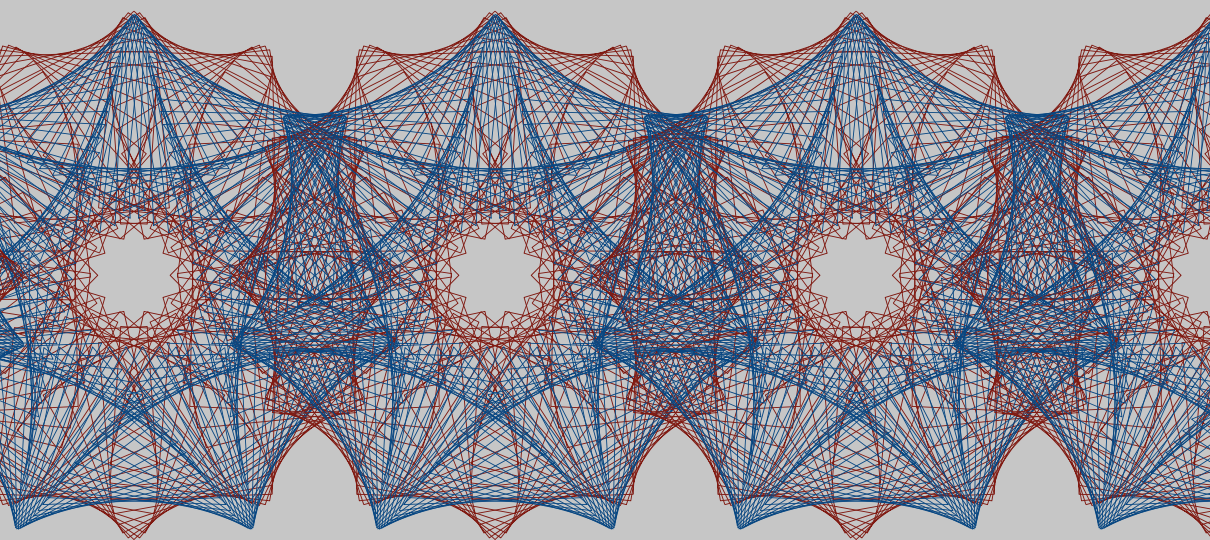# Institutional Change for Gender Equality in Research

edited by
Maria Sangiuliano, Agostino Cortesi

**Edizioni
Ca'Foscari**

Institutional Change for Gender Equality in Research

Scienza e società

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Institutional Change
for Gender Equality
in Research
Lesson Learned from the Field

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This publication draws on the research carried out in the context of the EQUAL-IST project.

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Lesson Learned from the Field

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Introduction

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Gender balance in research organizations is considered as a key step for ensuring research excellence and quality and inclusive-sustainable innovation. ERA (European Research Aerea) objectives have stressed the importance of gender equality in research, at the three levels of fostering equality in scientific careers, achieving gender balance in decision making and integrating a gender dimension in scientific research content. Still, in spite of an increasing number of Higher Education and research institutions committed to make science more equal and some slow but positive trends in figures on Gender equality in STEM (Science, Technology, Mathematics and Engineering) research (She Figures, 2018), it still appears to be difficult to prioritize gender equality. This is particularly true for disciplines such as ICT (Information Communication Technologies) and IST (Information Systems Studies) where female representation at all levels is among the lowest ones among STEM topics and where a gender sensitive approach to ICT design and to programming is far from being understood in its implications among computer and information systems scientists.

After the policies initiated during the late '90s to address these problems which were mostly informed by a 'fixing the women' approach, the concept of institutional change for gender equality has gained momentum. By merging change management and gender equality policies, the focus shifted to changing the institutions themselves, promoting the use of encompassing measures such as GEPs (Gender Equality Plans), able to cover a variety of actions in response to multifaceted challenges: several research projects have been funded by the European Union in this field in the last 2 programming periods starting from FP7 already and continuing with H2020.

This volume stems as an unforeseen output from one of those projects, namely EQUAL-IST (2017-2019), where a consortium of ICT/IST Research Performing Organizations (RPOs) has joined forces to use gender equality as a leverage to influence, innovate and transform Human Resources management, academic governance processes, institutional communication, research design, as well as teaching & services to students. Ca' Foscari University and the Department of Informatics, Environmental Sciences and Statistics being an active promoter of gender equality in ICT since several years already, has taken the role of supporting institution in EQUAL-IST, guiding all partner Universities in building internal capacity on gender equality policies, and ensuring that Gender Equality Plans were designed and implemented in a comprehensive, consistent and sustainable way. By the end of the project, and having accomplished all the reports and tools planned as part of the EQUAL-IST workplan, we have come to the conclusion that creating a legacy for EQUAL-IST by way of a comprehensive volume could serve a twofold purpose: on one side, we identified writing as a way to further enhancing reflexivity internally to the consortium on accomplishments, limits, encountered resistances. On the other hand, the mere fact of collecting, distilling and systematizing main results in one single Open Access volume, was thought to be the best option for dissemination purposes. We believe this can be an useful reading in particular for all those Universities and Research Organizations in the ICT/IST disciplines and beyond, that will engage themselves in similar initiatives in the future.

We have structured the volume in three main sections. The first one, from Chapter 1 to 4, presents some of the main methodologies and tools which have been designed to enable research organizations to go through the steps of assessment, design and implementation of GEPs, as well as the outcomes of the internal audits which lead to identify challenges and main actions to be worked out and included in the GEPs.

In Chapter 1, Maria Sangiuliano, Claudia Canali and Vasiliki Madesi look at the results of the participatory gender audit conducted by the EQUAL-IST through a series of consultation and the process of identifying/defining the existing processes while at the same time shaping the potential solutions. The discrepancies between these two levels, the diagnostic and the prognostic one, point at the always present risks of losing the transformative side of gender equality policies along the continuos tensions and negotiations which feature the institutional change process.

In Chapter 2, the main features of the EQUAL-IST project emerge, namely an emphasis on participatory methodologies and a bottom up approach hand in hand with an evidence based orientation. In fact,

Claudia Canali, Tindara Addabbo and Maria Sangiuliano present the gender assessment methodology which was developed in the EQUAL-IST project starting from the ILO Participatory Gender Audit: It kept together on one side, a quantitative approach, based on measurable indicators computed on gender disaggregated data, and on the other hand a qualitative approach, based on participatory techniques and tools such as focus groups, workshops, semi-structured interviews, thought of for playing also a raising awareness role and set up the building blocks for a common vocabulary and basic knowledge of gender equality issues at each University.

After the Gender Audit, participation of academic communities and staff at each RPO was further triggered by introducing an on line crowdsourcing tool for further consultations and preliminarily to the final design of the Gender Equality Plans: in Chapter 3, Elena Gorbacheva, Vasiliki Moumtzi and Armin Stein illustrate the CrowdEquality platform, which is an Open Source, re-usable and adaptable tool, but can also serve as inspiration or as a model for similar customized platforms to be designed and programmed from scratch.

As anticipated, in Section 2, readers can delve into the EQUAL-IST GEPs implementing phase, with its peculiar challenges, resistances included, and the not easy goal of making the achieved results sustainable after the life cycle of the project. In Chapter 4 the analytical framework used in Chapter 1 is further refined and the authors look at results from the first implementation phase of the Plans: Maria Sangiuliano, Claudia Canali and Elena Gorbacheva. As all partners have put major efforts to attract more girls in ICT studies (externally oriented actions, not in all cases made structural/permanent) due to the fact that the gender leak in the ICT-IST recruitment pipeline starting at the enrollment at university easily recognized by ICT/IST academics, the authors aimed at understanding to what point this could imply a risk to bend the process towards more externally-oriented actions, which might be less likely to impact internal power structures, at least in the short run. The chapter also explores whether structural change actions, which have the potential to go beyond mere raising awareness on the topics at stake, tend to be concentrated in the Human Resources and Management Practices area, and recognizes the weakness of a lack of actions aimed at integrating a gender dimension in ICT/IST research content.

Chapters 5 from to 10 report the case studies of GEPs actualization by the Portuguese, Lithuanian, German, Italian implementing partners of the EQUAL-IST consortium respectively. Isabel Ramos and Victor Barros present the case of the University of Minho (Chapter 5), where the Equality Plan was supported by a broad engagement strategy,

and internal consensus building relied on expanding the GEPs team from the Engineering faculty more broadly to the entire University and was fostered by the set-up of protocols and agreements with National Authorities. Chapter 6, authored by Daina Gudoniene and Danguole Rutkauskiene, reports on the experience from the Informatics Faculty Kaunas University of Technology: starting from a low level of internal awareness of gender inequalities in ICT and ICT and facing widespread stereotypes about girls and women being not inclined to study computer sciences 'by nature', the team managed to set up initiatives for attracting and retaining more female students in IST and involve the HR Management structures to revise their career guidance procedures. Chapter 7 is discussing the experience of the University of Modena and Reggio Emilia, where the Department of Computer Engineering has driven a change process involving the existing Equality Bodies already present at the broader University level. Claudia Canali and Tindara Addabbo explain how they have operated by way of carefully orchestrating internal networks and strategically exploring existing windows of opportunities such as the renewal of the Triannual Positive Action Plan due by Law to get the commitment of the University and promoting several structural changes. The GEP has touched upon in areas such as gender sensitive institutional communication, and last but not least, the University managed to set up an interdisciplinary network of STEM and socio-economic sciences/humanities researchers interested into developing joint scientific research which take gender into account as a research dimension.

Also Chapter 9 refers to a good practice developed by the University of Modena and Reggio Emilia, namely the so-called Digital Girls Summer Camps: Claudia Canali and Vicki Moumtzi not only describe and analyse the features of an extremely and increasingly successful initiative which has started to positively impact on the number of enrolled girls in Computer Engineering studies, but they also highlight the collaborative model which has ultimately made it possible via a collaboration between the University, Women's Ngos, and local/regional economic actors. Back to Chapter 8, we have the German case study about the implementation of the Gender Equality Plan at the University of Muenster, and its Department of Information Systems. The context is featured by an already very active central Gender Equality Office and less impactful policies at the Department and School levels. Here, Elena Gorbacheva explains how thanks to a systematic and evidence based approach, the GEP Working Group has managed to overcome most of the initial internal resistances towards the subject. The overall participation to the project has brought to increased attention and a higher visibility as well as enhanced legitimisation of gender equality, and to some important structural changes at the School level with allocation of extra Human Resources to support the work of the GE Officer.

The final Chapter of Section 2 looks into the important topic of sustainability after the end of the project, in search for an additional proof of the extent to which the triggered change has really been 'institutional', therefore supposedly permanently embedded in existing regulations and procedures and with adequate allocated resources. Here Maria Sangiuliano, Vasiliki Moumtzi and Apostolos Vontas unfold the EQUAL-IST approach to enhance sustainability of GEPs, based on keeping sustainability dimensions into account along all project phases and working on the design of individual Sustainability Plans by the end of the second implementation round, and fostered the commitment of high management levels. Although a 3 years long project with 2 years only devoted to implementation of GEPs is a limited time to guarantee that the initiated processes will smoothly continue in all of the involved universities, the emerging picture is overall positive.

The third and final Section of the volume moves away from the EQUAL-IST case to look into the bigger picture of Gender Equality Plans in Europe. In Chapter 11, Maria Sangiuliano elaborates on results from a study conducted as one of the first EQUAL-IST actions: drawing on 19 in depth interviews with representatives from Universities representatives with experience in implementing GEPs or in the process of commencing with such practice. Interviewed scholars and practitioners helped to understand to what point a systematic and comprehensive policy such as a GEP has added value in promoting structural change if compared with specific interventions or actions addressing particular inequality areas. Most common challenges and resistances to be met along the process are also highlighted in the study.

In Chapter 12, Thomas Berghoefer reports an overview of results from GENERA, another H2020 project on institutional change for gender equality which chose to adopt a disciplinary approach, addressing researcher organizations in Physics only. Methods and tools are described, such as the GENERA toolbox, for example, including more than 100 good practice measures to support gender equality in physics institutions have been compiled, the 'Gender in Physics days' – one-day national events invented by GENERA and organized and the involvement of some project partners in a new endeavour such as the ACT on Gender H2020 new project, which set up a series of Communities of Practices on institutional change. In such framework, the GENERA CoP is operating among others, which will ensure continuity to a peer learning process among RPOs in Physics interested in promoting gender equality within their institutions.

Insights from the H2020 GenderTime Project are instead to be found in Chapter 13, where Jennifer Dahmen Adkins and Helen Peterson focus on monitoring methodologies an tools used in the project

and frame monitoring as a key component of successful structural change. Their work goes beyond they typical vision of project monitoring as an on-going collection of data for continuos assessment: a dedicated toolbox, the use of cultural staff survey and national survey reports, peer consultation reflection sessions, present monitoring as one of the transformational leverages used within the project.

Last but not least, Chapter 14 closes the volume on a cautiously positive note: in their study on gender composition of Boards of Directors in all Italian Universities is and its correlation with the gender sensitivity of the University Strategic Plans, Romilda Mazzotta, Maria, Teresa Nardo, Patrizia Pastore and Giovanna Vingelli, suggest that from their analysis boards with higher gender diversity are positively correlated to the gender sensitivity of the strategic plans foreseen in the Italian regulatory framework and that the participation of women in the board of directors seems to bring new perspectives to the board in terms of addressing gender equality related issues. Along with the empirical findings from the study, the chapter presents 3 framing paragraphs with comprehensive and updated state of art reviews of EU policies on gender in research and on the debate on gender composition of boards, in the corporate sector as well as with focus on Academia.

Section I
Gender Equality Plan Design:
A Participatory Approach

Shaping Gender Equality Policies in IST-ICT Research Institutions

Reflective Negotiations from the Participatory Audit to Design of Gender Equality Plans

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Abstract   One of the critical issues highlighted by the existing literature on structural change for gender equality refers to the tensions and negotiations between the transformative goal of gender equality policies and the multiple ways they can be re-assumed and incorporated into existing policies and institutional goals. Institutional change can happen via small steps by exploiting existing discursive opportunities, or it can be overtly resisted and seen as a destabilizing factor for the status quo and existing power structures. The H2020 EQUAL-IST (Gender Equality Plans for Information Sciences and Technology Research Institutions) project supported 6 Universities across Europe starting from their Informatics and/or Information Systems Departments to initiate the design and implementation of gender equality plans from a field such as ICT/IST featured by extremely low representation of female researchers and full professors. The chapter analyzes the internal assessment phase and the preliminary steps of the initiated design process: based on a mixed methodology and a participatory approach to design gender equality policies, quantitative data collection has gone hand in hand with a qualitative Participatory Gender Audit: staff members and students discussed the main challenges related to gender inequalities and an idea generation process was kicked off. Discrepancies between the 'diagnostic' aspect of assessing problems and 'prognostic' ideas for measures and solutions are highlighted, leading to interesting insights as far as the afore-mentioned tensions are concerned.

Keywords   Gender Equality Plans (GEPS). Structural changes. IST research organizations. Gender audits. Participatory assessment and design.

1 Policy Framework and Operational Background

Gender equality in research has been addressed by the European Commission since 1999 through the establishment of the Helsinki Group and the first Communication on Women and Science" (European Commission 1999) Gender equality in research was already present as a policy goal across FP6 and FP7 with a gradual shift from actions aimed to making women more apt to be integrated into existing and male dominated higher education and research environments, to measures designed for 'fixing' academic and research institutions'. As it happened more in general for gender equality policies worldwide, the following decades marked also a stronger orientation towards gender mainstreaming, a policy approach featuring a so called 'double' track strategy complementing equal treatment policies and positive actions with integrating a gender approach crosscutting all policy areas (Stratigaki 2005). Overall, gender equality policies and debates have been featured by multiple discursive frameworks, often contradictory ones, in what has been described as a contested and complex 'negotiation' process (Bacchi, Eveline 2010).

The *Gender in Research Initiative* was a first EU wide investment to raise the awareness and enhance gender competences among researchers, until the issue was fully integrated into European Research Area policies leveraging on the argument of fostering research excellence and avoiding wasting women's talents (EC 2012a, 2012b). Resources were made available via the 7th Framework Programme and continued under H2020 2013-2017 to fund consortia of Research Funding (RFOs) and Research Performing Organizations (RPOs) committed to implement so called "structural changes" through design and implementation of Gender Equality Plans (GEPs) (EC 2014; EIGE 2016). EQUAL-IST was approved in 2016 within this policy framework and it gathers 7 RPOs from Germany, Finland, Italy, Liechtenstein, Lithuania, Portugal, Ukraine. Running for 36 months, EQUAL-IST main challenge is about approaching the specific research fields of Information and Communication Technologies and Information Systems, filling the lack of discipline-specific research and intervention in these areas (Benschop, Van den Brink 2011).

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* This chapter is a revised version of a conference paper of the same authors presented at the 2nd International Conference on Gender Research (ICGR 2018).

The design of the EQUAL-IST project was guided by a theoretical framework based on socio-constructivist gender theory, considering gender as a constitutive part of organizational practices (Acker 1990; Benschop 2001; Gherardi 1994), a 'doing of gender' approach (West, Zimmerman 1987) empirically imbuing rules, procedures, social interactions and discourses. In academic contexts, as Yvonne Benschop and Marianne Van Den Brink (ibid.) have brilliantly demonstrated, the variety of layers impacted by gender inequalities takes the semblance of a 'seven headed dragon' to be counteracted by highly flexible and context-based strategies and tools: the 'undoing' of gender inequalities implies enacting a different vision of gender relations in academic life. EQUAL-IST has lead towards finding a sustainable impact across 4 main areas of intervention; Human Resources and Management structures -including Governance; Research Design and Delivery; Institutional Communication, Teaching and Students Services. All project activities aimed at supporting partners in the path towards carrying out internal assessments and design their GEPs in full awareness of the fact that any attempts to introduce change in institutional contexts whose power structures and dynamics are entrenched with gender inequalities, would inevitably provoke internal resistances at various levels (Lombardo, Mergaert 2013). Interestingly, scholars have also spotlighted how even requests for research and training interventions can express implicit resistance , as data and evidence gathering and/or raising awareness can be used to divert attention from more challenging actions such as changing rules and procedures (Benschop, Verloo 2006).

This paper aims at achieving an ex-post and (self) critical review of the Participatory Gender Audit processes (PGA) in EQUAL-IST to highlight its strengths and limitations. Data provided by EQUAL-IST partners on their PGA processes (i.e. Individual Gender Audit Reports structured along a common reporting template) are analyzed by a heuristic framework inspired by Lombardo and Meier's study (Lombardo, Meier 2006), highlighting how when negotiating on meanings and goals of gender equality policies, two levels of analysis are intertwined: a diagnostic and a prognostic one. The former refers to the ways gender inequalities are assessed, their background reasons and the engaged (and/or held responsible) subjects are identified. The latter entails the solutions in terms of policies, measures, actions which are proposed to tackle them. Consistency and coherence between the two is expected in policy design, although this can be addressed in a multiplicity of ways indeed. Collected statistical data and the PGA workshops themselves held during the year 2016, confirmed the involved academic organizations were severely featured by gender inequalities along the entire research and education pipeline (low representation of female among students, researchers, full professors and Dept. Managers, absence of a gender perspective applied to teaching

research and institutional communication). By clustering typologies of interventions/solutions emerging from the PGAs in two main categories, structural change interventions and preparatory interventions or soft measures, we highlight ambiguities and tensions which have emerged: on one side we assess to what extent project partners have managed to go beyond the relatively short-term agenda foreseen by a tri-annual GEP and to include in the official GEPs measures which have the potential to become structural. On the other hand, we reflect on whether the abundance of preparatory and soft measures proposed (further research and internal analysis, raising awareness, training and communication action) shoulf be interpreted as a sign of internal resistance to change.

2   Assessing Gender Inequalities: An Evidence Based and Participatory Approach

At the end of March 2017, 10 months after the project's kick off, all engaged universities had completed their internal assessment and analysis of gender inequalities through a quali-quantitative audit methodology characterized by a strong participatory approach. From such process,a series of solutions and proposed activities to be further discussed by the management for potential inclusion in the GEPs have been selected (Sangiuliano 2017a)

In the need of crafting a gender audit methodology targeted at ICT/IST Departments and Faculties, two specific choices were guiding the methodology design process:

- a mixed methodology featured by a quantitative and qualitative approach,
- a participatory strategy able to trigger discussions, create ownership of the project's goals, identify challenges and needs in a thorough way, letting a collective idea generation process take shape.

Within EQUAL-IST, partners could benefit from having the opportunity to both collect and analyze quantitative gender disaggregated data, and foster the understanding of their internal institutional and gendered dynamics through qualitative methods (Canali 2017).

Furthermore, EQUAL-IST has been featured since the very beginning of the project design by the willingness of opting in for a participatory approach. Bottom-up push was emphasized without neglecting the importance of keeping the high and middle management levels engaged, to contrast risks typically entailed into implementing gender equality policies at large by reducing them to merely technical-bureaucratical "box- ticking" exercises (Squires 2007). This is typically the case when organizations/institutions have to comply with gender policies as they are enforced by national legislations or when

for opportunistic reasonspublic resources are made available to implement them. Additionally, it has been considered how accentuating participatory aspects could be more suitable to 'shake' a seemingly immobile situation in a highly male dominated environment and trigger discussions on gender equality; this was thought of being particularly suitable for a strongly discipline-oriented project, such as EQUAL-IST, targeting Research Institutions in the ICT/IST domain, where gender bias is particularly severe.

Starting from the adaptation of Participatory Gender Audit to research institutions from the GenisLAB project (Genova, De Micheli et al. 2014), the EQUAL-IST project has proceeded to customize the PGA to ICT-IST institutions based on the following assumptions:

- work systematically on the quantitative data collection and design a composite set of statistical indices;
- further simplify the original methodology keeping it focused on a set of actions such as: short preparatory surveys; individual in depth interviews with managers; a reduced number of workshops;.
- provide a set of semi structured interviews grids and workshops templates as well as a set of suggested group-exercises, leaving to each partner the freedom to further adapt to their own context.

The objective of the quantitative analysis was to collect data about gender equality with focus on the ICT/IST field, and to compare it with the general situation at each university.

Extensive data collection and analysis was conducted through four main areas of interest: students, academic staff, non-academic staff and work-life balance, both at the Department/Faculty and whole University level.

The participatory tools included in the EQUAL-IST gender audit methodology consisted of individual semi-structured interview and workshops.

Semi-structured interviews with key middle and top managers at each targeted area of intervention had the goal of identifying the main weaknesses and in terms of gender equality at each institution. The methodology includes five workshops – four thematic workshops plus one final comprehensive workshop – divided as follows:

1. W1 – HR practices and management for academic staff
2. W2 – HR practices and management for technical and administrative staff
3. W3 – Research design and delivery
4. W4 – Teaching and Student services
5. W5 – Final workshop

Institutional Communication was considered a cross-cutting topic to be covered in each workshop.

Each thematic workshop was expected to involve approximately

15 participants , while at the final workshop all participants to thematic workshops were invited.

Workshops were suggested to be gender/age/ethnicity inclusive and crosscutting the hierarchies.

- Short preliminary ex ante questionnaires were submitted to participants to the four thematic workshops with raising awareness purposes and to define a useful baseline for discussion.

The main goals of thematic workshops were:

- Raise awareness and start a self-reflection and learning process on gender in research issues at the institutional level.
- Identify the main internal gender issues and collect feedback about them from different stakeholders.
- Start thinking about possible actions to improve gender equality and about their applicability within the institution.

The final workshop was foreseen as the conclusive step of the gender audit process, to share results of challenges and identified potential solutions with all participants to the previous PGA's steps in the discussion about what would be the most suitable strategy and feasible actions to be potentially included by each RPO in their own GEPs. Only one partner, WWU in Germany, opted for replacing participatory workshops with a substitute survey, after having verified that most colleagues would not find the time to join face to face meetings.

The Gender Audits have been entirely handled by internal staff members due to a precise choice of merging the initial gender training of EQUAL-IST team members and Working Groups with a hands-on focus on delivering a PGA process in their own organizations. Two capacity building sessions have been organized to present and discuss the core elements of the Gender Audit Methodology. This action was led by an approach to gender training, which emphasizes the active experimentation- concrete experience and reflective observation steps of a learning cycle (Sangiuliano 2010, 2014).

3 Outcomes of Gender Inequalities Internal Assessment and the First Emerging Ideas for Action

Following the aforementioned methodology, the 7 RPOs conducted Participatory Gender Auditsto identify solutions , tailored to their contexts, to address gender inequalities by setting up GEPs. In total, 22 challenges were identified and 52 ideas for solutions were collected to tackle the emerging issues and proceed with the design of GEPs and its next step via a crowdsourcing experiment at each organization. (Gorbacheva, Barann 2017).

Overall, 458 participants joined the activities, interviews, participatory workshops and a substitute survey. Of these, 293 people were taking part to EQUAL-IST participatory workshops.

Workshops' groups were quite gender balanced, with men counting for more than 40% of participants although with some substantial differences among partners from FI and PT, featured by the more gender balanced teams. Although participants represented a small share of the population of the academic communities from the Departments/Faculties engaged in the project, it's good to remind how the Participatory Gender Auditing is featured as a qualitative methodology, where success indicators are the amount of collected information, the openness of the debate, the successful convergence of participants into sharing ideas on analyzing causes of gender inequalities, and identifying possible solutions setting the building blocks for future action. The figure below includes the total of participants to each activity, not distinctive attendees and shows how the academic component was the predominant one.
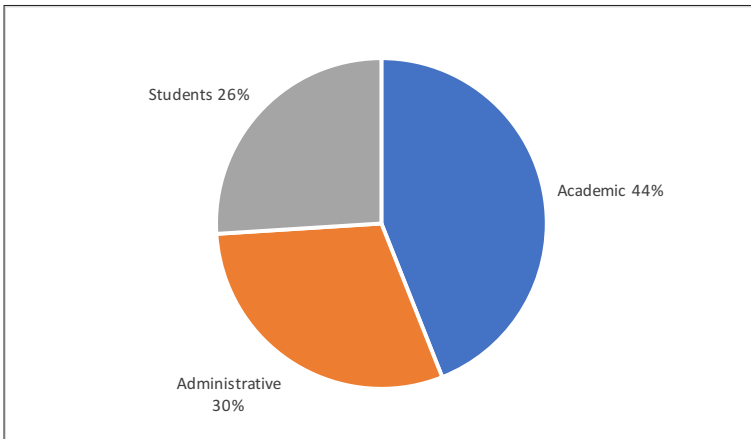
Figure 1   Total number of participants per employment type

Difficulties in motivating colleagues to participate were widespread among EQUAL-IST partners: attempts were made by motivating the audience with both online and offline activities and getting the support of Departments Directors and HR Managers, but constraints regarding the lack of time due to the limited timeframe for the crowdsourcing exercise and the internal audit in relation with the vacation period (April/May 2017) and the examinations' period limited the rates of successful engagement. In general, lack of widespread awareness on gender equality issues and how relevant-important they are for ICT-IST research was reported by all partners as a main factor at play in not reaching out to highest numbers of participants.

Analyzing the full set of emerging ideas and solutions from the workshops, it was possible to identify 22 common challenges addressed by overall 52 proposed ideas for solutions. The chart below shows how the Human Resources and Management Processes area, followed by Teaching & Students Services, got the highest shares of identified challenges and proposed solutions.
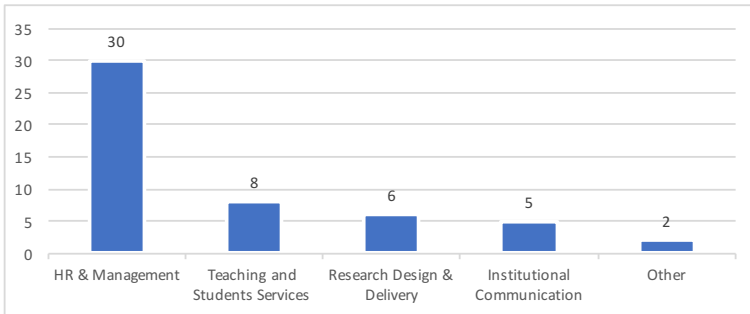
Figure 2 Proposed solutions per area of intervention

The table below illustrates the full picture in terms raised ideas/solutions clustered by Areas of intervention.

Table 1 Emerging challenges and proposed solutions per area of intervention

Main Area	Ideas/Solutions
HR & Management practices	ICT Careers presentations with focus on work life balance
	A training program on gender issues for staff and students
	Raising awareness workshops for managers
	Communicating about the opportunity for flexible working hours during the hiring process of researchers
	Making existing work life balance provisions and the work of Equality Machineries more visible
	Mentoring programs for women/parents
	Individual career/life plans between each employee and her/his superior
	On campus child care facilities
	Flexible working times; telework;
	Equal treatment provisions for single mothers
	Mentoring programs for women
	Ensure visibility of role models (existing women in apical positions)
	Raising awareness activities targeting decision makers and managers
	Job offers attracting international researchers
	Introducing target quotas to fill in professorship positions
	Internal survey/research to understand why female PhD holders didn't continue with their academic careers
	Ensure visibility to cases of inequalities and their consequences in hindering career progression, mobility etc.
	Create a Women's Network
	(raise awareness about the importance of) Increasing the share of young women in evaluation panels, committees and working groups
	Create a document which shows the career advancement criteria for each department and academic/non-academic staff
	Communicate more effectively that merit (not gender) is the selection criteria and highlight the reasons behind positive discrimination actions
	Implementing existing provisions on quotas for top positions to be assigned to the underrepresented sex when two equally qualified employees have applied
	Adjusting recruiting procedures to attract more women in ICT/IST during the recruitment process
	Mentoring programs
	Recognize operational management tasks in career progression at the same level as strategic planning are

Main Area	Ideas/Solutions
	More coordination among existing machineries
	Long term strategy by the University as far as GE is concerned
	Embed the GEP into the University Strategic approach
	Create a Gender Equality Committee
	Gathering gender disaggregated data and statistics on a yearly basis to document the main findings related to high/low numbers of students or employees and monitor how and why it changes per year
Teaching and students' services	Set up a Gender Studies Centre
	Raising awareness and training activities to research and teaching staff (and students*) on gender issues
	Include use of gender sensitive language by teachers as an indicator in the evaluation of courses
	Projects and initiatives to attract girls to ICT: University collaborating with local primary-middle schools
	Counselling high school girls to motivate them choosing ICT/IST Studies (having the RPO staff – and female professors as role models- visiting high schools)
	Upgrading/rethinking information/dissemination materials targeting perspective students
	Integrating initiatives for girls & ICT/IST into existing activities to promote enrolment to the University and/or into existing projects and info days for girls in STEM/ICT
	Create new ICT/IST Study programmes with an interdisciplinary approach to motivate more girls to apply
Research content & delivery	Funding for young women researchers
	Tutoring women researchers/encouraging researchers to apply for research funds
	Share leading responsibility with less experienced researchers
	Interdisciplinary Gender Research Centre
	Raising research unit's directors' awareness about the relevance of gender equality policies and research topics
	Web space with visibility of gender related research results & internal mapping of gender competences
Institutional communication	Establish working group on best practices in gender sensitive communication
	Improve and coordinate communication on existing activities on Gender Equality, provisions and facilities
	Raising awareness activities on gender sensitive language
	Promote women in ICT/IST success stories and dedicated events for girls
	Promote IST courses within the School conveying the idea that is interesting and relevant for both men and women
Other	Reframe gender equality policies as relevant and addressing both men and women
	Address sustainability issues already within the GEP design
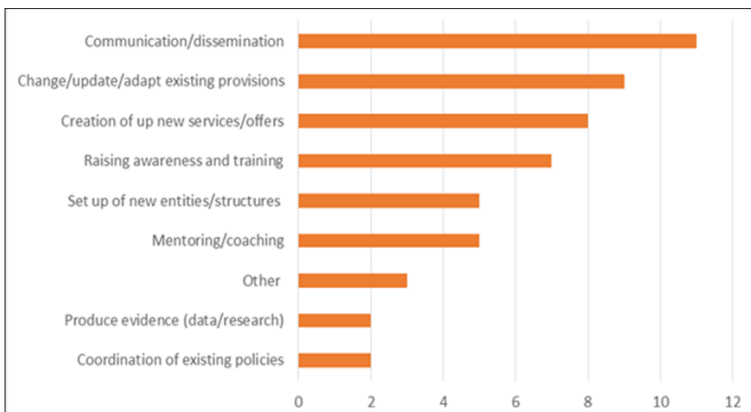
It is interesting to take a cross-sectoral look at the emerging ideas and proposed solutions: the chart above shows distribution along clusters based on a typology we designed. It spots how communication and dissemination play a leading role among the envisaged actions. Second in order we find the adaptation and change (as well as enforcement) of existing provisions, where a gender approach should be integrated (from evaluation to recruitment processes and students services etc., including all areas of interventions), followed by creation of new services, raising awareness actions (where in some cases decision makers have been set as the main target groups), creation of new structures or entities (networks, working groups, committee, centers) and the provision of mentoring and coaching services. Production of further evidence and quantitative data analysis has been also advocated as necessary, jointly with improving the coordination of existing measures and policies.

