

The CNR gender budgeting: critical analysis and possible uses

Nicolò Marchesini and Marco Cellini

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Il bilancio di genere del CNR: analisi critica e possibili utilizzi

Nicolò Marchesini¹ and Marco Cellini²

2023, p. 42 – IRPPS Working papers 139/2023

Sommario: Negli ultimi decenni, la Commissione Europea ha esortato a superare le differenze di genere nella ricerca e nell'innovazione per fermare la leaking pipeline e rompere il glass ceiling and la glass door. Mentre la pratica del bilancio di genere è ormai abbastanza diffusa, i piani per la parità di genere si stanno consolidando come criterio di ammissibilità per i bandi di HorizonEurope e per i numerosi progetti europei che ne supportano la definizione e l'attuazione. Tra questi, il progetto H2020 MINDtheGEPs supporta i GEP in sette partner attraverso un approccio basato sui dati per adattare le misure alle esigenze di ciascuna organizzazione. Pertanto, per il Consiglio Nazionale delle Ricerche (CNR) è stata raccolta una grande quantità di informazioni, sia in termini quantitativi che qualitativi, riguardanti il personale e le politiche e il seguito del lavoro svolto con il primo Bilancio di Genere nel 2021. Questo lavoro evidenzia il percorso del CNR verso una maggiore uguaglianza di genere analizzando, in una prospettiva di mainstreaming, il livello del processo decisionale, il reclutamento (ad es. borse di studio) e la progressione di carriera del personale, l'equilibrio tra lavoro e vita privata e il lavoro di ricerca secondo il framework del progetto MINDtheGEPs. Questo studio rappresenta un'occasione per valutare il dato amministrativo, evidenziandone le potenzialità attuali e soprattutto future, sottolineando come, sebbene siano stati apportati molti miglioramenti, i limiti nella raccolta e nell'organizzazione dei dati non consentono di affrontare le differenze di genere negli aspetti meno rilevanti dei lavoratori in un ente pubblico di ricerca. Infatti, è proprio nei processi interni e nella cultura organizzativa che risiedono le resistenze e gli ostacoli più forti alla parità di genere. È sempre più urgente affrontare la questione studiando e indagando le disparità tra le sfumature dell'organizzazione.

Parole chiave: Parità di genere, GEP, Integrazione della dimensione di genere, Bilancio di genere, Dati sociali

¹ National Research Council of Italy – Institute of Research on Population and Social Policies, nicolo.marchesini@irpps.cnr.it

² National Research Council of Italy – Institute of Research on Population and Social Policies, marco.cellini@irpps.cnr.it

CNR – IRPPS

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Abstract: Over the past decades, the European Commission has urged to overcome gender differences in research and innovation to stop the leaking pipeline and break the glass ceiling and glass door. While Gender Budgeting practice is now fairly widespread, Gender Equality Plans are becoming consolidated as an eligibility criterion for HorizonEurope calls for proposals and the several European projects supporting their definition and implementation. Among them, the H2020 MINDtheGEPs project supports GEPs in seven implementing partners through a data-driven approach to tailoring measures to the needs of each organisation. Therefore, a large amount of information was collected for the National Research Council of Italy (CNR), both quantitative and qualitative, regarding personnel and policies and following up on the work done with the first Gender Budgeting in 2021. This work highlights the CNR's path towards greater gender equality by analysing, from a mainstreaming perspective, the level of decision-making, recruitment (e.g., fellowships) and career progression of staff, work-life balance and research work according to the MINDtheGEPs project framework. The study is an opportunity to assess the administrative data, highlighting its current and especially its future potential, pointing out that although many improvements have been made, data collection and organisation limitations do not allow addressing gender differences in the less prominent aspects of workers in a public research organisation. Indeed, it is precisely in the internal processes and organisational culture that the strongest resistances and hindrances to gender equality reside. It is increasingly urgent to tackle the issue by studying and investigating the disparities between the nuances of the organisation.

Keywords: Gender equality, GEP, Gender mainstreaming, Gender budgeting, Social data

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National Research Council of Italy – Institute of Research on Population and Social Policies,
nicolo.marchesini@irpps.cnr.it

National Research Council of Italy – Institute of Research on Population and Social Policies,
marco.cellini@irpps.cnr.it

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1. Introduzione

In the last decades, there has been a great effort to address gender inequalities in research within the European Union (EU). The report of the European Technology Assessment Network (Rees, 2001), showing how gender is an important predictor of the probability of a researcher entering, remaining and advancing in the scientific career, represented a cornerstone in the definition of the issue of gender inequalities within European Universities and Research Institutions (Clavero & Galligan 2021). The report also represented a cornerstone in contrasting such inequalities by proposing a series of policy recommendations combining three policy approaches: equal treatment, positive actions and gender mainstreaming.

Based on this evidence and assumptions, since the 2010s, the European Commission (2012) recognised gender-aware management of universities and research organisations as a positive factor in the different phases of women’s academic careers, recommended adopting Gender Equality Plans (GEPs) to the Member States, and actively promoted and supported gender equality in research and innovations within the European Research Area to produce cultural and institutional changes (Council of the European Union 2015).

A survey conducted in 2014 by the European Research Area showed that 36% of research performing organisations interviewed had already adopted a GEP (European Commission, 2016).

The increase in awareness and the efforts made by the EU indeed contributed to some advancement in gender equality and gender mainstreaming within EU research performing organisations. However, in 2018, women accounted only for one-third of the total population of research at the EU level, and significant biases between women and men persisted in career progression: despite women representing nearly half of grade C and D research staff³, they accounted for only 26.2% of grade A research staff (European Commission 2021c).

For these reasons, to further reduce gender inequalities in access and career progression within the EU research landscape, the European Commission introduced further provisions into the Horizon Europe funding programme. In particular, reaffirming its commitment to gender equality in research and innovation, the European Commission developed and adopted the GEP as an eligibility criterion to access Horizon Europe funding. Since the calls for grants with deadlines in 2022 and onwards, each institution applying for Horizon Europe funding

³ The “She Figures” report provides a common classification of academic and research careers for the European member countries, divided into four steps: grade A represents the top and the highest while, passing through grades B and C, grade D is the lowest, i.e., career entry (usually PostDoc or Fellowship) (p.325, European Commission 2021c).

must be provided with an official public GEP (European Commission 2021b). According to the provision set up, to be eligible for funding, the GEPs elaborated by the applying institutions are required to meet four criteria: 1) being a formal and public document, signed by the institution's top management, demonstrating a clear commitment to gender equality; 2) having dedicated resources in terms of staff and funds for the design, implementation and monitoring of the actions implemented; 3) including arrangements for data collection and monitoring that assure the GEP to be grounded on evidence and founded on sex (or gender) disaggregated data; and 4) being supported by training and capacity building activities. In addition to these mandatory process-related requirements, the European Commission requires that the GEPs address at least the following five thematic areas: 1) work-life balance and organisational culture; 2) gender balance in leadership and decision-making; 3) gender equality in recruitment and career progression; 4) integration of the gender dimension into research and teaching content; and 5) measures against gender-based violence including sexual harassment (European Commission 2021b, p. 13).

In addition to making GEPs mandatory to apply for EU funding, the European Commission also directly financed the drafting and adoption of GEPs through some dedicated calls within the Horizon 2020 funding framework. In this context, the project “Modifying Institutions by Developing Gender Equality Plans” (MINDtheGEPs)⁴, involving ten EU research organisations from seven EU countries, has been funded in 2020 to implement GEPs in seven of them. As a MINDtheGEPs implementing partner, since 2021, the National Research Council of Italy (CNR) has drafted and implemented its GEP⁵.

The situation of gender inequalities within a research institution at different career steps and areas takes shape at different levels, i.e., at the individual level, at the meso level, and at the macro level (Murgia & Poggio 2018). Based on such awareness and according to the MINDtheGEPs approach, the CNR's GEP is tailored to the organisation's specific needs, resulting from processing a consistent amount and different data types (Solera et al., 2023). Regarding the meso level, i.e., the level related to policies and gender composition within the organisation, starting from the experience developed with the drafting of the first Gender Budgeting (Avveduto *et al.* 2021) and within the Working Group for the GEP and Gender

⁴ MINDtheGEPs (Modifying Institutions by Developing Gender Equality Plans) has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 101006543. <https://www.mindthegeps.eu>.

⁵ The GEP has been approved by the Board of Directors with the resolution no.139 of 2022. See <https://www.cnr.it/it/cnr-per-la-parita-di-genera>

Budgeting⁶ at the central level, data of both a quantitative and qualitative nature were collected and/or updated to carry out a CNR assessment at the year zero of the MINDtheGEPs project, i.e., 2020. This choice is instrumental in defining a common starting point for the seven implementing partners, allowing homogeneous comparisons between them wherever possible.

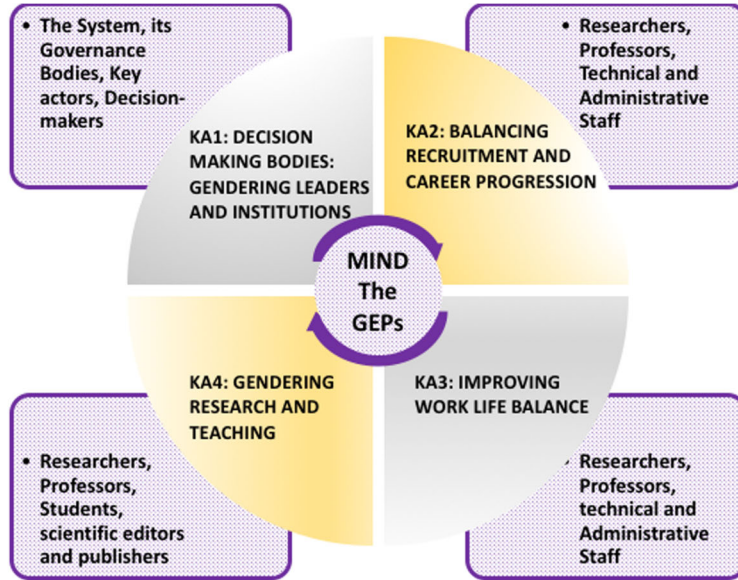
Such intensive data collection has the added value, on the one hand, of analysing the situation of the organisation with a gender perspective both in GEP-oriented gender mainstreaming and implemented policies to overcome potential discrimination and, on the other hand, of highlighting the need to reshape the internal processes of information and database collection and interoperability, in order to provide the administrative structure with a multilevel and multidimensional queryable system.

In the following sections, we reported the collected and systematised data analysis results at the meso level as the first step towards designing and implementing the CNR's GEP. The descriptive analysis concerns the four key areas identified MtG framework (Fig. 1.1): KA1) Decision-making bodies: gendering leaders and institutions, KA2) Balancing recruitment and career progression; KA3) Improving work-life balance; and KA4) research and teaching. These four key areas are partly overlapping and partly cross-cutting the five thematic areas later identified by the EC as essential in constructing a GEP (European Commission 2021a).

According to the project guidelines, the analysis compared 2020 and 2016 to identify changes already occurring that could not be ascribed to specific gender-related organisational policies.

⁶ The “permanent Working Group for the support activities to the Director General for the preparation of the Gender Equality Plan and for the annual updates of the CNR Gender Budgeting” has been established by provision no. 0033829 of 11/05/2021 and subsequent addendums. See <https://www.cnr.it/it/gdl-piano-parita-genere>

Fig. 1.1 MINDtheGEPs key areas of intervention.



Source: MINDtheGEPs, 2020.

1.1 Methodological note

The CNR consists of 7 departments⁷ covering the main scientific disciplines and the central administration office. Each department comprises several institutes (88 in total) throughout Italy which carry out research activities.

The CNR-employed staff is divided into four profiles. On the one hand, the researcher and technologist profiles (hereinafter TR) have a 3-level career, from level III (the lowest and initial one) to level I (the top one); on the other hand, the technical and administrative profiles (hereinafter TA), consisting of level VIII (the lowest) to level IV (the highest and with a greater degree of responsibility). While the researcher profile requires theoretical and empirical research skills, the technologist profile also requires managerial, project and/or team management, research support skills, and research-related ones. While the work of a researcher can be associated with a specific research field⁸, the work of a technologist, being

⁷ Earth system science and environmental technologies; Biology, agriculture and food sciences; Chemical sciences and materials technology; Physical sciences and technologies of matter; Biomedical sciences; Engineering, ICT and technologies for energy and transportation; Social sciences and humanities, cultural heritage.

