

The Gendered Analog-Digital Divide in Virtual Academia

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Abstract. During the Covid-19 pandemic, in times of worldwide lockdowns, academic careers were impacted in a gendered way (Gabster et al., 2020): Existing gender inequalities have increased (Oleschuk, 2020) and female academics, especially early career researchers, have conducted less research compared to men (Viglione, 2020; Amano-Patiño et al., 2020). Also, women’s submissions to peer reviewed journals dropped radically. One might argue that the pandemic is over, and that academic life is back to normal, leaving us with the benefits of improved tools and practices for virtual collaboration. However, virtual academia risks increasing inequalities, an effect we will refer to as the analogue-digital divide. These risks affect especially researchers at the beginning of their career, and those who contribute to a greater extent to academic and family care work, which are mainly women. In this paper, we reflect and consolidate the findings of six projects with partners across Europe and two universities which analysed the lasting effects of the pandemic from the perspectives of researchers at different career stages, service staff, as well as decision makers in boards and juries. We conclude that strategies and measures developed before the Covid-19 pandemic do not consider virtual academia sufficiently. We thus suggest how to counteract the analog-digital divide with requests of funding organisations and implemented by research processing organisations in their gender equality plans (GEPs).

1 Introduction

The Covid-19 pandemic has accelerated the impact of digitalisation on the academic system that can be considered as the result of the interplay of various actors, linking and shaping the institutions in which they perform multiple roles depending on their career stage. For example, well established researchers become members of boards,

panels, and juries, which among others decide on strategies and measures dedicated to gender, diversity, equality and inclusion. As supervisors they are expected to support students and **early stage researchers (ESR)**² who rely on feedback, guidance to build their academic reputation. Building personal networks for future collaborations, is thereby crucial to become a recognized member of academia which has been recognized for being highly gendered (van den Brink and Benschop, 2011).

To improve gender equality in academia **Research funding institutions (RFOs)** have strategies and dedicated resources and **research performing organisations (RPOs)** have set measures accordingly. The process of improving gender equality is supported by change agents³ who are dedicated to providing an environment that lets ESR develop their talents and supporting the implementation of measures for gender and diversity equality.

In this respect it must be added that available data and studies of the academic system lack a non-binary differentiation of gender. Additionally, European equality strategies and funding requirements still refer to gender in a binary way, especially when asking for indicators. The European SHE FIGURES (2018, 2021), an important reference guideline, represent the available data and the approach (Kleinberger-Pierer, Pohn-Weidinger and Grasenick, 2020). Thus, improving gender equality in the academic system mainly refers to the representation of female academics.

When analysing the impacts of the Covid 19 pandemic on measures dedicated to support gender equality, the present paper too, often relies on data presented in a binary way in the scientific literature and project reports. Our analysis is further based on surveys, interviews, focus groups, and workshops with different actors of the academic system engaged in several projects (cf. Figure 1). By identifying similarities and differences in the conclusions that have been drawn by the actors involved, we demonstrate that well-known mechanisms of gender inequality referring to care work and access to analog and digital resources are still at work and have been reinforced in virtual academia. These effects are referred to in this paper as analog-digital divide.

² The European Commission (<https://ec.europa.eu/info/funding-tenders/>) defines Early Stage Researchers (ESR) as researchers who have not been awarded a doctoral degree. They must be in the first 4 years of their research career (full-time equivalent research experience calculated from the date they qualified by a master or similar degree). For the paper we agreed to expand the definition to 2 years after the doctoral degree.

³ Change agents are people in organisations who are (formally) responsible or engaged for initiating, implementing and coordinating change in form of daily efforts, projects or full programs – here with regard to gender equality. Thus, they are feminist agents of transformation and cultural change, effecting change to the gendered status quo of their own institutions (Parsons and Priola, 2013; Meyerson and Tompkins, 2007). In this paper we include researchers, service staff and decision makers who are committed and contribute their personal resources to enhance gender equality as informal change agents.

Questions asked focused on the impact of the Covid-19 pandemic on workload and career development, the perceived challenges as well as potential benefits of virtual academia and recommendations for gender and diversity equality.

