materials based on good practices from the participating institutions. The aim is to design and implement a workshop on career development issues for early career researchers bringing in a gender and diversity perspective. On another level, GENERA helps other institutions to create their own gender equality plan (GEP) by sharing its best practices and knowledge from members. One of the tools used is the toolbox which was already developed during the GENERA project and is now assisting organisations that are in the process of the implementation of GEPs in tailoring their GEPs and gender equality measures to their needs. For this purpose, the toolbox offers a range of measures that can serve as models for other organisations.

The LifeSciCoP has the objective of exchanging good practices about the evaluation of researchers. Changing practices need to be done on a community level, rather than at the institutional level, as researchers tend to be very mobile during their careers, changing institutions. In terms of scaling up good practices for institutional change – often gender equality measures are started at the institutional level and individual departments/schools adopt measures or modify according to their specific context. Nevertheless, in some cases, it can be the reverse (expansion of the disciplinary dimension to whole institution) or in parallel (parallel institutional and unit/disciplinary level).

A CoP at the European level can be seen as an “insurance” measure to not let gender equality depend on the good will of national government whilst providing a supportive “infrastructure” to develop its’ priority at the institutional level, whilst sharing institutional good practices. CoPs brought together institutions with a long trajectory of gender equality work with those that were newer to this field – this was seen to provide a really useful function that ensured efforts were streamlined.

I think in our CoP what we feel most...particularly the groups where some were not very advanced at all with equality issues- not having a [GEP], not having things established is that it has brought tremendous strength and brotherly and sisterly spirit in. knowing that other people are in the same boat has been...everybody says it is really important and learning from other people. It’s ... it’s a huge source of strength and people are realising that they do not have to reinvent the wheel. They can take best practices from other people, they can reuse activities, reuse .... And that is really important because ... everybody likes to invent the wheel and they do invent the wheel and a lot of time and effort is wasted.

*(LifeSciCoP Member 4).*

In the LifeSciCoP, a very clear example was given about how institutional measures can be shared between institutions operating in very different contexts, and how those with a more developed legislative and policy framework can positively impact on institutions operating in contexts with less developed policy and legislative frameworks. As a CoP Member explains:

my colleague ... was asking about prevention of harassment protocols because in X she said they do not have much documentation in their institution which is quite large. They have a person responsible for this, but they do not believe that person has had any training ... did we have any guidelines? Well we have quite strict guidelines ... X law ... law in X tends to be very prescriptive. So they have exactly what you want to have which makes it quite easy to prepare because you are told what you have to have. So we have a document that is usable and we are still preparing it but that is something I can share with her and in the absence of anything else she can adapt it quite directly I think ... In the CoP what we are doing now is collecting documentation on policy guidelines, things that we can use, that people can pass around.

*(LifeSciCoP Member 2).*

## **Conclusions**

We have documented the extent to which organising a disciplinary CoP for advancing gender equality in R&I has been a useful strategy through producing knowledge about institutional change and integrating the gender dimension in research content (domain), through defining the CoP members – including stressing the importance of involving men and the support mechanisms of this approach (community) and through what they do – particularly sharing good practices (practice).

Regarding the domain there was no consensus as to the extent to which taking a disciplinary focus was beneficial. Even if life sciences is the CoPs domain – the discipline was not very present in the discussion. It was rather the assumed context that the members agree on. In the GENERA CoP however, a disciplinary approach favoured integrating the gender dimension into research content, i.e., integrating the gender dimension into physics was seen as a potential area for real discussion, interest and growth – as very little work had been done in this field to date. GENERA CoP is currently organising one of the first spaces to discuss integrating the gender dimension into research content and have begun to lay the foundations for this interesting contribution to knowledge.

Regarding the community – it has been highlighted how disciplinary CoPs can be valuable to catalyse innovation and progress within disciplines across geographic and cultural boundaries (MacGillivray, 2017, p. 42). Our experiences and research carried out in the framework of the ACT project highlights how disciplinary CoPs have been able to catalyse innovation

and progress for gender equality in R&I at the institutional level – across geographical and cultural boundaries. The transnational European disciplinary community (physics or life sciences) and networks provided a good basis for collaboration on gender equality in R&I organisations. The community has provided a safe-space and support – infrastructure for gender equality practitioners to share experiences and offload. This has proved invaluable – and is perhaps one of the most important yet least tangible outcomes of the CoP approach. This however is not disciplinary specific. The call to include more men into shouldering the workload for gender equality – has to be welcomed and came from the disciplinary CoP where men are severely over-represented.

In terms of practice, interviewees appreciated learning from peers by talking and exchanging, which is comparable to the xerox workers or car manufacturer examples discussed in the literature review (McDonald & Cater-Steel, 2017, p. vi). The organisation of work in the CoPs – through working groups, and overall CoP meetings – as goal oriented with medium- and long-term objectives was seen as key. Sharing and exchanging good practices – was seen as the real motor driving forward gender equality in each member institution.

Specifically forming part of a European project was seen as giving legitimacy to the CoP, “membership of being part of a European project – that’s very important because as you know scientists take these things into account. It is not just a vague voluntary thing – it is an organised ... an organised project with tangible objectives so that is important.” (GENERA CoP Member 5). The funding was also seen as key as it provided resources for a CoP facilitator that was seen to be crucial to the smooth functioning of the CoP – whilst resources were also seen to be key to institutional change.