⁸ The research fields are linked to the 14 scientific areas grouping the scientific-disciplinary fields (see Annex A, Ministry Decree 4 October 2000) and the ERC Sectors.

more transversal and wide-ranging, is referred to four technological sectors that the CNR itself defines⁹ as i) research support, ii) organisational-management sector; iii) legal-administrative sector and iv) design and/or management of plants, instruments and services.

According to the university career classification for Italy by the “She Figure” report (European Commission 2021c, p. 319), for the project MINDtheGEPs, the CNR classification is adapted as follows:

- Grade A, namely Level I in the CNR organisation, is Director of Research (*Dirigente di ricerca*) or Technologist Director (*Dirigente tecnologo*), as a permanent or temporary position with research and management responsibilities;
- Grade B, namely Level II in the CNR organisation, is Senior Researcher (*Primo Ricercatore*) or Senior Technologist (*Primo Tecnologo*), as a permanent or temporary position with research and management responsibilities;
- Grade C, namely Level III in the CNR organisation, is Researcher (*Ricercatore*) or Technologist (*Tecnologo*), as a permanent or temporary position with (usually) research responsibilities only;
- Grade D is Research fellow (*Borsista* or *Assegnista di ricerca*), only a temporary position and extendable for a maximum of 6 years, with research responsibilities.

The individual institute or department recruits grade D and temporary positions through an open competition. Through open competitions, recruitment for grades A, B and C (permanent positions) is managed at the central organisation level for all institutes and departments. The researcher grade D must win an open competition, open to non-CNR staff, to become a permanent employee of grade C (researcher or technologist). Grade C or B staff must win an open competition (reserved for internal staff or open to non-CNR staff) to progress to the next grade.

https://erc.europa.eu/sites/default/files/document/file/ERC_Panel_structure_2021_2022.pdf

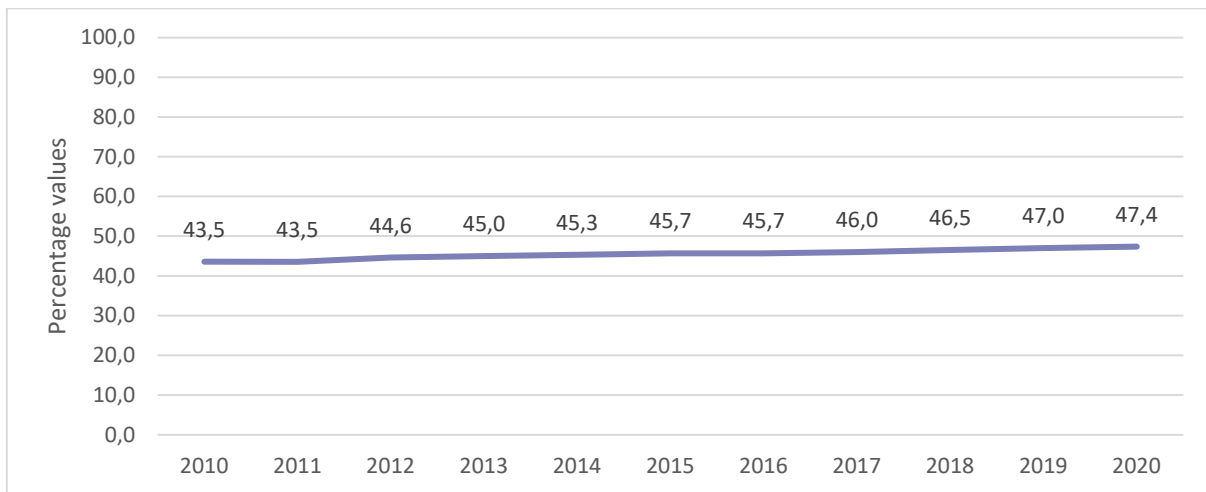
⁹ By 2022 the four technologist sectors can be retrieved at the following link

<https://www.cnr.it/sites/default/files/public/media/SETTORI%20TECNOLOGICI.pdf>

2. CNR gender (im)balance

As the largest public research performance organisation (RPO) in Italy, the CNR had 8,759 employees overall in 2020, 47.4% of whom were women, a slight increase from 46.2% in 2016 when the total number of employees was 8,552. The female component has gradually increased over the past ten years (43.5% in 2010) (CNR, 2022) despite the absence of specific policies targeting gender imbalance in the organisation (Fig. 2.1). Non-employee staff classified as research fellows (D grade) amounted to 2,264 in 2020, of which 50.5% were female, up from 49.2% four years earlier.

Fig. 2.1 Female incidence among CNR employees, 2010-2020 (percentage values)



Source: Caruso et al. 2022.

2.1 Key area 1: Decision-making bodies: gendering leaders and institutions

At the European level, the presence of women in decision-making and leadership positions in research (e.g., Head of Department or University/Research organisation) is still in the minority and, although improving over time, stands at 23.6% in 2019 (European Commission 2021c). Thus, the study starts with a gender-perspective analysis of the central administrative level, i.e., decision-making bodies, and the gender-sensitive policies the organisation has or should implement to change its gender composition and current organisational culture.

In 2016, CNR decision-making bodies were utterly male-dominated. The members of the Board of Directors and the heads of the seven Departments were all men. The picture changed in 2020, showing some improvements in gender balance. Indeed, in 2020, 2 out of 7 heads of Departments and 2 out of 5 components of the Board of Directors were female. Additionally, in 2021, a woman was appointed President of CNR for the first time since its foundation in 1923. However, these improvements cannot be imputable to specific policies at the organisational or national level but rather to a general, albeit slow, change in society.

A more gender-balanced situation appears when looking at the committees for open-ended competition. Indeed, the recruitment of researchers and technologists (TR), as well as technicians and administrative staff (TA), is managed by closely egalitarian committees regarding gender mainstreaming. In the years with a significant number of competitions (2016 and 2020 for TR only), the percentage of women as committee members is equal to 47.4%, while in 2020, the female presence as a committee member in open competitions for TA positions is 57.1%. This phenomenon is due to the application of the so-called “Legge Bassanini” concerning equal opportunities within employment in public administrations¹⁰, forcing commissions to reserve at least a third of their members for female commissioners. Regarding management policies and initiatives, gender mainstreaming within CNR shows a modest improvement between 2016 and 2020.

Following the general indications for the Italian language, both constituent documents such as statutes and regulations, as well as strategic documents, job advertisements, or communication and outreach material, report the use of the generic masculine, i.e. used with a neutral meaning so that masculine terms would refer to both men and women (Bazzanella 2010). Similarly, as of 2016 and 2020, there are no training courses on gender issues for competition committees or human resources, top management or decision makers, public communication, or internal staff.

Under Legislative Decree No. 198/2006, “Code for Equal Opportunities between Men and Women”¹¹, the organisation had a Positive Action Plan (PAP) in 2016, i.e., a policy document proposed by the *Comitato Unico di Garanzia* (CUG) to the Board of Directors identifying specific measures to eliminate the forms of discrimination detected. According to the abovementioned decree, the general PAP objectives, tailored to the organisational context and

¹⁰ Article 57, paragraph 1, letter a) of Legislative Decree no.165 “*Norme Generali Sull’ordinamento Del Lavoro Alle Dipendenze Delle Amministrazioni Pubbliche*”, 30 March 2001 and subsequent amendments.

¹¹ See art.48, Legislative Decree no.198, “*Codice Delle Pari Opportunità Tra Uomo e Donna*”, 11 April 2006, according to the art.6, Act 28 November 2005, no.246.

related to gender issues, concern guaranteeing equal opportunities in access to employment, career progression, working life, professional training and mobility opportunities; promoting organisational well-being and a better organisation of work that favours a balance between work time and private life; promoting a gender culture and respect for the principle of non-discrimination within the administration. However, no other policies or actions were implemented then (Tab. 2.1).

Tab. 2.1 Presence of general management policies and initiatives actions on gender issues

Policy or action	2016	2020
Collection of gendered data and report publication	No	Yes
Targets for women in governing boards and committees	No	No
Target for women applying as managers or high-level staff	No	No
Protocol for sexual harassment and gendered-based violence	No	Yes
Awareness-raising events and efforts	Yes	Yes
Existing gender equality plan (e.g., positive action plan)	Yes	Yes
Mention of gender equality in official documents	No	No
Sustainability budget, including gender equality issues	No	Yes
Support material concerning gender equality issues	No	No
Existing directory of resources about gender	No	No

Source: CNR (2021), authors' elaborations.

In 2020, the picture showed some improvements. The CNR has begun to collect and systematise gendered data and use them for public reports, such as its first Gender Budgeting (Avveduto *et al.* 2021). At the same time, in 2020, the CNR approved a protocol against sexual harassment and gender-based violence (CNR 2020), making a significant step forward in the fight against gender discrimination in the workplace. The procedure that could be activated in case of sexual harassment and mobbing episodes has been set up, but it was lacking two essential parts at the time of the data collection: the Confidential Counsellor (the role in charge of the protocol), appointed in 2022¹², as well as the listening point throughout the organisation, and such situation makes the procedure activation itself more complicated for CNR employees. Subsequently, however, the counsellor has been appointed, and the listening point is now

¹² Following a selection procedure, this appointment was conferred by provision no. 0038092 of 23/05/2022 of the Director General. <https://www.cnr.it/it/consigliera-fiducia>

active. Also, it is worth mentioning that the disciplinary proceedings unit provided a listening point before creating the listening point and the counsellor.

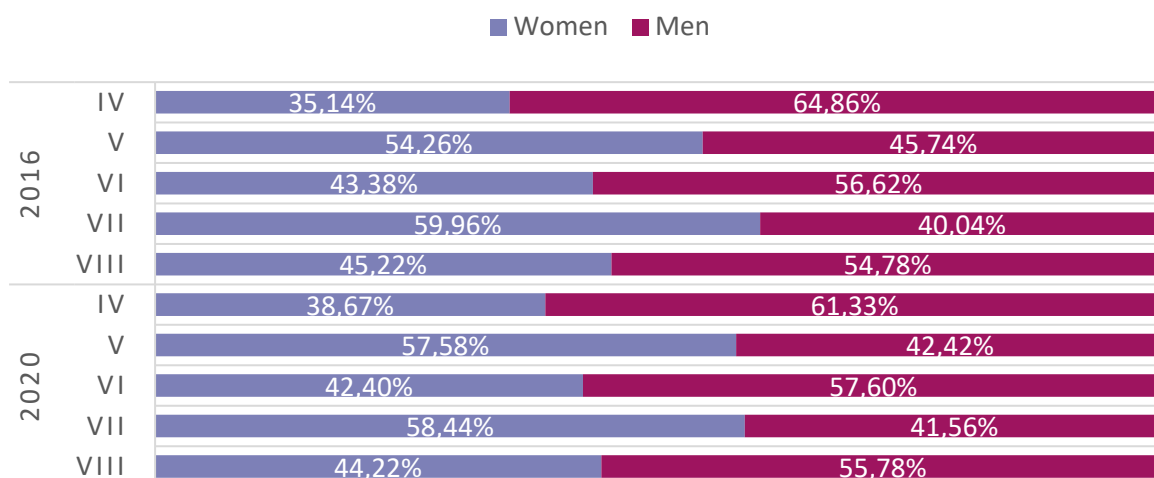
2.2 Key area 2: Balancing recruitment and career progression

Over the years, more and more women have been pursuing scientific careers. As the latest European data show, in 2018, women accounted for 47% of all scientists at the initial career level (D grade), but once at the top level (grade A), their presence is marginal, representing only 26%. This situation appears similar in Italy; although the glass ceiling seems more solid to break, while women represent 50% of grade D, their presence drops to 23.7% in grade A (European Commission 2021c).

The analysis at the CNR level does not appear to deviate from the national data. However, the analysis is proposed by separating the profiles (researcher, technologist, and technical-administrative) to consider each profile's different trends and characteristics.