It can be noticed how dissemination/raising awareness alone constitute a large share of the proposed initiatives: this can be attributed to the initial stage of implementation of gender equality policies and it is coherent with the lack of awareness of these issues observed by all partners. At the same time, when analyzing all Gender Audits Reports, we acknowledged how these types of solutions are also better defined in terms of scope and targets than those included in the type of "Change/adapt existing provisions" which have been formulated much more vaguely. This can indicate in a way how dissemination and raising awareness actions appeared at the considered stage as the 'easiest' cure to be proposed, particularly in a phase and within discussion groups acting out of internal negotiations with management structures and real decision-making processes.

To further understand to what point the partners were radically addressing the structural change objectives required by the project, we further simplified our typology in two main clusters as following:

Table 2   Typology of interventions: structural change and preparatory

Structural Change	Preparatory interventions
Creation of new services and measures	Communication and dissemination actions
Change/update/adaption of existing provisions and procedures	Raising awareness and training
Creation of new structures	Production of further evidence/data/research
Mentoring & coaching services	
Coordination of existing policies	

We observed that the trend expressed by the PGA working group in EQUAL-IST has gone to the direction of a predominant number of ideas pointing at "structural changes" as the pie chart below makes clear.
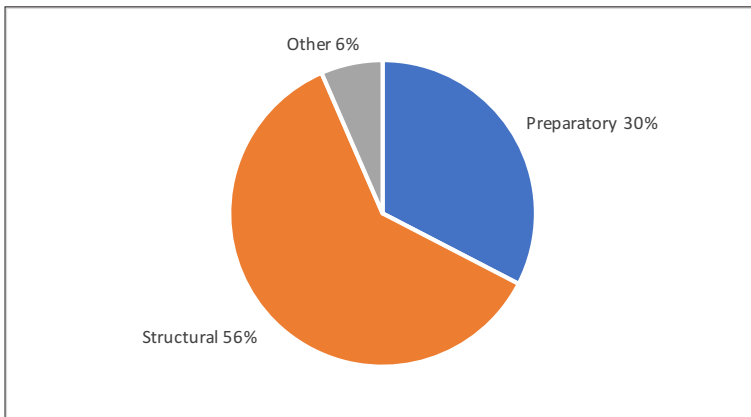
Figure 4   Number of changes per type of intervention

4   Concluding Remarks

Reflections coming from the Gender Audit processes were all started and conducted keeping ICT/IST as a focus, although discussions were often landing to broader issues. Point of departure for all partners was the acknowledgement of women under representation among academic staff being more severe in ICT/IST studies, and the same for

the ratio of girls among enrolled students. During the workshops, multiple reasons for gender inequalities were mentioned and raised, with 'gender stereotypes' most frequently named as roots of cultural and social constructions leading both men and women to think of STEM and ICT as a male domain.

Overall, the image of ICT/IST emerged ad strongly biased and contributing to change it is identified as one of the main priorities of actions to be put in place through GEPs. All reports are strongly featured by a prevailing role attributed to culture and stereotypes when identifying root causes of inequalities and this is coherent with the high number of communication/dissemination types of proposed interventions, meaning that to a predominant type of diagnosed problem (cultural stereotypes) consistently corresponds a most frequent 'cure' (raising awareness, communication actions).

At the same time, such a move allows to set the reasons outside the structure and the organization, in the farther cultural domain, therefore tending to distance from structural change oriented solutions/actions.

Looking for ICT/IST specific actions among the solutions emerging from the PGAs, we realized how these mostly pertain the areas of intervention related to Teaching and (potential) Students Services, but again in a way that doesn't affect the core mission of the RPOs and moves solutions 'outward' the structure: actions aimed at promoting coding since early stages of education and role models for upper secondary school girls in order to motivate and attract them towards Informatics and related discipline at a later stage were suggested by 6/7 RPOs. Although labelled among "new services/initiatives" and therefore included in the "structural change" type of actions, once again they happen to move the identified solutions outward the structure, to target a different institution (lower and upper secondary schools), even though positive impacts are expected in terms of female enrollments in the longer run.

Gender equality was confirmed from our Participatory Audit pilots as a contested site of discursive and practical tensions, as resistances were widely reported by all partners: gender equality seemed not fully understood as a relevant research dimension for STEM and ICT/IST: three ideas for solutions only were focusing on gender as a variable for ICT-IST research (i.e. Interdisciplinary Gender Research Centre; Raising research unit's directors' awareness about the relevance of gender equality policies and research topics; Web space with visibility of gender related research results & internal mapping of gender competences, see **[tab. 1]**). This was confirmed by impressions reported by EQUAL-IST team members during project meetings that a strong belief in the neutrality of computer science and algorithms was making difficult for their ICT-IST colleagues to grasp how a gender dimension could be applicable to their research areas.

In other cases, such as for students, the difficulty for example, an initial lack of understanding and a 'denial' type of resistance, as a tendency to consider that equality is already a fact, or defined by some partners as "a tendency to normalize gender inequalities" which is typical for younger generations.

'Diminishing/ridiculing' types of resistances were met during workshops as in particular among men, some individuals were hiding 'veiled laughing' when gender issues were presented and discussed, which typically happens when policies goals get to be ridiculed. We also found examples of a 'politicized' type of diminishing resistance confirmed by recent studies about backlashes and conservative approaches strongly criticizing gender equality policies (Köttig, Bitzan, Petö 2017):

- repeated arguments about gender inequalities as a non-relevant problem as both national policies and the University have already equality policies or statements in place, while interventions targeting women mostly are considered as discriminatory against men.
- stereotypes about gender policies labelled as 'feminist' and reported to be perceived as 'excessively based on ideological and emotional rather than rational, scientific, or legal arguments' were also expressed in discussions.

Considering the complex picture from the 7 PGAs, we conclude that the initial positive picture showing most of the proposed measures were pointing at structural changes type of interventions, needs to be counterbalanced by opposing trends emerging during the Auditing processes, such as a preference for outward-oriented actions as well as the resistances which were met along the way: continued support from and alliance with top decision makers from the Dept./ Faculty and University will be crucial to ensure successful implementation and sustainability of GEPs.

And still our findings point also at a new research area to be further investigated, the intersection between inward and outward oriented changes: an interesting set of studies on gendering innovation ecosystems (Andersson et al. 2012) has suggested how change interventions which address the two levels are best suited to generate positive feedback loops: the implementation phase of the Gender Equality Plans could be studied and analyzed in depth to understand if/to what extent the outward oriented actions with the upper secondary school systems triggered increased awareness and further inward actions towards structural change. Allocation of funds to implement them after the end of the project could be a suitable indicator to this respect.

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Adapting Participatory Gender Audit to Small-Medium Sized ICT/IST Research Institutions
The EQUAL-IST Methodology

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Abstract   One of the most critical phases to start a process of structural change for gender equality in a research institution is represented by the internal assessment of gender inequalities that allows to identify the main gender bias at the institutional level and may provide inputs to the design of the required measures and actions to enhance gender equality. Within the context of the EQUAL-IST project (Gender Equality Plans for Information Sciences and Technology Research Institutions), an innovative methodology for gender assessment has been developed to be adapted to research institutions with a strong component in ICT/IST. This field, recognized as one of the most affected by gender inequalities at all levels, presents peculiar issues iin terms of gender equality: in the ICT/IST field, indeed, a significant under-representation of women can be observed already at the level of the student population (Bachelor, Master and PhD); then, the gap tends to increase among the researchers and becomes more and more severe going up to the high levels of professors and top managers. In this chapter we present the gender assessment methodology developed in the EQUAL-IST project, that exploits a mixed strategy integrating two main approaches followed by existing methodologies for gender audit. On one side, a quantitative approach, based on measurable indicators computed on gender disaggregated data, is considered with the aim provide measurable and comparable information that facilitates monitoring and evaluation of gender equality policies impact over time. On the other side, the methodology integrates a qualitative approach, based on participatory techniques and tools such as focus groups, workshops, semi-structured interviews. These tools have the main objective to start raising awareness and to trigger a self-reflection process about processes and procedures, organizational culture and individuals self-perception about gender issues. The chapter presents in details the developed methodology for gender assessment, highlighting the main criteria followed for

the choice of the quantitative indicators and the collaborative nature of the design and development process that, starting from the ILO PGA (Participatory Gender Audit), led to the final version of the methodology based on feedbacks received from the 7 EQUAL-IST RPOs through several steps of adaptation and customization.

Keywords Gender equality in ICT/IST research institutions. Participatory Gender Audit. Quantitative and qualitative approach.

Summary 1 Introduction. – 2 Assessing Internal State of Play of Gender Inequalities: Adaptation of Participatory Gender Audit to ICT/IST Research Institutions. – 3 Methodology for a Participatory Gender Audit. – 3.1 Quantitative Data Analysis and Indicators System. – 3.2 Qualitative Participatory Tools. – 4 Discussion on Methodology Application. – 5 Conclusions.

1 Introduction

Awareness on the gender inequality in research and innovation is evidently shown in *She Figures*, a wide source of comparable statistics on gender equality in research and innovation institutions published each 3 years since 2003. This study allows to compute and compare the gender equality situation in one organization with national and EU institutions, and clearly shows the under-representation of women in the area (European Commission 2016). The Information Sciences and Technology (IST) field connects the disciplines of Computer Science and Business Administration. As such, the IST field, like the other STEM and ICT fields, faces the issue of gender imbalance, but also presents specific characteristics associated with its interdisciplinarity. The under-representation of women in the IST field, aside from its implications for gender equality in career progression, also has far-reaching negative consequences for human capital utilisation and innovation potential (Trauth 2011). Presence of women in key areas of academia is increasingly recognised as one factor in the gendering of research content, including the shaping of science priorities, research agendas, and methods (Ranga, Etzkowitz 2010). Reasons and dynamics behind these phenomena are complex, as the extensive literature from Gender and Organization Studies has highlighted: gender inequalities are embedded at all levels of work organization, affecting both human resources and management procedures, institutional levels and working interactions among individuals, shaping behaviours and gendered identities of workers and organisations also in relation to other social differences and discriminations, such as class, race, age and sexual orientations (Ashcraft, Mumby 2004).

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The EQUAL-IST project was approved in 2016 within the H2020 Science With And For Societies program following a well established policy framework on promoting gender equality in research institutions dating back to the FP7. The project gathers 7 RPOs (Research Performing Organizations) engaged into internal structural change through GEPs (from Germany, Finland, Italy, Liechtenstein, Lithuania, Portugal, Ukraine) supported by two organizations providing communication, management and gender expertise. Running for 36 months, it took the challenge of approaching the specific research fields of Information and Communication Technologies and Information Systems (ICT/IST), filling a gap which is a precisely the lack of discipline-specific research and intervention as far as gender equality in academia/research is concerned (Benschop, Van den Brink 2011).

In the need of crafting a gender audit methodology targeted at ICT/IST Departments and Faculties, who should perform an internal state of play analysis before kicking off the design of Gender Equality Plans to be implemented and monitored during the project course, two specific choices were made to guide the methodology design process:

- a mixed methodology featured by a **quantitative and qualitative approach**
- a **participatory strategy** able to trigger discussions, create ownership of the project's goals, identify challenges and needs in a more thorough way letting a collective idea generation process take shape

In this paper we are going to argue for the reasons which guided these methodological choices (Section 2), we'll present the quantitative and qualitative features of the PGA (Section 3) while the concluding section will provide insights on how the methodology was received and adapted in the 7 ICT/IST RPOs that made use of it.

2 Assessing Internal State of Play of Gender Inequalities: Adaptation of Participatory Gender Audit to ICT/IST Research Institutions

The design of the EQUAL-IST gender audit methodology (Canali 2017) has been based on the selection and adaptation of existing methods for gender audit previously developed by other European research projects and qualified international institutions. Specifically, the EQUAL-IST Project Task 2.1 State of the Art Analysis provided useful insights for identifying the most effective gender audit methods and tools to consider for the development of the EQUAL-IST methodology. Via a desk research we have analysed tools and methods designed and used by other past and ongoing EU funded projects, and verified how the choice of combining quantitative data collection

with qualitative assessment methods appears to be the most common and effective one.

Relevant inputs were provided by the STAGE project (FP7), which presented an advanced framework of understanding for data collection and monitoring about the state of the art of gender equality in research institutions. The strategy proposed in the STAGES Guidelines was based on the collection of existing available data (both quantitative and qualitative). A strong emphasis was given to the importance of presenting collected data to internal stakeholders to design actions based on that, and of setting data collection and policy assessment to become permanently embedded as routine actions to start with the approval and implementation of GEPs (Cacace et al. 2015). This input was strongly influencing the EQUAL-IST project approach: in fact, emphasis was put in EQUAL-IST methodology design on conducting internal audits to showcase gender equality plans as an example of evidence based policy design and on 'translating' existing gaps in gender disaggregated data availability into specific and permanent actions to be embedded within GEPs.

The Garcia Project has proposed guidelines to integrate statistical data collection into the analysis of organizational cultures, with the aim of integrating Gender Budgeting into research and scientific organizations (Bozzon, Murgia, Poggio 2016). Interviews with key players from Departments were conducted as well as funds allocation was analysed to understand its relation with performance indicators and resources distribution from a gender perspective. Takeaway from this project has been the need for blending qualitative and quantitative analyses and the attention paid to the resources dimensions: during the two capacity building sessions of the EQUAL-IST project dedicated to test, integrate and validate the audit methodology with the project partners, specific sessions have been held to discuss the importance of looking at resources distribution with gender lenses. Partners have reported how at the initial stage of the project, preliminary internal awareness building was needed before making the gender budgeting argument understandable in their contexts: an agreement has been reached on developing this aspect further during the second iteration of GEPs implementation.

EIGE (European Institute for Gender Equality) recently commissioned a research and the release of a Gender Equality in Academia and Research (GEAR) TOOLKIT, which is providing step by step guidance as well as documented arguments and plenty of selected resources to all research institutions interested into committing themselves to achieve structural changes towards gender equality. Possible actions are grouped into "core" and "complementary" assessment activities, whereas strictly necessary core ones consist of reviewing legislation, analysing staff disaggregated data on students and staff, and identifying existing measures promoting gender equal-

ity. It is suggested that an internal state of play assessment can be further enriched by surveying staff members on working conditions and how inequalities are perceived, and interviews or focus groups (EIGE 2016). The choice of prioritizing quantitative data collection, analysis and mapping of internal policies over qualitative methods is clearly due to the broad audience that the Toolkit is intended to reach: boosting the adoption of structural change programmes and GEPs beyond the restricted domain of EU funded projects is the objective and, in absence of additional resources, qualitative studies are clearly too time consuming to be undertaken.

Within the EQUAL-IST Project and the available funding from H2020, the partners could benefit from having the opportunity to choose the most complete option and to both collect and analyse quantitative sex disaggregated data, and foster the understanding of their internal institutional and gendered dynamics through qualitative methods.

Furthermore, EQUAL-IST has been featured since the very beginning of the project design phase by the willingness of opting in for a *participatory approach*. The rationale behind this preference for enhancing bottom up push, without neglecting the importance of keeping the high and middle management levels engaged, comes from the awareness shared by project promoters of the risks entailed into implementing gender equality policies at large by reducing them to merely technical-bureaucratic "ticking the boxes" exercise (Squires 2007), that organizations/institutions undertake as they are enforced by legislations or for opportunistic reasons, when public resources are made available to implement them. Moreover, as stated in (Powell 2017), demands for change must start with answering, in a collaborative way, what problem we are trying to solve when we start a new GE project, in order for it to be relevant to the specific context; otherwise, GE risks being the captive of consensus politics and gender inequality will persist. Additionally, it has been considered how accentuating participatory aspects could be more suitable to 'shake' a seemingly immobile situation in a highly male dominated environment and trigger discussions on gender equality; this is especially true for a strongly discipline-oriented project, such as EQUAL-IST, targeting Research Institutions in the ICT/IST domain, where gender bias is particularly severe.

In view of this, the ILO PGA (Participatory Gender Audit) methodology has been identified as the most well structured, comprehensive and worldwide acknowledged good practice to start with: the ILO has been providing capacity building on how to implement PGA in the last decade to members of a variety of organizations (local and national authorities, trade unions, NGOs) mostly within the International Development Cooperation context (ILO 2007). More recently, ILO has transferred its model and adapted the methodology to the

Accademia and Research Organization framework by taking part to the GENISLab Project on structural changes in research institutions.

The original PGA methodology revolves around the following pillars:

- staffing (HR issues and equal opportunity practices);
- substance (to what extents products/projects of the organisation are gender sensitive)
- structure (programmes, long-term vision, organisational systems and resource allocation).

During the GenisLab project, the original methodology has been recognized to be quite complex and time consuming, and was adjusted to the available resources and project timeline. The deployed model was featured by the following elements:

1. 3 months duration
2. quantitative-qualitative approach with focus on participation of staff members from different levels of the organization via focus groups and workshops
3. PGA teams composed both by external gender experts from the consortium conducting field visits at the involved research organizations during the audit and internal staff from the GenisLab teams at each scientific organizations (Genova et al. 2014).

3 Methodology for a Participatory Gender Audit

Starting from the GenisLAB adaptation of Participatory Gender Audit, in the EQUAL-IST project we have proceeded to customize the PGA to ICT/IST institutions based on the following assumptions:

- work more systematically on the quantitative data collection and design/propose a composite set of statistical indicators, that could makes the whole process more sound and credible in highly male dominated environments
- further simplify the original methodology keeping it focused on a set of actions such as: short preparatory surveys; individual in depth interviews with managers; workshops. In particular, the number of required workshops was reduced.
- providing a set of guided interviews and workshops templates as well as suggestions for group-exercises, leaving to each partner the freedom to further adapt to their own context

The Gender Audits have been entirely handled by internal staff members both to avoid high travelling costs for field visits from external experts and due to a precise choice of merging the initial gender training of EQUAL-IST team members and Working Groups with the purpose of delivering a PGA process in their own organizations.

Two capacity building sessions have been organized to present and discuss the core elements of the Gender Audit Methodology during the

ongoing design process: this was therefore an open and participatory design process in itself, where all EQUAL-IST partners had the opportunity to provide inputs. This action was lead by an approach to gender training which emphasizes the active experimentation, concrete experience and reflective observation steps of a learning cycle (Sangiuliano 2014). The abstract conceptualization step was postponed to inputs provided by the State of the Art analysis Research delivered within the project on good practices in designing and implementing Gender Equality Plans in Research Organizations (Sangiuliano 2017), and the joint reporting phase of the PGA done at the end of the process.

3.1 Quantitative Data Analysis and Indicators System

The areas chosen to measure gender equality across ICT/IST institutions are consistent with the ones that are considered crucial to assess gender equality by other EU funded projects dealing with gender equality in research and higher education institutions, like EGERA (http://www.egera.eu/) and GenderTime (Badaloni, Perini 2016). In defining gender equality within the ICT/IST institutions, we adopt a vertical perspective by measuring gender equality across different levels within different areas, including academic and non academic staff, and students. The finer focus on ICT/IST prevented us to take a horizontal perspective by focusing on gender differences across disciplines as in Silander, Haake and Lindberg (2013) analysis of gender equality in Swedish higher education.

Therefore a system of indicators has been proposed to measure it for different level of analysis, including different groups of people involved within the institution:
- Students
- Academic Staff
- Non Academic Staff

and different areas:
- Gender equality indicators (in terms of access to academic course, position in employment, governance, pay gap)
- Degree of work-life balance
- Equal Opportunities policies and dedicated committees

The presence of a quantitative approach is essential to provide measurable information that supports monitor and evaluation processes, and facilitates a comparison through time among:
- Different institutions (e.g., EQUAL-IST partner RPOs)
- Different geographical levels (local RPOs vs. national and European situation)

The proposed system of indicators is summarized in Table 1.

Table 1 The system of indicators

Indicators		
Gender Equality Indicators	**Work-life balance**	**Gender Equality Policies/Committees**
Representation Index	Parental leaves	GEP
GE in governance	Tele-working	Gender Budgeting
Structure of employment	Flexible hours	EO Committees
Wage differentials	Childcare facilities	Counselling Service

Gender Equality Indicators

Representation index measures the incidence of women in a given position and with reference to the different considered groups of people.

The representation index may be defined as the fraction F_{ji}/T_{ji} between the number of women and the number of people in a specific area i and at a specific level j For students, i represents the study field and j is the degree level (bachelor, master or PhD); for academic staff, i represents the research area and j the position level (researcher, associate or full professor); for non academic staff, i is the area (administrative or technical) and j is the position level (employee, middle or high manager).

GE in governance measures: the Rector (M – F); ViceRector/s' gender; Executive Board composition by gender; Academic Senate (or other equivalent high level Council) composition by gender.

Data on the distribution by gender and term of contract (part-time, full-time, temporary, permanent) by area of research/employment are collected to compute representation indexes to evaluate the **structure of employment**.

Data on gross wages by gender and position are collected in order to compute **gender wage gap** by level at Department and University level.

Work-Life Balance

Work-life balance is a crucial dimension in the achievement of gender equality (OECD 2017; Genova et al. 2014). We have included in this area indicators connected to the use of parental leaves and child care facilities (whose heterogeneity across EU countries is well documented in Blum, Koslowski, Moss 2017) as well as flexible time arrangements and tele-working (on the relevance of these practices in affecting gender equality at the workplace see OECD 2017; on the effect of time flexibility in academia on the reproduction of the gender segregated division at home see Rafnsdóttir, Heijstra 2013).

- **Parental leaves by gender**: ideally according to the National Laws, parental leaves should be computed upon eligible employees as following: fraction of employees taking the leave over employees eligible for the leave. We could then exploit the value of the index to compute a gender gap in the take up of parental leave. A similar indicator at EU level can be found in the Eurostat database and it is referred to the 2010 LFS (Labour Force Survey) ad hoc module on the reconciliation between work and family life.

- **Childcare facilities (**Kindergarten)
  0. no kindergarten and no agreement with local public or private institutions for reserved access
  1. agreement with public or private institutions for access at reduced rate
  2. presence of kindergarten

- **Teleworking** positions by gender + coefficients of representation amongst non-academic staff
  - employees can take tele-work
  - number of employees in teleworking by gender and compute (as in the representation index) to what extent women and men are represented in this contract

This indicator is limited to non academic staff assuming that academic staff members have more flexibility in terms of working hours. Anyway, if a different situation occurs at some RPOs, this indicator should be extended to include academic staff.

- **Flexible hours arrangements** (% by gender on the whole administration)
  - employees can enjoy flexible work arrangements
  - number of employees in flexible work arrangements by gender and compute (as in the representation index) to what extent women and men are represented in flexible work arrangements
  - Time bank presence (0 no, 1 yes)

Gender Equality Policies/Committees

A wider focus on the equal opportunity machinery and policies within the ICT/IST research institution is kept by measuring the following indicators: existence and quality (in terms of including a system of evaluation) of **gender equality plans (GEPs)**; existence and quality of **gender budgeting** within the institution; the **equal opportuni-**

ties committees at work within the institution and the existence of a **service devoted to counselling and/or of a Ombudsperson** (about mobbing, discrimination, harassment,...). The inclusion of this dimension allows to detect the degrees of development of equal opportunity machineries and policies within the organization (LeFeuvre 2009).

The proposed system of indicators can be put in relation with the gender equality situation of the country (national level) where the ICT/IST institution is located by exploiting the European Institute Gender Equality Index, a synthetic composite indicator that evaluates equality with regards to work, money, knowledge, power, time and health across EU countries and by each country (EIGE 2015), and the specific indicators available in OECD and Eurostat metadata. Finally, a comparison will be done with the European situation: if data are not available at the European level, a reference to partners' network of the project averaged value will be considered.

Together with the system of indicators, a platform to collect them has been proposed and the outcomes have then been summarized by means of Fuzzy Expert System (Addabbo, Facchinetti 2013). The latter application is consistent with the application of Fuzzy Expert System to the evaluation of firms' gender equality developed in (Addabbo et al. 2006).

3.2 Qualitative Participatory Tools

The participatory tools included in the EQUAL-IST gender audit methodology consists of:
1. Individual semi-structured interviews
2. Workshops

Individual Semi-Structured Interviews

Semi-structured interviews represent a qualitative method of inquiry that combines a pre-determined set of open questions (questions that prompt the discussion) with the opportunity for the interviewer to explore particular themes or responses further. The goal of this tool is to identify the main weaknesses and strengths in the target areas of the EQUAL-IST project and the main actions (past and on-going ones) carried out to promote gender equality. Specifically, the methodology foresees at least 1 interview in the areas of Research design and delivery, Student Services and Institutional Communication, and 2/3 interviews in the area of HR practices and management that includes different sub-areas: academic, non academic, organizational well-being and work-life balance, etc. The selection of interviewees should ensure the identification of key people (e.g., managers, decision makers) directly involved in decision-making process in each target area to

capture the vision of the high levels of the hierarchy on gender-equality. Their view on gender equality initiatives has been complemented by interviews to Equal Opportunities officers and/or responsible of Equal Opportunity machineries. It's important to select people able to provide specific information on the background and future plans of the organization in terms of gender-equality in the specific area, and information to understand to what extent gender mainstreaming fits into the overall direction of the area management.

Workshops

The methodology includes five workshops – four thematic workshops plus one final global workshop – divided as follows:
1. W1 – HR practices and management for academic staff
2. W2 – HR practices and management for technical and administrative staff
3. W3 – Research design and delivery
4. W4 – Student services
5. W5 – Final workshop

Institutional Communication is considered a cross-cutting topic to be covered in each workshop.

Each thematic workshop should involve at least 15 participants (number may vary depending on the size of the Research Institutions), while at the final workshop all the participants at the thematic workshops are invited.

In each thematic workshop, participants should be invited belonging to different levels of the hierarchy in each targeted area. It is important to keep in mind the need to facilitate an open discussion during the workshops, where everybody should feel free to express his/her opinion, evaluating case by case whether the presence of high-level managers is compatible with this conditions. Moreover, balance among participants should be taken into account in terms of gender, age, ethnicity and/or country/region of birth as well as representation of different contractual statuses (e.g., fixed terms; permanent contracts; full time; part time).

Short preliminary questionnaires should be submitted to the participants of the four thematic workshops prior to the workshops with the following purposes:
• Participants start thinking about gender-related concepts and potential issues
• Capture the initial perception about gender (in)equalities within the organization
• Define a useful baseline for workshops discussion through the collected answers

The main goals of the thematic workshops are:

- Raise awareness and start a self-reflection process on gender-related concepts and institutional situation in terms of gender equality
- Identify the main internal gender issues and collect feedback and personal perception about them.
- Start thinking about possible actions to improve gender equality and their applicability within the institution.

The final workshop is foreseen as the conclusive step of the gender audit process, with the following goals:

- Sharing with all participants to previous workshops the results of identified challenges and potential solutions
- Progress in the discussion about suitable strategies and feasible actions to be potentially included by each RPOs in their own GEPs

Workshop Participatory Exercises

Each thematic workshop includes specific participatory exercises divided into core (mandatory) and optional exercises.

Core exercises:

- CE1 Gender Focus Group – group discussion about the main weakness emerged by previous interviews and questionnaires: a good way to warm up participants, raise awareness and self-reflection about the internal situation and start a deeper discussion about gender equality .
- CE2 Historical Timeline – creation of the historical timeline of organization's gender policy: aimed at discussing institutional gender-related policies and start a reflection on possible actions to improve gender equality and on their applicability within the institution.

Optional exercises:

- OE1 Gender knowledge and awareness – evaluation of staff knowledge of gender-related concepts: suggested for those institutions where the results from preliminary questionnaires evidence the lack of background in terms gender culture.
- OE2 Classification of projects and activities – reflection on how different types of activities/projects can contribute to promoting gender equality: considered very useful and well received since it is directly related to work experience and the application of gender concepts.

- OE3 Hofstede's onion/Organizational culture – an onion as a metaphor for the organization: aimed at discovering the organizational culture and its implications in terms of gender equality, including unconscious perceptions about the organization public image and internal culture.
- OE4 Institutional Communication Analysis – analysis of the internal and external institutional communication: aimed at evaluating if the official textual and visual communication of the organization is gender-sensitive and gender-balanced.

The selection and use of the optional exercises are left to the discretion of the gender audit facilitation team in each RPO, except for the OEX4 that is required in at least one workshop.

4   Discussion on Methodology Application

The Auditing processes were successfully carried out following the gender assessment methodology: 458 people took part to the proposed activities overall in the 7 Universities, and led to 22 common identified challenges and 52 ideas generated.

Along the way, the partners reported on a series of internal conditions and limitations which had an impact on the process (Sangiuliano 2017). Among them, we mention that KTU and UTU Universities stressed how they have been faced with a widespread internal opinion that gender equality is already achieved at their own Universities. Moreover, difficulty in finding and collecting gender disaggregated data was mentioned as a limitation or as an element complicating the PGA process by UNIMORE, UNILI, KHNUE, UMINHO. Finally, all partners described the PGA process as time consuming, requiring to face communication challenges and the difficulty of engaging people to take physically part to the workshops. The latter point has been one of the key motivations for partners to change and adapt the Gender Audit Methodology to their own internal contexts, thus causing delays in implementing the PGA itself. However, a facilitating element has definitely been found in clearly communicating that the process had the support from the highest management levels (Uminho, KhNUE, UNIMORE), possibly jointly with a formal authorization to devote time to it within regular working hours.

The PGA Methodology has been flexibly interpreted by partners: although it has remained as the backbone and main framework for the operations of almost all partners, individual RPOs had the opportunity to adapt it to their internal conditions and contexts. Results of the audits have been thoroughly analyzed in a dedicated project deliverable (Sangiuliano, Grandi 2017) and the following concluding remarks can be highlighted.

Though the process PGA methodology has been adapted to ICT/IST institutions to get to a model that could be replicated reducing the criti-

calities experienced in its application, lack of time and available human resources have been repeatedly raised as reasons for shortening the originally proposed versions of the methodology, together with an initially limited awareness of gender equality issues and their relevance in the context of research in general and in IST/ICT fields in particular. This is echoing the literature findings, which confirm the precarious situation of public funding for R&I in times of austerity in the EU (Izsak et al. 2013) and the still very partial readiness to value and embrace gender equality policies in academic environments (ERA 2014).

Moreover, the participatory approach has been found to be highly appreciated in all pilot implementations of the methodology, resulting in a twofold impact: first, assessing the internal hurdles and the main challenges to address structural gender inequalities in academic IST/ICT environments; second, initiating an internal raising awareness and dialogue process on the complex dynamics behind gender issues. This responds positively to the calls for a more participatory approach to gender policies (Squires 2007; Benschop, Verloo 2011). Furthermore, the multiplicity of institutional areas identified during the audit process as affected by gender inequalities (HR, management, teaching and students services, institutional communication, research design and delivery) also confirms findings from previous studies about gender inequalities as being entrenched into academic and research structures (Cuny, Asprey 2002; Rosser 2004).