## Note

1. “Communities of PrACTice for Accelerating Gender Equality and Institutional Change in Research and Innovation across Europe” Horizon 2020 project, grant number 788204 is referred to throughout this book as “The ACT project”. See also <https://www.act-on-gender.eu>.

## References

- Barnard, Sarah, Hassan, Tarek, Dainty, Andrew, Polo, Lucia, Arrizabalaga, Ezeikiela. (2016). Using communities of practice to support the implementation of gender equality plans: Lessons from a cross-national action research project. Loughborough University. Conference contribution. <https://hdl.handle.net/2134/23681>
- Blanton, Maria, & Stylianou, Despina. (2009). Interpreting a community of practice perspective in discipline-specific professional development in higher education. *Innovative Higher Education*, 34(2): 79–92.

- Caprile, Maria, Addis, Elisabetta, Castaño, Cecilia Klinge, Ineke, Larios, Marina, Meulders, Danièle, Müller, Jörg, O'Dorchai, Síle, Palasik, Maria, Plasman, Robert, Roivas, Seppo, Sagebiel, Felizitas, Schiebinger, Londa, Vallès, Nuria and Vazquez-Cupeiro, Susanna. (2012). *Meta-Analysis of Gender and Science Research*, Publications Office of the European Union, Brussels.
- European Commission, Directorate-General for Research and Innovation. (2019). *She figures 2018*, Publications Office of the European Union, Brussels. <https://data.europa.eu/doi/10.2777/936>
- European Commission, Directorate-General for Research and Innovation. (2020). *Gendered innovations 2: How inclusive analysis contributes to research and innovation: Policy review*, Publications Office of the European Union, Brussels. <https://data.europa.eu/doi/10.2777/53572>
- European Commission, Directorate-General for Research and Innovation. (2021). *She figures 2021: gender in research and innovation: Statistics and indicators*, Publications Office of the European Union, Brussels. <https://data.europa.eu/doi/10.2777/06090>
- European Research Council (ERC) Annual Report on the ERC activities and achievements in 2017. Publications Office of the European Union, Luxembourg.
- Fochler, M. (2016). Variants of epistemic capitalism: Knowledge production and the accumulation of worth in commercial biotechnology and the academic Life Sciences, *Science, Technology and Human Values*, 41(5): 922–948.
- Fraser, Cath, Honeyfield, Judith & Breen, Fiona. (2017). 'From project to permanence: Growing inter-institutional collaborative teams into long-term, sustainable Communities of Practice'. In *Communities of Practice. Facilitating Social Learning in Higher Education*, edited by Jacquie McDonald and Aileen Cater-Steel. Springer.
- Hanrahan, Mary, Ryan, Micheal, & Duncan, Margot. (2001). The professional engagement model of academic induction into online teaching. *International Journal for Academic Development*, 6(2): 130–149.
- Haraway, Donna. (1988). Situated knowledges: The science question in feminism and the privilege of partial perspective. *Feminist Studies*, 14(3): 575–599.
- Hezemans Marijke, Ritzen Magda. (2005). Communities of Practice in higher education. In: Tom, van Weert, & Arthur Tatnall. (eds), *Information and Communication Technologies and Real-Life Learning. IFIP – The International Federation for Information Processing*, 182. Springer. [https://doi.org/10.1007/0-387-25997-X\\_5](https://doi.org/10.1007/0-387-25997-X_5)
- Jacquie, McDonald and Aileen, Cater-Steel. (2017). *Communities of Practice. Facilitating Social Learning in Higher Education*. Springer. Accessed 11 October 2018.
- Jakovljevic, Maria., Buckley, Shirley., & Bushney, Melanie. (2013). *Forming Communities of Practice in Higher Education: A Theoretical Perspective*. Active Citizenship by Knowledge Management & Innovation, 19–21 June, 2013, Zadar, Croatia.
- Kensington-Miller, Barbara. (2017). Surviving the first year: New academics flourishing in a multidisciplinary community of practice with peer mentoring. *Professional Development in Education*, 44(5):1–12, <https://doi.org/10.1080/19415257.2017.1387867>
- Lave, Jean, and Etienne Wenger. (1991). *Situated Learning: Legitimate Peripheral Participation*. Cambridge University Press.

- MacGillivray, Alice. (2017). "Social learning in higher education: a clash of cultures?," in McDonald, J. and Cater-Steel, A. (eds), *Implementing Communities of Practice in Higher Education*, Springer, pp. 27–45.
- Maher, Damian. (2019). "The use of course management systems in pre-service teacher education," in (Ed.) Jared Keengwe, (eds), *The Handbook of Research on Blended Learning Pedagogies and Professional Development in Higher Education*, IGI Global, pp. 196–213.
- Morton, Jane. (2012). Communities of practice in higher education: A challenge from the discipline of architecture. *Linguistics and Education*, 23(1), <https://doi.org/10.1016/j.linged.2011.04.002>
- Stephan, Paula. (2012). *How Economics Shapes Science*. Harvard University Press.
- Thomson, Aleksandra, Palmén, Rachel, Reidl, Sybille, Barnard, Sarah, Beranek, Sarah, Dainty, Andy., & Hassan, Tarrek M. (2021). Fostering collaborative approaches to gender equality interventions in higher education and research: The case of transnational and multi-institutional communities of practice. *Journal of Gender Studies*, 0(0), 1–19. <https://doi.org/10.1080/09589236.2021.1935804>