Technical and administrative staff at CNR is predominantly male at most levels, especially in the lower (VIII) and the higher (IV level) career levels (Fig. 2.2). In 2020, there has been a slight increase of men in the top levels, while a little increase in women rates has been registered in the bottom levels. However, such an uneven pattern results from the combination of two main elements: as shown in the last Gender Budgeting reports (Avveduto *et al.* 2021; Caruso *et al.* 2022), the technical CNR staff is mainly composed of men, while the administrative staff is predominantly female, and the technical staff is about three times the number of administrative staff.

Fig. 2.2 Gender composition of Technical-administrative staff (percentage values)

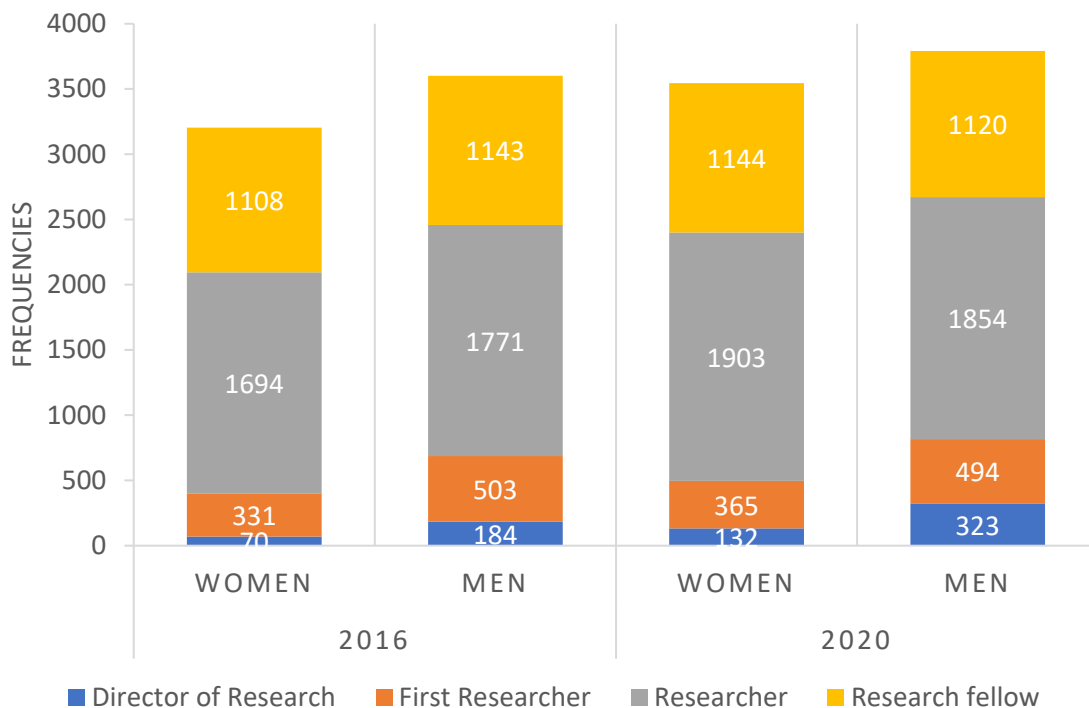


Source: CNR (2021), authors' calculations.

Concerning research staff, the CNR has two distinct profiles but similar in requirements, skills, and partial tasks: the researcher and the technologist. The latter requires more technical and technological skills, management and organisational skills beyond the specific research skills. Although they share the same career progression, the two profiles have very different numbers within the organisation. Given these characteristics, the analysis is carried out separately.

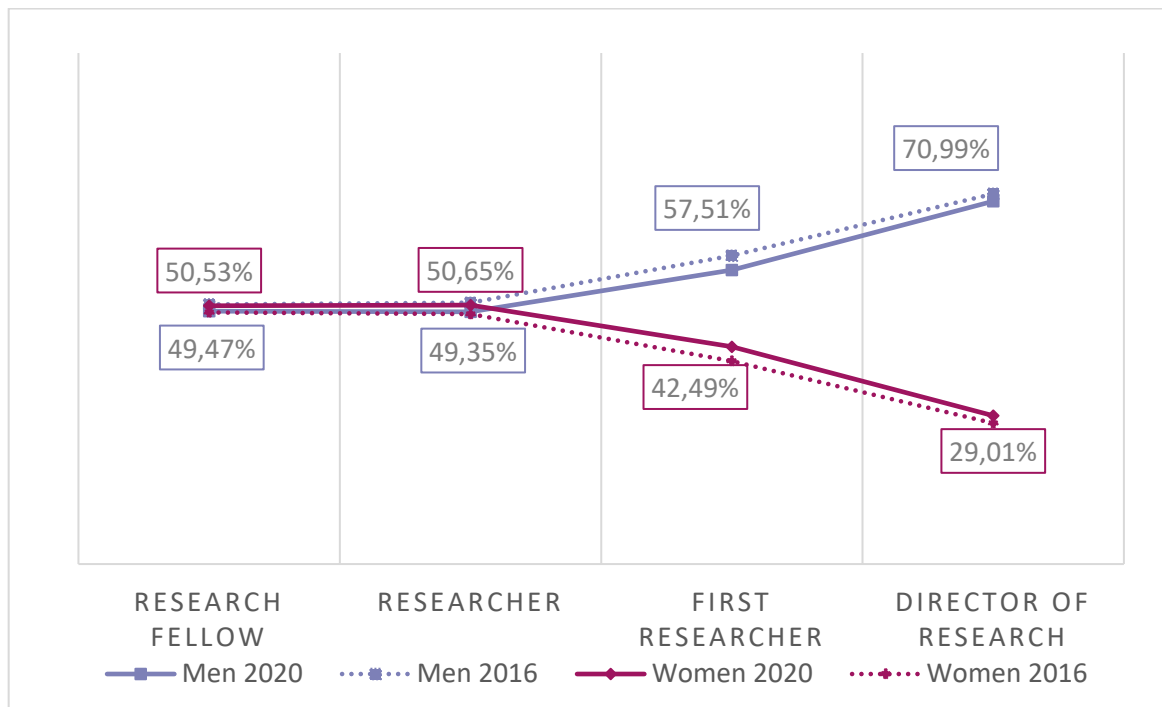
Concerning researcher profile, in the CNR, the gender gap increases when progressing through career levels (see Fig. 2. and Fig. 2.). Among Research Fellows (grade D) and Researchers (grade C), the female quota approaches 50% in 2016, while in 2020 it slightly surpasses the male one. However, moving to First Researchers (grade B) and Directors of Research (grade A), the gap widens consistently. Again, a slight increase in the female quotas was registered in 2020 in both levels II and I, representing 42.5% and 29.0% of employees in those grades. The gender scissors are similar in 2016 and 2020, showing a clear male predominance for grades B (level II – First Researcher) and A (level I – Director of Research), with a slight improvement in the last year. On average, the female component of each grade increases its incident by roughly two percentage points.

Fig. 2.3 Gender composition of Researcher staff by career level (Frequencies)



Source: CNR (2021), authors' calculations.

Fig. 2.4 Gender scissors of Researcher profile (Percentage values)



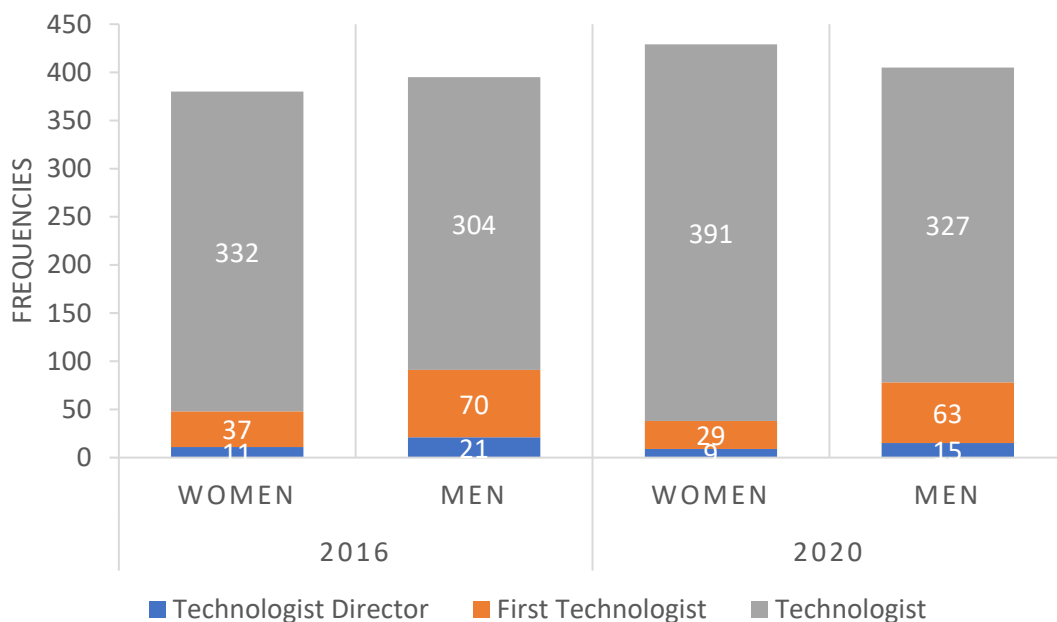
Source: CNR (2021), authors' calculations.

As mentioned, the numbers of technologist staff are significantly far from those of researcher staff: as of 2020, there are 834 staff members compared to 5,071 researcher staff members (net of grade D as they are non-employee staff). Nevertheless, the gender ratio appears similar between the two profiles: while grade C presents a reasonably balanced gender ratio (52.5% women in 2016, up by two percentage points by 2020), the first two grades (level II – First Technologist and level I – Technologist Director) are primarily male-dominated, with a slight improvement for the grade A in 2020 (see Fig. 2. and Fig. 2.).

Bearing in mind that research fellows, although they have almost exclusively research tasks, can enter the career of technologist by taking part in the related open competition, it was decided to associate the position of research fellow (grade D) exclusively with the researcher profile due to greater homogeneity of career paths. Thus, the career scissors for the technologist profile although evolving appears very similar in the two years under review. Indeed, the incidence of women at the start of their careers (grade C) increased by two percentage points between 2016 and 2020, decreased slightly at grade B and increased slightly at grade A.

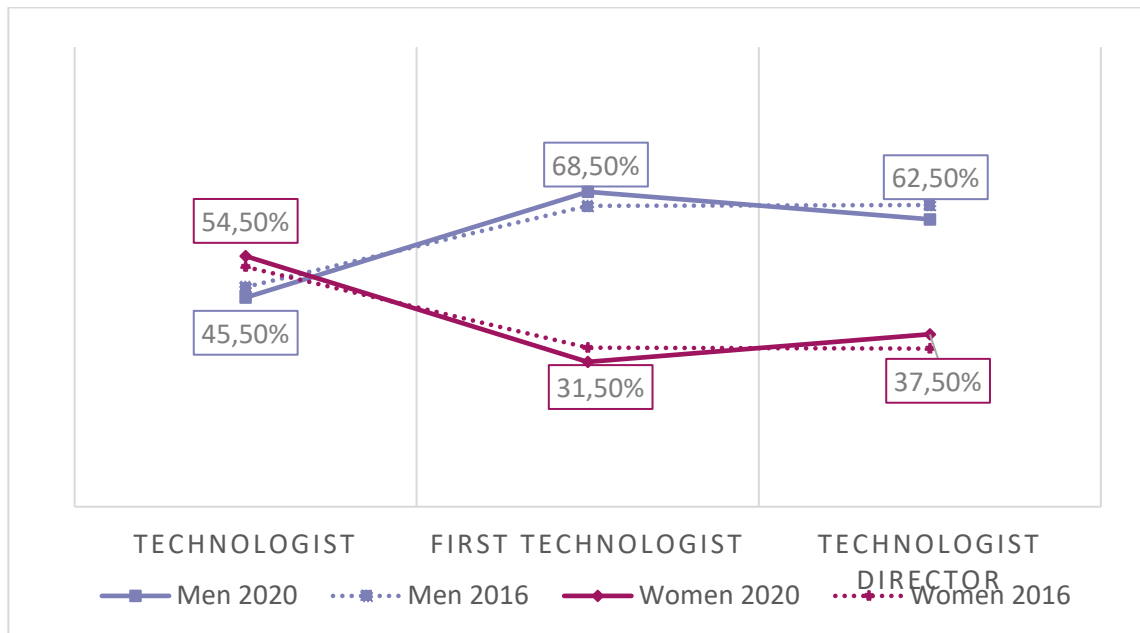
The changes in the composition of the researcher and technologist profiles in 2020 are arguably the result of the two public competitions and stabilisation procedures for non-employed personnel (under specific requirements) held in 2018-2020 to recruit new staff (grade C) and for the career progression of the existing employees.