Figure 1: Overview on contributing projects and the role of authors. Source: own illustration

Project Acronym	Main Focus, Website	Runtime	Partner Institutions	Countries	Role of Authors
ACT	Communities of Practice for Accelerating Gender Equality and Institutional Change in Research and Innovation https://act-on-gender.eu	2018-2021	17 RPOs, RFOs	26 (Europe)	external evaluators
Arqus	Action line "Research Support and ESR Development" (Pre- and Postdocs, established researchers) https://www.arqus-alliance.eu/	2019-2022	7 universities	7 (AT, IT, ...)	partner (implementation, monitoring)
CHANGE	CHAlleNging Gender (In)Equality in science and research" https://www.change-h2020.eu	2018-2022	6 RPOs	5 (AT, BE, DE, IL, PT, SI, SK)	partner (gender expert)
GenderNetz	Gender bias of women's career paths in engineering and information technology through informal support relationships and networks (pre- and postdocs, established researchers) https://gendernetz.de	2018-2021	11 9 RPOs, 2 companies	1 (DE)	principal investigator
GRANteD	Grant allocation from a Gender Perspective (RFO managers, established researchers) http://www.granted-project.eu	2021-2023	5 RFOs, RPOs		external evaluator
HBP	interdisciplinary neuroscience project with Gender Action Plan (GAP) (scientists of all career stages, managers of science) www.humanbrainproject.eu	GAP: 2017-2022 (Runtime: 13-23)	154 RPOs, hospitals	16 (EU, UK, IL, CH)	partner (gender and change expert)
TU Graz	Communities of Practice for Accelerating Gender Equality and Institutional Change in Research and Innovation https://act-on-gender.eu	2015 ongoing	2 university, company	1 (AT)	internal research and gender units, external expert

2 Brief Description of the Contributing Projects

The H2020 project **ACT** aimed at overcoming struggles in implementing gender equality plans through the advancement of **communities of practice (CoPs)**. Thus, the focus was on enabling effective inter-organisational sharing of experiences from gender equality work to support structural change in RPOs and RFOs across Europe. Most of the individual CoP members were either researchers or worked in the **Human Resources (HR)** department or as **Gender Equality (GE)** officers. The ACT project comprised seven CoPs, which were quite heterogeneous in their thematic focus (e.g., gender budgeting, GE in Life Sciences or Physics) and membership composition (132 CoP members came from universities, research organisations, funding organisations and research associations). The evaluation was carried out by JOANNEUM RESEARCH to assess the effectiveness of the CoPs and to identify the added value of membership via a quantitative survey among the CoP members and facilitators (n=77), monitoring and progress reports and semi-structured online interviews with all CoP facilitators (n=7) and a selection of CoP members (n=21).

Arqus European University Alliance aims to foster its cooperation in research, teaching, administration and social commitment. One of the so-called Arqus Action Lines, "Research Support and Early Stage Researcher Development" (chaired by a team in Graz), focuses on encouraging doctoral candidates and postdoctoral

researchers to participate in joint initiatives such as a Mentoring Programme. Due to the Covid-19 pandemic the concept focused on online mentoring and regular peer groups for 21 mentees and CoPs for mentors (of different genders and disciplinary backgrounds) by ESR support units in all universities. Insights from the Arqus Mentoring Programme shared in this paper are based on feedback groups with mentors, mentees, results of a satisfaction survey with all participants, as well as review meetings between the organisers from the University of Graz and the mentoring facilitator.

With **CHANGE** six RPOs have supported change agents across Europe (Austria, Belgium, Germany, Israel, Portugal, Slovenia, Slovakia) to design, promote and implement gender equality plans (GEPs). Partners have exchanged gender equality knowledge and expertise with other RPOs as well as RFOs through mutual learning and networking. With such a co-production of knowledge approach and by building CoPs among RPOs and RFOs in each participating region, support and mentorship structures have been established. Members of these CoPs act as change agents in their organisations stimulating institutional cultural change towards gender equal work environments in RPOs and fostering the importance of gender dimension inclusive research and innovation programmes in RFOs. The experiences of change agents and their mutual support in CoPs were documented in workshops and focus groups.