5 Conclusions

A gender assessment methodology has been developed to within the EQUAL-IST project to address the specific requirements of small/medium sized research institutions with a strong component in ICT/IST. The methodology exploits a mixed strategy integrating a quantitative approach consisting of indicators computed on gender disaggregated data with a qualitative approach including the use of participatory tools resulting from the adaptation of ILO PGA. The developed methodology was applied within the 7 Universities belonging to the EQUAL-IST consortium, successfully leading to the identification of gender challenges and, consequently, of ideas to address them at each institution. The Methodology has been flexibly interpreted by partners that adapted it to their internal conditions and contexts. We can conclude that the EQUAL-IST methodology has proven to be a flexible instrument that can be adapted to local situations and, by mixing quantitative and qualitative analyses, allows to reach a multifaceted view of gender equality within ICT/IST Research Institutions which can be used to design and implement with higher awareness gender equality policies for structural changes.

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An Innovative IT-Supported Approach Facilitating Co-Design of Tailored Gender Equality Plans
The CrowdEquality Idea Crowdsourcing Platform

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Abstract   Only few European research institutions have managed to implement structural changes and modernise their management towards higher gender equality. At the same time, gender equality is recognised to be an essential component towards achieving innovativeness and better performance. The EQUAL-IST project ("Gender Equality Plans for Information Sciences and Technology Research Institutions") was aimed at addressing this challenge by designing and implementing tailored Gender Equality Plans (GEPs) in the six involved STEM (Science, Technology, Engineering, and Mathematics) research institutions from Finland, Germany, Italy, Lithuania, Portugal, and Ukraine. In order to increase acceptance, minimise potential resistances, and ensure sustainability of the interventions promoting gender equality initiated within the project, it was decided to follow a participatory approach to GEP design. This approach means that internal stakeholders were engaged in the GEP design, including decision-makers, academic and non-academic staff members, and students. In order to support this approach, an innovative online crowdsourcing platform, called CrowdEquality, was developed and applied within the project. Internal stakeholders from the involved research institutions were invited to collectively use the developed platform during the following processes: (i) identification of specific challenges related to gender equality, which exist in the research institution ('problems'); (ii) generation of promising initiatives ('solutions') that could address each of the identified challenges; and (iii) voting on the selected feasible ideas. This article reports on the course and outcomes of using the CrowdEquality platform for the participatory GEP design within the EQUAL-IST project.

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Furthermore, it is reflected in the article on the challenges faced and lessons learned during the platform development and operation. The article provides valuable insights to the research institutions willing to apply a participatory approach to GEP design.

Keywords   Gender equality. Gender Equality Plan. Crowdsourcing. Co-design. Participatory approach. STEM.

Summary   1 Introduction. – 2 Background. – 3 Approach. – 4 Results. – 5 Discussion and Conclusion.

1   Introduction

Gender equality is recognised by the European Commission as an essential component towards achieving innovativeness and better performance (European Commission 2009, 2014). However, in most European research institutions women continue to be under-represented in senior academic positions (*vertical gender segregation*, e.g., European Commission 2015b) and in the STEM (Science, Technology, Engineering, and Mathematics) disciplines (*horizontal gender segregation*, e.g., Hewlett et al. 2008). As it is widely recognised that research and innovation are the main drivers of a prosperous economy and all potential talent needs to be utilised to its full extent, these challenges need to be addressed.

The European Commission proposed Gender Equality Plans (GEPs) as a tool to promote structural change towards gender equality in research institutions (European Commission 2012, 2015a). GEP is defined as "a set of actions aiming at: (i) conducting impact assessment / audits of procedures and practices to identify gender bias; (ii) identifying and implementing innovative strategies to correct any bias; and (iii) setting targets and monitoring progress via indicators" (EIGE 2016).

The EQUAL-IST project ("Gender Equality Plans for Information Sciences and Technology Research Institutions") was focused on the design and implementation of tailored GEPs in the six involved STEM research institutions from Finland, Germany, Italy, Lithuania, Portugal, and Ukraine. In order to increase acceptance, minimise potential resistances, and ensure sustainability of the interventions promoting gender equality initiated within the project, it was decided to follow a participatory approach to GEP design (Cargo, Mercer 2008). This approach means that internal stakeholders were engaged in the

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* Parts of this article were adopted from the input submitted by the same authors to the EQUAL-IST project website (`https://equal-ist.eu`) and, in particular, to its page about CrowdEquality (`https://equal-ist.eu/crowdequality-page`).

GEP design, including decision-makers, academic and non-academic staff members, and students.

In order to support this approach, an innovative online crowdsourcing platform, called CrowdEquality (`http://www.crowdequality.eu`), was developed and applied within the project (Gorbacheva, Barann 2017) as well as other challenges related to gender equity, can be addressed with the help of IT-enabled idea crowdsourcing. A systematic literature review was conducted to understand how the topic of gender equity promotion via collaboratively used IT artefacts has been addressed in extant research. Insights from the literature review, overview of existing related IT artefacts, and iterative discussions with scholars in the IT field have resulted in a set of requirements to the idea crowdsourcing platform aimed at the promotion of gender equity in IT research institutions. These requirements were analysed further and could be categorised into those specific for the target platform and those relevant also for other idea crowdsourcing platforms (with or without further adaptation. CrowdEquality is an online platform, which supported the following processes within the EQUAL-IST project: (i) identification of specific challenges related to gender equality, which exist in the research institution ('problems'); (ii) generation of promising initiatives ('solutions') that could address each of the identified challenges; and (iii) voting on the selected feasible ideas. Furthermore, CrowdEquality was aimed at connecting academic and non-academic staff members working in research institutions, policy makers, gender experts, members of NGOs (Non-Governmental Organisations) and national/international networks, as well as all individuals interested in the GEP design and implementation.

This article reports on the course and outcomes of using the CrowdEquality platform for the participatory GEP design within the EQUAL-IST project. Furthermore, it is reflected in the article on the challenges faced and lessons learned during the platform development and operation.

The article starts with explaining the concept of crowdsourcing and providing some background information about the development of the CrowdEquality platform. The approach for participatory co-design of tailored GEPs supported by CrowdEquality is described afterwards. The main challenges and ideas raised on CrowdEquality for each participating research institution, which were then reflected in respective GEPs, are presented in the following section. The paper is concluded by discussing the advantages and lessons learned from the IT (Information Technology)-supported participatory approach to GEP design followed within the EQUAL-IST project.

2   Background

The concept of *crowdsourcing*, which was first introduced by Howe in 2006, means the involvement of an undefined large group of internal and external individuals in the process of accomplishing a specific task or in innovation efforts (Howe 2006). The specific type of crowdsourcing, when novel ideas need to be generated by internal and external contributors, is called *idea crowdsourcing* (e.g., Kosonen et al. 2013). One common way to enable idea crowdsourcing is via Internet-based tools for crowdsourcing and idea management systems (e.g., Bansemir, Neyer 2009). Using idea crowdsourcing for the idea generation process can provide a number of benefits. First, it brings together a diverse set of people with different knowledge and skills, which facilitates the collection of a variety of thoughts and experiences and, as a consequence, the generation of the most innovative ideas (e.g., Whelan, Golden, Donnellan 2013). Studies show that people with diverse backgrounds and roles are likely to create synergies while they brainstorm and discuss ideas, and the solutions identified during this process have a high potential to be successful once implemented (e.g., Wang, Ramiller 2009). Second, idea crowdsourcing allows the collection of a high number of ideas in a cost-efficient way (e.g., Schweitzer et al. 2012). Third, the involvement of a 'crowd' can increase the public visibility of an organisation and its support (Johannsson et al. 2015).

In the study by Gorbacheva and Barann (2017) a literature review was conducted, where the gap in research on the potential of IT-enabled idea crowdsourcing to tackle the challenges related to gender equality could be revealed. This study acted as a basis for the development of the CrowdEquality idea crowdsourcing platform within the EQUAL-IST project. Although one of the studies analysed within this literature review (by Trauth, Jessup 2000) provided valuable insights for the identification of initial requirements to the platform, no studies discussing the promotion of gender equality in research institutions via collaboratively used IT artefacts could be identified. Furthermore, within the study a market analysis of existing idea crowdsourcing platforms was conducted and further requirements to the platform were collected via a focus group with the research institutions involved in the EQUAL-IST project. As a result, the requirements to the CrowdEquality platform were defined, analysed, and compared with the features of other idea crowdsourcing platforms.

3   Approach

The CrowdEquality platform was developed by a team of eight Bachelor students studying Information Systems at University of Muenster as part of their project seminar in October 2016 – February 2017.

(Note: A project seminar is a special teaching format, usually done in collaboration with companies, where the students work in teams on some task relevant for practice.) The students were supervised by researchers from the University of Muenster who acted as stakeholders. Afterwards the platform was tested and further improved by the Working Group members of the EQUAL-IST project at the University of Muenster. The platform technical basis is the OpenideaL distribution of the widely recognised Content Management System Drupal (`https://www.drupal.org/project/idea`). Within the EQUAL-IST project the platform was used from March – June 2017, when students and staff members from the involved six research institutions, as well as external users, had an opportunity to contribute to the platform.

The phases of participatory co-design of tailored GEPs supported by CrowdEquality are presented in Figure 1. During Phase 1, the specific challenges related to gender equality, which exist at each participating research institution ('challenges' hereafter), were identified. Phase 2, in turn, was aimed at the generation of the promising initiatives that could address each of the identified challenges ('ideas' hereafter). Phase 1 and Phase 2 were both supported by the CrowdEquality platform and formed the *Ideation* step in the participatory co-design of tailored GEPs. It is noteworthy that the initial sets of challenges and ideas submitted to the platform were derived from an internal gender audit conducted in each research institution, which were then extended with further contribution from the registered users. The *Review* step, which corresponds to Phase 3, included the analysis of the collected ideas and the selection of those of them, which were meaningful and feasible to be implemented in research institutions. Within the EQUAL-IST project this phase took place outside the CrowdEquality platform (and therefore marked with grey in **[fig. 1]**), although the platform also offered the recommendation functionality for the identification of the most promising ideas based on the average number of 'likes' an idea received per day since its publishing. The pre-selected ideas then entered Phase 4, which corresponds to the *Voting* step. Here the users were invited to up-vote or down-vote on the platform on each idea. Based on the results of this phase, the *winning ideas*, i.e. those that received the highest number of up-votes and the lowest number of down-votes, were identified and communicated to the involved research institutions. Finally, the *Implementation* step, which corresponds to Phase 5, took place outside the platform. Here action plans were developed for the *winning ideas*, which then formed the core of the tailored GEPs and implemented by the research institutions in two iterations (1st iteration: October 2017-May 2018; 2nd iteration: July 2018-April 2019).
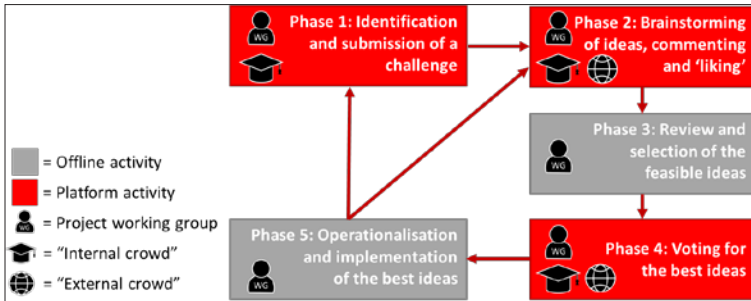
Figure 1 Phases of participatory co-design of tailored GEPs (adapted from Gorbacheva, Barann 2017)

All personal data collected on the platform was stored in a secure way on the server of the Department of Information Systems at the University of Muenster ('department' hereafter). The platform was maintained by the department during its active phase within the EQUAL-IST project. Afterwards, for the code security and mainte-nance reasons, it was transcoded to a static website. The platform will remain in this static mode for at least three years after the end of the project. The platform code (without content) is available on the University of Muenster's GitHub repository (`https://wiwi-gitlab.uni-muenster.de/equal-ist/crowdequality`).

4   Results

The CrowdEquality platform was used by the following six STEM re-search institutions involved in the EQUAL-IST project during the par-ticipatory co-design of their tailored GEPs (GEP details are availa-ble on the website of the EQUAL-IST project at `https://equal-ist.eu/gender-equality-plans`):

1. Finland: University of Turku (UTU), Information Systems Sci-ence Unit (ISS) at the Department of Management and Entre-preneurship
2. Germany: University of Muenster (WWU), Department of In-formation Systems (DIS)
3. Italy: University of Modena and Reggio Emilia (UniMORE), Department of Engineering (DIEF)
4. Lithuania: Kaunas University of Technology (KTU), Faculty of Informatics (IF)
5. Portugal: University of Minho (UMINHO), School of Engi-neering
6. Ukraine: Simon Kuznets Kharkiv National University of Eco-nomic (KhNUE), Information Systems Department

In total 331 users registered to the platform, including 142 students (101 students from RPOs and 41 external students); 107 academic staff members (90 academic staff members from RPOs and 17 external academic staff members); 28 non-academic staff members (25 non-academic staff members from RPOs and 3 external non-academic staff members), and further 54 users. 54 challenges and 104 comments to the challenges, as well as 91 ideas and 75 comments to the ideas were submitted to the platform.

The main challenges and ideas raised on CrowdEquality for each participating research institution, which were then reflected in respective GEPs, are presented below.

For **KhNUE** the information on CrowdEquality was provided in both English and Ukrainian languages in order to increase the participation of the targeted audience. In order to address the existing work-life balance challenge, the activities included in the GEP focused on determining the need in establishing a children's room on the campus and the resources required for it, as well as on ensuring opportunities for teleworking for academic staff members with young children. Another challenge identified at the Information Systems Department was the gender imbalance among the students of computer and economic sciences study programme. It was agreed to include in the GEP awareness-raising activities, such as the events to spread information about women in the IT industry and special nominations for all-women teams in IT competitions. Finally, attention was paid to existing at the department lack of gender culture and awareness about gender equality issues. Here the activities to improve the content of promotional material and to raise awareness of students and academic staff were proposed.

For **KTU** the priority was to support women in IT academic careers in creating a clear career vision. Based on the voting results, the activities included individual counselling on designing and monitoring their career plans. Furthermore, it was proposed to create a mentoring network connecting senior researchers with PhD students. In order to address the challenge of the lack of visibility of women in IT, the CrowdEquality audience suggested a range of communication activities, which were then included in the GEP.

One of the main challenges identified at **UMINHO** was the need in improving gender equality reflexivity and in increasing awareness about the topic. The proposed idea, which was included in the GEP, was to develop an online knowledge portal, called the Gender Observatory, which later on was extended with the information from other universities in Portugal.

At **UniMORE** in order to tackle the challenges of existing gender stereotypes about IT studies and careers, as well as the lack of female role models in the IT field**,** the following key activities were included in the GEP: (i) creation of an educational module for high

schools about gender equality and gender stereotypes and (ii) extension of the IT summer camp "Digital Girls". Regarding the challenge of the lack of gender neutral communication and the lack of awareness of gender equality issues at all levels within the university, the following activities were included in the GEP: (i) guidelines for gender neutral communication at the institutional level; (ii) seminars on gender neutral communication for academic staff members; (iii) identification and promotion of existing at the university expertise and initiatives in the area of gender equality; and (iv) organisation of workshops and seminars on gender equality. Both academic and non-academic staff members, especially those with young children, faced the work-life balance challenge. Here the GEP activities were aimed at increasing visibility of existing information and regulations about parental leave and work flexibility. Furthermore, a study was carried out about setting up childcare facilities at the university. The proposed first step to address the scarcity of resources and coordination in existing committees on gender equality included the identification of a reference person for gender equality matters at each university department. Another activity included in the GEP was aimed at improving the monitoring and evaluation of gender equality indicators by designing an IT-supported system for it.

For **UTU** the priority was to improve peer support between the employees. The relevant activities included in the GEP were focused on setting up of a peer support program at the ISS unit. In order to give voice to women and empower them, respective activities to improve institutional communication were proposed.

At **WWU** in order to tackle the challenge of the low share of women among Bachelor Information Systems students, activities to evaluate existing communication channels and materials to promote this study programme were included in the GEP. The challenge of existing lack of awareness of the topic of gender equality and interest in it was addressed by developing marketing materials about the importance of gender equality and the value of gender-sensitive language. Further challenges raised by the CrowdEquality audience included, on the one hand, vertical gender segregation and, on the other hand, the need in reacting to negative attitude (of both men and women) towards existing interventions aimed at advancing women in their academic careers. Activities here focused on improving the communication and clarification of the content of such interventions, as well on promoting them. Another key challenge was about the difficulties in balancing work and family life. Here the CrowdEquality audience suggested that it was necessary to communicate more clearly during the hiring process the expectations from staff members.

5   Discussion and Conclusion

The CrowdEquality platform developed within the EQUAL-IST project enabled an innovative IT-supported approach to participatory co-design of tailored GEPs. CrowdEquality was aimed at collecting ideas and triggering discussions about promising initiatives for promoting gender equality and diversity and improving work-family balance in research institutions. The platform was developed using the Drupal Content Management System by the team of eight Bachelor students studying Information Systems at the University of Muenster and then tested and further improved by the Working Group members of the EQUAL-IST project at the University of Muenster.

Development of the platform was based on the study by Gorbacheva and Barann (2017), which included (i) a literature review of academic studies discussing how gender equality can be promoted with the help of IT-enabled idea crowdsourcing; (ii) a market analysis of existing idea crowdsourcing platforms; and (iii) the collection and analysis of requirements to the idea crowdsourcing platform aimed at the promotion of gender equality in STEM research institutions. As a result of the study, the requirements to the CrowdEquality platform could be identified and classified into (i) *generic* (relevant also for other idea crowdsourcing platforms), (ii) *adapted* (relevant for other idea crowdsourcing platforms, but adaptation for CrowdEquality was required), and (iii) *specific* (peculiar for CrowdEquality). The *specific* requirements included, for instance, a challenge life cycle (see Figure 1) and private and shared areas on the platform. The private area was accessible for the so-called "internal crowd", i.e. the staff members and students from the respective research institution. The shared area, in turn, was accessible for all users (the so-called "external crowd").

One of the lessons learned during the platform development and operation was the challenge faced in structuring information in the shared area of the platform, namely the need in combining the "wisdom of crowds" with the non-disclosure of sensitive information. Another challenge faced was low participation and a general lack of interest of the "internal crowd". This could be caused by the fact that the participatory co-design of tailored GEPs took place right after or even in parallel with the internal gender audit conducted at the involved research institutions. The internal gender audit included face-to-face interviews and workshops, as well as (online) surveys. This could limit the participation, as staff members and students who have already expressed their views and perceptions during the audit could perceive contribution to CrowdEquality as redundant. Thus, the research institutions, which intend to follow a participatory approach to the GEP design, might find useful to apply the crowdsourcing process instead of the internal gender audit, as well as to develop incen-

tives to contribute to the platform and the platform dissemination strategy for both "internal crowd" and "external crowd".

To conclude, the CrowdEqulity platform supported (i) identification of the specific challenges related to gender equality, which exist at each participating research institution; (ii) generation of the promising ideas that could address each of the identified challenges; and (iii) voting on the selected feasible ideas. The participatory co-design of tailored GEPs included the following steps. First, the *Ideation* step, where the challenges were identified and the ideas to address them were generated. Second, the *Review* step included the analysis of the collected ideas and the selection of those of them, which were meaningful and feasible to be implemented. Third, the *Voting* step, where the users were invited to up-vote or down-vote on the platform on each pre-selected idea. Fourth, the *Implementation* step, where action plans were developed for the *winning ideas*, which then formed the core of the tailored GEPs and implemented by the research institutions. Here special attention was paid to securing the sustainability of the GEP implementation also after the end of the EQUAL-IST project. The *Ideation* and *Voting* steps were performed using the CrowdEquality platform, while the *Review* and *Implementation* steps took place outside the platform.

The collaborative IT-supported participatory GEP design that was followed within the EQUAL-IST project facilitated the internal raise of awareness about the topic of gender equality, triggered creativity in the GEP design, and provided valuable input to the involved stakeholders and decision-makers to set up GEPs that consider the needs and perceptions of affected staff members. Therefore, despite the challenges faced, we recommend it to the research institutions willing to implement structural changes and modernise their management towards higher gender equality.

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From Planning to Tailoring and Implementing GEPs: Lessons Learned within the EQUAL-IST Project

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Abstract This chapter is focused on the H2020 EQUAL-IST project outcomes and it analyzes the first iteration of Gender Equality Plans implementation taking place between October 2017 and May 2018 and focused on 4 main intervention areas, namely Institutional Communication, Human Resources and Management Practices, Teaching and Services for (Potential) Students, Research Design. Based on internal reports provided by the 6 involved research institutions, we classified all the implemented actions as 'structural change actions' or 'preparatory actions' (following up the study carried out in Chapter 1 by Sangiuliano, Canali, Madesi) and as 'internally-oriented actions' or 'externally-oriented actions'. The peculiarities of GEP implementation in the Information Sciences and Technology (IST) and Information and Communications Technology (ICT) disciplines appeared to be a common effort from all involved institutions to attract more girls in ICT studies: indeed, the gender leak in the ICT-IST recruitment pipeline starts at the enrollment at university, with extremely low numbers of female students. We therefore aimed at critically understanding if the notable amount of actions to attract more female students, which were initiated within the EQUAL-IST project during the first iteration of GEP implementation, implies a risk to bend the process towards more externally-oriented actions, which are less likely to impact internal power structures, at least in the short run. The chapter also intends to explore whether structural change actions, which have the potential to go beyond mere raising awareness on the topics at stake, tend to be concentrated in the Human Resources and Management Practices area.

Keywords Gender Equality Plans (GEPs). Structural changes. Research organizations. Implementation. Information Sciences and Technology. Sustainability.

Summary 1 Motivation and Background. – 2 Reporting on the GEP Implementation and Continuous Monitoring. – 3 Methodology for Studying GEPs Implemented Actions. – 4 Study Results. – 5 Final Remarks and Recommendations.

1 Motivation and Background

Over the last decades, policies for European Research and Technological Development have been increasingly focusing on how gender aspects impact Research and Innovation (R&I). Following up the research and policy work in this field set up by the Helsinki Group, the European Research Area (ERA) has prioritized the following objectives: gender equality in decision-making, gender equality in research teams, and incorporation of the gender dimension into research content and innovation (European Commission 2012a; Council of the European Union 2015). Therefore, European Union (EU) Member States are expected and encouraged to set up incentives to achieve these objectives. ERA is also encouraging partnership of EU governments with Research Funding Organizations (RFOs) and Research Performing Organizations (RPOs) to promote cultural change in academia and consequently trigger institutional change.

e ERA priorities and the policy tools promoting institutional change reflect the gender mainstreaming perspective and are referred to as *structural or institutional change* (European Commission 2012b). Structural change practices are aimed at provoking transformations in research institutions, in particular, in their rules, regulations, organizational processes, and cultures (European Commission 2014). Thus, structural change is an effort to progress beyond the idea that women need to be trained or granted special support as the under-represented sex. In the FP7 and Horizon 2020 (H2020) framework programs, *Gender Equality Plans (GEPs)* have been promoted as the main tool to achieve structural change. Based on insights from sociology of gendered organizations (Gherardi 1994), GEPs are intended to incorporate gender equality policies into change management practices and lead to institutional transformation (EIGE 2016).

Since 2007, the EC have funded on average 3-4 FP7 and H2020 projects per year to support European RPOs and RFOs in designing, implementing, and evaluating GEPs. Projects like GenisLab (2014), Integer and Stages (2015), Egera, Festa, Garcia, and Genovate (2016), GenderTime and Trigger (2017) delivered insightful reports and toolkits on how to foster structural change for gender equality and what are the main constraints and critical aspects at stake. In these pro-

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jects, gender equality is being increasingly framed not only as an is-
sue ofwomen's under-representation , but also as a core dimension
of research excellence (European Commission 2011). This also reso-
nates with the new normative foundations for higher education and
research institutions to become more 'managerial' and 'entrepre-
neurial' (Kreissl et al. 2015).

Implementation of GEPs in research institutions is monitored in the
ERA periodic reports, which show that in spite of an increasing num-
ber of RFOs and RPOs adopting the aforementioned policies the major-
ity of EU research organizations are still not committed to structural
change for gender equality (European Commission 2017). Consequent-
ly, additional guidelines and tools, such as the GEAR (Gender Equality
in Academia and Research) Toolkit developed by the European Insti-
tute for Gender Equality (EIGE), have been provided to assist research
organizations (EIGE 2017). The H2020 EQUAL-IST project ("Gender
Equality Plans for Information Sciences and Technology Research In-
stitutions"), approved in 2016 within the H2020 program "Science with
and for Societies", applied these guidelines and tools to research insti-
tutions in Information Sciences and Technology (IST) and Information
and Communications Technology (ICT) disciplines.

IST and ICT belong to the STEM fields (Science, Technology, Engi-
neering, and Mathematics), where statistics shows severe under-rep-
resentation of women along the entire career pipeline, from studying
to accessing research positions to progressing in the career ladder
to top leadership positions. Figures on ICT tertiary studies in 2015
highlight that there are four times as many male graduates as female
graduates (European Commission 2018a). As for leadership positions
in EU research organizations, the SheFigures 2015 study (European
Commission 2016) reported that despite some positive trends over
the last years women constituted on average 20.9% of Grade A (full
professors) across all disciplines and only 9.8% in the Engineering
and Technology field, which includes IST and ICT.

The EQUAL-IST project has focused on supporting six Informatics
and Information Systems Departments from Germany, Finland, Italy,
Lithuania, Portugal, and Ukraine to become engaged into achieving
internal structural change for gender equality through GEP imple-
mentation. Running for 36 months, the project took the challenge to
develop and implement the lacking discipline-specific interventions
related to gender equality in the ICT and IST fields. Gender Equality
Plans have addressed the following four main areas of intervention:
Institutional Communication, Human Resources (HR) and Manage-
ment Processes and Practices, Teaching and Services for (Potential)
Students, and Research Design and Delivery.

The project started with an internal participatory gender audit
performed at each RPO, where a mixed methodology was applied
using quantitative data analysis and qualitative techniques (e.g., fo-

cus groups, semi-structured interviews, and workshops). This process had led to the identification of the challenges related to gender equality at each RPO. Such challenges, as well as ideas to address them, were then discussed on an online crowdsourcing platform, developed within the project (`http://www.crowdequality.eu`) in order to further trigger a participatory approach to design the tailored GEPs. The designed GEPs have been implemented at RPO in two rounds: the first iteration from October 2017 to May 2018 and the second one from July 2018 to April 2019.

In this paper the results of the first iteration of GEP implementation are analyzed and discussed. The analysis is based on the GEP implementation reports delivered by participating RPOs. As we clarify below, a self-assessment process was performed during the GEP implementation as part of a continued monitoring activity, which was conducted in a dialogue with the external evaluation team and supported by mutual learning during face-to-face meetings and online sessions of the project consortium.

In line with Chapter 1, we propose to analyze the self-reported implemented actions as either 'structural change actions' or 'preparatory actions'. Furthermore, based on the main audience/target beneficiaries involved in the implemented actions, we proposed to further classify them as being either 'internally-oriented' or 'externally-oriented'.

Identification of the share of structural change actions was considered to be especially important, to prevent therisk that the project could end up with non-sustainable actions having limited impact. Such risk was highlighted in the majority of the 19 in-depth interviews with representatives of research organizations across Europe, several of them involved in projects aimed at GEP design and implementation funded by national or EU programmes, as reported in Chapter 11 of this volume.. Furthermore, the ERA progress report (European Commission 2017) and the FP7 GenderNet project reports (GenderNet 2015) stressed the need for continuous institutional commitment and monitoring mechanisms for GEP implementation. GEP sustainability is also highlighted by the EC as a core element to work on (European Commission 2018b).

Furthermore, earlier feedback from most participating RPOs had showed that attracting more girls to ICT studies was likely to form the focus of GEP actions, as such actions could be more easily understood and approved by internal decision-makers. On the other hand, RPOs reported that during internal gender audits no need was identified to integrate the gender dimension into ICT and IST research content. This could lead to a serious limitation of having the actions mostly focused on the Teaching and Services for (Potential) Students intervention area and targeting external stakeholders, thus losing an inward-oriented approach towards changing structures, internal regulations, and processes.

The first purpose of the chapter is to explore, whether the notable amount of actions to attract more female students, which were initiated within the EQUAL-IST project during the first iteration of GEP implementation, implied a risk to bend the process towards more externally-oriented actions, which are less likely to impact internal power structures, at least in the short run. The second purpose of the present chapter is to explore, whether structural change actions, which have the potential to go beyond mere raising awareness on the topics at stake, tend to be concentrated in the HR and Management Practices area.

2 Reporting on the GEP Implementation and Continuous Monitoring

The objective of internal reporting within the EQUAL-IST project was to monitor and assess the GEP implementation progress by (i) RPOs internally, (ii) project task and work package leaders, and (iii) the external evaluation team. Each RPO had to report continuously on the initiated actions and their evaluation. At the end of the first iteration of GEP implementation the final versions of internal reports provided by the RPOs were included into a project deliverable (Gorbacheva 2018). This deliverable also contained an overview of the GEP implementation progress at each RPO and analysis of content and time deviations from the GEPs.

During the first iteration of GEP implementation, 63 distinct actions were reported by the RPOs. These actions were aimed at addressing the challenges related to gender equality identified at each RPO during internal gender audits. Each action could be classified into one of the following project intervention areas: Institutional Communication, HR and Management Practices, and Teaching and Services for (Potential) Students.

When performing the reporting, the RPOs had to follow specific guidelines, which were developed by the task and work package leaders, informed by the recommendations from the project external evaluation team, as well as disseminated, discussed, and approved by all RPOs. The guidelines for internal reporting prescribed provision of the following information for each implemented action:

- General description of the work performed, focusing on the action objectives, main ideas, and content.
- Action impact focusing on the changes in processes and procedures and the changes related to behavior and culture.
- Details of the course and outcomes of the action evaluation.
- Action duration and status (completed, in progress, in preparation).
- Stakeholders involved in the action management and implementation, as well as those providing informational and advisory support.

- In case the reported action was an event or a standalone study: number of participants and the numbers of men and women among them.
- Faced problems or obstacles during the action planning or implementation and undertaken solutions to address them.
- Factors that have made the action successful or unsuccessful.
- Unexpected positive or negative results observed during the action planning or implementation.
- Links to all available materials related to action preparation and implementation, which had to be stored separately.
- Elaboration on how the sustainability of the action beyond the project runtime was planned to be ensured (in terms of resources, knowledge, institutionalization etc.).

3 Methodology for Studying GEPs Implemented Actions

As mentioned, this work follows up the study conducted in chapter one of this volume and is focused on the analysis of results of the first iteration of GEP implementation (October 2017-May 2018). Here the classification used to analyze the results of the challenges spotlighted via the Participatory Gender Audit and the first identified solutions where 'structural change actions' were distinguished from 'preparatory actions', is refined into a more complex matrix intersecting the initial categorization with the scope of the actions as being 'internally-oriented' or 'externally-oriented' **[fig. 1]**.

Internally-oriented actions
Actions primarily targeted at staff members and/or students at the implementing RPO

Externally-oriented actions
Actions primarily targeted at local, national, and international beneficiaries/stakeholders who are not members of the implementing RPO

Implementation of GEPs

Preparatory actions
Actions focused on creating preconditions and aimed at raising awareness and building capacity

Structural change actions
Actions focused on introducing structural changes and aimed at changing institutional procedures, structures, and regulations

Figure 1   Proposed classification of implemented actions

As clarified in figure 1, the following four labels were used to classify the implemented actions:

- "IP" – Internally-oriented preparatory actions: actions targeting staff members or current students at the implementing RPOs and focused on raising awareness on gender equality issues; the ultimate goal of such actions is to promote a change in the institutional culture.
- "EP" – Externally-oriented preparatory actions: actions targeting external stakeholders aimed at supporting the overall process of change.
- "IS" – Internally-oriented actions focused on introducing structural changes: actions targeting internal stakeholders and staff members focused on moving beyond the objective of creating preconditions and resulting in changes in structures, procedures, regulations etc.
- "ES" – Externally-oriented actions focused on introducing structural changes: actions targeting external stakeholders and resulting in (internal) structural changes.