Fig. 2.5 Gender composition of Technologist staff by career level (Frequencies)



Source: CNR (2021), authors' calculations.

Fig. 2.6 Gender scissors of Technologist profile (Percentage values)



Source: CNR (2021), authors' calculations.

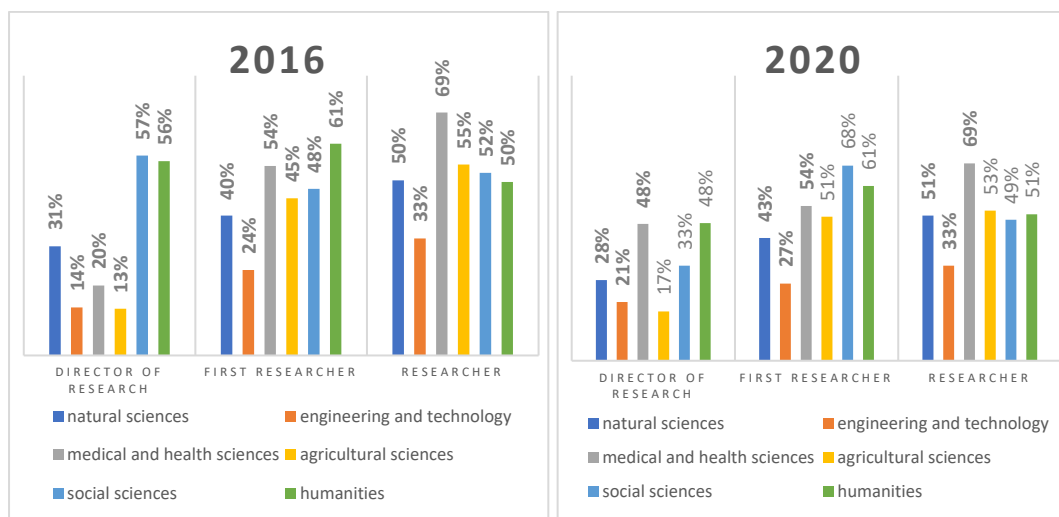
As the CNR is a multidisciplinary research organisation, and with the awareness of the strong segregation of women by research field (European Commission 2021c), it is essential to observe the evolution of the female presence in the research staff within the organisation by research field and profile.

Looking at the percentage of female researchers by scientific area and level¹³, data show significant differences in female incidence among research fields. As far as the early stages of the career progression are concerned, in 2016, the Engineering and Technology field was the research area with the widest gap between women and men (only 1 out of 3 persons was a woman), while in the Medical and Health Sciences field such incidence was close to 70% (grade C), no general improvement was registered four years later. However, moving from grade C to grade A, the percentages of women decreased significantly in almost all research fields. By 2020, no area achieved complete gender parity at grade A – but Medical and Health Sciences and Humanities reached 48% of female incidence – and yet the percentage in the research field of

¹³ Analyses by research field are carried out exclusively for researchers, because technologists are not required to be divided into research fields but into strategic fields (research support, organisational-management sector, legal-administrative sector, and design and/or management of plants, instruments and services). See 1.1 Methodological note.

Engineering and Technology remains at 21%, while in the Agricultural Sciences women do not even reach one-fifth of all grade A staff. However, it is noteworthy that both negative and positive changes in the gender ratio at grade A depend primarily on the small absolute numbers of staff (especially women) in that position per field of research, making them of little significance.

Fig. 2.7 Percentage of women researchers by research field and level (Percentage values)



Source: CNR (2021), authors' calculations.

Tab. 2.2 Researchers by sex, research field and level (Frequencies)

	I level		II level		III level		
	Director of Research		First Researcher		Researcher		
	M	W	M	W	M	W	
2016	Natural sciences	97	44	306	204	938	940
	Engineering and technology	44	7	99	32	346	174
	Medical and health sciences	12	3	22	26	51	116
	Agricultural sciences	13	2	38	31	124	149
	Social sciences	6	8	11	10	43	47
	Humanities	4	5	15	23	64	63
	NA	8	1	12	5	205	205
2020	Natural sciences	198	78	286	216	872	903
	Engineering and technology	54	14	108	40	340	170

Medical and health sciences	13	12	16	19	45	101
Agricultural sciences	24	5	48	49	118	131
Social sciences	14	7	6	13	43	42
Humanities	15	14	12	19	72	76
NA	5	2	18	9	364	480

Source: CNR (2021), authors' calculations.

Career scissors by research field can provide a valuable overview to interpret the career paths of men and women within the CNR as a multi- and inter-disciplinary organisation (Fig. 8), potentially since part of the personnel belonging to a research field works daily thematically distant institutes or departments, thus facing potential career difficulties in their disciplinary field (e.g., publications in journals in a distant research area).

In the two years under review, the gender scissors for Natural Science researchers follow the general trend. At grade C, the gender ratio is balanced, and the gap widens at the upper levels to 68.8% and 71.7% men for grade A in 2016 and 2020, respectively.

The Engineering and Technology sector has historically been male-dominated. At all three levels, the percentage of women in both years never exceeds 33%, although there is a slight improvement in 2020. However, this improvement is extremely sensitive to the low number of female researchers in grade A.

Compared to Engineering and Technology, the Medical and Health Sciences field is traditionally female-dominated. In grades C and B, most female researchers were female in 2016 and 2020. As a result of the latest competitions, the vast gap in 2016 for grade A has been closed since the male proportion of 80% in 2016 dropped to 52% in 2020. However, it is essential to emphasise that in absolute numbers, there are very few Directors of Research (grade A) in this field of study.

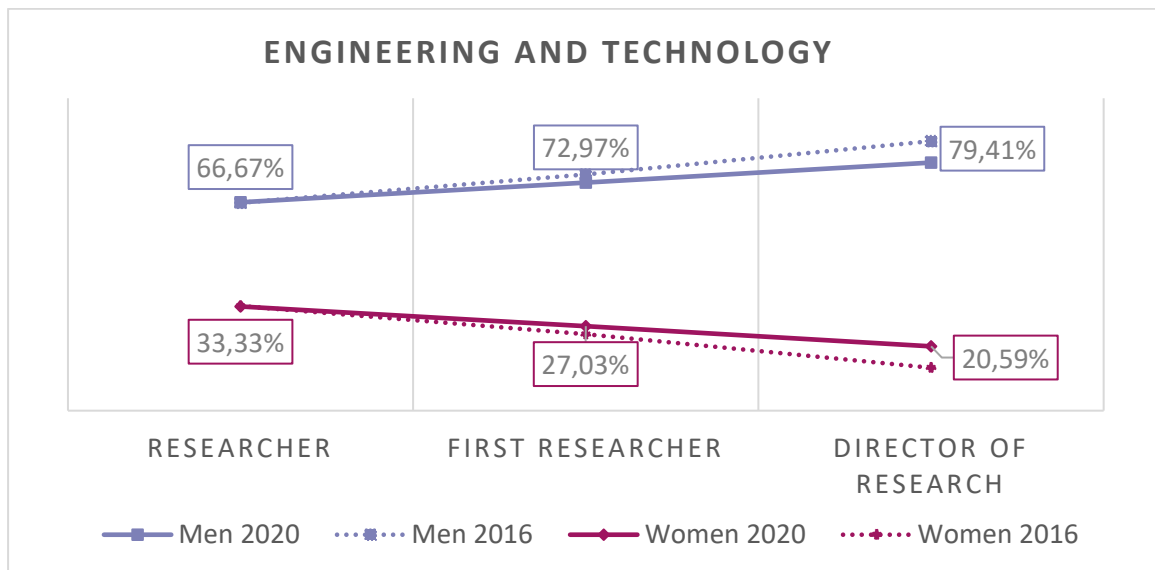
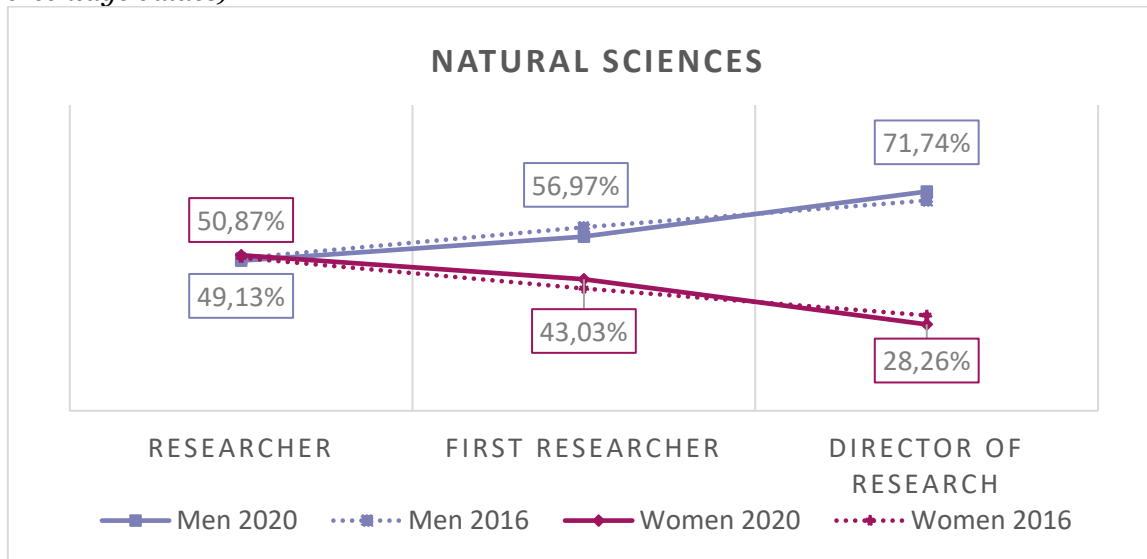
In the research field of Agricultural Sciences, the trend remains similar for 2016 and 2020. There is a greater balance in the level of access to research careers (grade C), where the proportion of women declined from 54.6% in 2016 to 52.6% in 2020, while there was a catch-up in grade B (the proportion of women rose from 44.9% to 50.5%). On the other hand, the gap at grade A displayed in 2016 was also held in 2020.