The Human Brain Project (HBP) started in 2013 and is one of the largest research projects in Europe. Over 500 scientists and engineers from more than 140 universities, teaching hospitals, and research centres across Europe are currently participating mainly online. The HBP has improved the gender balance in leadership positions from 16% in September 2017 to 36% in January 2022 based on a Gender Action Plan, involving a **Diversity and Equal Opportunities Committee (DEOC)**, the **Directorate (DIR)** and the **Science and Infrastructure Board (SIB)**, collaborating mainly online. The DEOC can thereby be considered as a network of 25 change agents of the HBP, co-creating and implementing measures with support of the 7 DIR and the 14 SIB members. To reflect the measures and their effectiveness as well as the impact of the Covid-19 pandemic, the authors carried out a survey on collaboration and diversity for all scientists, engineers, and service staff. Additionally, the participants of the mentoring programme (45 mentoring partnerships over a four years period) were asked to reflect their experiences via questionnaires and workshops.

GenderNetz investigated the influence of informal support structures and networks on research careers in engineering and information technology in Germany. In particular, the postdoc phase and its subject-specific career conditions on the way to a professorship were analysed in this national project. The findings from the GenderNetz project are based on 32 interviews with postdocs, 31 interviews with professors as gatekeepers (who are at the same time supervisors, funders, sponsors of the pre- and postdocs), as well as 12 focus group interviews with change agents, conducted before the Covid-19 pandemic. Additionally, two workshops with female early career

researchers in academia and industry and three workshops with change agents from RPOs were conducted focusing on how to maintain professional social relationships in virtual academia, the role of professors as gatekeepers and recommendations.

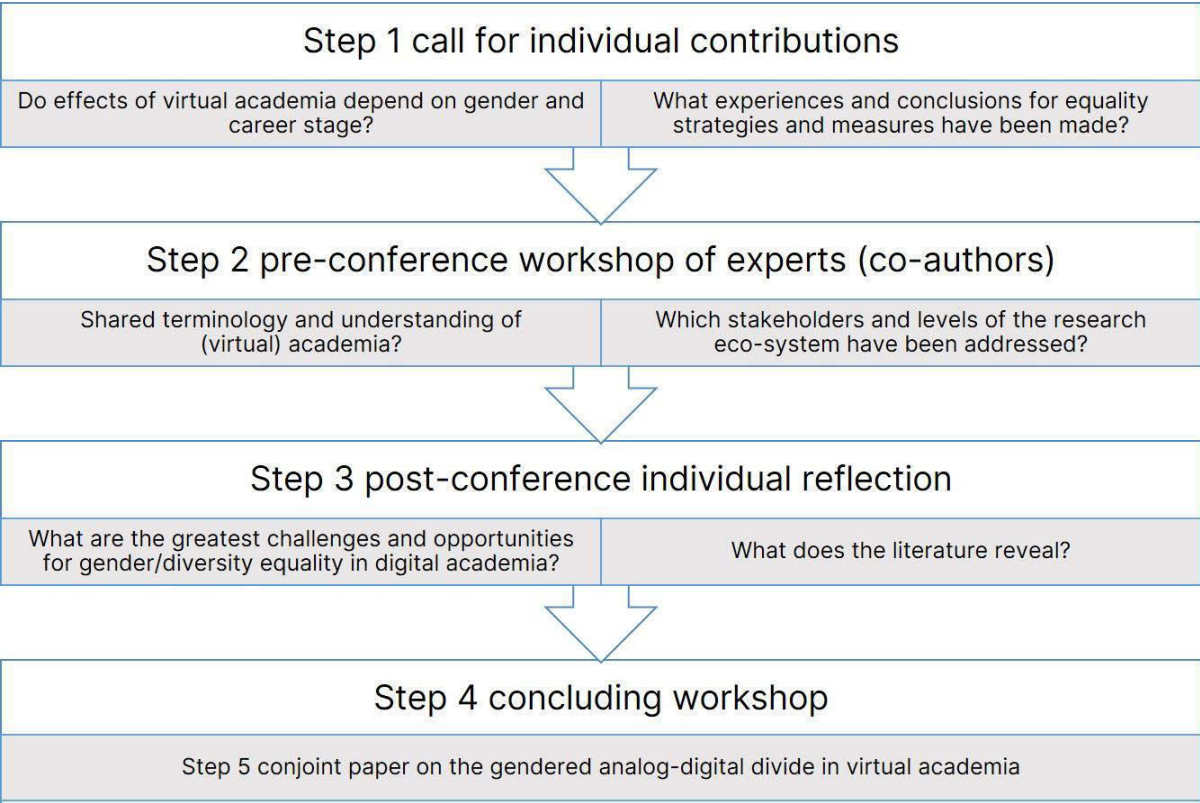
In **GRANteD** the allocation of research grants is studied from a gender perspective, aiming to identify potential factors of gender bias. Based on this research, recommendations are developed for RFOs but also for a more inclusive research system in general. Today, research grants are of increasing relevance for building an academic career. Thus, how grants are allocated and how scientific merit is assessed is relevant for an inclusive academic workforce. To identify (potential) gender bias in the grant allocation process, each of the five case studies, policies have been analysed and surveys have been sent to applicants from each RFO to learn more about their career ambitions, about their subjective belonging to the research system and their assessment of the granting process. Furthermore, interviews are conducted with staff members and RFO management (in total 5 to 10 per RFO) to learn more about how policies are applied in practice. In some RFOs, panel members are interviewed (approx. 25 per RFO). In others, panels are also observed in real time (in total five observations). Some preliminary findings by the co-author of these observations are discussed below, illustrating how the assessment and allocation of research grants was impacted by the virtual format of panel meetings.