This categorization provides a first step to analyze the nature of actions towards institutional change and it does not reflect all possible contextual complexities of change processes. In this matrix, internally-oriented actions for structural change ("IS") can be seen as the 'main' actions, while externally-oriented actions to build preconditions ("EP") can be framed as 'preliminary steps' in the path towards structural change ; the other two categories, namely "IP" and "ES", stand in between. The proposed framework is a simple and still useful tool to enhance understanding of prevailing patterns in structural change processes.

As mentioned in the previous section, the individual reports provided by the six RPOs implementing tailored GEPs within the EQUAL-IST project were screened and 63 distinct implemented actions could be identified. Each action has been attributed to one of the aforementioned four categories. A cross-check of interpretative choices and doubts was shared and resolved by the authors. In cases where a specific action could be assigned to more than one category (e.g., targeting both internal and external stakeholders), the most fitting category was chosen.

Data analysis reported in the following section presents our findings both in an aggregated way (without specifying individual RPOs) and for each project intervention area. It needs to be noted here that some inconsistencies in allocating actions to intervention areas could be revealed in the reports submitted by the RPOs. Therefore, during the analysis re-allocation of such actions to correct intervention areas was performed.

4   Study Results

Most of the 63 analyzed actions belonged to the HR and Management Practices project intervention area, followed by the actions in the Teaching and Services for (Potential) Students and Institutional Communication areas at almost the same rates **[fig. 2]**. At the same time, the Research Design and Delivery area remained unattended during the first iteration of GEP implementation.

HR and Management Practices is a broad area and includes such crucial aspects as recruitment, retention, career progression, access to top academic positions, as well as work-life balance. Furthermore, within the EQUAL-IST project such management aspects as governance structures and equality bodies were also included into this intervention area. Therefore, this is definitely the core area for promoting institutional change and it is not surprising that 31 out of 63 implemented actions belonged to it. As for the Teaching and Services for (Potential) Students area, a higher share of actions was expected here, as during the project mutual learning activities and monitoring sessions the RPOs often stressed the need for actions to attract more girls to apply to the respective study programs. This observation shows that project working groups at the RPOs (who are in charge of steering the GEP implementation) managed to achieve a balanced representation of actions in the project main intervention areas. Nevertheless, no actions were foreseen in the GEPs in the Research Design and Delivery area. This reflects internal difficulties reported by the RPOs in grasping how the gender dimension could be relevant in ICT and IST research, which is considered to be gender-neutral by its nature.
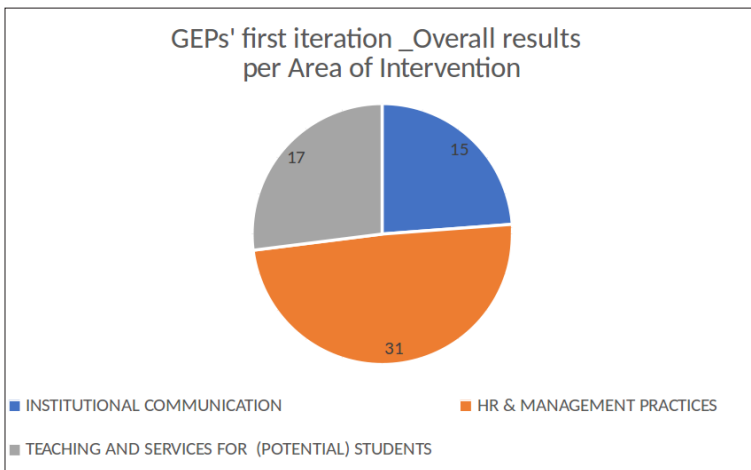
Figure 2   Implemented actions per area of intervention

Regarding the nature of implemented actions, figure 3 shows that that twice as many preparatory actions as structural change actions were implemented (45 vs. 18 actions). This finding is not surprising, as all RPOs are still at the initial stage of setting up gender policies and this was the first iteration of GEP implementation. Therefore, implementation of 18 structural change actions already before the end of the project can be considered as a positive outcome. The majority of the actions were internally-oriented (53 out of 63). Out of 10 externally-oriented actions, 9 were preparatory actions. The only externally-oriented action focused on introducing structural changes was assigned to the HR and Management Practices area of intervention. In this action, a collaboration protocol was signed with external national-level stakeholders. The protocol was focused on joint actions to promote gender equality in research institutions across the country. This strategic action had a positive and triggering impact on the overall GEP implementation, as the protocol increased its legitimacy, as well as increased recognition of the EQUAL-IST project, in particular, in the eyes of the promoting RPO middle-level management.
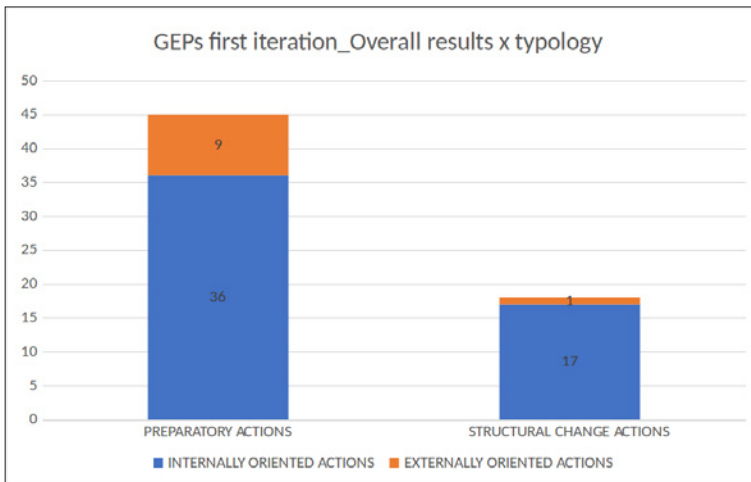
Figure 3 Overview of preparatory and structural change actions

A closer look at each intervention area revealed that external stakeholders were not involved in the Institutional Communication area **[fig. 4]**. In this area, internally-oriented preparatory actions were focused on raising awareness of gender bias in visual and verbal communications, as well as assessment of communication materials using a gender-sensitive approach. The internally-oriented actions focused on introducing structural changes here included updating

communication materials based on the recommendations from the performed gender assessment, setting up of new dedicated communication channels, and formal adoption of guidelines on gender-sensitive communication.
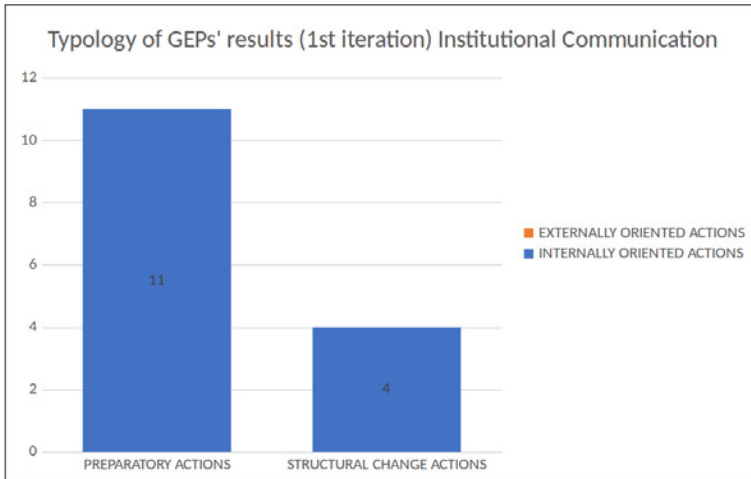
Figure 4 Preparatory and structural change actions in the Institutional Communication area

The most populated HR and Management Practices intervention area (Figure 5) contained the majority of internally-oriented actions focused on introducing structural changes. The most relevant actions here included, as follows: formal agreements on telework, changed procedures for data collection and analysis (considering gender-disaggregated data), gender-sensitive career planning tools adopted at the department level, setting up of gender equality bodies, formation of networks for female researchers, appointment of contact people for gender-related matters at departments, and incorporation of gender equality as one of the values into the faculty mission statement. Internally-oriented preparatory actions, in turn, included the interventions focused on raising awareness, building capacity, providing information about existing work-life balance regulations and the roles of existing gender equality machineries, carrying out a study to investigate the opportunity to establish on-campus child-care facilities, and analysing of the needs of staff members with childcare duties. One striking finding was that even though the ICT and IST disciplines are among those with the lowest shares of women among full professors and in leadership positions, no actions to address this challenge were included in the GEPs. The prevailing discourse of unbiased and meritocratic recruitment proved hard to be challenged, at

least during this initial phase of implementing gender equality poli-cies. Activities to raise awareness of gender bias in recruitment were initiated only at one RPO. Here, each time a new appointment com-mittee for tenured positions was formed, the faculty Equal Opportu-nities Officer sent to the members of these appointment committees emails informing about unconscious bias and about existing regula-tions related to gender equality in recruitment. The goal was to sen-sitize the members of appointment committees about the importance of ensuring equal treatment of all candidates and avoiding any form of bias and discrimination.
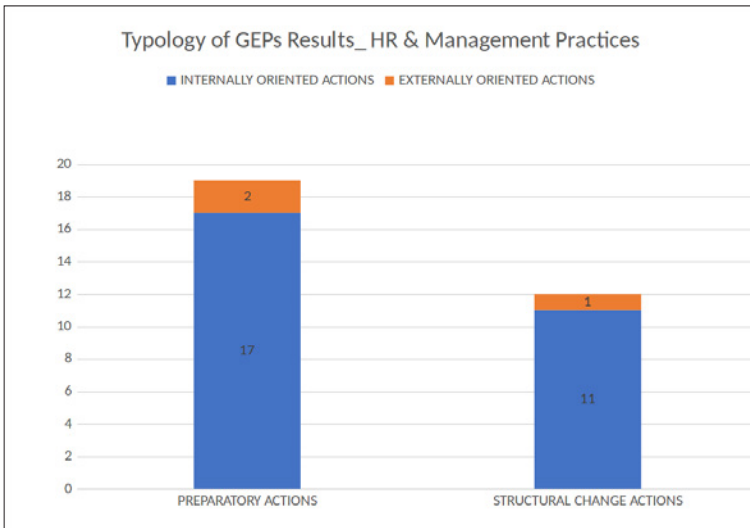
Figure 5 Preparatory and structural change actions in the HR and Management Practices area

Finally, the Teaching and Services for (Potential) Students area tar-geted external stakeholders the most (Figure 6). The externally-ori-ented preparatory actions had girls from primary to high schools as beneficiaries and were aimed at teaching them basic coding skills and encouraging them to pursue studies in the ICT and IST disci-plines. These actions involved such external partners or sponsors as schools, ICT companies and foundations, and local Non-Governmen-tal Organizations. Most of these actions required significant admin-istrative efforts (e.g., organization of summer camps located at dif-ferent campuses). Internally-oriented actions focused on introducing structural changes it this intervention area were related to reviews of teaching materials to eradicate gender bias, launching of awards for teams of ICT students that involve women, and institutionaliza-tion of annual events on training high school girls to code as perma-

nent activities. It is interesting to note that while initiatives to attract girls to study ICT and IST undertook a clear disciplinary focus, actions on gender-sensitive teaching were not addressing the specificity of teaching in the ICT and IST disciplines. In order to have these aspects more widely covered during the second iteration of GEP implementation, several good practices and inspirational examples were proposed to the RPOs in the toolkit developed within the EQUAL-IST project (available at `https://equalist.dais.unive.it/public`).
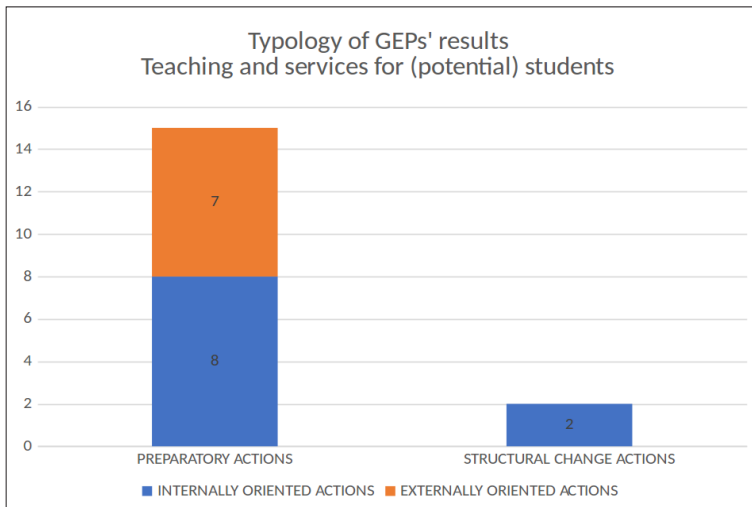
Figure 6   Preparatory and structural change actions in the Teaching and Services for (Potential) Students area

5 Final Remarks and Recommendations

This chapter aimed at studying the main characteristics of GEP implementation at ICT and IST research institutions. The analysis is based on the results of the first iteration of GEP implementation within the EQUAL-IST project.

Using the information provided by the RPOs in their reports on the first iteration of GEP implementation, we have elaborated a four-dimensional matrix to classify all the reported actions along the 'preparatory' vs. 'structural change' and the 'internal' vs. 'external' dimensions. The results disconfirmed the foreseen risk that a preparatory orientation hinders structural change dynamics: even in a first implementation phase from institutions being at a very initial stage of carrying out Gender Equality policies, 18 out of 63 aggregated actions were still focused on introducing structural change. Furthermore, although the Teaching and Services for (Potential) Stu-

dents area generated 17 actions, the majority of actions (31 out of 63) was implemented within the HR and Management Practices area. Here it needs to be mentioned that the importance to balance across the different intervention areas was communicated to the RPOs during training and mutual learning events as a fundamental element of GEP design and implementation.

The emerging unexpected critical aspect was the strong presumption and identification of ICT and IST research as gender neutral, which resulted in having no GEPs actions included in the Research Design and Delivery intervention area. Including a gender dimension into ICT research appeared to be a kind of 'taboo' at all involved RPOs, perceived as something difficult to grasp and being a low priority. Several factors could influence this phenomenon: for instance, the resistance to consider (cyber-) feminist and gender theories in the ICT and IST research, as well as the limited knowledge of recent developments in such research areas as algorithmic gender bias (Bolukbasi et al. 2016; Boulamwini, Tebru 2018). These aspects were highlighted in a dedicated section of the toolkit developed within the EQUAL-IST project (Sangiuliano 2018), and a webinar on gender in ICT research content,[1] to further stimulatecorrective measures to support actions in the Research Design and Delivery area during the second iteration of GEP implementation.

As for the 'transformativity' of the achieved structural changes, it is important to underline the following two *caveats*:

- In the HR and Management Practices intervention area the implemented actions did not address the issue of under-representation of women in leadership and top academic career positions. Existence of gender bias in recruitment and in the definition of excellence standards was generally denied.
- The sustainability of most internally-oriented actions focused on introducing structural changes (e.g., the actions related to internal governance changes and those addressing financial and HR-related constraints) could not be guaranteed. Therefore, during the second iteration of GEP implementation partners were stimulated and guided to set up dedicated sustainability plans to ensure the support of all initiated structural change actions.

Despite the revealed shortcomings, for such an early stage of GEP implementation we consider that satisfactory results in terms of triggering structural changes could be achieved within the EQUAL-IST project.

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1 The on line version of the EQUAL-IST Toolkit can be consulted at `https://equal-ist.dais.unive.it/public/`. The recorded webinar on Gender in ICT Research content is available at the EQUAL-IST Website: `https://equal-ist.eu/support-gep-implementation/`.

The following recommendations to research institutions that intend to implement GEPs as a tool for achieving structural change emerged from the study outcomes, which are in line with available studies and literature:

- Organize trainings on integrating the gender dimension into research content, as, especially in ICT and IST disciplines, there is a lack of awareness about its importance and a lack of understanding of how it could be performed (European Commission 2017; Gender Net Project 2015).
- Ensure that actions addressing the (gender) bias in recruitment procedures and lack of women at top academic positions are considered for inclusion in GEPs and thoroughly implemented (European Commission 2012a and 2012b).
- Introduce indicators related to GEP sustainability and perform periodic monitoring of GEP implementation: the impact of implemented actions needs to be evaluated, including regular collection and analysis of gender-disaggregated statistics (EIGE 2016).
- Value collaboration with the following external stakeholders: (i) girls as perspective enrolled students and (ii) national high-level stakeholders as the agents driving GEP legitimacy and acceptance.
- Support of external stakeholders could prevent the marginalization of gender equality issues and emergence of anti-feminist attitudes towards gender equality policies. Thus, gaining external support and building allies is especially important in such a controversial time as the present one, when advances coexist with backlashes (Kottig, Bitzan, Petö 2017).

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**Section II
Implementing EQUAL-IST Gender Equality
Plans: Challenges, Resistances and Results**

Gender Equality at the University of Minho: Empowering Women for Successful Careers in Engineering

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Abstract   With the impacts of technology and globalization, there's an increasing need for studies involving topics related to gender equality. There is a need for growing awareness about gender inequalities and promoting effective actions for their eradication., it is no different. Effective policies must be implemented in academia and scientific institutions to address and promote gender equality in managing human resources, research and pedagogical activities. This chapter describes the actions carried out at the University of Minho to implement a Gender Equality Plan (GEP) under the auspices of the European Project H2020, titled "EQUAL-IST – Gender Equality Plans for Information Sciences and Technology Research Institutions". It describes the activities implemented the encountered resistances, the strategic decisions made to overcome them and lessons learned during the execution along the process.

Keywords   Gender equality plans. Academia. Research. Engineering. Cohalition building. Institutional communication.

Summary   1 Introduction. – 2 Gender Equality in academia: an overview of the situation in Europe and Portugal. – 2.1 Gender Equality Plans in Portugal. – 2.2 The overview of Gender Equality in the Portuguese Universities. – 2.3 The overview of Gender Equality in the University of Minho. – 2.4 Gender Equality Plans (GEPs) in Portuguese Universities. – 3 UMINHO's GEP implementation: the experience of a 3 years' projec. – 3.1 Defined strategy: scope and goals. – 4 The GEP's implemented actions, faced issues and engendered coalitions. – 4.1 Human Resources and Process Management. – 4.2 Research. – 4.3 Teaching and academic services. – 4.4 Institutional Communication. – 5 Sustainability initiatives and the foreseen future of the UMINHO's GEP. – 6 Lessons learned and recommendations to other Universities implementing a GEP. – 7 Conclusion.

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1   Introduction

Gender equality in academia and science has been a central theme of several scientific studies around the world (Bradley 2000; Stewart, Malley, LaVaque-Manty 2007; Gaughan, Bozeman 2016; Sales-Oliveira, Villas-Boas, Las-Heras 2016). In contexts of increasing mobility, globalization and cultural change, it is urgent that science and education policies addressing the management of the University's human resources (including faculty, researchers, administrative staff and students) grow their awareness about gender inequalities and promote effective actions for their eradication. The design of such actions must be a collective and participatory effort to ensure the engagement of stakeholders and that women's aspirations and challenges are taken into account.

Since gender inequality is a transversal problem and holds implications both for the University as an institutions, and individually for people who are its staff members or beneficiaries, this chapter describes the actions carried out at the University of Minho to develop and implement a Gender Equality Plan under the auspices of the European Project H2020, titled "EQUAL-IST – Gender Equality Plans for Information Sciences and Technology Research Institutions". The project involves eight Research Performing Organisations (RPOs) from Northern, Southern, and Central Europe, as well as one from CIS (Commonwealth of Independent States). We also describe the resistances encountered, the strategic decisions made to overcome them and the learned lessons. The narrative intends to share the successes and failures of a highly motivated project team in order to contribute to a collective memory on gender equality initiatives in Higher Education in Portugal and to serve as an inspiration for future initiatives. We believe that changes in this area benefit from cumulative efforts and transfer of experience in order to capitalize on learned lessons.

This chapter is structured in the following sections: section 2 presents an overview of the situation in Europe and Portugal regarding Gender Equality; section 3 describe the implementation of the UMINHO's GEP and the experience of a 3 years' project: EQUAL-IST; section 4 lists the lessons learned and recommendations to other Universities implementing a GEP; while section 5 reports conclusions of this study.

2 Gender Equality in Academia: An Overview of the Situation in Europe and Portugal

Female and male talents in the area of Information Technology and Systems are becoming increasingly necessary as society becomes more digital and interconnected. The quality and excellence of research and teaching now depend on a policy of inclusion and diversity, not limited to any stereotype and / or segregation, but rather focusing on the quality and excellence of initiatives aimed at the development of socio-technical arrangements that advance the human condition. However, much remains to be done to change mindsets and establish learning and work environments that integrate the values of diversity and gender equality.

In the EU-28, women account for more than 50% of all students in the high education system. In 2016, almost one third (32.0 %) of all students were studying social sciences, journalism, information, business, administration or law. Nevertheless, within natural sciences, mathematics, statistics, and information and communication technologies the share of men on the total number of higher education students was 61.1 % (EUROSTAT 2018).

Similarly figures from the year 2016 referring to the EU28 show how male graduates accounted for 57.5% of all graduates in the same disciplines. When focusing on the labor market in the ICT sector, women are underrepresented with only 16.7% female specialists, workers whose job is to develop, operate and maintain ICT systems. Since ICT employment is growing at a fast pace in the EU-28 due to the fast digitalization of work processes, the low number of female workers in this sector requires effective measures to ensure gender equality and the benefits that come with a diverse work environment.

In Portugal, the percentage rate of female students in the fields of science, mathematics and computing is significantly above the EU average – 46.2% vs. 37.6% (EUROSTAT 2018). However, they are as underrepresented in the ICT sector as in the EU, and experience the same barriers to reach the highest positions of the careers in ICT, both in industry and in High Education institutions. In recent years, discussions have been intensifying in Portugal about the factors that lead to gender imbalances in the STEM areas as well as the measures necessary to reduce the gap. The lack of attractiveness of these areas for young women, as well as the difficulties that female graduates encounter in the labor market, are a matter of great concern, as they distract women from jobs and career positions that can ensure greater profitability and professional achievement.

In this context, the importance of bringing these concerns within the university itself is perceived as crucial. The promotion of gender equality discussions and strategies in the Higher Education is the basis for creating mechanisms to attract girls to engineering

and ICT study programs, promoting their successful integration into the labor market and, last but not least, encouraging gender equality more broadly.

2.1   Gender Equality Plans in Portugal

In Portugal, gender equality is one of the State's fundamental tasks taken into account in all aspects of the public and political decision-making processes. It is a fundamental principle of the Portuguese Constitution, and the structural principle of the democratic State. One of the instruments for the implementation of public policies for the promotion of gender equality and the combat of discrimination based on sex and sexual orientation in Portugal, is the V National Strategy for Gender Equality, Citizenship and Non-discrimination 2014-2017 (V PNI).

In the specific area of Higher Education, the V PNI intends, mainly, to promote non-discrimination on grounds of sex and promote equality between women and men in Portuguese Education and Scientific institutions. V PNI is seeking to encourage the definition of Protocols between the CIG (Commission for Citizenship and Gender Equality) and higher education institutions to promote the adoption an implementation of Gender Equality Plans. This national effort, although at an early stage, has produced important results, in particular in terms of raising the awareness towards the many challenges faced by women within the institutions, as students, teachers, managers and administrative staff. Moreover, some of the institutions begin to adopt gender equality plans and to dialogue among themselves to define joint strategies that promote the sustainability of such plans.

2.2   The overview of Gender Equality in the Portuguese Universities

In a global overview, in 2017/18, 53.8% of female students were enrolled in higher education in Portugal (PORDATA). The percentage of new female students was particularly low in the ICT area – 16.5%. This area has seen a continuous decrease of new female students since 2016, our year of reference in this work.

Regarding faculty in Higher Education, the higher the position in the career, the lower the number of women, reaching about 23% of women in the category of Full Professor / Coordinator Professor in Portugal. While men account for 44.8% of faculty members in higher education institutions in Portugal, they hold about 77% of the highest position in the academic hierarchy.
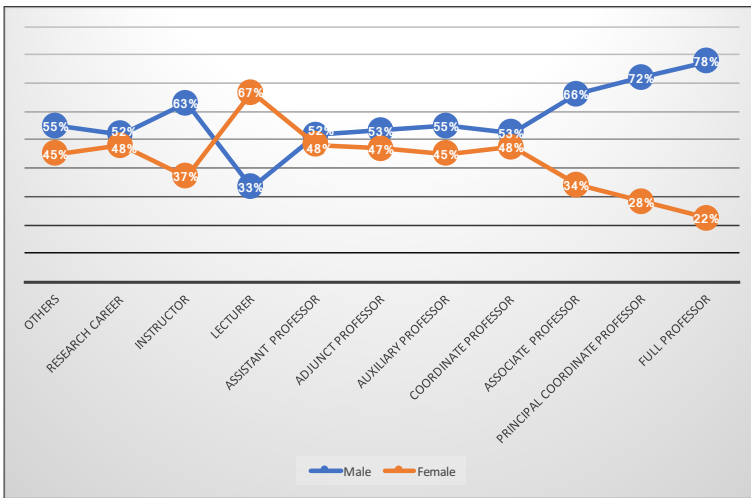
A longitudinal analysis of graduates in ICT between 1999 and 2015 reveals that the rate of feminization has been decreasing. From 26.2% in 1999, it reaches 18.5% in 2015, with some variations over the years. Finally, for what concerns research and development activities, data show that in business and higher education the number of men is always higher than the number of women. The exception is in the Public Sector where the number of women is slightly higher than that of men; the same trend can be seen in private non-profit institutions (PORDATA 2018).

2.3   The overview of Gender Equality in the University of Minho

University of Minho implements a set of principles that promote equal opportunities for its employees, through non-discrimination practices, whether based on race, ethnicity, gender, age, disability, religious belief, opinion or political ideal. University of Minho is committed to the promotion of diversity and equal opportunities for men and women.

In recent years, the educational offer of the University of Minho is growing above the average growth of other higher education institutions in Portugal. New and enhanced study programs at the level of graduate and postgraduate studies have been created in emerging areas. In the academic year 2017/18, the University of Minho had 18,600 students, 12,200 of them in undergraduate and integrated

master's degrees students; 4,500 were masters students; and 1,900 were PhD Students. The University of Minho covers almost all scientific disciplines in 12 schools and institutes and 32 research units.

In 2018, 50.6% of the 2,001 employees were women. In the teaching career, out of the 1,237 professionals that make up the teaching staff of the University of Minho, 555 (44.8%) were women. Career patterns are similar to the already reported trends in higher education institutions in Portugal and Europe. In most disciplinary areas, including those with the highest number of female teachers and researchers, women are underrepresented in the higher level positions, especially in the full professor position. The University never had a female Rector, while various schools and institutes were led by women.

2.4 Gender Equality Plans (GEPs) in Portuguese Universities

In Portugal, 4 Universities (from a universe of 37 universities) have implemented Gender Equality Plans (GEPs), including the University of Minho which has now a GEP formally signed by the School of Engineering. These GEPs systemize principles and regulations that guided the Equality Gender interventions in these universities and describe the adopted actions and best practices. The Portuguese GEPs are:

1. UBIGUAL Equality Gender Plan, Center of Social Studies, University of Beira do Interior, Portugal
2. "UTAD rima com Igualdade", Equality Gender Plan of UTAD, University of Trás-os-Montes and Alto Douro (UTAD), Portugal
3. Diagnostic and Implementation of Gender Equality Plan, School of Education of the Polytechnic Institute of Porto (ES-EPP), Portugal
4. Gender Equality in Information Systems and Technology, School of Engineering of the University of Minho (UMIN-HO), Portugal

The following sections describe the GEP development process at the University of Minho.

3 UMINHO's GEP Implementation: The Experience of a 3 Years' Project

At the beginning of the EQUAL-IST project, the University of Minho was in a very early stage, in what concerns Gender Equality policies. Despite the impactful research being carried out in the area of gender equality, predominantly in the Institute of Social Sciences, much of its efforts focused on aspects external to the University. Other schools and institutes of the University also had some activity in the gender area. The School of Economics and Management,

where gender issues are analyzed in the labor market; the School of Law with research on various governmental initiatives for gender equality; and the Institute of Education that carries out studies focused on gender violence.

Within the framework of the EQUAL-IST project, it was possible to work internally on policies, actions and strategies in order to introduce structural changes to improve gender equality, diversity and the balance between work and family. The tool for achieving such objectives was to design and implement a Gender Equality Plan (GEP). The strategies adopted for the creation of the GEP, the actions and activities carried out during its implementation as well as the future actions outlined to guarantee the sustainability of the GEP at the University of Minho, are described in the following subsections.

3.1 Defined Strategy: Scope and Goals

Based on what has been outlined by the EQUAL-IST project, 4 dimensions of study were identified: (1) human resources and management processes, (2) research, (3) teaching and (4) institutional communication. For each of these dimensions, an initial diagnosis was conducted to highlight a set of ideas and challenges in higher education in Portugal as starting points to identify the specific needs of the University of Minho in the gender equality realm. To this end, an exhaustive compilation of gender equality initiatives carried out in Portugal was done. All national/regional projects and studies that discussed gender equality in higher education were analyzed.

In order to begin to involve the key organizational actors, and following the EQUAL-IST Participatory Gender Audit Methodology, a series of workshops and individual interviews were held at the University of Minho in order to understand what students, teachers, researchers and administrative personnel perceived as gender equality and what the main challenges each of these communities felt. This internal discussion was important to understand the specificities of the situation at the University of Minho and, thus, propose a Gender Equality Plan that reflected internal preoccupations.

In total, 12 interviews were conducted involving various sectors, positions and functions at the University of Minho; 02 surveys, one for teachers and one for students; and 05 Workshops, of which four were intended for specific audiences (faculty, administrative staff, researchers and students), and 01 Final Workshop involving all participants of the previous actions and in which the results of this initial diagnosis were presented. Such internal audit generated the first ideas of actions and activities that would make up the Gender Equality Plan of the University of Minho.

3.1.1   Human Resources and Process Management

The human resources and management process is a fundamental organizational function in promoting the principles of diversity and equality. Dealing daily with the implementation of legislation and processes related to recruitment, selection, evaluation of people, human resource management includes the implementation of information systems appropriate to the systematic and up-to-date knowledge of variables directly related to gender inequalities.

Data collected at the School of Engineering and University of Minho, particularly through interviews and observation, indicated the existence of several challenges. These challenges include a profound rethinking of a number of issues related to building a more gender-responsive human resource management culture capable of deconstructing some of the existing ideas and beliefs about the preferences and merits of women and men for access and stay in certain activities, as well as to manage family and / or personal balances.

Among others, it was possible to detect an excessive trend towards naturalization of inequalities between men and women, based on supposedly different by merit and / or performance. Information management practices that do not consider gender as a category of analysis also promoted inequalities, particularly regarding absenteeism, maternity / paternity leave management of academic and non-academic staff.

Thus, the main challenges discussed that emerged from the discussions in this dimension of Human Resources Management were:

A   Reflexivity and Awareness on Gender Equality
at the University

A university culture that promotes Gender Equality leads to a better organizational performance benefiting the external recognition of the institution. It is necessary to instigate those who hold academic management positions to reflect and recognize these issues, contributing to a better assessment of the situation of women and men and to mobilize resources in support of initiatives to diagnose and intervene on this reality.

B   Institutionalization of Gender Equality as a Guiding Principle
        of the Mission and Strategy of the University

The analysis performed shows that women's participation in ICT / IST
is very low and this happens both at the level of non-academic staff
and at the level of teachers and researchers. In addition, the inter-
views show that women who remain in these areas are ultimately in-
duced to perform administrative / support tasks (horizontal segre-
gation), being "diverted" from currently better evaluated activities,
such as networking activities with companies, or activities which in-
volve resolution of technical problems (compared to teaching and /
or more routine activities).