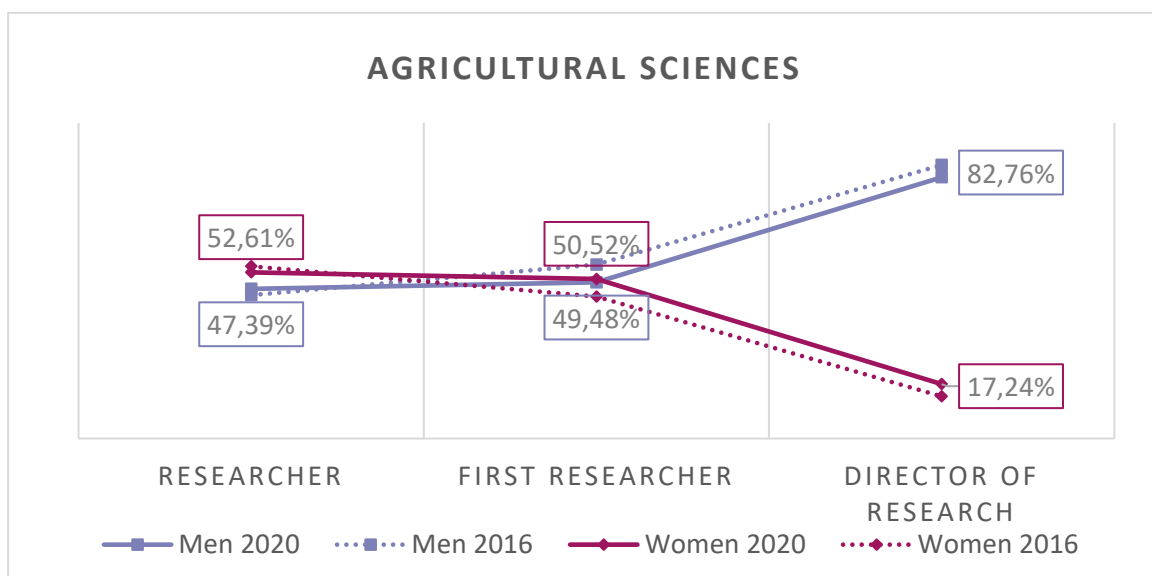
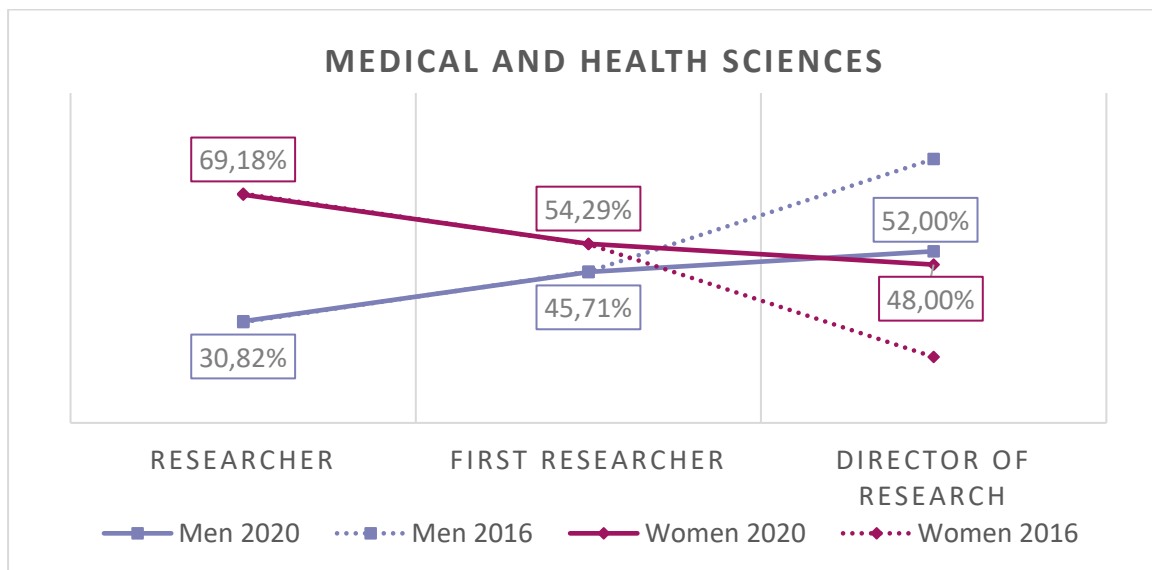
In the CNR, the field of Social Sciences is the one with the lowest number of researchers. Traditionally, with a high proportion of female research staff, the Social Sciences showed, as of 2016, a general gender balance across the three career levels, with a female predominance at the highest level. By 2020, following the competitions held, grade B shows a considerable

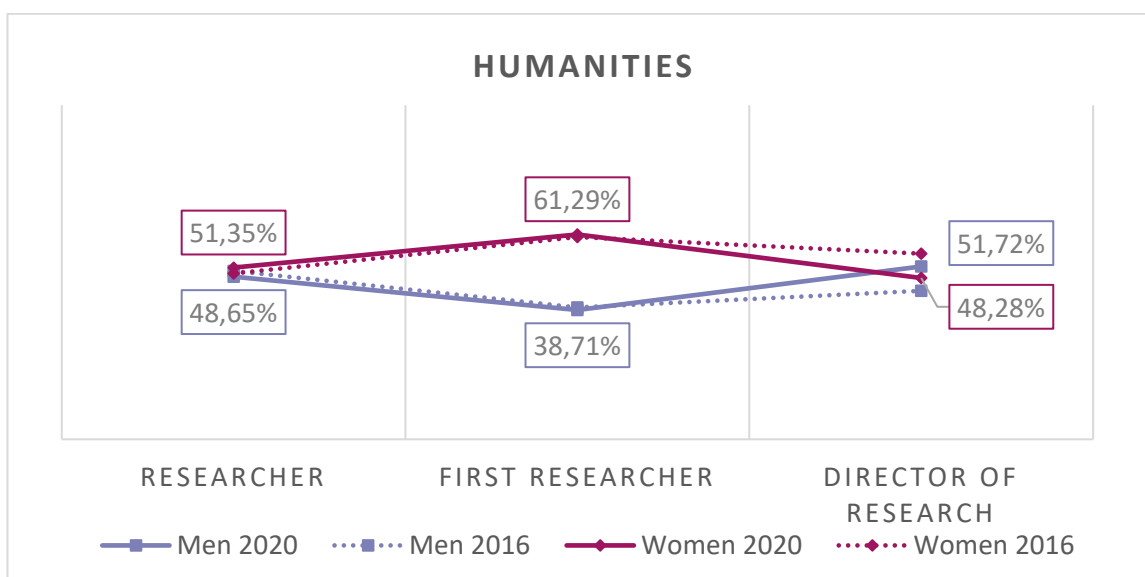
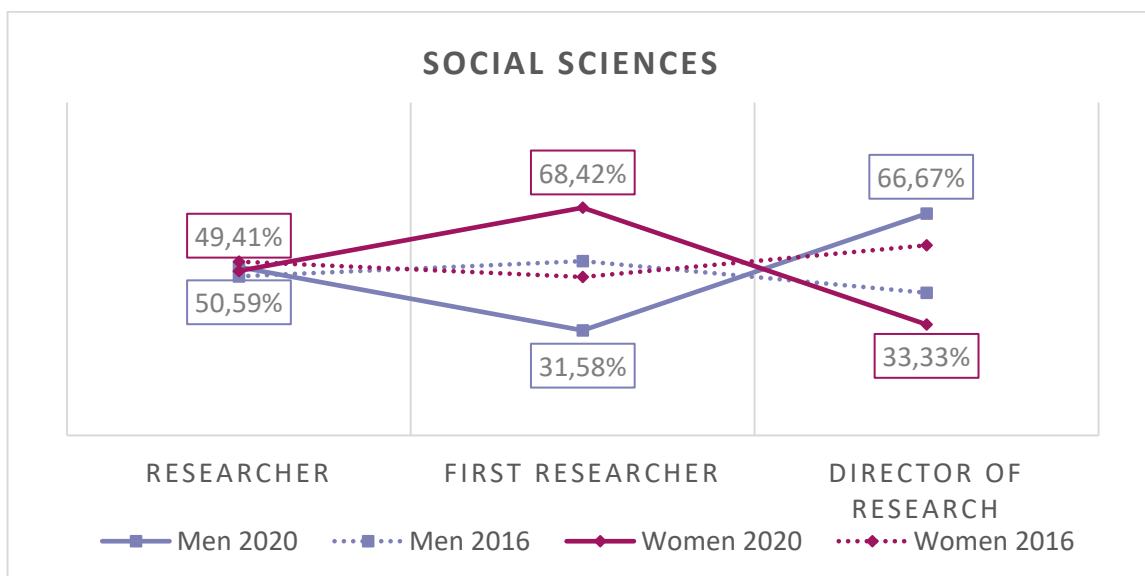
increase in female First Researchers (level II) and a substantial increase in male Directors of Research (level I).

Finally, the field of Humanities showed 2016 a gender balance at grade C and a predominance of women at the higher grades. In 2020, the proportion of women in grades C and B was stable, while it decreased among the Directors of Research (grade A).

Fig. 2.8 Gender composition scissors of Researchers by career level and research field (Percentage values)







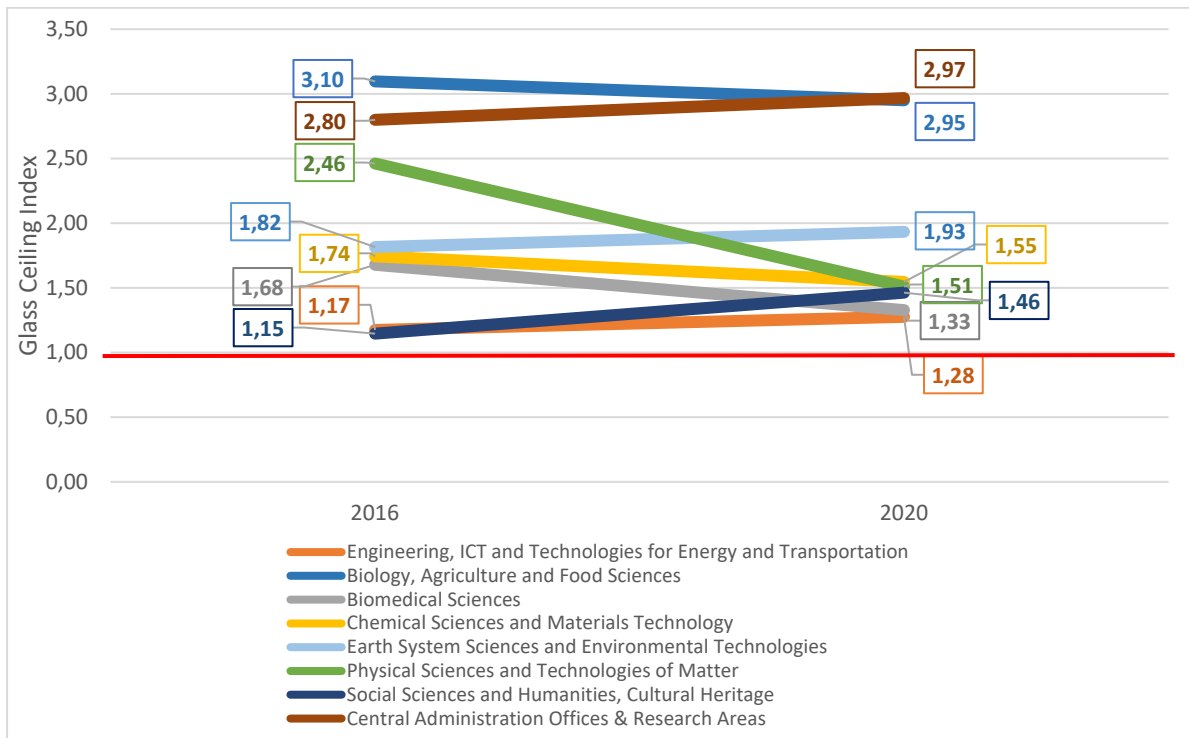
Source: CNR (2021), authors' calculations.

The evidence that has emerged about the presence of men and women in the top positions of the organisation requires further investigations into career paths. In gender studies, the “glass ceiling” metaphor describes the invisible barrier preventing or hindering women’s access to leadership positions (Carli & Eagly 2001; Townsend 1997). This barrier is thickened by the difficulties encountered on the path to professional affirmation, by causes related to work organisation and the recognition of women’s competencies, frequently challenged by socially shared stereotypical representations of gender roles (Cotter *et al.* 2001; Weyer 2007). Starting from this metaphor, the most commonly used index to translate women’s difficulties in reaching top positions into numerical terms is the Glass Ceiling Index (GCI) (The Economist 2014). The GCI measures the likelihood of women reaching top career positions and is calculated regarding grades A, B, and C by normalising for the relative presence of women over men in the three levels. It, therefore, refers exclusively to the career path of female researchers and technologists, marked by two stages: First Researcher/Technologist (level II or grade B) and Director of Research/Technologist (level I or grade A). The index assumes values of 1 if there is an equal proportion of women to men at the top levels, values of less than 1 when women are over-represented in the topmost positions within the organisation, and values of less than 1 in the opposite case of their under-representation.