TU Graz has developed a strategy called “Integrating Diversity in University’s Key Areas” (IDuK) over the years since 2009 when the rectorate established a working group for Gender and Diversity to establish common ground (Grasenick, Kleinberger-Pierer, and Pilinger, 2020). The members of the working group have proven to be important change agents initiating and communicating measures for diversity and inclusion. Since 2015, research and teaching have been set as new strategic fields of action. Its participatory implementation and continuous development involve several service departments as well as scientists, lecturers, students, and trainers. Support structures and guidance have been established while during the Covid-19 pandemic all related measures were continuously offered virtually. More specifically, a training course on gender and diversity competencies for 12 scientists, a lecture series across all departments and virtual mentoring and coaching for 20 predocs have been carried out, reflected, analysed and results contributed to this paper by the responsible support units and researcher (co-author). Measures were open for all genders and career stages.

2.1 Methodological design of the validation process

The process to reflect and validate the effects of virtual academia as experienced by the various actors involved to enhance gender equality shares some similarities with the Delphi method (Giannarou and Zervas, 2014; Landeta, Barrutia, Lertxundi, 2011). It started with a call for contributions focusing on the impact of digitalisation and remote work on gender equality in science and technology at the **Science, Technology and Society Unit (STS)** conference (cf. Figure 2). Thus, co-authors first provided contributions based on their personal expertise and the related project reports. In a pre-conference meeting all abstracts were shared and structured. Thereby the different levels of the research ecosystem (Carayannis and Campbell, 2009) were addressed: universities and other research organisations, research funders and various support-structures, like CoPs, networks, and change agents as well as researchers of different genders and career stages. Workshop results were analysed and a second phase of individual reflection of co-authors followed. The resulting contributions were shared and the individual reports were discussed again in an online meeting.

Figure 2: Methodological design of the validation process. Source: own illustration



3 Digitalisation and Individual Academic Careers

Digitalisation has affected all areas of academia: teaching, research as well as interaction and collaboration. Especially for ESR who are not yet well known in their communities, interacting virtually impacts how working relationships with colleagues,

mentors, supervisors and potential future collaborators are built. Those who are granted opportunities and resources to meet in person and/or have access to state-of-the-art tools, support and training programmes are privileged. Research on the impact of the Covid-19 pandemic has shown that working in the office (showing presence) gains further higher appreciation than working at home in home office (Ziegler et al., 2022). The office is a very important place for ESRs to show their commitment and devotion to scientific work. In a culture of informal hiring for qualifying positions, this increases their chances of being perceived by the supervisor as a promising candidate for a career in science. Thus, in times of home office demands working in the office is even more a privilege that mostly is granted to men.