  Thus, along with the promotion of reflexivity and awareness and
training on Gender Equality, it is necessary to create mechanisms
for its formal institutionalization. For this, Gender Equality must be
reflected in the scope of strategic documents, becoming an indica-
tor of institutional performance.

C   Physical Structures and Services that Favor the Practice
        of Gender Equality and the Conciliation of Life

During the discussions with the various actors involved, it was found
that one of the major difficulties for academic and non-academic staff,
at all hierarchical levels and in various contractual situations, includ-
ing students, is the lack of knowledge about the rights and proce-
dures to be adopted in situations that indicate the existence of gen-
der inequalities. In addition, the need for the University to provide
infrastructure to support inclusion and diversity was also emerging
from the audit process. Thus, it was decided to include in the GEP
dedicated actions aimed at creating such formal structures that fa-
vor Equality and Diversity, namely by extending the functions of the
already existing Office for Inclusion to support for gender equality.

3.1.2   Research

Taking the gender dimension into account in scientific research is a fun-
damental point in disseminating the principles of diversity and equali-
ty, mainly because knowledge production supports teaching and allows
the interaction between the University and society. Research is, there-
fore, a structuring element of all activities developed at the University.

  From the data collected by the previous actions, several challeng-
es were revealed that imply the need to deeply rethink several ques-
tions related to the scientific inquiry process at the University. There-
fore the main challenges identified are:

D Fairly Recognize, Encourage and Evaluate Gender Equality Projects / Publications in the Organic Sub-units of Education and Research

Data show that themes and areas of research continue to be valued and recognized in a very androcentric way, and research projects, publications and other scientific indicators developed on the theme of gender and gender equality are, as a rule, considered less important and therefore devalued and unrecognized. This finding is transversal to the various scientific areas, but is more worrying in the areas of Engineering and Technologies, considering the enormous relevance that gender equality has for the development of science and technology.

In fact, there is an overall predominant trend to identify gender with choices and careers paths of researchers only. Instead, the issues of how results of scientific research conducted without taking the gender dimension into account benefit and integrate more or less positively women and men as users of innovations is not explored and tackled.

E Promotion of Gender Diversity in Groups and Research Projects

Data show that the composition of teams in scientific research projects follows affinities that are often shaped by the gender of the promoters and it has been possible to identify several situations in which there is no gender balance. The main focus of discussion was non-discrimination against researchers, regardless of gender, age, ethnic, national or social origin, religion or belief, sexual orientation, language, disability, political opinion, social or economic status. It was acknowledged how there are a number of mechanisms, some implicit and others explicit, that explain the discrepancy in access, for example of women, to project coordination and / or team integration.

3.1.3 Teaching and Students' Services

The teaching dimension refers to several challenges that touch on gender equality, evident from the still residual number of women in certain degrees such as engineering and technology.

Thus, priority is given to the definition and implementation of measures to increase women's demand for traditionally male dominated degrees and to widen the gender balance in other study programs which tend to be traditionally female dominated. We begin to list the challenges, namely:

F   Gender Inequalities During Studying Course

The results of the studies and discussions revealed that gender differentially affects the time spent studying by students, with women, particularly those living with the family, tending to accumulate family and household tasks, something that does not happen with the same intensity and impact in the case of men. Another noteworthy aspect was women's tendency to undertaking 'service tasks' such as report writing activities and organization of meetings when they are part of working groups, particularly in the Engineering and Technology courses; this phenomenon, partly resulting from an expressed preference and partly outcome of social-group stereotyped expectations, limits female students' availability to more technically oriented learning that will later be fundamental for their professional success.

G   Awareness of the Impact of Gender on Professional Life Among Students

There is no information on the challenges faced by female graduates once they have entered the labor market. This lack of information leads to a lack of knowledge about solutions to the challenges to be faced, lack of interventions with the industry to promote mechanisms that ensure gender equality and fear of the professional future expressed several times by the female students.

H   Lack of Awareness of Teaching Staff About Gender Issues

This situation means that gender issues are not integrated into classroom dynamics and evaluation processes, which can result in injustice and inequality of opportunities for female and male students.

3.1.4   Institutional Communication

The promotion of gender equality in the academic context is facilitated by the development of an effective communication policy that covers the various dimensions (teaching, research and administration) and includes the areas of content design, as well as communication strategies and means to be used, both internally and externally, in the relationship with the surrounding community. The main challenges that emerged from these discussions were:

I Concern About Language Issues in the Description of Study Programs and their Dissemination Through Communication

The study revealed the importance of a gender-sensitive communication methodology, starting with the construction of communication messages for dissemination of science, to the use of images and other multimedia content sensitive to gender.

This first diagnosis exercise carried out through internal data analysis and the Participatory Gender Audit Methodology was further elaborated by the EQUAL-IST project Team at UMinho and subject to several rounds of negotiations with the internal management structures. This process resulted in the Gender Equality Plan, including a set of actions for each of the concerns and ideas presented and discussed above, and activities emerged, described in the following paragraphs together with the encountered resistances and the implementation strategy which was pursued.

4 The GEP's Implemented Actions, Faced Issues and Engendered Coalitions

In order to respond to the challenges mentioned in the previous subsection, the Gender Equality Plan includes a set of short- and medium-term measures with the objective of developing a policy focused on Gender Equality.

4.1 Human Resources and Process Management

In this dimension, a set of actions were set out in the Gender Equality Plan of the University of Minho, taking into account the main challenges mentioned in the previous section. The actions included in the GEP and already carried out in concrete activities during the duration of the project are:

- To organize scientific and technical events focusing Gender Equality challenges in several contexts.
- To train top and middle managers in the application of informed and gender equality sensitive practices.
- To adopt information systems that support the monitoring of the GEP implementation and to create a Gender Equality Observatory to give visibility to data and monitoring results.
- To create a book of 'life stories' of the Female Portuguese Scientists.
- To define, implement, and disseminate a Code of Conduct for diversity and gender equality.

- To create infrastructures and processes for raising awareness and offering support to gender equality and diversity.

These actions were generally understood as relevant and conducive to greater justice practices. However, difficulties were raised in relation to any financial effort associated, in particular, with the extension of the responsibilities of the Office for Inclusion. This office already exists and has as its mission to promote inclusion in the academic context, aiming at equal opportunities, and to provide support to students, teachers and other workers with disabilities or special needs. Its mission is currently to guarantee the best accessibility conditions at the University of Minho. The extension of its functions shall include the responsibilities of (1) collecting data and disseminating aggregate information on the status of the University with regard to gender equality on a continuous and regular basis, (2) organizing training and other events on gender sensitive practices and communication strategies, (3) dissemination of the code of conduct for diversity and equality, and (4) support for concrete situations of gender inequality.

In order to reinforce the commitment to implement this structural change and make of the University's GEP an example that can be used by other universities in Portugal just starting a similar process, two protocols of collaboration with Gender-Related Governmental Bodies were set up, including the Portuguese Commission for Citizenship and Gender Equality.

4.2 Research

Regarding the research dimension, a set of intervention actions were listed in the Gender Equality Plan of the University of Minho, namely:
- To promote the implementation of projects and publications on gender equality, in all fields of science, with a special focus on IST. This action includes the supervision of internships and project-based learning, involving students from different courses and disciplines; it also includes collaborative activities with local, national and international entities already having in mind future funding gender equality projects.
- To train researchers and research leaders on the need for non-discrimination of specific research themes, including gender equality and diversity.
- To promote gender-balanced project teams as a requirement for the University's endorsement of the submission of project applications.
- To promote seminars to analyze gender issues on science and their implications in alienating talented researchers.

- To ensure a balanced dissemination of research results achieved by female and male researchers.

The major challenge encountered by the EQUAL-IST project team was the lack of regular dialogue on gender issues affecting research at the University. Thus, it was necessary to carry out the above mentioned activities in several research centers, to meet with the leaders of the research centers and the university. From such dialogues a growing awareness of the difficulties faced by female researchers and a genuine interest of many male researchers in implementing fair practices emerged.

Another important result of the GEP implementation in this area was the identification of researchers carrying out gender studies in the various disciplines, from medicine to law through engineering and management to social sciences. This allowed the creation of a multidisciplinary working group committed in pursuing collaborative and cross disciplinary research in the area.

4.3 Teaching and Academic Services

In this dimension the actions outlined took into account the gender imbalances found in the STEM areas and the need to raise both teachers' and students' awareness of the impact of gender issues in studying and working life. Thus, the following actions were defined:

- To establish a program of contacts and clarifications in secondary schools to demonstrate the potential of women in these areas, demystifying some of the stereotypes still existing about women in STEM.
- To carry out regular activities to raise awareness about gender inequalities in the University.
- To organize events to raise awareness among faculty and students about the importance of taking the gender equality principles into account while defining the study programs.
- To offer courses, seminars and lectures on gender equality and specific content, including the segregation and discrimination against women in the business world and ways to identify and address them.
- To establish a practice of putting students in contact with successful women in the information systems and technology field in order to overcome stereotypes and inspire young women.
- To provide specific training for teaching staff on how to adopt a gender sensitive approach in the programs and dynamics they define for the courses for which they are responsible.
- To create an observatory with publications/projects about gender equality and diversity to support gender mainstreaming in

disciplinary areas as well as to promote partnerships and exchanges of experiences with researchers and teachers.

The planned actions and the activities that were carried out to implement them, allowed to establish a permanent dialogue on gender issues and to begin to create a culture of transparency that allows pointing out problems and co-designing solutions. The success of the activities was such that it students themselves ended up integrating issues of gender equality in events that they organize and propose themselves in the framework of the activities of the University's GEP.

4.4 Institutional Communication

With regard to institutional communication, the planned actions focus on language issues in the description of teaching programs and their dissemination through communication:

- To encourage seminars and lectures to raise awareness about the importance of gender-sensitive communication in all dimensions, inviting professionals and experts in the field;
- To organize meetings to inform and train teachers and researchers on materials and informative content to be used year by year;
- To disseminate norms specifically directed to gender inclusion practices in organizational and scientific communication and communication, particularly with regard to the language used.
- To integrate support for linguistic neutrality in marketing Educational Offers and other information.

The activities defined and implemented benefited from the participation of internal experts to the University with wide experience on modes of communication. Currently there is a strong proximity and collaboration with the Office of Communication, Information and Image of the University.

5 Sustainability Initiatives and the Foreseen Future of the UMINHO's GEP

The EQUAL-IST project took place in a context of little reflection on the internal challenges of gender equality. During the three years of the project, a large number of activities were implemented to raise awareness of existing problems. Alongside this efforts activities focused on the production of structural changes, thus ensuring that GEP is maintained and updated by the University were also carried out. Some important permanent changes include: (1) the collaboration with the National Commission of Citizenship and Gender Equality established by a dedicated protocol signed by the Rector of the University of Minho; (2) the data intelligence process to promote transparency

about gender issues at the University and the online observatory that ensures the dissemination of updated insights; (3) the University's Gender Equality network of researchers ensuring the collaboration in multidisciplinary research projects and events; (4) the organization of annual events to attract girls to ICT study programs; (5) the integration of modules/classes on gender equality into existing courses; (6) the issuing of annual calls for multidisciplinary projects and master dissertations on gender equality topics; (7) the annual definition of proposals for projects submitted to local, national and international funding on gender equality topics; and (8) the regular dissemination of guidelines regarding gender-sensitive language and practices.

Creating awareness and changing mindsets requires time and effort. Although the EQUAL-IST project was instrumental in triggering a change process, giving it a multinational dimension and respectability of a theme that deserves European funding, 3 years is a very small period for the changes to mature and strengthen. Many planned structural changes were not implemented. Among these, the recommendation of ensuring parity in the career progression and doctoral dissertation panels, the recommendation for the recruitment of candidates according to the needs of gender balance in the University's units and subunits, the recommendation for the creation of structures to support the balance between professional and family life, the recommendation for greater support for the women's career advancement, among several other recommendations that emerged from the project. In essence, the non-implemented changes are precisely those that alter power balances and, therefore, find the strongest resistance to their implementation. The continuity of the activities initiated with EQUAL-IST is seen as essential to produce the change of attitudes and rooted practices; it is believed that the national and international collaborations that have been established within the scope of the project will allow the continuation of the GEP's actions not yet implemented.

6 Lessons Learned and Recommendations to Other Universities Implementing a GEP

In fact, each step of this trajectory from the design to the implementation of Gender Equality Plan in University of Minho has helped us, on one side, to identify the important challenges in reducing gender disparities and, on the other side, to generate contexts for people to identify the possible measures to be implemented in order to deal with each challenge. In this way, the GEP's implementation has been instrumental to promote internal discussions, identify researchers in the University that are experts in the field, facilitate multidisciplinary collaboration and raise awareness among all University's actors.

Along the process, some lessons were learnt:

- It is important to continuously nurturing awareness of the role played by women in engineering, both to motivate students and to remove existing stereotypes.
- Promoting interaction with academics and researchers of all Organic Units of Teaching and Research (UOEI) of the University of Minho researching gender equality in their different domains and areas of knowledge, was crucial to include a multitude of perspectives and knowledge in the defined GEP.
- While giving visibility to gender disparities is very important to promote internal dialogues, of no less importance is to provide incentives to empower organizational actors to pro-actively define initiatives to deal with those disparities.
- GEP plays an instrumental role in promoting internal discussions, identifying researchers that are experts in the field, facilitating multidisciplinary collaboration and raising awareness among all actors
- Partnerships with funding agencies and governments' entities that address gender equality issues are of central importance to reduce internal resistance.
- Once awareness and motivation are created, it is important to support internal initiatives that result from the self-organization of the actors involved (students, researchers, staff) because they signal that the principles have been incorporated by the various communities.

As recommendations for universities that are starting the process of defining and implementing a GEP, we highlight the need to obtain the support of the top management as well as internal collaboration networks that promote the informed discussion of topics related to gender equality.

On the other hand it is important to relate the recommended structural changes with positive impacts on the image of the university, its programs of study and graduates. Collaborations with national and European entities that promote gender equality can empower the promoters of the GEP implementation process.

Finally, the involvement of the students, the communication with secondary school students and the collaboration with the employers of the graduates are considered of extreme importance. These aspects are of particular importance for the STEM areas where there is still a weak integration of female students and major gender challenges in the various professional careers due to stereotypes rooted in culture.

7 Conclusion

This chapter provides an overview of the work carried out during 03 years of the implementation of the GEP in the University of Minho. All the implemented activities were important to increase awareness of internal gender equality issues; this awareness was almost inexistent at the beginning of the project since there was not enough dialogue between faculty, researchers, administrative staff and students about the topic. Moreover, there was a general belief that merit would be independent of specific personal circumstances, or that supposedly 'natural preferences' different from men and women were at play, many of which are in reality rooted in traditionally gender biased culture.

Based on the experience of the GEP implementation, a set of lessons learned emerged and were presented in this chapter. These lessons emerged from the difficulties and opportunities encountered while carrying out activities: some of the defined solutions to the faced challenges worked very well, others proved to be more difficult to implement in the given timeframe.

Very important factors associated with the success of the GEP implementation at the University were the creation of an internal network of experts in researching gender equality topics (usually focusing issues outside the university) and the close collaboration with the Portuguese Commission for Citizenship and Gender Equality that empowered internal initiatives to change mindsets and structures.

From the lessons learned we developed some recommendations for Universities starting the effort of implementing GEPs, in particular, in Engineering and IST.

For the future, a dedicated GEP Sustainability Plan was designed and approved internally, which includes a set of actions and activities to further enhance gender equality at the University of Minho as well as to continue contributing for a more inclusive society.

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Preparation and Implementation Stages of Gender Equality Plan at Information Science and Technology Organization
Lithuanian Case

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Abstract   Gender inequality in technological sciences is a problem, which discussed louder than ever. The number of women and men working in the technology sector still struggles to reach equality. The same applies to technological faculties of universities, as women often undertake roles, which include administrative work mostly. This case provides an analysis of the situation at the Kaunas University of Technology (KTU). In Lithuania, the distribution between men and women studying in the field of ICT is similar to the global trend. A big gap can be observed between boys and girls studying in the field of ICT and engineering. During the EQUAL-IST project implementation period, many positive structural changes implemented in the University not only in the faculty level but in the institutional level as well. The study illustrates the preparation and implementation stages of the KTU Gender Equality Plan.

Keywords   Equality. Gender Gap. Inequality. Research. STEM.

1 Introduction: The Context and Methodology

Taking the issue from the roots, in schools (K9), 15-year-old girls outperform 15-year-old boys (by the equivalent of roughly one year of school), while in mathematics boys outperform girls (though by a narrower margin, the equivalent of less than half a year of school); in science there is instead little difference between boys' and girls' performance. Yet when digging a little deeper, a more nuanced picture emerges. OECD provides a statistic that there are far more boys (24.9%) than girls (12.5%) among the lowest-achieving students in reading, while there are far fewer girls than boys among the top performers in mathematics (10.6% vs. 14.8%) and science (7.7% vs. 9.3%).

There are even larger gender differences in the fields of study chosen in higher education: in OECD countries, fewer than 1 in 3 engineering graduates and fewer than 1 in 5 computer science graduates are girls. This is likely because of stereotypes and expectations, rather than performance differences in math and science. For example, at age 15 far fewer girls (4.7%) than boys (18%) – even among the top performers – reported that they expect to have a career in engineering or computing (OECD 2019).

In Lithuania, the distribution between men and women studying in the field of ICT is similar to the tendency from all over the world. Taking into consideration all three levels of post-secondary education (vocational; college and university studies) the biggest difference can be seen between boys and girls studying in the field of ICT and engineering. In the vocational level, only 2.6% of girls choose engineering or computing studies while 41.6% of boys consider it as a future profession. Similar situation is in the college level as well, where 1.6% of girls choose engineering studies while at the same time 37.19 of boys choose it. The situation is slightly better at the university level where 4.4% of girls and 30.3% of boys study engineering (Masiulyte-Sukevic 2016). However, these numbers show the huge gap between the choices of girls and boys. These numbers of students are not enough to cover the need of ICT and engineering professionals fully.

Talking a little bit further, even when girls do graduate from scientific fields of study, they are much less likely than boys to work as professional in these fields, more often choosing to become teachers. Data from a subset of OECD countries show that, among graduates with science degrees, 71% of men but only 43% of women work as professionals in physics, mathematics and engineering As a result, across OECD countries, only 13.7% of the inventors who filed patents are women.

There are three types of problems for women: cultural traditions and stereotypes; internal barriers; external barriers **[tab. 1]**. These stereotypes cause a low rate of women interested in the ICT field.

Table 1 Problems that prevent women from entering the ICT sector

Cultural traditions and stereotypes:	1. Cultural ideas about women's role in society
	2. Stereotypes around the sector
Internal barriers:	3. Reticence to talk openly about gender issues
	4. Lack of self-confidence
	5. Difficulties at negotiating and competing in the sector
External barriers:	6. Strongly male dominated and discrimination
	7. "Old-boys network" culture
	8. Complexity of conciliating personal and professional life
	9. Lack of role models in the sector

Women face various problems that prevent women from entering the ICT sector in Lithuania. Most of the problems are related with stereotyped views of "female" and "male" jobs permeating society, and research institutions as such. However, these barriers create a huge gap between women and men working in the academic field of ICT. The Informatics faculty at Kaunas University of Technology seeks to change the situation and encourage women to choose their career in ICT field. In addition, it seeks to break the stereotypes and eliminate obstacles that causes the low rate of women joining the ICT field. To increase the low number of women, choosing their career in ICT field, it is important to know the factors that make a positive impact to girl's interest in STEM. Parents and teachers can make the biggest influence on the interest

The prepared gender equality plan is a result of long and intensive discussions, researches and analysis of data in need to create a plan that perfectly fits the situation of Informatics Faculty at KTU. During the EQUAL-IST project implementation period, many positive structural changes were implemented in the university not only at the faculty level but at the broader university level as well. To ground KTU change strategy in the actual gender challenges and gaps, we analysed internal data since 2016, year when the project started.

According to the overall project methodology, a participatory gender audit was carried out in 2016 at KTU. Interviews were held with human resource managers (3), a researcher, a representative from student service organization and a representative of Communication Department at KTU. The aim of the interviews was to gain more information to identify weakness and strengths of KTU and main actions, which should be taken in regards of GEP thematic.

There were considered the main issues regarding gender equality within institution in the specific areas. In the area of strategic planning of KTU, the activities led by documents where no gender is distinguished: "we use documents that are no gender directed" (R1). Overall, the university follows the European Charter for Researchers and the Universities Charter for Life Long Learning and other legal documents where the main values such as competences, professionalism, initiative, responsibility and dutifulness highlighted: given this framework, gender seems to lose relevance in the eyes of staff members, in favour of a broader, 'universal' approach. Same for another area – project management, where the competences of 'a person' to be playing the main role for the decision to accept the person into a working group.

In the area of marketing, interviewed staff members at KTU identified no gender discrimination. Marketing actions of the University are directed to the strengthening of the institutional image/brand and it is intended to reach a wide audience without excluding or differentiating neither on gender or any other ground: "The acts of marketing that are related to the image of University and Studies, should be directed to both genders and do not show any differences or special conditions for genders which could be understood as privileges for female or male students, employees or other interested parties" (R5). This quote highlights how gender sensitive communication can still be misinterpreted by as 'privileging' one gender on another. At the same time, as gender equality policies increasingly gain visibility and acknowledged as priorities in ERA (European Research Area) policies, the University also has put in place some marketing actions that are gender oriented. One of those is the special action directed to girls to motivate them to study STEM (Science, Technology, Mathematics and Engineering) disciplines.

At the Faculties level, it is notable that women are applying more often to academic positions at various levels: "Despite open job position advertisement are gender friendly, most of applicants are still woman" (R4). Even if vertical segregation is evident and it is more difficult for women to reach the highest managerial positions, still staff members stress how this is not the consequence of 'discrimination': "There is no discrimination by gender at our university [...] the main issue regarding gender equality maybe is the proportion of female in the positions of full professors" (R6). Exploring this issues two hypothesis seemed to be shared by most stakeholders:

1. women do not often apply to the highest positions;
2. there are some 'hidden' obstacles for women to reach those positions, i.e. women tend to have less continuous career progressing, and their achievements are hindered by work life balance issues and care related work.

There is also clearly horizontal segregation as most of the employed women work in the administration or, among academic pro-

files; they are mostly represented within social sciences, areas that are traditionally considered as "feminine" and where more women take the highest positions: "The majority of employees in my current department are women (we have only 1 male member of staff)" (R4). "However, in academic STEM departments, the majority of employees are male, while in social/humanitarian – female" (R3). A widespread view is that this reflects a 'natural' gender distribution in working areas between men and women. Societal and cultural impact tends to be underestimated and the roots of inequalities, which seem to be due to a purported 'natural inclination' is seen: "The proportion of female/male members of staff is not an outcome of any discrimination but more of a natural inclination of females to work in social/humanitarian fields rather than technological/physical sciences and vice versa" (R3).

To summarize, there is for sure a gap between the rules and norms set in the statutes of the University, which ensure equal rights for all people despite of their gender, beliefs, social position or sexual orientation, and the inequalities, which can be observed in the institution's employment patterns. Our audit highlighted how in order to make sense of such gap, university staff seems to identify the cause of gender segregation in natural preferences/differences by women and men, or by traditions. To tackle such a situation, and reflecting current societal trends where traditional gender stereotypes are more and more abandoned, the Kaunas University of technology has committed to equality and diversity policies and guidelines of its implementation were presented to the university' community in 2018.

This case will analyse the process and policies put in place for promoting structural changes during the EQUAL IST project implementation, i.e. preparation stage described in the chapter 2 and the Gender Equality Plans (GEP) implementation in chapter 4, where general situations and problems related to gender inequality are identified and the solutions for the structural changes implemented.

2 The Preparation Stage for GAP Design

2.1 The Analysis of the Gender Issues at the Faculty of Informatics at KTU

This section discusses the representation of gender distribution in the academic community of the Faculty of Informatics at Kaunas University of Technology (KTU). The Faculty of Informatics is one of nine faculties at KTU, which carries out research in Informatics and plays a central role in information society of Lithuania. Primary IT study branches include technological sciences and physical sciences. There are full-time and part-time studies; full-time studies is the

main form of studies. KTU awards Bachelor's, Master's, and Doctoral degrees. Study programmes offered by the Faculty of Informatics listed below [tab. 2].

Table 2 Three cycles of studies programmes

Bachelor study programmes (6)	Master study programmes (5)	Doctoral study topics (2)
Health Informatics Informatics Informatics Engineering Information Systems Multimedia Technologies Software Systems	Informatics Information and IT Security Information Systems Engineering IT of Distance Education Software Engineering	Informatics Informatics Engineering

Statistics from 2016 shows that a much larger number of men than women has graduated from the Faculty of Informatics [tab. 3]. It is noted that the percentage of women among the Master's degree graduates is higher than the Bachelor's and it is growing over years. Noticeably, Multimedia Technologies study programme has much more female graduates from Bachelor degree in comparison to other programmes [fig. 2].

Table 3 Female and male graduates from the Faculty of Informatics at KTU by degree (Updated on: 2016-07-11. KTU 2016)

Year	Bachelor's degree		Master's degree		PhD degree	
	men	women	men	women	men	women
2013	188	17	73	10	8	1
2014	201	17	74	16	4	1
2015	178	15	61	15	3	3
2016	174	20	69	21	2	0

A very high percentage of women (54.1%) graduated from a Distance Education IT Master degree programme. However, only 20% of Master's graduates from Information technologies, Information Systems Engineering and Informatics study programmes are women.

	Bachelor's degree % men	Bachelor's degree % women	Master's degree % men	Master's degree % women	PHD degree% men	PHD degree% women
2013	91,7	8,3	88,0	12,0	88,9	11,1
2014	92,2	7,8	82,2	17,8	80,0	20,0
2015	92,2	7,8	80,3	19,7	50,0	50,0
2016	89,7	10,3	76,7	23,3	100,0	0,0
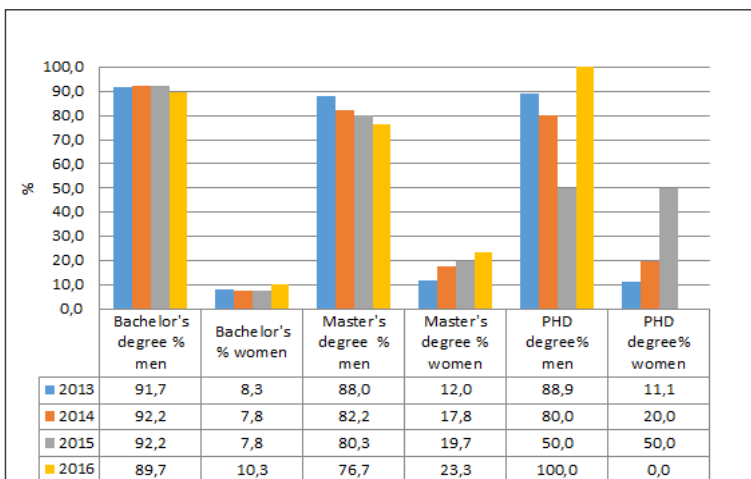
Figure 1 Percentage of female and male graduates from the Faculty of Informatics by degree (Updated on: 2016-07-11. KTU 2016)

Percentage of women Bachelor's graduates 2013-2016

	Information systems	Informatics	Informatics engineering	Multimedia technologies	Software systems
% women	7,5	7,6	3,1	29,4	1,9
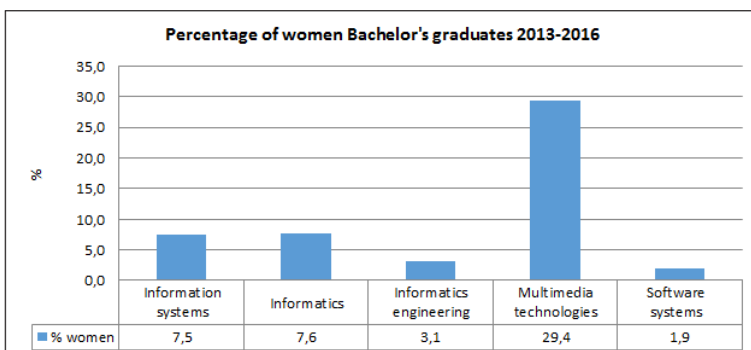
Figure 2 Percentage of female Bachelor graduates by study programmes from the Faculty of Informatics at KTU (Updated on: 2016-07-11. KTU 2016)

Percentage of women Master's graduates 2013-2016

	Information and IT Security	Information technologies	Information Systems Engineering	Informatics	IT of Distance Education	Software Engineering
% women	7,5	21,7	20,0	19,5	54,1	5,7
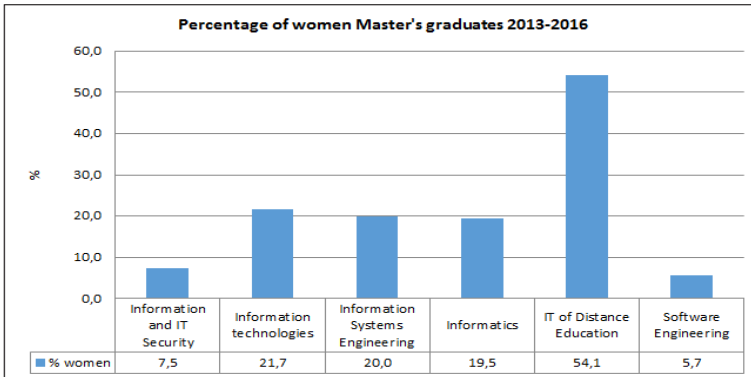
Figure 3 Percentage of female Master graduates by studies programmes from the Faculty of Informatics at KTU (Updated on: 2016-07-11. KTU 2016)

Faculty staff consists of academic staff of the university (professors, associate professors, lecturers, assistants and contracted teachers) and researchers carrying out projects and other research related activities (analysts, experts, technicians, engineers, programmers); management staff-members of university administration (dean, heads of departments and other units, coordinators, managers, administrators, academic assistants).

Women represent 29.3% of staff in the Faculty of Informatics at KTU, which overall amounts to 246 persons. Analysis of the Faculty staff structure has shown that women prevail in the Dean's office (61.5%) but in the lowest administrative (91.5%) and coordinating (75%) positions. Top management positions of the faculty and departments' heads, directors of research centres are dominated by men (100% of deans/vice deans, 75% of department heads, 100% of centre directors).

There is also a clear-cut vertical segregation by gender in research staff: women occupy more than a half of lowest positions as analysts (58.3%) and experts (50%), while men dominate in the highest positions as senior researchers (100%), researchers (83.3%), and junior researchers (75%) in "technological" positions as engineers (90%), programmers (100%) and technicians (100%).