In the two years under analysis, the GCI has mainly remained steady at the organisation level, from 1.67 to 1.63, showing a slight difficulty for women reaching the top positions (level A). Nevertheless, significant differences emerge if looking at the index by department Fig. . The Department of Biology, Agriculture and Food Sciences and the Central Administration Offices are the departments in which women’s careers within the two research profiles appear to be most hindered, with the indices close to 3 in 2020 and remaining significantly off the parity value. Concerning this, it must also be stressed that the index is calculated exclusively for personnel belonging to levels I to III, i.e., for the researcher and technologist profiles, who represent only about one-third of the total staff in the Central Administration, compared to the remaining two thirds with a technical-administrative profile.

On the other hand, five departments show values relatively close to parity by 2020, albeit with different trends. The traditionally male-dominated Physical Sciences and Technologies of Matter show the gains in access to top positions by gender, going from a GCI of 2.5 in 2016 to 1.5 in 2020. Other improvements are to be found in the departments of Chemical Sciences and Materials Technology (from 1.7 to 1.6) and especially Biomedical Sciences (from 1.7 to 1.3), the department with the highest presence of women among the research profiles within the CNR (63.8% in 2020).

Fig. 2.9 Glass Ceiling Index by department

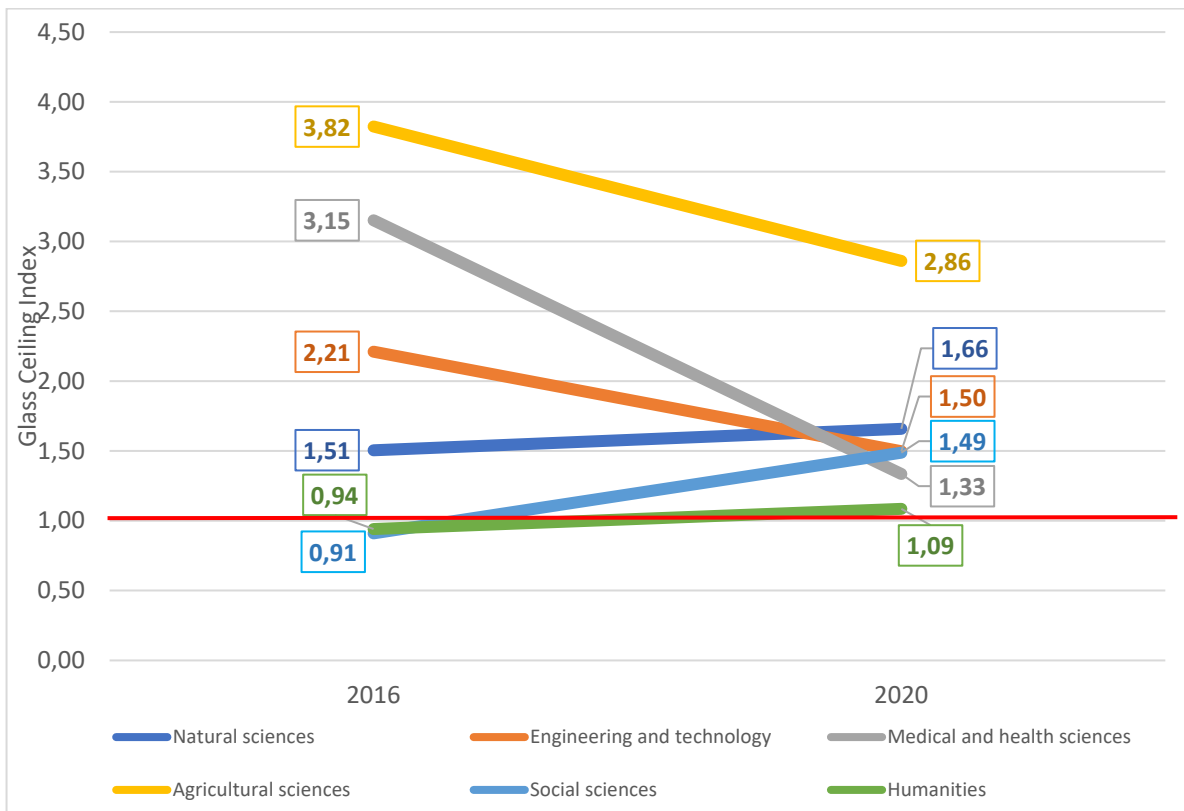


Source: CNR (2021), authors' calculations.

The multidisciplinary nature of the CNR enables the advancement and innovation of knowledge by bringing together knowledge from several fields and allowing a dialogue across the disciplines. The departments, unlike universities, are characterised by wide-ranging research and composed of specialised personnel from different disciplines. Consequently, this characteristic affects the career paths of research staff because some scientists work and perform their tasks within a context that does not match their subject of study. For instance, in terms of publication performance, working in a department or research institute, not in the own field, may limit publications in journals in the same area, thus creating a potential obstacle to career development within the organisation. For these reasons, the Glass Ceiling Index should also be analysed by the research field to realise the presence of barriers to women's career advancement across the departments (

Fig.).

Fig. 2.10 Glass Ceiling Index by research field



Source: CNR (2021), authors' calculations.

The Agricultural Sciences remain the field of research with the highest GCI, thus significantly improving over time (3.82 in 2016 and 2.86 in 2020), highlighting the most impacting glass ceiling effect or the most challenging career for women within the CNR. In 2020, all the remaining research fields gradually converged towards a value between 1.66 (Natural Sciences) and 1.09 (Humanities). While the Medical and Health Sciences drop from 3.15 to 1.33, showing a solid betterment for women's careers over time, Natural Sciences, Humanities, and Social Sciences are the only research fields where the index has increased between 2016 and 2020. In particular, while the Social Sciences and the Humanities used to have values of less than 1 – 0.91 and 0.94, respectively – and thus showed a slight female advantage for achieving grade A in the research career in 2016, the situation is reversed, showing values close to (Humanities) or firmly above (Social Sciences) parity in 2020.

Given the situation just described regarding the career paths of female researchers and technologists at the CNR, it is essential to point out that until 2020, there are no organisational policies relating to female empowerment (e.g., mentoring programmes) or directly to gender equality in the recruitment process (Tab. 2.3). The only measures in place concern the gender balance in selection committees, both for research and technical-administrative competitions

(due to Presidential decree nr.487/1994 “Regulation concerning rules on access to employment in public administrations and the procedures for competitions, single competitions and other forms of recruitment in public employment”, article 9, paragraph 2).

Tab. 2.3 Presence of recruitment and career policies

Policy	2016	2020
Mentoring programs	No	No
Targets in selection committees (TA)	Yes	Yes
Targets in selection committees (TR)	Yes	Yes
Policy in recruitment and gender-balanced career of scientific personnel	No	No

Source: CNR (2021), authors' elaborations.

2.3 Key area 3: Work-life balance

In a traditional context such as the Italian one, in which the burden of caring for children, dependent persons and family life, in general, is mainly on the women's shoulders (Istat 2019), work-life balance measures are essential in order to produce the medium to long term a cultural change in the approach to gender discrimination – even unconscious discrimination – in the workplace. According to the EIGE definition, “work arrangements should be sufficiently flexible to enable workers of both sexes to undertake lifelong learning activities and further professional and personal development, not necessarily directly related to the worker's job”¹⁴.

As of 2016, CNR had some work-life balance measures in place (Tab. 2.). Teleworking is regulated at the central organisation level, based on an agreement between the employee and the organisation under specific conditions regarding the implementation of a specific project related to the organisation's activities. Teleworking may last up to two years. Moreover, CNR organises summer camps for employees' children and agreements with existing nurseries. These work-life balance measures are managed at a territorial level (Institutes and/or research areas), and to date, data collection is not structured to gather aggregate or specific information about them. Similarly, the CNR provides financial contributions for the enrolment of employees' children in nurseries and kindergartens, but the information system does not allow for knowing the exact amount of the allocated contributions.

¹⁴ <https://eige.europa.eu/gender-mainstreaming/concepts-and-definitions>

The COVID-19 emergency led the organisation to introduce specific measures to enable employees with children or dependent persons to continue their daily work. Smart working, once the acute phase of the pandemic was over, became a structural, organisational measure from the beginning of 2022: based on an individual agreement between the employee and the head of the Institute or Department, smart working allows employees to choose to work for up to 10 days a month from home.

*Tab. 2.4 Presence of work-life balance policies, services and measures**

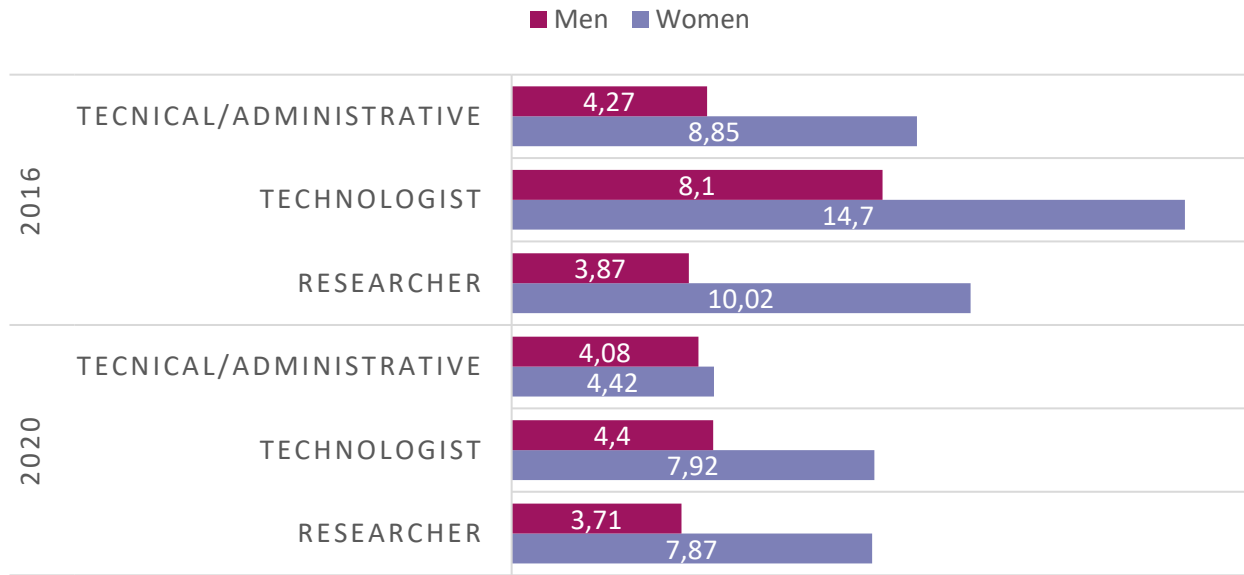
Policy	2016	2020
Lactation rooms	No	No
Nursery	No	No
Elder care assistance	No	No
Summer camps	N/A	N/A
Agreement with external services as benefits for TA staff	N/A	N/A
Flexibility arrangements	Yes	Yes
Adaptation of meeting times to care-related workers' needs	No	No
Covid-19 policies/services/measures for the most sensitive categories	N/S	Yes
Total expense for the enrolment of children in nurseries	N/A	N/A
Total expense for child bonuses	N/A	N/A

* N/A: not available; N/S: not suitable.

Source: CNR (2021), authors' elaborations.

Starting with data on leaves of absence from the workplace, we analysed the number of employees by gender who have access to parental leave. Given the unreliable number of employees with children, because they are only registered by those applying for a relative welfare measure, the percentages are calculated on the total number of employees in each career level. In 2016 and 2020, the female contingent accessed these measures more than the male contingent, both for the technical-administrative and researcher or technologist profiles. However, in 2020, there is a substantial reduction in access to these measures, especially for the female contingent among technical-administrative and research staff. This reduction can be attributed to the emergency introduction of smart working due to COVID-19.

Fig. 2.11 Employees in parental leave out of total staff (percentage values)



Source: CNR (2021), authors' elaborations.

In studying the relationships between the presence of women in research, positions in decision-making bodies, recruitment, career progression and work-life balance, the CNR has two specialised centres internally. Within CNR-IRPPS (Institute of Research on Population and Social Policies, partner of MINDtheGEPs project), the permanent observatory Gender and Talents (GeTa) has been established as part of the “Knowledge society” research unit¹⁵, working on gender equality in science and human resource for STI. GeTa¹⁶ comprises female and male researchers with longstanding research experience and project management capacity on structural change and integration of the gender dimension in research institutions. GeTa, in January 2019, received full support and mandate from the CNR top management to analyse, design and manage both a gender equality plan and a diagnosis study on the gender situation in the organisation. GeTa is publishing an annual report in Italian on gender and research with annual focuses.