Simultaneously, virtual academia offers new opportunities to connect pre- and postdocs, ESR with colleagues and experienced scientists across different universities, thus expanding their networks internationally and independently from their supervisors via formally planned measures such as online mentoring.

3.1 Networking as a key task for ESR

Networks are central to successful career trajectories, facilitating collaborations, publications, and citations (Husu, 2004). Network ties increase researchers' chances to receive a grant and to progress in their career (Wennerås and Wold, 1997).

From the perspective of ESR, networking in virtual academia is particularly challenging. Structural factors, above all, also influence the networking opportunities and strategies of predocs and postdocs (Ibarra, 1993; Burt, 1998). Especially postdoctoral researchers often lack support comparable to **Master (MA)** or **doctoral degree (PhD)** programmes. In the digitally conducted group discussion and surveys (GenderNetz workshops, HBP, Arqus, TU Graz) the questions of how they maintain their professional social relationships and how they go about becoming visible at online conferences, were of main concern and strategies were discussed accordingly. During the pandemic, ESR tried to gain visibility in their scientific community via social media like Twitter, LinkedIn or XING or by communicating at online conferences via video conference tools and follow up E-mails. While trying to make the best out of digital communication platforms, they are also aware that social events around non-digital conferences, project meetings, excursions etc. are the most important places for meaningful networking and building up valuable contacts (GenderNetz workshops) This is especially true for hybrid formats that bare the high risk of increasing the gap between those with sufficient financial resources and support and those who lack support and/or have family obligations hindering their presence at the venue and thus hindering the informal talks, whereby one misses out on crucial information and the opportunity to build trustful relationships. Particularly women, especially female ESRs, are affected by this development as male researchers were the first ones to return to

in-presence academia and as it is difficult to establish or enter networks virtually (Ziegler et al., 2022).

Thus, based on experiences shared by concerned ESR of the listed projects, it can be assumed that these strategies are not very effective with regards to network building: While virtual academia enables those who have less travel budget to tune into conferences or even present first achievements, the opportunities to build good personal relationships with peers and experienced professors are much more restricted (Henderson, 2021).

For women, as a strongly underrepresented group in the technical sciences, there is also a particular challenge for some to specifically approach male colleagues and “gatekeepers” in the scientific community. Lacking support for women in academia has been discussed in various studies and is often related to the preference for homophile ties (Bird, 1996; van den Brink and Benschop, 2014) network ties increase researchers’ chances to receive a grant and to progress in their career (Wennerås and Wold, 1997). A key finding of the GenderNetz-project was that gatekeepers are often not aware of their personnel responsibility for ESRs and that they have different awareness and attitudes toward networking practices and their gender biased implications (Wolffram et al. 2020), which risk to be increased by virtual academia. This risk for falling behind due to lack of resources and/or family obligation is especially the case for ESRs who are highly aware of networking requirements in order to push their careers.

3.2 Online mentoring supporting ESR networking

To enable meetings with peers and experienced researchers on a regular basis formal virtual mentoring can be successfully established across different universities and countries. The online setting can take into account individual needs of the researcher, e.g. if they have care obligations that restrict travel, have a hearing or visual impairment or are restricted in their physical mobility. Especially the Covid-19 pandemic showed that flexibility and adjustment to virtual settings are crucial for today’s working environment in academia.

Online mentoring programmes as implemented by the HBP and Arqus have shown that constant communication, especially personal calls to check in with colleagues and peers (Grasenick and Guerrero, 2020), are important to prevent mentoring partnerships from getting lost in “cyberspace”. These personal connections counteract a lack of community feeling and trust, although needing more resources, a higher workload for the organisers, facilitators, and trainers of the programme.

While offering a low threshold, flexible support online mentoring can take an intersectional approach by considering several factors that concern a certain group more than others, e. g. career stage, caring obligations and ethnicity or race.

As stated above, female researchers are more affected by the negative aspects of these work conditions. This might be one of the reasons why female professors might

have greater awareness of challenges than early-stage researchers, and in particular female ESR. Female researchers thus tend to be more willing to fulfil the mentoring role to alleviate these challenges. Mentoring can thus be seen as academic care work, which is taken on largely by female researchers, reflecting the general distribution of care work within society. It is thus essential to appreciate supervision and mentoring as equivalent to publications in grant and tenure application so that this care work is being recognized.