Research of gender distribution with regard to academic titles has revealed that men dominate in all positions: professors (93.3%), associate professors (80 %), lecturers (73.3%), assistants (85.7%) and contracted teachers (61.1%).
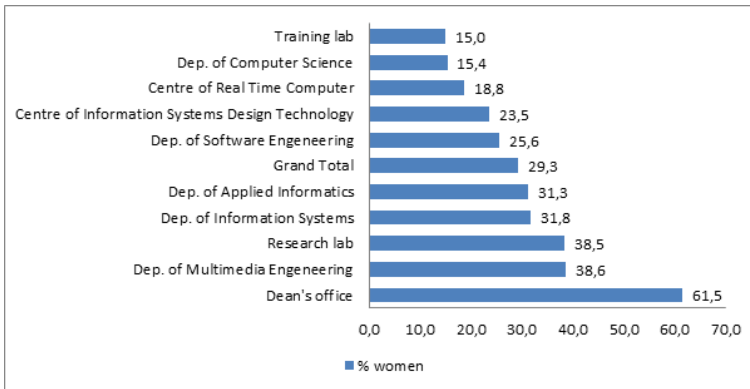
Figure 4   Percentage of women in the Faculty of Informatics at KTU by subunit
(Updated on: 2016-07-11, KTU 2016)
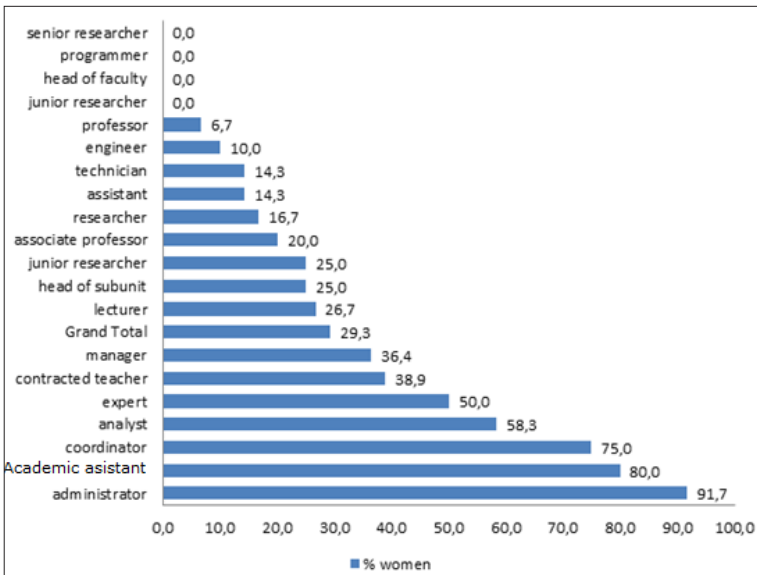
Figure 5   Percentage of women in the Faculty of Informatics at KTU by position
(Updated on: 2016-07-11, KTU 2016)

2.2 Gender Auditing the Internal Students Services and HR Policies for Technical, Administrative and Academic Staff

The distribution between women and men working in STEM disciplines is still far from equality. The situation in the Faculty of Informatics is a typical one as in many technological Faculties as women take roles, which include administrative work mostly. In order to reflect on how to promote equality in the Faculty of Informatics, various people having the direct influence to Human Resource Management were invited to take a part into the workshop. The results and insights are provided below.

The questionnaire provided to the participants contained 6 questions about Student service quality indicators and HR management processes for non-academic staff. 13 questionnaires were filled in. Each of the question had to be rated in a scale from 1 – not at all sufficient to 6 – entirely sufficient.

Results showed a complex picture where awareness of inequalities is mostly missing, and a relatively high share of staff members express uncertainties in answering or prefer not to take a bold position on the topic.

For example, when asked if gender equality is respected in students' evaluation and treatment, the issue appeared to be controversial, with almost half of respondents showing polarized opinions to the extremes, and an equal share of people 38% respectively being negative or positive towards the issue.

Another question was exploring perceptions about the extent to which teaching activities can influence non-stereotyped students' attitude and behaviour. Even though half of the respondents declared to be uncertain about the issue, another 46% expressed positive and trustful opinions about a positive influence from teachers on contrasting stereotypes.

Even the most evident, objective issue of female representation in university courses witnessed a high rate of uncertain opinions among respondents, with more than a half quite surprisingly answering they are not sure, and still 30% showing awareness of the unequal and unbalanced presence of female students.

As far as specific obstacles that female students face while accessing university or during their academic career are concerned, the internal survey revealed how although the majority of respondents do not think that there are obstacles for female students/researchers, still more than one third are hesitant and 16% show some awareness of the problem.

More specifically, the survey addressed the issue of sexual harassment asking about personal experience of undesired jokes or allusions targeting female students and answers revealed how 61% of respondents did not experience this while 16% did, and a relatively large share or participants (almost ¼) preferred not to disclose their opinion.

Dedicated explorations held to identify problems in HR management for non-academic staff. Staff members acknowledged the following issues: non-academic staff is not motivated enough towards career progression.

There is still a minority of women working in technical positions, while on the opposite, few men work in administration. Staff members experience a lack of flexibility in the working environment (flexibility for working time, place), a huge workload, routine work and in certain cases, too much responsibility (working with students, clients, other).

Possible actions were identified, such as motivating employees financially or other type of non-material rewarding or, if not feasible, to decrease their workload; to set up actions to reach gender balance in technical and administrative areas. To reach for gender equality in technical and administration areas.

Participants to the study were asked to identify reasons why girls are not so interested in IT specialties. The main ideas provided below:

1. there is a lack of knowledge about present and new ICT specialties;
2. girls are oriented towards using media tools and their interests lie on traditionally 'feminine' topics such as fashion and health. However, consensus reached on the idea of a lack of a good tutoring for motivating girls to study ICT.

Some participants also mentioned that the stereotype of a typical ICT employee does not help to attracting women as well as most of the times work in ICT seems boring, dull and monotonic.

The idea of a 'natural destiny' for women to lack motivation towards science and technology was also debated during workshops, and several participants showed awareness of the predominantly cultural and social stereotypes on gender: it was noted how even if there is no restriction for girls to take a career and they are free of doing so, our culture is still very traditional and form a negative attitude to girls about their roles and career paths.

Possible actions identified were as following:

3. To motivate young girls by showing good practices to study ICT.
4. To encourage girls to be interested in IT not just as a tool but also as research area for research.
5. Teaching society about IT specialties in the press or social networks due to promotion of IT specialties among girls.
6. Create more specialties of IT that would be more attractive for girls.
7. These activities would promote girls to study Information Technologies.
8. Mentoring program for girls working in IT sector.
9. Mentoring program.

10. To promote the tutors of study programmes for reaching 50% or more of girls studying IT specialties.
11. To create study programmes that would integrate more elements from arts, architecture, design and others.
12. Create a programme for young doctoral students.
13. To increase the number of IT lessons at schools.
14. Start learning IT from the first grade.

The participants provided various suggestions for activities for improving the balance between men and women in the Faculty of Informatics. The spectre of activities spanned from 'educating' society on IT studies to mentoring or tutoring programmes. The implementation stage of Gender equality plan.

Based on the survey studies and the workshops organized within the participatory audit process, Kaunas University of Technology has selected 5 challenges related to Gender Equality issues and set dedicated Goals to address them via a comprehensive Gender Equality Plan, which is presented in the table below **[tab. 4]**.

Table 4   Main areas and challenges

Challenge Main Area	Challenge Title	Objective(s) to address the Challenge
HR and Management Practices	Lack of support to female students at KTU to retain them into ICT academic careers	Create mentoring Network for Women PhD students at KTU
	Women struggle in creating a clear career vision	Help women to create their career Roadmap
	Women are not involved into decision making at the Faculty	Supporting women leadership
Teaching and Students Services & Institutional Communication	Lack of visibility of women in IT	Present more good practices of women working in IT
Other Gender Equality Issues	Lack of men involved in Gender Equality Actions	Encourage men to stand for Gender Equality

2.3 Gender Equality Strategy: Areas of Intervention and Goals

Lack of support to female PhD students and junior researchers at KTU to retain them into ICT careers

The low number of female academics (professors, doctoral and post-doctoral researchers) in ICT field can be related to a low number of female students choosing their bachelor and master studies in this field. The closer analysis of students segregation (D 2.4) in ICT has shown that only about 10% of girls have chosen their bachelor studies in ICT field and in the past two years this percentage was not stable (10% – 2013; 5% – 2014; 6% – 2015). The instable number of girls choosing master degree causes a lack of female students taking PhD studies in the field of ICT. This situation might be caused due to a lack of mentoring actions for female students in the Faculty as women face various kinds of problems while having studies in the field of ICT. Another reason is the lack of support to female students (PhD) from their lecturers, especially when they face uncommon problems while studying. The mentoring Network would help PhD students to get insights/advices/help from the female academic staff working in the field of ICT. This might encourage PhD students to continue their Career in the academic environment and become professors or researchers.

According to the research results, several goals and challenges were identified related with gender equality strategy and the areas of intervention:

1. Goal – Create a mentoring Network for Women.
Challenge – Women struggle in creating a clear career vision.
Description: The interviews with HR management group, researchers and academic staff have shown that women, working in the Faculty, never planned their career consequently. Analysing this situation, it was noticed that women do not have any career Plans and never had one before. This also affects their career because women have to accommodate work life balance related events and conditions to their career paths: marriage, children, parental leave etc. It appeared how women tend to act more spontaneously and not to set clear goals in their career paths As a consequence, women are not sure of how to visualize their future career and how to plan it as no Career Counselling Services are provided for administration or/and academic staff in the Faculty. This situation adds instability to women's careers when women do not seek for promotion opportunities and choose to take lower level positions instead of reaching out higher-level work positions.

2. Goal – Help women to create their long-term gender sensitive career-planning template.

Challenge – Women are not involved into decision making at the Faculty.

<u>*Description:*</u> The interviews with HR management and Administrative Staff have shown that women take administration-level work positions in the Faculty of Informatics while men take the leading positions in the Faculty. This situation shows the unbalance in the leading Board, as women are not involved to the decision making process in the Faculty. In addition, women are not involved in the working groups and do not lead them.

3. Goal – Involve women in decision-making process.

Challenge – The lack of visibility of women in IT.

<u>*Description:*</u> the general image of women in IT field is dull and boring. This type of image gives rise to the opinion that working in IT is boring and monotonic. However, the reality is different. For this reason, it is important to make women working in IT more visual. It is necessary to stress out that this picture does not mirror the reality. There are many successful women studying and working in ICT: they are charismatic, confident and socially active. Mass media is just stereotyping. This would help to change the society's mind about IT and women working in it. Additionally, it would help to encourage girls to choose studies and later work in this field.

4. Goal -Present more good practices of women working in IT.

Challenge – Lack of men involved in Gender Equality Actions.

<u>*Description:*</u> Gender Equality actions may be seen as a feministic approach as most of women get involved in this kind of action. Women fight for equal rights at work and at home. They try to prove that women are equal to men but these actions are fruitless without the involvement of men. However, most of the times, men are left besides the actions, they are not invited to take part and feel responsible for the change. In addition, men's involvement might be seen as an inappropriate act that will not be accepted by society. However, men should be involved to the actions for gender equality.

2.4 Gender Equality Plan

The following actions intended for the KTU GEP implementation[1] [tab. 5].

Table 5 The main areas of the GEP implementation

Main Area	Sub-Area	Challenges and Goals	Action	Output Planned Target value	Responsible Stakeholders /Units	Timeframe Mx-My	Resources
HR & Management practices	Gender Segregation	**Challenge:** Lack of support to female students at KTU to retain them into ICT academic careers Goal: Create Mentoring Network for Women	Involvement of female students to scientific Researches	10 female master/PhD students will be involved in STEM research projects	EQUAL-IST Working Group; academic staff; female master/PhD students; junior researchers	2017-07/2018-06	Workshops (5 sessions)
			Inviting to female students to assist teachers in informal education activities	10 female master/PhD students will be involved in assisting activities; 5 sessions	EQUAL-IST Working Group; academic staff; female master/PhD students, junior researchers	2017-07/2018-05	workshops (5 sessions)
			Creating a Mentoring network of Research Professionals and PhD students	1 mentoring network; 2 mentors and 2 PhD students (2 pairs); 5 sessions for each pair	EQUAL-IST Working Group; academic staff; PhD students; professors, researchers	2018-02 / 2018-05	Surveys; interviews
		Challenge: Women struggle in creating clear career vision Goal: Helping women to create their career roadmap	Creating a long-term Gender Sensitive Career Planning Template	1 template for Career Planning	EQUAL-IST Working Group; HR management Group; Academic staff	2017-07/2017-12	Template
			Adaptation of a template for specifics of IT specialties	1 Career Planning Template for staff of Informatics Faculty	EQUAL-IST Working Group; HR management Group; academic staff	2018-01 / 2018-03	Adapted template
			Individual Counselling and Monitoring to Women in designing their Career Plans	10 women; 10 individual counselling sessions	EQUAL-IST Working Group; HR management Group; female academic staff; female Researchers	2018-03 / 2019-03	Individual workshops
		Challenge: Women are not involved into decision making process of the organization Goal: Involve women to organization decision making process by supporting women leadership	A workshop on Leadership development for Women	1 workshop; 10 women.	EQUAL-IST Working Group; female academic and administrative staff.	2018-04 / 2018-05	Workshop
Teaching and students services	Contrasting gender segregation in studies choices	**Challenge:** Lack of visibility of Women in IT Goal: presenting more good practices of Women working in IT	A set of Webinars for Girls	3 webinars; 15 participants for each webinar	EQUAL-IST working Group; female academic staff; female students studying ICT; schoolgirls; students	2017-07/2018-04	webinars
			Organization of special session "Women in ICT" in International Conference ALTA	1 special session; 3 Researchers sharing their outputs and insights in the conference	EQUAL-IST Working Group; female academic staff; educators; PhD students; professors	2017-07/2018-11	Session in the conference
			Organization of special session „Women in ICT in International Conference ICIST	1, special session; 3 Researchers sharing their outputs and insights in the conference	EQUAL-IST Working Group; female academic staff; educators; PhD students; professors	2018-09/2018-10	Session in the conference
			Creation of social network for Women's good Practise Exchange	1 social page	EQUAL-IST working group, women working in IT; professors; administrative staff, students, researchers, social partners, other interested parties	2017-09/2019-05	Social network; virtual resources
Other Gender Equality Issues		**Challenge:** Lack of men involved in Gender Equality Actions	A workshop with experienced professors on Gender Equality for students	1 workshop; 20 participants in each workshop	EQUAL-IST working group, students, researchers, professors, administrative staff	2018-04/2018-05	Workshop, discussion

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1 KTU GEP https://equal-ist.eu/gep-in-the-kaunas-university-of-technology-lithuania/.

2.5 GEP Assessment Methodology

The specific objective of the Assessment methodology is based on monitoring results of the GEP implementation in terms of outputs planned (target indicators) compared to what has been achieved in a period of 12 months. In details, it aims to:

1. be a guide for RPOs for their GEP implementation process,
2. help them to analyse the process and the activity outputs,
3. monitor if and to what extent the planned results have been achieved,
4. make process changes, if necessary, while implementation is in progress,
5. learn from good practices and avoid pitfalls.

The GEP implementation was carefully reviewed from a gender perspective to identify driving forces that widen gender gaps in the involved RPOs and it offered useful recommendations on the GEP implementation as well as strategies for their wider application at an organisational level to scale them up from the Departmental level towards a cross-departmental and cross-sectorial approach.

Main Areas represent the main functional areas of intervention covered by the GEP. They include the 4 target areas identified by the EQUAL-IST project: HR Management practices, Research content & delivery, Teaching and student services, and Institutional Communication. Furthermore, the analysis of the RPOs internal gender audits has suggested that a new Main Area could be added in order to meet all the critical issues that were described, that is Area of Governance and decision-making Bodies.

Each main area has been divided in Sub Areas, representing specific fields of intervention within the main areas as emerged by the internal audits.

Challenges present the critical situations that have been detected in RPOs' contexts.

The Objectives represent the good practices, formulated in general terms that have been identified were adopted within the institutions in order to solve the specific Challenges.

Each Objective, in turn, has been expanded into detailed Actions, that is a series of different concrete *actions* that were carried out in order to satisfy the relative Indicator.

3 The Results of GEP Implementation. Concluding Remarks

The GEP implementation at Kaunas University monitored throughout the project following the EQUAL-IST monitoring and evaluation methodology (Gorbacheva 2019; Forest 2019), including internal and

external evaluation. The results have pointed at positive outcomes in terms of raising the awareness of stakeholders and staff members on Gender inequalities and the need to address them with most of the activities aimed at capacity building and ensuring more visibility to women in research and gender equality issues in general. Although the plan has not focused extensively on changing structures or introducing permanent transformations in routines and institutional practices, still there was proof of evidence that, also thanks to GE-Ps activities, the female ratio among students and junior researchers has been raised during the EQUAL-IST project life cycle, as it is shown in the tables below **[tabs. 6-8]**.

Table 6   Enrolled students in ICT courses in 2016

			2016				**Average 2013/14, 2014/15, 2015/16**
			M	**F**	**T**	**%F**	
Enrolled students	ICT course	Bachelor	600	92	692	13.29%	7.77
		Master	93	21	114	18.42%	16.44
		PhD	7	1	8	12.50%	33.33
	Department / Faculty Level	Bachelor	600	92	692	13.29%	7.77
		Master	93	21	114	18.42%	16.44
		PhD	7	1	8	12.50%	33.33

Table 7   Enrolled students in ICT courses in 2018

			2018			
			M	**F**	**T**	**%F**
Enrolled students	ICT course	Bachelor	584	74	658	11.25%
		Master	92	23	115	20.00%
		PhD	4	2	6	33.33%
	Department / Faculty Level	Bachelor	584	74	658	11.25%
		Master	92	23	115	20.00%
		PhD	4	2	6	33.33%

Table 8   Female researchers among all new recruited researchers

	2016			**2018**		
	F	**M**	**%F**	**F**	**M**	**%F**
Grade A	0	2	0.00%		1	0.00%
Grade B	0	3	0.00%	1	6	14.29%
Grade C	2	2	50.00%	3	2	60.00%
Grade D	3	3	50.00%	3	5	37.50%

To recap, the first steps of the project implementation was to make a research on the current situation of the Faculty and to plan the possible actions to make changes. At the same time, the project disseminated widely not just in the Faculty but beyond it as well. The main indicators in the State of the Art research were distribution of genders in academic; non-academic and students positions; the distribution of genders in high-managerial positions at faculty and university levels; the types of work contracts; working hours; Pay gap and others.

In relation of results of the research, the Gender Equality Plan was prepared to eliminate the issued raised due to Gender imbalance at Kaunas University of Technology. The main outputs of Gender Equality Plans are gender sensitive career plans and a mentoring network for women. Gender sensitive career plans aim to help women, working in Informatics Faculty at Kaunas University of Technology to become aware of their career and set goals for their own career as well as have a clearer image of what they want to reach in their career and how to do it.

1. The career plans created for female academic staff working in the Faculty (researchers and PhD students) as this type of staff is the most sensitive in the sense of parental leave and other career breaks. It is expected to help female academic staff to have clearer sense on how to plan their Career; to identify strengths and weaknesses and skills/knowledge are still missing to reach set goals.

2. A Mentoring Network for Women was set up which aims at helping to connect young researchers (PhD students) and experienced researchers/professors to share their experience, ideas and advices on various types of issues. This network should help to minimize the drop out percent of female PhD students studying in Informatics field. It is expected to help female PhD students to get more support while studying as it would serve as a motivation to graduate and reach to a Career in the Research field.

3. The former tools and activities are to be kept active and can be considered the main achievements in terms of structural changes implemented at the university level assure the wider impact of women in IST organization. A Sustainability Plan[2] for GEP has been prepared and discussed with the KTU Management covering 3 years after the EQUAL-IST project termination.

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2 Sustainability Plan https://equal-ist.eu/eq-uploads/2017/01/EQUAL-IST-GEP-Sustainability-plan-_KTU.pdf. Sangiuliano, Rossi, Cortesi 2019.

4   Acknowledgement

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The EQUAL-IST GEP Implementation at the University of Modena and Reggio Emilia

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Abstract   In the recent policies issued by the European Commission (EC), which were reflected in the FP7 and Horizon 2020 (H2020) framework programs, *Gender Equality Plans* (GEPs) have been promoted as the main tool to achieve structural change for transforming institutions and, in particular, their rules, regulations, organizational processes, and cultures. The Horizon 2020 EQUAL-IST (Gender Equality Plans for Information Sciences and Technology Research Institutions) project supports six Universities across Europe (Italy, Lithuania, Germany, Ukraine, Finland, Portugal) to design and implement actions towards gender equality, with a specific focus on the ICT/IST area, through two phases of implementation. The paper presents the analysis of the experience of the EQUAL-IST GEP implementation at the University of Modena and Reggio Emilia in Italy. Particular attention will be devoted to analyze the encountered resistances and critical issues, highlighting the adjustments adopted during the second implementation phase to overcome them and to ensure sustainability of the main actions.

Keywords   Gender Equality Plans. Information Sciences and Technology. Implementation. Sustainability. Structural change.

Summary   1 Introduction. – 2 UniMORE GEP Overview. – 3 HR and Management Practices. – 4 Teaching and Student Services. – 5 Institutional Communication. – 6 Research Design and Delivery. – 7 Highlights and recommendations. – 8 Conclusions.

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1 Introduction

Implementation of Gender Equality Plans (GEPs) in research institutions is monitored in the ERA periodic reports, which show that in spite of an increasing number of RFOs and RPOs adopting the aforementioned policies the majority of EU research organizations are still not committed to structural change for gender equality (European Commission 2017). As a consequence, additional guidelines and tools, such as the GEAR (Gender Equality in Academia and Research) Toolkit developed by the European Institute for Gender Equality (EIGE), have been provided by the EC to assist research organizations in understanding steps and specific implementation processes to exploit (EIGE 2017).

The H2020 EQUAL-IST project ("Gender Equality Plans for Information Sciences and Technology Research Institutions"), approved in 2016 within the H2020 program "Science with and for Societies", applied these guidelines and tools to the research institutions in Information Sciences and Technology (IST) and Information and Communications Technology (ICT) disciplines. Specifically, the EQUAL-IST project focuses on supporting six ICT/IST Departments from Germany, Finland, Italy, Lithuania, Portugal, and Ukraine to become engaged into achieving internal structural change for gender equality through GEP implementation. Running for 36 months, the project took the challenge to develop and implement the lacking discipline-specific interventions related to gender equality in the ICT and IST fields (Benschop, Van den Brink 2011). The project addresses the following four main areas of intervention: Human Resources (HR) and Management Practices, Teaching and Student Services, Institutional Communication and Research Design and Delivery.

During the initial stage of the project, an internal gender audit was performed at each participating RPO, where a mixed methodology was applied using quantitative data analysis and qualitative techniques (e.g., focus groups, semi-structured interviews, and workshops). This process had led to the identification of the challenges related to gender equality at each RPO. These challenges, as well as ideas to address them, were then discussed on a crowdsourcing online platform (Gorbacheva 2017), which was developed within the project (`http://www.crowdequality.eu`) in order to trigger a participatory approach to design tailored GEPs.

The designed GEPs have been implemented at RPO in two rounds: the first iteration from October 2017 to May 2018 and the second iteration from July 2018 to April 2019. Between the two iterations, the GEPs were redesigned at each partner RPO, based on the results of the first implementation phase and on the assessment carried out by the EQUAL-IST external evaluator, to allow a realistic re-adjustment of the GEPs in consequence of organizational hurdles and unexpect-

ed events or dynamics, as well as to take advantage of unforeseen windows of opportunity for change. In particular, during the second iteration of GEP implementation, great effort was devoted to ensure sustainability of the main actions toward gender equality also beyond the end of the project. To this aim, we recall that each RPO elaborated a dedicated Sustainability Plan (Sangiuliano 2019) that was approved by the highest management levels: this proved to be very useful in the overall process of self-reflection on the impacts as well as in designing a strategy to make the first steps toward structural change more stable and to build pre-requisites to further and more transformative changes in upcoming years.

In this paper, the specific case of GEP implementation at the University of Modena and Reggio Emilia (UniMORE) is presented. The paper aims at analyzing the GEP implementation highlighting the resistances and obstacles encountered during the first iteration and evaluating the solutions proposed to overcome them during the second iteration trying to set the path to sustainable structural changes.

2 UniMORE GEP Overview

The Gender Equality Plan was the result of a long process of discussion and analysis internal at UniMORE. According to the methodology for participatory gender audit in ICT/IST research institutions (Canali 2018), the identified challenges were categorized into the four intervention areas considered in the EQUAL-IST project: HR and Management Practices, Teaching and Student Services, Institutional Communication and Research Design and Delivery. Then, the GEP was designed based on the results of the internal Gender Equality Audit, the crowdsourcing process carried out on the online CrowdEquality platform,[1] the analysis of the resulting data, discussions among the members of the UniMORE EQUAL-IST Working Group, and meetings with the main stakeholders that were involved in the GEPs implementation.

During the first and the second iteration of GEP implementation, 16 actions were implemented at UniMORE, covering all the intervention areas: 14 were initiated during the first iteration and two new actions were added during the GEP refinement phase to be implemented during the second iteration; moreover, 10 actions were included in the Sustainability Plan. The overall distribution of the GEP actions (and corresponding activities) implemented at UniMORE is reported in table 1.

The distribution among the four intervention areas reveals that the majority of the initiatives were carried out in the area of HR Man-

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1 https://www.crowdequality.eu.

agement Practices, mainly due to the fact that it is quite a comprehensive area including two different and quite broad domains: Human Resources (including staff recruitment/career progression and well-being/work life balance) and Governance (entailing functioning of internal structures/bodies involved in consultations and/or strategic policy design and approval; gender equality machineries; inter-institutional agreements and framework protocols). The number of initiatives was quite balanced in the areas of Teaching and Student Services and Institutional Communication, while the less populated area was Research Design and Delivery for the reasons that will be explained in Section 6.

Table 1   Overall view of GEP actions at UniMORE

	1st Iteration		2nd Iteration		Sustainability Plan
	N. Actions	**N. Activities**	**N. Actions**	**N. Activities**	**N. Actions**
HR and Management Practices	6	15	7	7	4
Teaching and Student Services	3	5	4	5	2
Institutional Communication	4	7	4	6	3
Research Design and Delivery	1	1	1	1	1
Total	14	28	16	19	10

In the remaining sections of this paper, specific actions and activities implemented for each intervention area will be described, focusing mainly on the sustainable actions. In the detailed description, it will be interesting to note the shift from the "*preparatory*" nature of most of the actions characterizing the first iteration of GEP implementation, to the "*structural change*" nature of the majority of the actions carried out during the second iteration. These terms refer to the definition given in the study by Sangiuliano et al. (Sangiuliano, Canali, Gorbacheva 2019) and distinguishing "*preparatory* actions", including activities focused on creating preconditions and aimed at raising awareness and building capacity, from 'structural change actions", focused on introducing structural changes and aimed at changing institutional procedures, structures and regulations.

3   HR and Management Practices

During the first iteration of GEP implementation, it emerged very clearly that one of the main challenges to support the structural change process toward gender equality was about the sustainability of the actions included in the EQUAL-IST GEP in the long term and after the end of the project. For this reason, during the second iteration a clear focus has been placed on institutionalization of changes, passing from the implementation of more 'preparatory' actions, such as the identification of existing gender expertise within the university, to the adoption of a more strategic framework consisting in negotiating with power structures and representative bodies.

At the end of the first iteration period, two sub-commissions had been already established within the Unified Committee for Guarantees (CUG), on 'Well-being at work' and 'Positive Actions for gender equality'. A new action included in the refined version of the EQUAL-IST GEP at UniMORE was about the exploitation of a window of opportunity regarding the renewal of a strategic document at the university level. Specifically, the new action concerned the inclusion of several initiatives held in the EQUAL-IST GEP (that was formally approved but merely project-based document) into the official triennial, legally binding GEP, namely Triennial Plan for Positive Actions, adopted under Italian Law for the next three years period (2019-21). This document has been consecutively elaborated by the Unified Committee for Guarantees (CUG), of which Claudia Canali is a member and chairperson of the sub-commission on Positive Actions for gender equality. The document includes several actions derived from EQUAL-IST GEP and considered to be the key priorities for UNIMORE, including actions to increase visibility of information about leaves and work flexibility regulation, a feasibility study about the setting up of a child care service in the university facilities, the collection of gender disaggregated data and publication of statistics, the adoption of guidelines for gender neutral communication at the institutional level, and training activities on gender neutral communication for UNIMORE staff members. The official proposal for the Triennial Plan 2019-21 has been approved by the Unified Committee for Guarantees (CUG) on 25 February 2019 and it is currently under approval by the trade unions' representatives, before being passed for ratification to the Administrative Board.

Let us now briefly analyze the actions concerning the area of HR management and practices that have been included in the Triennial Plan 2019-21. The feasibility study about the setting up of a child care service in the university facilities, initially included in the EQUAL-IST GEP, has been actually postponed with respect to the initial planning. The complexity of carrying out a complete feasibility study has been underestimated, also due to the fact that the overall management of

UniMORE was going to change during the GEP implementation period (all the heads of the departments changed in November 2018 and a new Rector was elected in May 2019). In fact, such a study would involve the evaluation of several possible alternative agreements with local stakeholders, a full financial sustainability plan and security assessments of the potential locations for the services in a university with departments dislocated over two cities and several urban areas.,. This change hindered the possibility to carry out a task requiring a long-term commitment with respect to the agreements with local stakeholders and to the definition of the financial sustainability plan. However, the action was redesigned from implying the creation of an internal service only to including different alternatives scenarios, such as new agreements with already existing childcare services and the possibility to involve internal resources of the Department of Education and Social Science (following the successful experience of other Italian Universities). Moreover, other measures were foreseen such as the installation of babies changing tables in each UniMORE Department.

The other action included in the Triennial Plan 2019-21 was about the collection of gender disaggregated data and publication of statistics. The initially planned data collection was limited to the DIEF department of Engineering, but during the GEPs implementation we envisioned the opportunity to extend data collection and analysis to the entire University and to guarantee sustainability to this action over the next years. Indeed, UniMORE was actively involved into a national CRUI (Conference of Italian University Rectors) working group on Gender Budgeting, that was defining official guidelines on how to implement Gender Budgeting within a research institution. The guidelines will be officially released and presented to the Italian Rectors in October 2019. Hence, we exploited this window of opportunity and the collected data will be published following the CRUI guidelines in order to a) exploit the knowledge of experts at the national level that defined clear and comparable indicators, leading to results easily comparable with other Italian RPOs; b) to leverage the official recommendation of the CRUI towards the adoption of a periodic gender budgeting in each Italian University to reinforce the engagement and the support of the high level management of our institution beyond the end of the project.

Finally, it is worth to underline that an identified challenge encountered during the project in this area of intervention was the lack of actions directly aimed at increasing the percentage of women accessing to senior and decision-making positions in career. This is basically due to the fact that the percentage of female professors in grade A at the Department of Engineering 'Enzo Ferrari' is much higher than in other engineering departments in Italy, while the situation in the ICT area is even more outstanding with 3 women out of

4 full professors. This situation essentially caused the fact that during the initial gender audit and the crowdsourcing-based GEP design at UniMORE, no actions directly targeting female career for high level positions were planned.

4 Teaching and Student Services

According to Eurostat 2018 data (Eurostat 2018), about 1,3 millions of people in Europe are enrolled in ICT courses (in different levels of education), but only 16.7% are women (13% in Italy), therefore (European Commission 2018) men graduate 5-7 times more than women in ICT on average in Europe. The statistics collected during the EQUAL-IST gender audit on the proportion of women students at Bachelor, Master and PhD ICT courses of the Department of Engineering 'Enzo Ferrari' (DIEF) at UniMORE confirm this gender gap, showing much lower percentages of women with respect to all the other university courses. While at the university level the share of women in UniMORE courses is around 55%, which is consistent with the national average (Bartoloni 2018),[2] the ratio at the department ICT drops down at around 14-15%.

A key action implemented within the EQUAL-IST project to address the gender gap in the ICT student population was about **replicating and extending the innovative best practice represented by the summer camp Ragazze Digitali (*Digital Girls*)**. 'Ragazze Digitali' was organised annually since 2014 by the Department of Engineering 'Enzo Ferrari' of UniMORE, in collaboration with the association European Women Management and Development (EWMD), with the main goal of encouraging female students to enroll in Computer Science/Informatics programs through a creative learning-by-doing approach based on team-based activities. During the summer camp, dedicated to girls of third and fourth grade of the high schools and free for them to participate, the girls learn how to code through creative laboratory activities. The summer camp was indeed designed based on the belief that interventions aimed at increasing young girls' interest and self-efficacy in technology-related activities have the potential to reduce the gender gap in participation (Master et al. 2016). Moreover, they are exposed to female role models (Shin 2016) represented by women expert in the ICT field who intervene as speakers on dedicated topics. The Summer Camp represents a highly innova-

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2 M. Bartoloni. "Università gratis o scontata per le studentesse che scelgono corsi scientifici". *Il Sole 24 Ore*, 8 gennaio 2018. URL `https://www.ilsole24ore.com/art/no-tizie/2018-01-08/universita-gratis-o-scontata-le-studentesse-che-scelgo-no-corsi-scientifici-153505.shtml`.

tive best practice to promote female participation in ICT studies: its long duration (4 weeks) along with the fact that it dedicated to girls and free for the participants makes this initiative unique, not only in Italy but, at the best of our knowledge, in Europe and in the world.