Additionally, the CNR is involved in an inter-agency gender awareness project. The OctopusLab¹⁷ has been launched within the Florence Research Area, a project designed to raise awareness of the causes and effects of gender inequality in academia and research. From the initial idea of offering seminars focused on gender inequality in STEM disciplines, the need to

¹⁵ <https://www.irpps.cnr.it/en/cose-societa-della-conoscenza/>

¹⁶ <https://www.irpps.cnr.it/en/geta-osservatorio-su-genere-e-talenti/>

¹⁷ www.area.fi.cnr.it/index.php/it/news-list/211-octopus-lab

speak to a broader community quickly emerged. Therefore, the project decided to address the issue of gender inequality in academia and research by involving those who study and work within the University of Florence and research institutions (National Research Council of Italy, National Institute of Nuclear Physics, and National Institute of Astrophysics).

2.4 Key area 4: Research area

Key area 4 is the most challenging data collection from a gender perspective within the organisation. Although data on doctoral students carrying out research activities in the CNR are available, although the database on research output (publications, patents or other products) exists, and although the database on funding received for projects is maintained, the current data available do not allow for an in-depth analysis of the various dimensions by gender because they are not structured to be interrogated from that perspective. A dialogue on this matter has been opened with the Directorate General and the relevant central offices to make appropriate changes shortly to analyse this data for gender purposes.

3. Discussion and recommendations

Boosted by the development and implementation of the GEP, a massive collection and analysis of gender-related data and policies concerning the management, research, and administrative staff working in the institution has been carried out within the CNR. As pointed out by the EC, the development of a GEP must be grounded on and driven by evidence and tailored based on the particular needs of each institution (European Commission, 2021a). In other words, to design and implement a fruitful GEP, it is essential to map the institution's situation and understand its starting situation. For these reasons, in May 2021, the Working Group for the GEP and Gender Budgeting, created explicitly by the CNR Director General, started a data collection process, resulting in a consistent amount of different gendered data. The present paper reported the analysis of such data.

The data analysis shows how the CNR presents a certain gender equilibrium among its research and non-research personnel and how some improvements have been made in the last few years. However, the research institution is still far from reaching consistent gender equality. In particular, the analysis focused on the following aspects: the Institution's leadership and the policies and initiatives undertaken, the recruitment and career progression, and the work-life balance of CNR employees.

3.1 Key area 1: Decision-making bodies: gendering leaders and institutions

The assessment of the CNR decision-making bodies shows how, in 2020, compared with 2016, some improvements have been made within the Board of Directors and Department directors. While in 2016, both bodies were entirely dominated by men, in 2020, three out of five components of the Board of Directors and two out of seven Department directors were women. However, the analysis shows how related policies have not driven such improvements. It is worth underlining that while the Department directors are selected and appointed through an open competition by the CNR, the members of the Board of Directors are nominated and appointed politically by external entities from the organisation itself. Therefore, while the CNR could and should create the basis for facilitating the appointment of women within the Department directors, it cannot intervene in selecting the Board of Directors components.

Concerning the policies related to gender issues, at the time, the CNR showed no explicit commitment, although it appears from the analysed data that some improvement is taking place between 2016 and 2020. In particular, no policies or actions have been undertaken concerning gender-sensitive language or training activities on gender issues in 2016 and 2020. At the same time, while in 2016, the CNR had an approved Positive Action Plan under Legislative Decree No. 198/2006 and organised awareness-raising events on gender issues, no other policies or initiatives have been undertaken on gender issues concerning general management. In 2020, however, additional actions have been performed: the collection of gendered data, the approval of the protocol for contrasting sexual harassment and gendered-based violence, and the approval of a sustainability budget, including gender equality issues, i.e., the Gender Budgeting (Avveduto *et al.* 2021).

To support the structural change towards a gender-balanced working place, the organisation should foster an internal structural change by introducing gender-balance amendments for the governing rules about the top manager appointments, e.g., heads of Institutes, Departments, and Research Areas, and positions, such as the selection of working groups and committees' members or the recruitment of central administrative directors and managers. To spread a culture of equal opportunities and balance, awareness-raising and training activities for employees and temporary staff should be developed in parallel to the abovementioned activities and work on actions concerning gender-sensitive language and institutional communication.

3.2 Key area 2: Balancing recruitment and career progression

Concerning recruitment and career progression, the analysis showed how TA staff is predominantly composed of males within most career levels, especially in the top levels, mainly due to the technical profile outnumbering the administrative profile by three times. For TR staff, composed of researchers and technologists, the analysis showed how the gender gap increases moving from the bottom to the top levels of the career. Even in this case, a slight increase has been registered for women in 2020 but is well beyond the men's quota, especially for the top level, in which men still represent 71.0% and 62.5% of the total for researchers and technologists. Such vertical segregation is a major issue that CNR should address to offer employees the same rights for working development and personal fulfilment and to strengthen excellence in research.

At the same time, marked differences between female and male researchers are found when considering the different research areas and career levels. Considering early career stages, the Engineering and Technology field is where the most significant gap between men and women is registered, with women accounting only for 1 unit out of 3. Contrarily, Medical and Health Sciences is the field with the highest women participation, with female researchers accounting for almost 70% of the total. Nevertheless, moving along the career ladder, the percentage of women significantly decreases in almost all the research fields considered. In 2020, with the notable exception of the Medical and Health Science field, which registered 48% of women in grade A, no area achieved or moved closer to gender parity.

Until 2020, no specific measure or policy has been implemented at the CNR to govern and manage gender differences in recruitment or career progressions, except for the legislative decree no. 165/2001 concerning the gender composition of competition commissions. Aiming to overcome vertical and horizontal segregation within the CNR, an issue shared with the Italian research and academic system, organisational strategies should, first of all, develop a mentoring programme to support women and early career workers in creating and sustaining a personal network within the organisation, to share experiences and develop strategies to deal with the own working life mainly in those highly masculine and often competitive environments as the STEM (*Science, Technology, Engineering, Mathematics*) research fields usually are. Also, at the individual level, strategies such as GEP should activate systems to support the return to work after a long period of abstention (e.g., maternity leave) since women in early career positions (employees or fellows) are also those of reproductive age, especially in a context of postponing reproductive choices such as Italy. For instance, research grants or

specific projects for the return from maternity leave could be activated to support the person to re-enter the work rhythms in a high-stress and extremely pervasive system in their personal life.

3.3 Key area 3: Work-life balance

Regarding the third dimension considered, work-life balance, the analysis showed how the CNR implemented a few policies in 2016 and 2020. In 2016, among the considered indicators, the Institution only offered its employees some flexibility arrangements in teleworking. Summer camps for employees' children were also activated. However, data related to such measures are not collected structurally and organised, so it is not possible yet to properly relate them to the reference population. Similarly, the CNR provides financial contributions for the enrolment of employees' children in nurseries and kindergartens as well as scholarships, although the information system does not yet allow for a consistent analysis of the contribution amount in relation to the personnel structure.

In 2020, due to the spread of the COVID-19 pandemic, the CNR introduced containment measures according to the national legislation, partially maintained after the emergency period ended. In particular, the possibility to request smart working up to ten days per month has been introduced. In this respect, a series of qualitative interviews conducted among CNR staff before drafting the GEP gave several insights into how the Institution could promote a better work-life balance. In particular, two main themes have been raised: the possibility of making smart working more structural and, on the other side, the possibility of activating company kindergartens or agreements with private kindergartens for its employees.

The first fundamental criticism concerning work-life balance measures concerns the coverage of the measures. Until 2020, the (few) proposed measures only concern researchers, technologists, administrative, and technical staff, excluding grade D staff (fellows or scholarships). This group represents many workers, i.e., more than 2,200 in 2016 and 2020, and plays a central role in research projects and contributing to the innovation process. Nevertheless, given their situation as non-employees, they have no welfare measures provided for by national legislation (except for compulsory maternity leave) and no access to the corporate welfare measures put in place by the CNR. However, this group of people should be better supported in their career path, given their younger average age, their early career situation, and the job insecurity they are exposed to.

Other critical issues in organising a cohesive and efficient system of measures limiting work-life conflict are to be found in the multilevel management of the organisation, i.e., the conflicts that may arise between central and peripheral management such as Departments, Institutes

or Research Areas, as well as in the fragmentation of the organisation on the Italian territory. These two factors make the entire system challenging and complex, as well as define not effective welfare actions at a territorial level.

Based on this review, the welfare measures that can contribute to the reduction of gender inequalities may concern the broadening of the range of beneficiaries (including, for example, non-permanent staff) primarily as already done by other research institutions, adapting the existing measures to the real needs of CNR families (e.g., organising summer camps in the weeks when schools are closed but not parents or tutors are still working), strengthening the offer of support to employees and non-employed staff with care responsibilities in the territory, through conventions and agreements with already existing realities; encourage through ad hoc policies for male employees access to national measures for fathers, such as paternity leave or parental leave, contributing to the spread of a culture of co-caring and co-responsibility between the two genders.

3.4 Key area 4: Research area

As mentioned, the current data availability does not allow for an in-depth analysis of the various dimensions by gender related to the key area 4. To interpret the impact of gender differences in personnel on research output, e.g., articles, chapters, books, or patents by topic, and on scientific performance, e.g., incoming funds due to principal investigator's activity or the number of fellowships tendered per topic, the organisation's strategic actions should strengthen the already existing data collection specifically concerning scientific activity, in order to link it with other existing databases. Such information, if analysed from a gender perspective and in integration with personnel and economic data, would lead to an increase in the knowledge of dynamics hitherto hidden, making possible the planning of specific interventions to support the most marginalised groups and, in the long run, strengthen the CNR's scientific excellence.

3.5 A cross-cutting theme: the data availability

The data collection that has been carried out thanks to the MINDtheGEPs project highlighted the strengths and weaknesses of the administrative data currently collected. Although many steps forward have been taken over the years, the mapping of all the aspects necessary to identify the career breaks of CNR staff, particularly female staff, is not possible yet, especially when these breaks are not explicit but hidden in the nuances.

Recruitment and career progression data should enable the mapping the entire career path for the different profiles, starting from the years of precariousness (fellowships and scholarships). Indeed, the career beginning and its transformation into a permanent position do not follow a linear and standardised path as in the Italian university system since the tenure track option does not yet exist as a recruitment tool. Instead, such evolution may consist of numerous contractual and profile changes. The beginning of a career is characterised for both men and women by several years in fellowship positions, usually on different projects and funds, with the lack of possibility of precarious career reconstruction in contractual and salary terms and in terms of research content. About the transition from fellow to employee position, a data linkage system enabling the study of trajectories is not yet automated, i.e., whether those who start from a precarious employment situation manage to become employees with a TR or TA profile, and in the first case in which disciplinary field. This situation limits the creation of already established indices (e.g., the glass door index) and would require an in-depth study. Finally, data on career progressions are still partly missing, making the quantification of level transitions difficult in terms of duration at the same level and, thus, to be able to quantify the female disadvantage. The data collection on recruitment for temporary and permanent staff and level transitions does not yet allow an in-depth study of competition procedures since information on candidate staff, admitted staff, qualified staff, and successful staff could not be analysed appropriately.

With current data availability, scientific performance analysis from a gender perspective is limited. Gender differences in the staff structure have an impact on research work, both in terms of content innovation and knowledge advancement and in terms of career possibilities. Regarding the impact on working careers, the possibilities to investigate the participation of staff and fellows in international conferences or events and the analysis concerning the finding of funds by type and role remains limited due to a data collection not designed for scientific analysis. The first trial concerns the organisation's adhesion to the European campaign No Women No Panel, coordinated in Italy by the broadcast company RAI¹⁸, which aims to monitor the presence of women in various types of panels, including scientific panels. However, this is an internal monitoring, i.e. in events organised directly, in this case, by the CNR itself. Therefore, secondary information on women's involvement in CNR-organised scientific panels could be obtained for the purposes just described, although this data would concern a small part of the scientific participation of the organisation's staff. Such a situation limits the study

¹⁸ <https://www.rai.it/dl/sociale/website/ContentItem-515b9ef4-4b31-416b-880e-230e6f8e5fe0.html>

of indirect factors on potential gender bias. Concerning purely scientific production, except the number of publications, albeit with some limitations, there is no possibility, for example, to study how gender enters into research (thus trying to enter into the broader debate of *gendered innovations*), thus producing a lack of information concerning potential scientific innovation by CNR researchers and technologists.