Additionally, the need for systemic changes such as formal regulations that involve gate keepers as well as more open solutions tailored to the institution were addressed by participants of surveys, interviews and workshops (GenderNetz workshops, HBP). A central open approach is to establish and maintain contact with those professors who have already become visible as responsible and ESR-oriented supervisors to become more active change agents and acknowledge their contributions, for example, through awarding prizes. A more formal approach aims at obliging professors (or newly appointed professors) to participate in workshops of self-awareness and reflection about their own careers and what they would have done differently (GenderNetz workshops, HBP). Change agents additionally suggested concrete regulatory models or a clear career code for the support of ESRs within their institutions. Thus, every ESR should be obliged to go through an 'internship' period accompanied by a professor as mentor (CHANGE, GenderNetz workshops).

4 Networking among Change Agents and Communities of Practice

The Covid-19 pandemic not only impacted the careers of researchers, but also the workload and collaboration of change agents for gender equality in their organisation and international projects. Some of them were already prepared to work mainly online (international CoPs, committees and working groups of international projects) (ACT, Arqus, HBP, TU Graz). Like online mentoring, virtual exchange formats have offered opportunities for change agents to exchange experiences and support each other. Interviews and focus groups demonstrate that compared to ESR networking, building trust and supportive relationships becomes easier with work experiences – which is usually related to already having a personal network established. Such virtual formats can even be beneficial within institutions that might be locally distributed across different buildings, districts or countries. Benefits rise with the distance of contributors, when connecting on European or even international level.

4.1 Change agents in a virtual world

Building knowledge and expertise solely virtually can be successful: CoP members reported that they received inspiration for their GE work or felt motivated to initiate change processes in their organisation. Members appreciated the collaborative aspect of the CoP, especially the interdisciplinary cooperation, which opens new perspectives

and strategies. A central benefit of CoPs for members was access to new people. When trust is established, they know where to turn to for a safe space, help, support and solidarity.

Yet, even though the networking proved to be beneficial, it is helpful if CoPs are partially planned virtually from the outset and are not surprised by a pandemic, as in the case of ACT. Not surprisingly, for the CoPs who had never had the chance to meet in person, the community building was harder than for the ones who did. Gendered effects of the pandemic too became evident, as supporters, change agents etc. have been mainly women, still to a much greater extent responsible for family obligations to which virtual meetings are not the solution (e.g., home schooling). Additionally, the individual workload increased due to the shift to online teaching and collaboration as well as additional support tasks. For many change agents, this was associated with emotional strain (ACT, HBP).

Facilitators have played a crucial support role in online communication under such demanding and stressful circumstances. Adapting duration and design of meetings, tact and sensitivity, reaching out to everyone without burdening members of a CoP, Working Group or Board with additional work has proved to be important. Thus, to increase resilience, we can learn that the well-being of a community and its members has priority over their activities (Thomson et al. 2021; Grasenick and Guerrero, 2020; ACT, HBP) and will finally lead to an open and frequent interaction.

The CoP facilitators also wished for more training and exchange and intervision between them to address questions of adequate technological solutions, group building, leadership, moderation, conflict management etc. (Reidl et al. 2022). So, when starting networking activities, one should think about the skills, competencies and resources that are needed and especially how the implementers can be supported during the process. As the development of a CoP is a fluid process, these needs change and an open flexible approach is thus crucial.

Even though virtual CoPs may be somewhat less costly for the members to participate, financial support for a CoP is crucial and should ideally be long-term. Community building takes time and online formats need to be well conceptualised, prepared and supported as well – an effort which should not be underestimated. Thus, the central limitations of the CoP approach – and probably many other networking approaches – are financial and time resources. CoPs need resources for at least a basic facilitation and members need resources to engage (Reidl et al. 2022, Arqus, HBP, TU Graz). However, compared to face-to-face work, online collaboration can be somewhat lower threshold (i.e. saving time and travel costs) for change agents who do not have sufficient resources.