During the EQUAL-IST project, thanks to the support of local entities and foundations, the initiative has been extended in Modena starting from 2018 with two camps running in parallel and working on different activities related to coding and ICT (videogames in Python and Arduino-based projects). Moreover, it has been replicated in the nearby city of Reggio Emilia with a camp based on Arduino projects. Finally, Ragazze Digitali has been extended also to the city of Cesena with a three weeks summer camp . In terms of achieved impact, the last two editions of Ragazze Digitali saw a significant increase of enrolments with respect to the previous editions, reaching the number of 117 participants in 2018 and 166 in 2019. The promotional events carried out in the local high schools to present the summer camps involved almost 1,500 participants (students and teachers). This successful initiative has achieved sustainability thanks to the commitment of a local Banking Foundation, which has allocated funds to support the initiative for the next three years, and to agreements made with the university of Bologna that allowed the replication of the Summer Camp in the city of Cesena.

More details on the Summer Camp, on its impact on the participating female students, on their changed attitudes and plans for future studies and careers can be found in a recently published paper (Canali 2019).

Another important sustainable action implemented in this intervention area, not initially included in the UniMORE GEP, regarded the activation of a new teaching course "Language and Gender". The course (36 hours) will be activate starting from the academic year 2019-2020 within the Bachelor Degree on "European Languages and Cultures" at the Department of Linguistic and Cultural Studies. Furthermore, it would be available as an optional course to any student of UniMORE. It is worth to note that this course is the first teaching course active at UniMORE on a gender-related dimension.

5 Institutional Communication

During the first iteration of the GEP implementation, most of the activities in this area focused on the organization of **workshops and seminars aimed at raising awareness about gender (in)equality** in research institutions and in the ICT field among UniMORE staff and students. The effect of these preparatory initiatives was important to prepare the ground for actions more oriented to structural change.

During the second iteration, we envisaged that the more sustainable strategy to improve the communication toward the students to **permanently include information about the gender gap and stereotypes directly in the official guides and presentation documents of the ICT courses at UniMORE**. Hence, data about the gap in the student population of ICT courses and considerations against the gender stereotypes characterizing the field of Computer Science as a male discipline were included in the official brochures of the Department courses, that are published online. Information about initiatives like the summer camp "Ragazze Digitali", encouraging female students to enroll in ICT courses was also included in the official slides used during the presentation events of the ICT courses for the local high school students, to give them maximum visibility.

Another important action implemented during the second iteration was about the **adoption of guidelines for gender sensitive language in the institutional communication**. The guidelines have been designed and written by Prof. Cecilia Robustelli,[3] who is a UniMORE professor in linguistics, and were approved by the Italian Ministry for Education and Research in March 2018 (Robustelli 2018). Being aware that the concrete adoption of these rules in the university documents and communication channels will take a long process to be correctly implemented, we included the guidelines adoption in the strategic Triennial Plan of the CUG in order to give sustainability to this action. Moreover, the effective and concrete adoption of the guidelines requires appropriate training of the university staff members responsible for communication. For this reason, the EQUAL-IST GEP included also a **yearly event**, organized by the CUG committee, **for training staff members on the non-discriminatory use of gender in the language of the institutional communication**. Important success factors for the effectiveness and the sustainability of this actions are: a) the possibility to exploit an internal resource from the Linguistic and Cultural Studies Department and her expertise for training the staff, thus reducing the financial resources needed to implement the action; b) the inclusion of this event within the mandatory training for the University staff members to make the training effective and trigger high participation.

6 Research Design and Delivery

Addressing gender equality in the area of Research Design and Delivery revealed more difficult and challenging for UniMORE, as well as for the other EQUAL-IST partners, with respect to other areas of in-

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3 http://personale.unimore.it/rubrica/dettaglio/crobustelli.

tervention. The main motivation is that, as in most of the hard STEM fields, the understanding of how gender can be a relevant dimension to take into account into Computer Sciences and IS research content remains rather limited. The allegedly inner neutrality of algorithms and coding is often mentioned to question the need for gender-sensitive CS/ICT and IS research. As UniMORE was directly involved with its ICT section of the DIEF Engineering Department, it reflected this limited awareness, and prioritized actions in other intervention areas.

The lack of actions in this intervention area emerged at the end of the first iteration of GEP implementation. To address this issue, a dedicated **webinar on Gender in IST/ICT research** was held at the consortium level titled *"Gender in ICT/IST research content: why and how to integrate a gender (and intersectional) approach in your research projects",* with keynote contributions on gender in Human Computer Interaction and UX design as well as on gender and artificial intelligence and machine learning, in order to increase awareness and achieve a shared understanding of what it actually means to integrate the gender dimension in those fields. Moreover, a dedicated section on Gender in ICT Research content in the EQUAL-IST online Toolkit (Sangiuliano 2018) was made available as a tool for providing partners with additional resources and knowledge on this ERA priority.

This allowed UniMORE to reach a better understanding, at the institutional level, of how to integrate gender content in research and supported the efforts undertaken towards mainstreaming the gender dimension in research during the second iteration of GEP implementation. During the first iteration, indeed, the only scheduled and implemented action was the organization of the workshop "Women and Research", organized on 29 March 2018 and dedicated to young female researchers, that was meant as an occasion of networking to share experiences and openly discuss about the gender impact on research careers and activities. On the other hand, the second iteration saw the establishment of an interdisciplinary working group, namely "Gender and Research", involving permanently almost 20 female researchers belonging to 7 different UniMORE departments. The working group is expected to deliver research projects where a gender dimension is taken into consideration in ICT and STEM research. This action as well as the management of the working group will be sustained after the end of the project by the interest from the Research Office to increase the number of submitted and approved projects to EU calls for proposals.

7 Highlights and Recommendations

As underlined in the previous sections, the biggest shift from the first to the second iteration of GEP implementation at UniMORE consisted of moving from a focus on raising awareness to embedding actions into the operational structures and institutionalizing change in a sustainable perspective.

To this regard, it has to be highlighted that the UniMORE experience in "hacking" the legally binding Triennial Plan for Positive Actions to be enacted by any Italian university could be decisive for other universities to follow that path. A path that requires to bring gender expertise inside the CUG, to identify key priorities at the level of the organization and potential windows of opportunities outside (as, in the UNIMORE case, the adoption of nation-wide guidelines for gender budgeting and gender-sensitive communication). The triennial plan of UniMORE has yet the potential to set a new, higher quality standard for those legally binding plans, known to be often left dead letters (EIGE 2016). This experience should be widely shared, and it has potential to deliver its impact beyond the project timeline. To this aim, control mechanisms have been carefully devised in the sustainability plan elaborated by the project team, which contains clear, achievable objectives for the post-project period.

The UniMORE sustainability plan also includes an action of which the realization has been postponed during the project, consisting in a feasibility study for establishing childcare facilities at UniMORE. To this regard, it is interesting to highlight the EQUAL-IST external evaluator's recommendation to facilitate the implementation of the feasibility study regarding such a complex service. The suggestion is to adopt a flexible framework, such as combining new facilities at some faculties with reserved places in existing facilities outside the university, depending on demand and funding. Moreover, it was suggested that a participatory process, for instance in form of co-design workshops, could certainly help to document the needs in terms of childcare facilities (organization, functioning, opening hours, services...) and to co-design appropriate, tailor-made solutions.

Moreover, the successful experience of the summer camps *Ragazze digitali* offers a clear potential for replication, not only in different national contexts, but also in different areas. It should nonetheless be mentioned that Emilia-Romagna also provides a specifically favorable context for such an initiative, with a strong presence of IT companies – often related to the automotive industry, an active third sector supported by regional foundations and used to cooperate with the academia. Not only this successful experience is likely to be maintained at least for the next three years thanks to local fundings, but it has inspired a project of Engineering Summer School "Women in Transport" promoted by the Motor vehicle University of Emilia-Ro-

magna[4] within the Women in Transport – EU platform for change (European Commission 2019).

Finally, the permanent working group 'Gender and Research' established in 2019, which should work as a research cluster allowing researchers from different areas and departments with interests and expertise on gender issues to cooperate, will reinforce the visibility of gender knowledge at UniMORE. A trend that will be also supported by the opening of the first course on gender sensitive language at the B.A level at UniMORE. Thanks to the achieved transdisciplinary collaboration, UniMORE has been judged as one of the two partners most far-reaching in gendering research content under the EQUAL-IST project (Forest 2019), offering potential for mutual learning among former partners and in the regional and national context in Italy, beyond the timeline of the project.

8   Conclusions

The GEP implementation carried out at the University of Modena and Reggio Emilia (UniMORE) during the Horizon 2020 EQUAL-IST (Gender Equality Plans for Information Sciences and Technology Research Institutions) project is presented in this paper. The actions were analyzed by area of intervention (Human Resources (HR) and Management Practices, Teaching and Student Services, Institutional Communication and Research Design and Delivery): among the several activities implemented for each area, the paper focuses on the structural change actions, meaning the actions aimed at changing institutional procedures, structures and regulations. The GEP implementation was analyzed with the aim to highlight the encountered resistances and to present the solutions proposed to overcome them, with particular attention to the shift toward sustainability occurred between the first and the second iteration of the implementation process. Finally, some highlights about the strategic approach adopted at UniMORE are reported to provide useful recommendations for RPOs willing to implement similar initiatives toward Gender Equality.

As future work, we plan to continue along the path initiated during the EQUAL-IST project. To this aim, we identified some key elements that will be fundamental toward the effective continuation of gender equality policies at UniMORE: a) in close collaboration with the CUG committee, to monitor the implementation of the Triennial Plan of Positive Actions; b) to strength collaboration with the external stakeholders, at the local (banking foundations, private associa-

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4 https://motorvehicleuniversity.com/.

tions and companies) and national level (Conference of Italian Rectors, networks of ICT researchers) to support on-going and future actions; c) participate in International and National projects on gender-related dimensions by leveraging the existence of the Gender and Research working group.

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Promotion of Gender Equality at the University of Muenster's Department of Information Systems

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Abstract   The article provides an overview of the work done at the University of Muenster (WWU), Department of Information Systems (DIS) within the Horizon 2020 EQUAL-IST project ("Gender Equality Plans for Information Sciences and Technology Research Institutions"). During the project, the existing at DIS challenges related to gender equality, diversity, and work-family balance were revealed, the objectives to address these challenges were set, and the interventions to achieve these objectives were designed, implemented, as well as continuously assessed and refined. This article provides insights into the course of project implementation at WWU, achieved outcomes, and sustainability plan.

Keywords   Gender equality. Gender Equality Plan. Interventions. Diversity. Inclusion. Structural change. Sustainability. Information Systems. Research organisation.

Summary   1 Introduction. – 2 Approach. – 3 Implemented Interventions and Resistances Faced. – 4 Project Sustainability and Conclusion. 4.1 DIS Sustainability Plan. – 4.2 SBE Sustainability plan.

1   Introduction

EQUAL-IST ("Gender Equality Plans for Information Sciences and Technology Research Institutions", https://equal-ist.eu, https://www.uni-muenster.de/forschungaz/project/10219?lang=en) was an international project funded by the European Commission within the Horizon 2020 Framework Programme (https://ec.europa.eu/

programmes/horizon2020/en). The project started in June 2016 and was successfully completed in July 2019. The project was aimed at *introducing structural changes to enhance gender equality, diversity, and work-family balance* at the six participating Information and Communications Technology (ICT) and Information Sciences and Technology (IST) research institutions. It has been demonstrated that ICT and IST belong to the fields, where gender inequalities at all levels can be observed (Eurostat Press Office 2017; E. Gorbacheva, Beekhuyzen, vom Brocke, Becker 2018).

The EQUAL-IST project was focused on the design and implementation of tailored Gender Equality Plans (GEPs). A GEP is "a set of actions aiming at: (i) conducting impact assessment / audits of procedures and practices to identify gender bias; (ii) identifying and implementing innovative strategies to correct any bias; and (iii) setting targets and monitoring progress via indicators" (European Commission 2012, 13). Within the EQUAL-IST project the tailored GEPs were designed in a participatory manner involving a wider audience of staff members (both academic and non-academic), students, and decision makers. This participatory approach was supported by the online crowdsourcing platform, called CrowdEquality (http://www.crowdequality.eu), which was developed and applied within the project (E. Gorbacheva, Moumtzi, Stein 2019; Gorbacheva, Barann 2017) as well as other challenges related to gender equity, can be addressed with the help of IT-enabled idea crowdsourcing. A systematic literature review was conducted to understand how the topic of gender equity promotion via collaboratively used IT artefacts has been addressed in extant research. Insights from the literature review, overview of existing related IT artefacts, and iterative discussions with scholars in the IT field have resulted in a set of requirements to the idea crowdsourcing platform aimed at the promotion of gender equity in IT research institutions. These requirements were analysed further and could be categorised into those specific for the target platform and those relevant also for other idea crowdsourcing platforms (with or without further adaptation.

This article is focused on the interventions towards higher gender equality, diversity, and work-family balance ('interventions' hereafter), which were implemented within the EQUAL-IST project at the University of Muenster (WWU), Department of Information Systems (DIS). Note: Interventions are specific activities aimed at changing the status quo (e.g., Craig 2015).

The need to tackle the under-representation of women at DIS at all levels motivated its participation in the EQUAL-IST project. In 2017 the share of women among Bachelor Information Systems (IS) students was 13.2% (vs. 46% of women among all WWU students). The shares of women were higher in the Master IS study programme (25%), as well as among doctoral researchers (24%) and full professors (1 out of 6, 16.7%), although the numbers were low in these cat-

egories too. The lowest share of women was observed among post-doctoral researchers (12%).

The article starts with the introduction of the approach followed at WWU within the EQUAL-IST project. Afterwards, the main implemented interventions are introduced and classified according to the objectives they intended to achieve; the faced resistances are indicated here as well. The article is concluded with a summary of the steps towards ensuring the sustainability of the initiated interventions after the end of the EQUAL-IST project.

2   Approach

The approach followed at WWU within the EQUAL-IST project included the following phases [fig. 1].
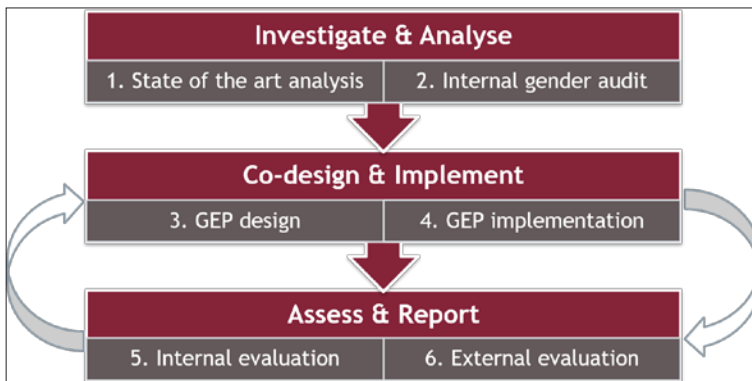
Figure 1   Approach followed at WWU within the EQUAL-IST project

During the first phase, the state-of-the-art analysis of related work was performed in order to provide valuable insights into the forthcoming GEP design and implementation at DIS. Here the following materials were collected and analysed: GEPs implemented at Departments of Information Systems in Germany and information about third-party funded projects aimed at the GEP design and implementation.

During the second phase, an internal gender audit was conducted (i) to investigate current issues related to gender equality, diversity, and work-family balance faced by students or staff members at DIS and the School of Business and Economics (SBE) – the faculty which DIS belongs to ('challenges' hereafter), and (ii) to collect the ideas to address these challenges ('ideas' hereafter). The internal gender audit included the following steps:

First, in order to show evidence that women are under-represented at all levels at DIS, comprehensive gender-disaggregated statistics, as well as the indicators related to work-life balance, were collected and calculated for IS students and DIS staff members for the years 2011-18. Moreover, it was attempted to collect the same statistics for all Departments of Information Systems in Germany. This initiative, however, was not entirely successful, as only few relevant statistics could be found. The statistics for DIS were then analysed and later on extended and used in the subsequent project phases. The extended statistics were required, in particular, to justify the interventions initiated within the EQUAL-IST project and the need in their continuous implementation after the end of the project. It is intended to continue the collection, analysis, and dissemination of relevant gender-disaggregated statistics of (potential) staff members (both academic and non-academic) and students after the end of the EQUAL-IST project. A respective activity was included in the project sustainability plan.

Second, a comprehensive survey "Gender Equality & Diversity @SBE" was conducted, where DIS and SBE staff members and students were invited to participate. The survey was designed in a way that each target group (academic staff members, non-academic staff members, and students) received a set of dedicated questions in addition to the questions relevant for all target groups. Thus, a more profound feedback from each target group could be obtained. The survey was informed by (1) the survey on the status of women faculty conducted by the Association for Information Systems Women Network and (2) extant academic literature on gender imbalance in the IS field (e.g., Ahuja 2002; Armstrong, Riemenschneider 2014; Loiacono, Iyer, Armstrong, Beekhuyzen, Craig 2016). As a result, 122 complete responses could be collected: 74 from academic staff members (43 of them were from DIS), 7 from non-academic staff members (5 of them were from DIS), and 41 from students (17 of them were from DIS). The survey data, together with the collected statistics, were then analysed and relevant findings were communicated during the subsequent gender audit studies, namely: (i) a workshop with six IS students; (ii) five interviews with decision-makers (three of them were from DIS); and (iii) a focus group with two DIS non-academic staff members (both female team assistants). It is intended to rework and regularly conduct follow-up surveys "Gender Equality & Diversity @SBE". A respective activity was included in the project sustainability plan.

The challenges and ideas to address them, which were identified during the internal gender audit, were then discussed and extended by DIS staff members and IS students via the aforementioned Crowd-Equality online crowdsourcing platform. All DIS-related input collected via CrowdEquality was then analysed by EQUAL-IST project Working Group at WWU and discussed with the stakeholders foreseen to

be involved in the forthcoming implementation of the DIS GEP, including DIS study coordinator, representatives of IS student council, and representatives of WWU Equal Opportunities Office.

As a result, during the third phase, the DIS GEP document could be designed and in the subsequent fourth phase it was implemented. In DIS GEP the objectives to address the identified challenges were formulated ('objectives' hereafter). Furthermore, the action plan for the interventions aimed at achieving these objectives was set up. These interventions were based on the selected feasible ideas, which were proposed in the previous phase. The implemented interventions are summarised in the next section.

The fifth and sixth phases were focused on the continuous assessment and reporting on the progress and success of the DIS GEP implementation, which was done both internally (fifth phase) and by an external evaluator appointed for the EQUAL-IST project (sixth phase). The internal assessment was focused on the performed work, while the external assessment – on the impact of this work. In case the performed work was not in line with DIS GEP, corrective actions were discussed and carried out by respective stakeholders. DIS GEP was implemented in two iterations. Based on the outcomes of the 1st iteration and the feedback received from the project external evaluator, the initial DIS GEP document was refined and then implemented further during the 2nd iteration.

Further work packages of the EQUAL-IST project included project management, dissemination of all project activities, as well as ensuring that the ethics requirements set by the European Commission were fulfilled.

3   Implemented Interventions and Resistances Faced

This section provides an overview of the main interventions included in DIS GEP and implemented within the EQUAL-IST project. These interventions were aimed at achieving the objectives, which were set to address the challenges revealed during the internal gender audit at DIS.

The interventions were implemented at the department, faculty, and university levels and are tagged in table 1 as follows:

- [DIS] – Intervention was implemented at the department level primarily by EQUAL-IST project leader at WWU in collaboration with EQUAL-IST project Working Group at WWU.
- [SBE] – Intervention was implemented at the faculty level (which includes DIS) primarily by EQUAL-IST project leader at WWU in the role of SBE Equal Opportunities Officer.
- [WWU] – Intervention was implemented at the university level (which includes SBE and DIS) by EQUAL-IST project leader at

WWU and EQUAL-IST project Working Group at WWU in collaboration with WWU Equal Opportunities Office.

The first objective of the interventions implemented within the EQUAL-IST project (Objective A) was ***to increase the share of women among Bachelor IS students***. The under-representation of women at DIS at all levels was the main reason, why DIS participated in the EQUAL-IST project. During the project internal gender audit, it was revealed that the root problem for it was the low share of women among *Bachelor* IS students.

The second objective was ***to enhance inclusion of international IS students*** (Objective B). The results of internal gender audit showed that international IS students often felt excluded, especially from group work, as German students tended to team up with other German students. The Master IS study programme at WWU, where English is the only language of instruction, needs to be focused on, as the share of international students there is especially high.

The third objective was ***to improve work-family balance of DIS academic staff members*** (Objective C). During the internal gender audit several academic staff members indicated that the expectations from them were not communicated clearly during the hiring process, which resulted in dissatisfaction and turnover intention. Difficulties in balancing work and family life were also highlighted by several parents working at DIS.

The fourth objective was ***to raise awareness about the aspects related to gender equality*** (Objective D). Although DIS faces an under-representation of women at all levels, the internal gender audit revealed that the topic of gender equality had *not* been extensively discussed or recognised as important. Overall lack of interest and even hostility towards the topic could be observed. Low interest in the topic of gender equality often stems from the lack of awareness about what constitutes gender equality and gender inequality issues beyond direct discrimination, why it is important to tackle these issues and how, as well as what interventions already exist at the department, faculty, university, and country levels.

Five interventions were implemented to achieve Objective A, five interventions to achieve Objective B, four interventions to achieve Objective C, and seven interventions to achieve Objective D. Moreover, three further valuable interventions were initiated. The intervention titles and goals are presented in table 1, whereas further details about each intervention are available at `https://www.wi.uni-muenster.de/career/diversity-and-inclusion`.

Table 1 Overview of the interventions implemented at WWU within the EQUAL-IST project

Title [Level of Implementation]	Goal(s)
Objective A: To increase the share of women among Bachelor IS students	
Organisation and implementation of the events promoting the IS study programme within the "Hochschultag" annual information day. [SBE]	To promote the SBE study programmes to potential students as an inclusive place welcoming all.
Organisation and implementation of the events promoting the IS study programme within the "Girls' Day" annual information day. [DIS]	To promote the IS study programme to potential female students as an inclusive place welcoming all.
Survey "How did you learn about your study programme?" [DIS] Preparatory intervention: Review of relevant studies.	(i) To understand, how current Bachelor and Master IS students, especially female IS students, learned about their study programmes; (ii) to identify promising communication channels to promote the IS study programme; (iii) to reveal, how current communication channels promoting the IS study programme could be improved.
Workshop "Why should one want to study Information Systems at the University of Muenster?" [DIS]	To identify promising activities and communication channels to promote the IS study programme, especially to potential female students.
Revision of the marketing materials promoting the IS study programme applying a gender-sensitive approach. [DIS] Preparatory intervention: Review of relevant studies.	To revise the marketing materials promoting the IS study programme applying a gender-sensitive approach in order to ensure that this study programme is presented in an attractive and welcoming way for all.
Objective B: To enhance inclusion of international IS students	
Workshop "Towards higher gender diversity and inclusion of international students in the Information Systems study programme at the University of Muenster?". [WWU]	To discuss the ongoing and prospective interventions towards enhancing gender diversity and inclusion of international students in the IS study programme.
Initiation of a working group within IS student council to support international IS students. [DIS]	(i) To support international IS students; (ii) to connect them with local students.
Organisation and implementation of the sessions "How to study successfully in Muenster" within the "Master Orientation Day" information days for Master IS students. [DIS]	To provide practical information and recommendations related to studying IS at WWU to those Master IS students who did not study at WWU before and, in particular, to international IS students.
Assignment of students to groups within (Master) IS courses in a random way. [DIS]	(i) To bring in contact local and international students during the group work within (Master) IS courses; (ii) to mitigate gender and culture prejudices that could exist.
Investigation of the opportunities for the involvement of regular international IS students into existing initiatives supporting international (exchange) students in Muenster. [DIS]	To explore, how regular international IS students could be (further) involved in existing initiatives supporting exchange students in Muenster.

Title [Level of Implementation]	Goal(s)
Objective C: To improve work-family balance of DIS academic staff members	
Support in the design and implementation of the survey "Studying with Children". [WWU]	(i) To identify and analyse the requirements of students who have children or are about to become parents; (ii) to understand their level of awareness of existing (at WWU and beyond) initiatives and opportunities for parents.
Implementation of the updated in 2018 version of the Maternity Protection Act. [SBE]	To support and protect students who have children or are about to become parents.
Improvement in the communication to (potential) DIS staff members of the expectations from them. [DIS]	To improve communication of the expectations from DIS staff members.
Workshop "Why should one want to work at the University of Muenster's Department of Information Systems?" [DIS]	To identify promising activities to make DIS an attractive place to work for the best potential academic staff members, and especially for qualified and motivated women.
Objective D: To raise awareness about the aspects related to gender equality	
Dissemination of the implemented interventions. [WWU, SBE, DIS, external]	To disseminate the implemented interventions to all target groups.
Presentation of DIS GEP at a brown bag meeting of DIS academic staff members. [DIS]	
Presentation of DIS GEP to DIS professors. [DIS]	
Dissemination of the implemented interventions to EQUAL-IST project external evaluator. [DIS]	
Dissemination of the implemented interventions within the proposals for SBE national and international re-accreditations. [SBE]	
Communication of DIS GEP to SBE dean. [SBE]	
Communication of DIS GEP to SBE Equal Opportunities Commission. [SBE]	
Dissemination of the implemented interventions to WWU Decentralised Equal Opportunity Officers. [WWU]	
Proposal of the suggestions for improvement of existing regulations related to gender equality within the refinement of WWU Equal Opportunity Framework document. [WWU]	To improve the existing at WWU regulations related to gender equality.
Support of a photo campaign at SBE for the 2018 International Day for the Elimination of Violence against Women. [WWU, SBE]	To support the 2018 International Day for the Elimination of Violence against Women.
Raising awareness of gender equality aspects among the members of appointment committees for tenured positions at SBE. [SBE]	(i) To ensure fair and transparent appointment procedure at SBE; (ii) to sensitise members of appointment committees at SBE about the importance of ensuring equal treatment of all candidates and avoiding any form of bias and discrimination.

Title [Level of Implementation]	Goal(s)
Incorporation of the gender equality aspects into the SBE mission statement. [SBE]	To incorporate the gender equality aspects into the SBE mission statement.
Awareness raising activities at DIS by EQUAL-IST project external evaluator. [DIS]	To raise awareness about the importance of promotion of gender equality at DIS.
Keynote speech "Why we Need more Women in IT-Startups" within the "Startup Nights Münster" event. [external]	To raise awareness of the participants of the "Startup Nights Münster" event about the importance of promotion of gender equality in IT-Startups.
Further implemented interventions	
Development of the WWU Database of Gender Equality Interventions. [WWU]	(i) To structure and store online in a secure way the information about WWU interventions promoting gender equality; (ii) to provide an overview of these interventions and to disseminate them; (iii) to continuously revise, update, and extend information about these interventions.
Appointment of EQUAL-IST project leader at WWU as (i) SBE Equal Opportunities Officer and (ii) member of WWU Equal Opportunities Commission. [WWU, SBE]	(i) To increase visibility of the EQUAL-IST project and the initiated interventions; (ii) to build alliances for further collaboration.
Formation of a new Equal Opportunities Commission at SBE. [SBE]	To assemble a new Equal Opportunities Commission at SBE with active and motivated members.

Resistances towards the EQUAL-IST project were faced both at the department and faculty levels, especially at the beginning of the project. A general resistance to acknowledge that there were internal challenges related to gender equality could be observed from DIS and SBE decision-makers and staff members. However, in the course of the project, a set of interventions were implemented to address this resistance and there was a positive change in the attitude towards the topic of gender equality. In particular, in the course of the EQUAL-IST project SBE dean, who was initially sceptical towards the topic of promotion of gender equality, became sensitised about its importance. She became a member of the dedicated working group for reworking WWU Equal Opportunity Framework document (German: *"Gleichstellungsrahmenplan der Westfälischen Wilhelms-Universität Münster"*, `https://www.uni-muenster.de/Gleichstellung/ Gleichstellungsrahmenplan.html`) and contributed to its fundamental revision and improvement.

4   Project Sustainability and Conclusion

The interventions towards higher gender equality, diversity, and work-family balance, which were initiated within the EQUAL-IST project, need to be sustainable to make a difference. According to the

work done by Athena Swan (`http://www.ecu.ac.uk/equality-char-ters/athena-swan`), the results of successful interventions become visible only after at least five years since the start of their implementation. In order to develop the EQUAL-IST project sustainability plan, the initiated interventions were analysed and those, which needed or had potential to continue to be implemented beyond the project runtime, were identified and discussed by EQUAL-IST project leader at WWU with EQUAL-IST project Working Group at WWU. The selected interventions were then classified as those (i) relevant only for DIS and (ii) relevant for SBE (which includes DIS). These interventions formed the basis for the sustainability plans at the department level (DIS sustainability plan) and the faculty level (SBE sustainability plan). Both sustainability plans are discussed in this section. While DIS sustainability plan has been finalised, approved by DIS professors, and published on the DIS website facing no significant resistance, the design of the SBE sustainability plan is still in progress. Both documents will need to be disseminated, implemented, as well as later on regularly evaluated and refined. It is important to ensure that the stakeholders involved in the implementation of the sustainability plans remain active and motivated.

4.1 DIS Sustainability Plan

At the department level, a new document entitled *"Plan for Recruitment, Retention, and Advancement of Talented Women, Internationals, and Parents for the Department of Information Systems"* was designed as DIS sustainability plan for the period 2019-22. The goals of the DIS sustainability plan were to ensure sustainability of the interventions initiated within the EQUAL-IST project and to improve the processes for personnel recruitment, retention, and advancement DIS.

Once the activities to be included in the DIS sustainability plan were selected, the main stakeholders foreseen to be involved in their implementation were contacted and their commitment was ensured. These stakeholders included DIS study coordinator, IS student council, and selected DIS staff members. A draft version of DIS sustainability plan was then presented by EQUAL-IST project leader at WWU to DIS professors during one of their regular meetings. DIS professors were asked to provide feedback to the presented activities, as well as to propose further activities to be included in the document. All feedback was incorporated into the final version of the DIS sustainability plan, which was approved by DIS professors in July 2019 and published on the DIS website. The document is available at `https://www.wi.uni-muenster.de/career/diversity-and-inclusion`.

The activities included in the DIS sustainability plan were aimed at achieving the following objectives, which match the objectives of

the interventions implemented within the EQUAL-IST project presented earlier (Objective A – Objective C):

1. To increase the share of women among Bachelor IS students.
2. To enhance inclusion of international IS students.
3. To improve work-family balance of DIS academic staff members.

17 activities were included in the DIS sustainability plan: eight activities to achieve the first objective, four activities to achieve the second objective, and three activities to achieve the third objective; moreover, two further activities were proposed, which dealt with (i) raising awareness of the topics related to gender equality among IS students and (ii) evaluating the implementation progress and success of all activities. For each activity, the following information was presented: goal(s) and main idea, implementation frequency, and the stakeholders responsible for leading the activity management and implementation ('activity leads' hereafter). Activity leads are responsible for further development of the detailed action plan for each activity, including definition of the activity target indicators, timeline, resources required, and further relevant aspects. Commitment of most activity leads has been achieved. The DIS sustainability plan is foreseen as a living document, which will be discussed and monitored continuously and reissued every four years.