Scientific production is strongly linked to welfare in support of personnel. A research organisation that recognises the importance of welfare in the workplace not only as a mere goal in itself but as a precondition for its workers to perform their work to the best of their ability should seek to reduce the work-life conflict with actions to supplement national welfare for all staff, both employees and fellows. Therefore, the organisation needs consistent and up-to-date data on the target population of welfare measures, thus covering childcare and dependent care. This innovation would allow the tailoring of welfare measures to all employees and promote, through specific measures, a care model balanced between the two genders. Finally, administrative data should evolve towards a system of detecting gender identity rather than the biological sex assigned at birth to overcome the traditional, binary male/female approach and thus enable the creation of a welcoming and inclusive working environment, e.g., through the so-called alias careers (already in place in some academic institutions).

All the phenomena and characteristics described above refer to a complex organisation such as the CNR. A territorial dispersion characterises the largest RPO in Italy as it is not confined to a single facility, municipality or territory. Indeed, its 88 institutes (including secondary locations and research units at third-party institutions) are distributed over almost the entire national territory. Another peculiarity is the multilevel organisation: while the directives and welfare measures are established at the organisational level, the day-to-day organisation of work and part of the organisational culture takes shape at the local level, potentially with significant differences between institutes. In addition, there are the Research Areas which, as research structures that also bring together other organisations beyond the CNR, can provide further possibilities regarding staff services.

The multidisciplinary and interdisciplinary nature of the research characterises the CNR from a scientific point of view. However, these two aspects, crucial for advancing and innovating knowledge, pose complex challenges for scientists. On the one hand, work requirements such as equipment and materials, subscriptions to scientific journals, and networking needs are different depending on the scientific field studied; on the other hand, working in an institute or department not directly related to the research discipline area can lead to a slowdown or even hinder the development of the personal scientific career, since the

evaluation system of scientific production still does not value interdisciplinary studies properly.

Therefore, in a situation of structural fragmentation and career complexity, the organisation's administrative databases should be able to provide the basis for an intersectional analysis of gender differences. Data on careers, scientific production, welfare measures and related access, local specificities, and financial information, if accessible and analysable in an integrated manner, could facilitate the identification of the nuances in which female and, we would add, the non-binary workers' disadvantage would materialise.

In this perspective of data integrability and intersectionality, the qualitative-quantitative integration work carried out with the MINDtheGEPs project can leave a great legacy to build on. The CNR should aim to collect and integrate qualitative with quantitative data. While quantitative data are more accessible to collect and systematise, they may not necessarily help to identify the often subtle and hidden aspects in which obstacles to gender equality arise and become rooted. In this respect, for instance, designing and setting up periodic interviews or focus groups among the staff could let the top management uncover sensitive topics or aspects needing new policies that the Institution could implement.

4. Conclusions

Overall, the analysis of the collected data systematised as a first step for the development of the first CNR Gender Equality Plan (CNR 2022), shows a picture in which, notwithstanding the progress that the Institution has undoubtedly made in the last years, much work is needed for all the areas considered in order to reach complete gender equality.

In particular, measures must be introduced to correct the high gender inequalities in employees' career progression for both TR and TA staff. To overcome such inequalities, the CNR ought to design and implement policies and measures to favour employees' work-life balance in academia since such policies have been identified as a major driver of female career development, especially in the aftermath of the pandemic (European Commission, Directorate-General for Research and Innovation 2023). Additionally, the general methodology should aim towards a holistic and cross-cutting approach since "Gender equality contributes to the integrity and societal responsibility of research" (Council of the European Union 2021).

Lastly, the analysis also pointed out how to design and implement better measures. Following the principle of "no data, no problem, no policy", CNR should improve the collection and systematisation of the gendered data concerning its employees and fellows. However, in

the context of and thanks to the MINDtheGEPs project and the GEP design, it has been activated a fruitful discussion with the central administrative offices in charge of the data collection to overcome the main and persistent issues and implement a coherent, consistent, and reliable administrative data flow. Efforts are being made to allow the communication and integration of the different databases and sources of information to be able to collect, produce and analyse those data that are currently unavailable. The information systems could even partially automate the information extraction process so that a useful monitoring tool would be available at any time for the active surveillance of the effects of the Institution's internal policies and for measuring the consequences in terms of equality of conditions for all staff, but also in terms of competitiveness with other national and international scientific realities.

References

- Avveduto S. (Ed.), Antonucci M.C., Caruso M.G., Cellini M., Cerbara L., Coratella R., Crescimbene C., Demurtas P., Di Tullio I., Luzi D., Marchesini N., Pecoraro F., Pisacane L., Reale M. and Ruggeri R. (2021). *Bilancio di genere - Anno 2019*. Roma: CNR Edizioni. Available at: <https://doi.org/10.14600/978-88-8080-423-9>.
- Bazzanella C. (2010). Genere e lingua. In R. Simone, G. Berruto and P. D'Achille (Eds.) *Enciclopedia dell'Italiano*. Istituto dell'Enciclopedia Italiana. Available at: [https://www.treccani.it/enciclopedia/genere-e-lingua_\(Enciclopedia-dell'Italiano\)](https://www.treccani.it/enciclopedia/genere-e-lingua_(Enciclopedia-dell'Italiano)).
- Carli L.L. and Eagly A.H. (2001). Gender, Hierarchy, and Leadership: An Introduction. *Journal of Social Issues*, 57(4), 629-636. Available at: <https://doi.org/10.1111/0022-4537.00232>.
- Caruso M.G., Cerbara L., Gaggero D., and Marchesini N. (2022). *Bilancio di genere CNR, anno 2020 - Infografica*. Roma CNR Edizioni. Available at: https://www.cnr.it/sites/default/files/public/media/servizi/infografica_Bilancio_genere_1_07.pdf.
- Clavero S., and Galligan Y. (2021). Delivering gender justice in academia through gender equality plans? Normative and practical challenges. *Gender, Work & Organisation*, 28(3), 1115-1132. Available at: <https://doi.org/10.1111/gwao.12658>
- CNR (2020). Codice per la prevenzione e il contrasto delle molestie nel CNR. Decision n.191/2020. available at: <https://cug.cnr.it/sites/default/file/Codice%20per%20la%20prevenzione%20e%20il%20contrasto%20delle%20molestie%20nel%20CNR.pdf>.
- CNR (2022). *Personnel administrative records* (years 2016 and 2020) [Data set].
- CNR (2022). *Piano per la parità di genere 2022-2024* (p. 37). Roma: CNR Edizioni. Available at: https://www.cnr.it/sites/default/files/public/media/attivita/gender-equality/GEP_CNR_FINALE.pdf.
- Cotter D.A., Hermsen J.M., Ovadia S., and Vanneman R. (2001). The Glass Ceiling Effect. *Social Forces*, 80(2), 655-681. Available at: <https://doi.org/10.1353/sof.2001.0091>.

- Council of the European Union (2015). Advancing gender equality in the European Research Area - Council conclusions. No. 14846/15. Available at: <https://data.consilium.europa.eu/doc/document/ST-14846-2015-INIT/en/pdf>.
- Council of the European Union (2021). Virtual Conference ‘Deepening the ERA Through Gender Equality’ (8-9 July 2021) and Ljubljana Declaration on Gender Equality in Research and Innovation - Information from the Presidency. No. 12044/21. Available at: <https://data.consilium.europa.eu/doc/document/ST-12044-2021-INIT/en/pdf>.
- European Commission (2012). *Structural change in research institutions: Enhancing excellence, gender equality and efficiency in research and innovation*. Directorate-General for Justice and Consumers. Publications Office of the European Union. Available at: <https://data.europa.eu/doi/10.2777/37288>.
- European Commission (2016). *Strategic engagement for gender equality 2016-2019* (p. 50). Directorate-General for Justice and Consumers. Publications Office of the European Union. Available at: <https://data.europa.eu/doi/10.2838/454429>.
- European Commission (2021a). *Horizon Europe guidance on gender equality plans* (p. 54). Publications Office of the European Union. Available at: <https://doi.org/doi/10.2777/876509>.
- European Commission (2021b). *Horizon Europe. Work Programme 2021-2022. 13. General Annexes*. Publications Office of the European Union. Available at: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-13-general-annexes_horizon-2021-2022_en.pdf.
- European Commission (2021c). *She Figures 2021. Gender in Research and Innovation Statistics and Indicators* (p. 352). Publications Office of the European Union. Available at: <https://op.europa.eu/s/uVLR>
- European Commission (2023). *COVID-19 impact on gender equality in research & innovation: Policy report* (p. 127). Directorate-General for Research and Innovation. Publications Office of the European Union. Available at: <https://data.europa.eu/doi/10.2777/171804>.

- ISTAT (2019). *I tempi della vita quotidiana. Lavoro, conciliazione, parità di genere e benessere soggettivo*. Istituto nazionale di Statistica. <https://www.istat.it/it/files//2019/05/ebook-I-tempi-della-vita-quotidiana.pdf>
- Legislative Decree no.165 (30 March 2001). *Norme generali sull'ordinamento del lavoro alle dipendenze delle amministrazioni pubbliche* Official Gazette of the Italian Republic no.106, 09 May 2001. Ordinary addendum no.112. Available at: <https://www.gazzettaufficiale.it/eli/gu/2001/05/09/106/so/112/sg/pdf>.
- Legislative Decree no.198 (11 April 2006). *Codice delle pari opportunità tra uomo e donna*. Official Gazette of the Italian Republic no.125, 31 May 2006. Ordinary addendum no.133. Available at: <https://www.gazzettaufficiale.it/eli/gu/2006/05/31/125/so/133/sg/pdf>.
- MINDtheGEPs (2020). *Horison2020, call H2020-SwafS-2018-2020, proposal no.101006543 Modifying Institution by Developing Gender Equality Plans*.
- Ministerial Decree (4 October 2000). Official Gazette of the Italian Republic no.249, 24 October 2000. Ordinary addendum no.175. Available at: <http://attiministeriali.miur.it/anno-2000/ottobre/dm-04102000.aspx>.
- Murgia A. and Poggio B. (Eds.) (2018). *Gender and Precarious Research Careers: A Comparative Analysis* (1st ed.). London: Routledge. Available at: <https://doi.org/10.4324/9781315201245>.
- Presidential decree no.487 (9 May 1994). *Regolamento recante norme sull'accesso agli impieghi nelle pubbliche amministrazioni e le modalità di svolgimento dei concorsi, dei concorsi unici e delle altre forme di assunzione nei pubblici impieghi*. Official Gazette of the Italian Republic no.185, 09 August 1994. Ordinary addendum no.113. Available at: <https://www.gazzettaufficiale.it/eli/gu/1994/08/09/185/so/113/sg/pdf>
- Rees T. (2001). *Mainstreaming Gender Equality in Science in the European Union: The 'ETAN Report'*. *Gender and Education*, 13(3), 243-260. Available at: <https://doi.org/10.1080/09540250120063544>.

- Solera C., Balzano A., Tuco F., Pisacane L., and Fernow J. (2023). *No data: No policies! The MINDtheGEPs approach to evidence-based policies for Gender Equality Plans* (Policy Briefs). MINDtheGEPs. Available at: <https://doi.org/10.5281/zenodo.7785413>.
- The Economist (2014, March). *The Glass Ceiling Index*. The Economist. Available at: <https://www.economist.com/graphic-detail/glass-ceiling-index>.
- Townsend B. (1997). Breaking Through: The Glass Ceiling Revisited. *Equal Opportunities International*, 16(5), 4-13. Available at: <https://doi.org/10.1108/eb010692>.
- Weyer B. (2007). Twenty years later: Explaining the persistence of the glass ceiling for women leaders. *Women in Management Review*, 22(6), 482-496. Available at: <https://doi.org/10.1108/09649420710778718>.