In the CoP member organisations, some noted a change in the relevance of the issue of gender equality as the Covid-19 pandemic was seen as a priority and other issues were seen as less important. For example, some found it more difficult to engage internal stakeholders in their GE work (Sekula et al. 2022). It seems that the impact on

the internal GE work was less of a concern in organisations with highly developed GE structures.

Digital communication and collaboration are an opportunity for remote partnerships, co-creation and co-decision processes as well as for maintaining cross-institutional networks for change agents – if not considered as full substitute for face-to-face meetings and if accompanying measures are taken to monitor and counteract diverse impacts of digital work. Thus, when deciding whether to work online or face-to-face or how to best combine the different approaches, advantages and disadvantages must be carefully weighed up.

These experiences can easily be transferred to RFOs that now also need to have a GEP when applying for **European Commission (EC)** funding. In CoPs, RFOs too can share mutual experiences of what has worked in practice and what failed – this refers to the whole funding cycle.

With Horizon Europe's GEP eligibility criterion it can be assumed that this exchange and support on GE between research (funding) organisations in Europe will become even more necessary. Especially newcomers might appreciate the inspiration and support from other GE change agents and practitioners, which can be realised by the participation in online communities of practice.

5 Decision Makers in Virtual Academia

While the effects of the Covid-19 pandemic are obvious on the level of less experienced researchers it is yet unclear how RFOs take the pandemic into account and become active in their role of assessing scientific merit.

Change agents participating in CoPs, a change in the relevance of the issue of gender equality could be observed as managing the pandemic gained high priority while other issues were seen as less important. For example, some change agents found it more difficult to engage internal stakeholders in their GE work. It seems that the impact on the internal GE work was less of a concern in organisations with highly developed GE structures. However, it was also reported that some stakeholders became more aware of gender issues when these were highlighted in the public debate of the Covid-19 pandemic. For example, a university with comprehensive gender structures gender-mainstreamed all Covid-related measures for students, while others feared that the topic of gender equality might disappear completely from their organisation. Crises such as the Covid-19 pandemic therefore carry the risk of widening the gap between advanced organisations and newcomers to GE work (ACT).

5.1 The role of RFOs

RFOs play a crucial role when it comes to deciding how the research system and research careers are constructed and how scientific merit is assessed (Witteaman, Haverfield, and Tannenbaum, 2021). Already before the Covid-19 pandemic, RFOs

have worked hard to design and implement new policies to increase the transparency of the assessment process and also its gender fairness and inclusiveness (like assessing the gender-in-research dimension). Peer review panels as bodies to assess the quality of proposals are at the core of the grant allocation process – they are of specific relevance for gender-fairness, and this holds also or even more in times of the Covid-19 pandemic. RFOs define rules and policies to optimise the quality of the assessment in panels, also aiming for more gender fairness, in online as well as in onsite settings (GRANteD).

Here it must be considered that framework conditions differ in countries and partially on institutional level. For example, some decision-making bodies only met virtually, others still or partly face-to-face; some RFOs extended the runtime of projects (GRANteD). Additionally, to differences in strategic measures for gender equality such as childcare, parental leave or career support measures, also Covid-19 related restrictions varied between countries (HBP). In large and complex projects such as the HBP, the project itself is requested to act as RFO by defining **calls for expressions of interests (Cols)** and assessing the proposals. While little is known about panels suggesting proposals in general, the HBP has provided reports on the assessment procedures which have been carried out solely virtually. By supporting applicants as well as juries with detailed guidelines and examples on how to consider gender and diversity for team members as well as in research content, the participation of women and the quality of the proposals were improved significantly (HBP).

5.2 Virtual reviews and panels

Other RFOs have modified their assessment process, enabling a review of the remote review process (GRANteD). This way, a quality assurance of the remote reviews was implemented. Learnings from this process might be of specific relevance when more reviewing is done virtually in the future. In the remote review, gender is taken into account when remote reviewers are to assess if/how the gender dimension in research content is addressed. From a gender perspective this illustrates that the gender awareness of remote reviewers becomes more relevant; in particular as they do not have the chance to discuss their assessment but do it by themselves. Thus, when more assessment is done virtually, funding organisations should make sure that remote reviewers are gender aware.

In general, the composition of virtual panels is expected to be more inclusive and gender-fair, simply because people with care obligations would need less time and could avoid travelling; this would favour women who still do most of the – due to Covid-19 increased – care work. Yet RFOs reported that in the pandemic, female researchers more often reject the invitation to become a panel member than male researchers (GRANteD). This was on the one hand explained by the additional workload due to care obligations and virtual teaching. Also, it was argued that people get used to virtual

meetings, thus they schedule more meetings than they would do onsite with less breaks in between. This increases the workload and people feel more stressed and less able to participate in virtual panels.

When observing panels, it becomes evident again how important adequate resources and expertise are. The chair acts as facilitator and is requested to have specific expertise on (gender) biases in academia. Here also RFO staff members play an important role as they explain formal details and provide advice in case the panel members are not sure how to implement new regulations in practice (GRANteD, HBP).

6 Conclusions: Counteracting the Analog-Digital Divide

The Covid-19 pandemic accelerated technologies, tools and their usage to collaborate professionally online, especially in academia. Opportunities to harvest the benefits vary strongly. Investigating the experiences that have been made by different actors of the academic system demonstrates that trustful, beneficial relationships can be built at all career levels and for different purposes if set up and supported professionally and need oriented. Virtual academia offers more opportunities to stay connected across distances and collaborate effectively with less need to travel. Thus, at an early career stage, researchers benefit by establishing networks across different universities, while change agents exchange experiences and expertise in CoPs. Especially for newcomer change agents, a virtual exchange can be a lower threshold (due to lack of time and financial resources) (Sekula et al., 2022).

In contrast, it has been demonstrated that for more experienced researchers the networks themselves are less important as they have already been established, instead, less travel time for meetings as members of juries, boards, projects are of relevance. However, the prevailing differences in academic and family care work are a high risk for individual career development.

Thus, the benefits of virtual academia also bare the risk of increasing gender and diversity imbalance – a phenomenon we define as analog-digital divide that refers to the difference created due to virtual academia by an unequally gendered distribution of analog and virtual resources:

1. Different opportunities to build trustful relationships by analog, in-person meetings
2. Different access to state-of-the-art tools and professional facilitation for virtual collaboration
3. Different distribution of academic care and family care work, whereas virtual academia is more demanding than analog support

To avoid new inequalities, such risks of the analog-digital divide need to be counteracted by RPOS and RFOs that set guiding frameworks and funding opportunities. Risk mitigation includes paying special attention to a fair balance of

academic care work, of opportunities to meet, to develop and maintain stable, supportive relationships and sufficient resources for professional tools and services. Furthermore, our analysis has emphasised the importance of detailed guidance for online assessment (remote reviews and juries).

When developing strategies and measures to enhance equal opportunities we conclude that it is important to include a thorough reflection of such potential inequalities and to counteract them, among others, by including indicators referring to the three risks of analog-digital divide when monitoring and evaluating equality measures, for instance by providing data on:

- The distribution of resources and opportunities to meet in person and to work at the office as well as measures dedicated for international virtual collaboration
- The access to resources for professional tools, process design and facilitation of virtual academia; monitoring of hybrid conferences and their inclusiveness for virtual attendees
- The amount of resources dedicated to guarantee a fair distribution of academic and family care work
- Personal, socio-economic background and career stage of actors to enable an analysis of the intersection of several aspects of diversity that contribute to the analog-digital divide

RPOs must pay special attention to the analog-digital divide when designing strategies and measures. A specific focus should lie on instruments and procedures enabling networks between ESR and established researchers across different academic institutions to support inclusive career development. Supportive resources to implement measures mitigating the effect of Covid-19 have been provided, e.g. by the European Institute for Gender Equality (EIGE) in the GEAR tool⁴.

RFOs and funding juries must provide guidance accordingly with detailed questions and examples of good practices that are indeed considered in the evaluation process while acknowledging the various national and regional framework conditions of RPOs. The obligatory GEPs, the further emerging guiding materials and consultancies supporting their implementation are an opportunity to integrate the analog-digital perspective in strategies, specific measures and indicators for monitoring.

⁴ <https://eige.europa.eu/gender-mainstreaming/toolkits/gear/measures-mitigating-effect-covid-19>

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