4.2 SBE Sustainability Plan

At the faculty level, an existing document entitled *"Gender Equality Plan for the University of Münster's School of Business and Economics"* (German: *"Gleichstellungsplan der Wirtschaftswissenschaftlichen Fakultät"*) is currently reworked and updated as SBE sustainability plan for the period 2019-23. Establishment of this policy-planning document is prescribed by the state and university regulations and is obligatory for all faculties at WWU.

Once the activities to be included in the document were selected, they were presented by EQUAL-IST project leader at WWU (in the role of SBE Equal Opportunities Officer) to SBE Equal Opportunities Commission during a dedicated workshop. The commission members agreed that it was important to ensure that the interventions initiated within the EQUAL-IST project would be continuously implemented in the future and widely disseminated. They also proposed further activities to be included in the SBE sustainability plan. All ideas were collected into a shared document, where the commission members then had an opportunity to express their opinions. Further ideas for the activities to be included in the SBE sustainability plan were proposed by SBE dean during one of the meetings with EQUAL-IST project leader at WWU. These ideas were incorporated into the

shared document as well. The document was then transformed into a draft version of the SBE sustainability plan, which was shared with SBE Equal Opportunities Commission, SBE Dean, and the new SBE Equal Opportunities Officer who overtook this role from EQUAL-IST project leader at WWU. The document is available at `https://uni-muenster.sciebo.de/s/1wMmdIFNOV2wasS`. It is crucial that the new SBE Equal Opportunities Officer and SBE Equal Opportunities Commission members finalise and receive approval of this document, as well as monitor and support its implementation. Commitment of the following stakeholders foreseen to be involved in the implementation of the SBE sustainability plan has already been achieved: SBE Equal Opportunities Commission, SBE student council, and selected SBE staff members.

The proposed draft SBE sustainability plan had the following target fields, which were in line with the objectives of WWU Equal Opportunity Framework document:

a. Monitoring of the intervention course and outcomes.
b. Promotion of equal opportunities for (potential) students.
c. Promotion of equal opportunities in personnel recruitment, retention, and advancement.
d. Raising awareness of the importance of promotion of gender equality.
e. Gender-sensitive communication.
f. Prevention of sexual and gender-based violence.
g. Non-discriminatory committees and meeting times.

23 activities were proposed in these target fields: three activities in the target field A, four activities in the target field B, one activity in the target field C, nine activities in the target field D, and two activities in each of the target fields E, F, and G.

It is noteworthy that only one activity was proposed to address target field C: "Promotion of equal opportunities in personnel recruitment, retention, and advancement". This activity was focused on the provision of informational and advisory support to staff members and especially to staff members with children. No further activities at SBE were included here due to a high number of related interventions at the university level. It was decided to first disseminate and promote existing interventions, rather than to initiate further faculty-specific interventions.

Two activities were included in both the DIS sustainability plan and the SBE sustainability plan: the first one was aimed at the application of a gender-sensitive approach when revising existing or establishing new materials (including teaching materials) and the other one was aimed at regular evaluation of the implementation course and outcomes.

In addition to preparing the draft SBE sustainability plan, EQUAL-IST project leader at WWU developed a document summarising the envisioned tasks and responsibilities of future SBE Equal Opportu-

nities Officers and estimated annual workload for each task (available at `https://uni-muenster.sciebo.de/s/Hk7SDfqWBM0gk6u`). This document was presented to SBE dean, arguing that the current situation that the position of SBE Equal Opportunities Officer does not receive any dedicated funding needs to be changed and additional support, resources, and opportunities need to be provided to SBE Equal Opportunities Officers. As a result, the following structural changes related to the position of SBE Equal Opportunities Officer took place. First, a tenured female professor at SBE overtook the role of SBE Equal Opportunities Officer from EQUAL-IST project leader at WWU. Earlier this role was assigned to SBE staff members who had fixed-term contracts, which hindered the continuity and sustainability of the conducted work. Furthermore, one of the tenured SBE staff members was assigned to support the new SBE Equal Opportunities Officer on an operative basis. Thus, sustainability of the gender equality work at SBE could be ensured.

Finally, it needs to be mentioned that further interventions aimed at enhancing gender equality, diversity, and work-family balance are continuously implemented at the WWU level, independently or with only minor support from the EQUAL-IST project. WWU Equal Opportunities Office is primarily involved in leading the implementation of these interventions and ensuring their sustainability.

To conclude, the EQUAL-IST project resulted in an increased attention and a higher visibility of the topic of gender equality not only at the department, but also at the faculty and university levels. Enhanced legitimisation of the topic and raised awareness about the importance of promotion of gender equality at DIS and SBE positively contributed to the sustainability of the interventions initiated within the project. The project sustainability plan was designed at both the department and faculty levels and it is intended to evaluate regularly the implementation progress and success, as well as to refine both sustainability plans.

Acknowledgements

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Digital Girls Summer Camp: Bridging the Gender ICT Divide

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Abstract   Women are currently severely underrepresented in the ICT field of study and in the ICT professions. This brings about severe gender gap at disadvantages in the access to new employment and wages and increased the risk to be left out from the digital revolution. Not only EQUAL-IST maps the gaps in ICT at the disadvantage of women in the different institutions and contexts involved in the partnership, but it also promotes actions to close the digital divide. One of these actions is a Summer Camp that is reserved to girls attending the third or fourth year of high schools to acquire knowledge in ICT by active learning implemented at the University of Modena and Reggio Emilia (UniMORE). The activity has shown to be successful in a twofold way: a) in terms of diffusion and replication, increasing the number of involved girls from the initial 35 participants of the first edition in 2014 in Modena to almost 130 girls participating in 2018 to the summer camps located in an increased number of sites, including locations outside of the region Emilia Romagna; b) in its capacity to reduce the digital divide with a real change in girls' ICT knowledge and in their expectation with regards to future education and professional roles.

Keywords   Gender segregation. ICT Summer Camp. Gender stereotypes. Learn-by-doing approach.

Summary   1 Introduction. – 2 The Reduction of the Gender Digital Divide as a Key Objective in UniMORE GEPs. – 3 'Digital Girls' Summer Camp as a key Action to Reduce the Gender Digital Divide. – 4 The 'Digital Girls' Impact. – 5 Concluding Remarks

1   Introduction

As PISA (*Programme for International Students Assessment*) OECD data clearly show, 15 years old girls show much lower expectations than 15 years old boys to see themselves in ICT professions and of the 1.3 million of people that in Europe are in ICT women represent only 16.7% (Eurostat 2018). Women under representation in STEM fields is shown by data together with a larger gender gap in technological fields such as computer science and engineering than in math and science (Cheryan et al. 2017).

This trend is also reflected within the University of Modena and Reggio Emilia data that, in the 2015/16 academic year, shows only 18% women amongst those students enrolled in ICT at bachelor level, going down in the Master degree at only 7% and to none at the Doctoral level.[1]

The aim of increasing the presence of women in ICT Departments is shared by the European Commission (European Commission 2018) that points to a series of policies that could reduce the gap by tackling the gender stereotypes by using awareness-raising campaigns and concrete actions. The need to address earlier than in Tertiary education gender stereotypes on 'masculine' and 'feminine' subjects of study and professions has been stressed by the literature (OECD 2015a; Davaki 2018) together with the lower access to computer for women (OECD 2015b).

Within the EQUAL-IST project the challenge to increase the number of women enrolled in the ICT Department of Engineering Enzo Ferrari (DIEF) has therefore been taken and actions to address this challenge have been implemented. A key action of the UniMORE GEP to achieve this goal is analysed in this Chapter: the Summer Camp 'Ragazze Digitali' (Digital Girls).

The 'Summer Camp is organised annually by the Department of Engineering 'Enzo Ferrari' of the University of Modena and Reggio Emilia in collaboration with the association European Women Management and Development (EWMD). The summer camp has the main goal of encouraging female students to enrol in Computer Science/Informatics programs and to attract girls towards computer science through a creative and innovative approach based on team-based activities. It is dedicated to girls of third and fourth grade of the high schools and it is free for them to participate. No previous competences are required in terms of coding or ICT skills and the approach is

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1   The results for doctoral courses are very variable also due to the very limited numbers of students in the course.

based on learn-by-doing and team working. During the summer camp, which lasts for 4 entire weeks between June and July, the girls learn how to program video-games in Python. The Summer Camp represents a highly innovative best practice to promote female participation in ICT studies: its long duration (4 weeks) and the fact that it dedicated to girls and free for the participants makes this initiative unique, not only in Italy but, at the best of our knowledge, in Europe and in the world. In this Chapter we describe the Summer Camp experience, highlighting the impacts of this experience on the participating female students, with a specific focus on their changed attitudes and plans for future studies and careers.

2 The Reduction of the Gender Digital Divide as a Key Objective in UniMORE GEPs

The advanced research methodology for participatory gender audit applied within the EQUAL-IST project (Canali et al. 2017) to UniMORE between December 2016 and April 2017 identified the increase in the presence of women in ICT field as one of the main challenges related to gender equality in UniMORE.[2]

UniMORE EQUAL-IST unit organized online and face-to-face meetings with the main stakeholders involved in the GEP implementation, namely the Rector of the University, the Head of the Department, the President of the CUG (Unified Committee for Guarantees, the Responsible of the Research Office, the members of the Interdepartmental Center CRID (Research Center on discriminations and vulnerability). The meetings had a twofold objective: on one hand, to discuss with the stakeholders how to translate the solution, emerged on the crowdsourcing process and formulated in general terms, into concrete actions that are feasible and effective at the same time to address the specific challenges within the UniMORE institution; on the other hand, the involvement of the stakeholders in the design phase of GEPs was aimed at engaging them to have their support in the following implementation phase.

According to the methodology for participatory gender audit in ICT/IST research institutions, the challenges identified should be categorised into particular intervention areas. One of the areas that UniMORE focused has been the **Teaching and Students Services** that

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2 As a result of the audit, several challenges were identified, and some solution proposed to address them. These challenges and solutions were uploaded as an initial input into the CrowdEquality online platform (Gorbacheva et al. 2017) to trigger a collaborative crowdsourcing process leading to the proposal of additional solutions aimed at addressing the identified challenges, according to the bottom-up ideation approach envisaged by the EQUAL-IST project.

contrasts gender segregation in ICT studies choices. More specifically, UniMORE identified that while graduate enrolments generally evidence a substantial balance or even a female predominance, girls are definitively reluctant to pursue ICT academic studies: in these courses, girls typically account for 10% to 20% of students at every level (bachelor, master, doctoral degree). On the other hand, the percentage of women overall enrolled in the UniMORE courses (considering all courses, not only the ICT ones) is between 51, 30% and 56, 04% for the same period, showing a prevalence of female students.

According to the results of the gender audit in UniMORE and to existing studies, the under-representation of women within the student population of ICT courses appears to be mainly caused by cultural issues, including gender stereotypes and lack of female role models in ICT fields (phenomenon known as "stereotype threat", meaning that gender stereotypes have negative consequences for girls' performance and interest in STEM and technological fields – Régner et al. 2014). These disciplines are perceived as "male" courses by the students, differently from many other academic disciplines and even from some STEM discipline, like mathematics. Programming is mostly seen as a male activity, only attracting nerds and geeks. Another issue is represented by the lack of computer science disciplines in the Italian primary and secondary schools: the lack of knowledge of what computer science and ICT actually tends to reinforce the stereotype about 'male' disciplines among the youngest generations. Indeed, the gap between girls and boys in terms of interest and attraction towards technology fields apparently starts to become evident during middle school, then tends to increase with age. These observations are confirmed by recent results in literature about gender gaps in STEM and in particular in ICT studies. For example, a study underlines how a possible reason why girls may show lower motivation than boys for computer science and engineering is because they have fewer *experiences* with technology to generate their interest and build self-efficacy (Barker, Aspray 2006). As early as elementary and middle school, indeed, girls spend less time playing with computer games and technological toys (Cherney, London 2006).

On the other hand, research also claims that interventions aimed at increasing young girls' interest and self-efficacy in technology-related activities have the potential to reduce the gender gap in participation. (Master et al. 2017) describe the results of providing 6-year-old girls and boys with a brief experience in programming robots, and report how this can affect girls' immediate interest and self-efficacy in computer science and engineering, drawing the following conclusions:

- Girls given programming experience showed higher technology interest and self-efficacy.

- Experience eliminated gender differences in technology interest and self-efficacy.
- Providing girls with positive STEM experiences is beneficial.

Another important aspect to counteract the gender gap is the lack of female role models in technological fields that contributes to reinforce stereotypes. An interesting study (Shin et al. 2016) showed that role model exposure had positive effects on both STEM and non-STEM students' interest in STEM as well as their perceived identity compatibility between the self and STEM. Moreover, role model exposure had a positive impact on academic sense of belonging, and a positive impact on academic self-efficacy among STEM students.

On the basis of results of the gender audit in UniMORE and of existing studies, the UniMORE research unit identified the Summer Camp 'Ragazze Digitali' as a key action of the UniMORE Gender Equality Plan (GEP) developed within the European H2020 EQUAL-IST project.

The summer camp will be described in details in the following section of this paper.

3   'Digital Girls' Summer Camp as a key Action to Reduce the Gender Digital Divide

'Digital girls' can be considered as an innovative practice in Italy and, to our knowledge, in the world. In fact:

- it represents the first and only summer camp entirely dedicated to girls.
- It is characterized by a long duration (4 weeks)
- it is free for participants,
- no previous competencies are required regarding coding or ICT skills.

A success factor can be envisaged in the significant increase in the number of female students taking part to the five Summer Camps editions (35 participants in the initial edition in 2014 up to almost 130 girls involved in 2018). Together with the Summer Camp, a wide raising awareness campaign took place every year involving more than 3.000 students and teachers overall in the promotional activities.

During the summer camp, the girls learn how to program videogames in Python.

The laboratory activities focus on a **learning-by-doing approach** that has a two-fold goal:

1. smoothly and nicely introduce girls to computer science and a "smart" technological world;
2. give girls a better understanding of what ICT is and how it can be applied to different and multidisciplinary fields. Moreover,

during the summer camp dedicated seminars with speeches are done by external experts and women who have reached leadership positions because of scientific studies will help to **promote existing female role models**. The goal of such seminars is to expose girls to examples which are disruptive with respect to the well-known social gender stereotypes, and to present the concrete opportunities that ICT-related competences may offer in terms of studies and careers at the local and national level.

To summarize, the main activities carried out during the summer camp were:
- Introduction to the basic tools supporting programming and management of software projects, such as OS Linux, shell bash, IDE Python (Pycharm), Google Gmail, Google Drive.
- Principles of programming in Python
- Video-games development in Python (PyGame library)
- Principles of graphics, animations and audio in PyGame
- Seminars on ICT topics such as cybersecurity, digital communication on Web and social networks
- Speeches of experts and entrepreneurs of local ICT companies to inform girls about career opportunities of in this field

Moreover, preliminary and promotional activities were carried out:
- Promotional events organized in the high schools to present the project to teachers and students: during the events we talked about gender stereotypes among young generations with many interventions from the students attending the events, showing interest and curiosity about the topic.
- Public events to give visibility to the summer camp – press review at the link `https://www.ragazzedigitali.it/category/parlano-di-noi/`.

Moreover, the Web site of the Summer Camp 'Ragazze Digitali' (`www.ragazzedigitali.it`) was completely renewed: the improved online version was published online at the beginning of February 2018. The online subscriptions were opened on February 27th, 2018, very early with respect to the beginning of the summer camp.

The above described Summer Camp 'Ragazze Digitali/Digital Girls' has been included as a concrete action to attract female students towards ICT studies in the Gender Equality Plans of our University developed with the support of the European Project Horizon 2020 EQUAL-IST. The impacts of the initiatives are described in the following section.

As a final note, we add that the summer camp has also been selected as a best practice in the context of the project Gender aware ed-

ucation and teaching (Gender4STEM), a research project co-funded by the Erasmus+ Programme of the European Union and included in the on line learning platform[3] created within the project, **to promote** and **support teachers** in dealing with gender balance and diversity in their classroom. In that framework, dedicated Guidelines for teachers to customize and tailor 'Digital Girls Summer Camps' to lower education grades and middle schools in particular, have been delivered and disseminated at the EU level (Sangiuliano, Cescon, Canali 2018).

4 The 'Digital Girls' Impact

The success factors of the 'Digital Girls' Summer Camp can be summarized in numbers, participants' feedback and their expectations' fulfilment.

The first important metric we considered is the number of girls reached by the programme, both in the camp and in the awareness campaign. Also the number of schools reached by the action and their location is another metric used to assess the impact.

In its first editions, indeed, the summer camp was mainly promoted within the cities of Modena and Reggio Emilia (locations of Uni-MORE), but then the promotional activities were extended to include close by cities within the same region Emilia Romagna (e.g., Parma and Bologna). Moreover, the initiative was disseminated through social networks channels (mainly Facebook and Twitter), the Web site, local and national press, and a promotional speech in Rome.

The second metric that we consider to measure impact is the feedback of the participants on the summer camp experience. To collect feedbacks an online survey both before and after the camp has been produced to investigate: the previous (before the camp) programming experience of the girls; the appreciation for the team work and the activities carried out during the camp; their attitude towards programming after the camp; the change in their knowledge about computer science; their increased technological and coding skills.

As the literature on the gender gap in STEM shows, one of the main problems in generating digital divide is also connected to the expectations of girls as regard to their future involvement in ICT. To check the 'Digital Girls' Summer Camp impact we have carried out an online survey in 2018 over the participants to the first 4 editions to collect information about the girls' choice of academic studies (for girls who already got their diploma) or about their future intentions (for girls who are still at the high school).

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3 The Gender4STEM Teaching Assistant platform can be consulted at `https://www.gender4stem-project.eu/teaching-assistant/`.

a) number and geographic origin of participants and of high schools involved

Every year at least 5 promotional events were organized to present the summer camp in different high school located in Modena and Reggio Emilia: from 2014 up to now, more than 3,000 students of the high schools attended the promotional events.

The total number of female students that participated to the 4 previous editions (from 2014 to 2017) of the summer camp is 202, with an increasing trend from the first to the last edition.

Participants came from 43 different high schools not only of the city of Modena (15 schools) and of its province (11 schools), but also from other Italian cities, both belonging the same region Emilia Romagna (Reggio Emilia: 6 schools, Bologna: 5 schools, Parma: 1 school, Rimini: 1 school) and located in other regions (Mantova in Lombardia: 1 school, Rome in Lazio: 2 schools, Lecce in Puglia: 1 school). Many girls, indeed, come every year from outside of the city of Modena, where the camp is located. We also saw a major increase in participants coming from outside Modena for the 2014 and 2015 editions; the trend is maintained in the 2016 edition and followed by another major increase in the 2017 edition. Moreover, the average distance travelled by the participants is increasing from the 2015 edition to the 2016 edition. In fact, while the percentage of non-local participants was rather stable between the two editions, in 2016 the 58% of the non-local participants came from more distant locations with respect to the previous year. In the 2017 edition, not only the number of non-local participants but also the travelled distance increased. This increase is to be attributed to a gain in popularity of the summer camp outside of Modena. In conclusion, while in the early editions of the camp the participants came mostly from Modena and its province, the newest editions saw a significant increase of participants coming from outside the province, both in terms of number and travelled distance. In terms of the uneven and heterogeneous distribution of ICT skills and access to broadband (as stated also in the World Economic Forum *Global Information Technology Report;* and in Istituto Nazionale di Statistica, Istat 2017) and gender stereotypes across Italian regions the increase in the flow of students from outside region can indeed produce a relevant improvement in the gender equality in the access to ICT.

b) feedbacks from the participants collected through a survey conducted for the last three editions

Overall, feedbacks from the participants to the three past editions were highly positive, especially considering that their skills in programming before the Summer Camp were rather poor: 70% of the participants in 2016, 62% in 2017 and 82.6% in 2018 weren't able to program at all before this experience. After the camp, 80% of the girls in 2016, almost 70% in 2017 and in 2018 stated they had definitely understood more clearly what computer science actually means. However, what makes us really proud about this project is that 100% of the girls in 2016 and more than 95% in 2017 and in 2018 declared they had acquired new technical and coding skills thanks to the Camp's activities. Moreover, 95% of the participants in 2016 and 2017, and 97% in 2018 rated the team working and the collaborative projects carried out within the Summer Camp very positively; team activities have been rated from very positive to excellent by 47% in 2016, 55.3% in 2017 and 63% in 2018. Finally, after the camp the girls declared a high appreciation for programming (data shown in Table 3 for the last three years).

Table 1   Attitudes of participants towards programming

Do you like to program?		
2016	**2017**	**2018**
I like it a lot	36.8%	34.2%	33.9%
I like it	42.1%	42.1%	43.2%
I am indifferent to it	21.1%	18.4%	17.8%
I dislike it	0%	5.3%	5.1%
Not at all	0%	0%	0%

c) impact of the summer camp on participants' future choice of studies

To evaluate the impact of the summer camp on the participants' future choice of studies, a survey was conducted in 2018 over the participants to the first 4 editions. The 34% of the girls answered to the survey with the following results.

Among the girls who got their High school diploma and who carried on their studies:

- 31.6% chose a Faculty from the Information Technology area (that is, Information Technology Studies or Computer Engineering)
- 15.8% went for a Faculty from the Engineering area other than Computer Engineering

- 15.8% chose another different Scientific Faculty not belonging to the Information Technology Department
- 36.8% opted for a Faculty from other different areas.

One of the most relevant comments on the questionnaire was about the influence of the Camp on the girls' decisions about their future careers: 50% of those who have chosen IT or Computer Engineering studies at University declared that the Summer Camp experience had a major influence on the choice of the Faculty.

Data concerning Digital Girls participants who haven't finished High school yet are encouraging as well:

- 30% of the girls are going to apply for a Faculty from the Information Technology area (that is, Information Technology Studies or Computer Engineering)
- 5% are going to apply for a Faculty from the Engineering area other than Computer Engineering
- 37.5% are going to apply for another different Scientific Faculty not belonging to the Information Technology Department
- 7.5% are going to apply for a Faculty from other different areas.

It is important to note that there are also additional positive impacts to be evaluated connected to the high number of girls who took part to the summer camp who, even if they did not choose to carry out a STEM tertiary education after the high school, did state to have acquired a better training in ICT: they will disseminate their increased digital competences amongst peers and within their families, therefore positively contributing to the contrast of gender stereotypes.

Finally, as regards the enrolment of female students in the ICT courses offered by the University of Modena and Reggio Emilia, we registered a positive trend: while in 2014 the percentage of enrolled women was 11.37%, in 2017 we reached the 15.37%, with an increase of 4 percentage points.

In July 2018 also Cesena (as part of Bologna University) held a three weeks camp on programming video-games in Python. In the summer of 2019 all the three camps will be replicated.

5 Concluding Remarks

The Summer Camp 'Ragazze Digitali' has been considered by Uni-MORE as a best practice to achieve one of the GEP's aims: increase the presence of women in the ICT area to reduce the gender digital divide at women's disadvantage. In this Chapter we have analysed the extent of the challenge that UniMORE faces also with regards to the international data and within the EQUAL-IST partnership that leads to include 'Ragazze Digitali' as a best practice to counteract

gender stereotypes about computer science and to attract female students towards ICT studies as a positive action in the Gender Equality Plans of our University developed with the support of the European Project Horizon 2020 EQUAL-IST (2016-19).

By using different metrics we can state that the action has been largely successful both because of the number of girls involved and because of the extension of the area in the country included in the action.

Success was also confirmed by by analysing the results of the feedback surveys on the programme

In fact, not only participants evaluate the experience positively, but their knowledge about computer science, technological and coding skills and on the whole their attitude towards programming have improved.

With this positive assessment 'Ragazze Digitali' is expected to experience new challenges:

- By further replicating the camp in new locations (we wish to reach new areas even outside Italy)
- By including, as already done in 2018, also activities on robotics
- By improving the evaluation design with an extended analysis of participants' proficiency in different fields of study and on the cultural background and gender attitudes in their family that, according to the literature,[4] are found as key determinants in producing gender gap in different areas of knowledge.

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Sustaining and Expanding Gender Equality Plans in RPOs from Faculty to Institution Level

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Abstract   Through a challenging 36 months period, EQUAL-IST project have addressed the issue of gender inequalities in Information Sciences and Technology research and institutions and influenced organizational structures through the enhancement of gender equality at six (6) Research Performing Organisations (RPOs), through the design and implementation of tailored Gender Equality Plans (GEPs) containing specific measures (activities/practices/interventions) to address gender imbalance. In order to maximise the project impact a dedicated sustainability plan was developed, to ensure the optimal use and institutionalisation of EQUAL-IST results and for ensuring that the GEPs design processes and implementation will be expanded from the Department-Faculty Levels to the whole Academic Institution. The EQUAL-IST project applied a sectoral approach to GEPs design and implementation: Faculties-Schools-Departments specialised in IST/ICT took the lead in initiating the process and achieved the goal to expand the GEPs since the initial steps of the process. In addition, balanced bottom-up and top-down design and implementation were carried out both ensuring engagement and commitment of highest hierarchical representatives (academic and administrative levels), taking into account needs and voices of employees, students and stakeholders at the involved research organisations. It has been impressive the fact that all RPOs designed their sustainability plans and secured the commitment of the higher management level, to continue the actions the next years.

Keywords   Sustainability. Gender Equality Plans.

Summary   1 Introduction. – 2 Sustainability & Structural Change. – 2.1 Background. – 2.2 The EQUAL-IST approach towards sustainability. – 3 EQUAL-IST Sustainability Plans Overview. – 4 Evidence of impacts. – 5 Conclusions and future work.

1   Introduction

Women remain a minority among academic leaders, especially in the Science, Technology, Engineering, and Mathematics (STEM) fields. The under-representation of women in the Information Sciences and Technology (IST) field, aside from its implications for gender equality in career progression, also has far-reaching negative consequences for human capital utilisation and innovation potential (Trauth 2011). Presence of women in key areas of academia is increasingly recognised as one factor in the gendering of research content, including the shaping of science priorities, research agendas, and methods (Ranga, Etzkowitz 2010).

Towards this direction, the Horizon 2020 EQUAL-IST (Gender Equality Plans for Information Sciences and Technology Research Institutions) project supported six (6) Universities across Europe (Italy, Lithuania, Germany, Ukraine, Finland, Portugal) to design and implement Gender Equality Plans (GEPs) and actions towards gender equality, with a specific focus on the ICT/IST area. This goal was achieved by creating awareness among management, employees, and students of the participating IST institutions at the partner Universities (Research Performing Organisations (RPOs)), making the institutions reconsider their culture, improving the communication, and supporting women in their career persistence and advancement.

In order to maximise the project impact and to ensure the optimal use and institutionalisation of EQUAL-IST results after project's completion and therefore, speed up the potential of their wider use and impact to the economy and society, a dedicated **sustainability** plan was developed. At the core of the overall EQUAL-IST strategy was the participatory approach to the design of the GEPs based on a co-design methodology and the crowdsourcing collaborative online platform, as it is demonstrated that these methods increase the sense of ownership of the designed policies, services and actions by the engaged communities. Complementary to this, was the active engagement and constant dialogue which the GEPs Working Groups (a multidisciplinary and multi-sectorial team of staff inside the Research Organisation, with the mission to implement, monitor and assess the GEP process) ensured with top managers and the highest governance levels at each involved RPOs.

In addition, a specific target of the strategy was represented by promoting dialogue with national, regional, and EU level Research Funding Organisations in order to initiate discussions on how to more effectively integrate gender indicators among crosscutting requirements in Calls for Proposals for funding research in the disciplines at stake as well as in research results evaluation, both in terms of balanced gender presence and leadership of researchers and with regards to research contents.

The Sustainability phase was started two years after the project start (June 2018) along with the completion of the 1st phase for the GEP implementation and run until the end of the project (May 2019) with the goal to develop key strategies for ensuring that the GEPs design processes and implementation would be expanded from the Department-Faculty Levels to the whole Academic Institution.

2 Sustainability & Structural Change

2.1 Background

The wide literature available on gender mainstreaming has provided the main conceptual frameworks for reflecting on the sustainability of institutional change in the EQUAL-IST project. The institutional change incorporates both elements from gender mainstreaming policies and positive actions or equal opportunities, and along the years it has been tailored specifically to research and research funding institutions, while gender mainstreaming methods and tools were designed for the public sector more broadly meant. Still, there are many areas of intersection between the respective policy tools. Sustainability has been addressed in gender mainstreaming concerning evaluating the impact of the undertaken policies. A thorough evaluation model for gender mainstreaming is the one proposed by the African Development Bank (ADBG 2011), which identifies a series of impact drivers, for gradually developing the capacity of institutions for gender mainstreaming, such as:

- effective leadership
- adequate financial and human resources
- availability of appropriate procedures and processes
- appropriate organisational incentives and accountability structures

The preconditions mentioned above can be considered as applicable to research organisations as well. It can be noted that sustainability of gender equality policies and GEPs implemented within an EU funded project such as EQUAL-IST had to be thoroughly pursued and monitored, precisely due to the fact that change has been promoted within a project and time-bounded frame and further enabled by the financial resources made available within the project itself: this implies a stronger initial drive, potentially able to fuel efforts towards change at the beginning, while at the same time such special, project-related, conditions might pose higher dismissal risks for gender equality policies and measures after the project conclusion.

For this reason, a conceptualisation used and proposed by the European Institute for Gender Equality (EIGE), once more in the con-

text of broader gender mainstreaming policies (see below, Table 1), reveals to be useful for highlighting the risk for gender equality policies to remain circumscribed to the project life cycle and being subject to isolation once it is ended, in this case foreclosed within RPOs GEP's Working Groups and their committed teams.

Table 1   Implementation of Gender Mainstreaming and use of Methods, Tools and Good Practices (EIGE 2013)

Institutional capacity	
Degrees of Institutionalisation of gender mainstreaming	
Project	Gender equality actions are initiated as **short-term, low-priority, one-off projects** that are not related to 'core business'.
Isolation	Gender mainstreaming tends to be **driven by service or a unit**.
Growth	Gender mainstreaming is **driven by a set of Institutional structures** within the institution.
Integration	Gender mainstreaming is a **part of the mandate of a high profile person**.
Institutionalisation	GM is **structurally embedded in all processes**.

When evaluating outcomes and sustainability of gender equality policies, it is important to shift the focus from policy adoption to the actual policy implementation: political scientists Engeli and Mazur have proposed an interesting categorisation for adoption of gender equality policies trying to distinguish between more adaptive and radical/transformative efforts, including resistances in the model as well. The same authors have also relied on several other studies in assessing the impacts of gender equality policies and have stressed the role played by contextual/institutional legacies and the fact that backlash is also a possible outcome, especially when policies aim at more radical change than proceeding through a more gradual approach (Engeli, Mazur 2018).

Table 2   Outcomes of Gender Equality Policies (elaborated from Engeli, Mazur 2018)

Gender Equality Policies_Outcome type	**Features**
Gender neutral	Failed; no tangible effects; poor resources invested
Gender row-back	Derailed from their original intention, equality policies end up having unexpected negative impacts on women's lives
Gender accommodation	accommodating or compensating traditional gender relations instead of transforming them.
Gender transformation	Changes in gender and sexualized norms

The above typology is interesting and useful to guide the operation-alisation of sustainability as a goal in the framework of EU funded projects, precisely thanks to its critical approach: it recalls the always present, although extreme, possibility of 'no impact', and even the possibility of unintended consequences: this is particularly important to be kept in mind especially whereas change processes are implemented via EU funded projects or funds from external donors, where favorable internal conditions might slowly change, once the obligation to comply with grants' conditions expires.

All previous projects focused on institutional change funded by FP7/H2020 similar to EQUAL-IST have had to tackle sustainability aspects to guarantee the continuation of GEPs and make sure that the initiated change process could progress after the overall short terms objectives of 3 years-long projects.

For example, the STAGES (D6.3, 2015) project has approached the issue setting a **clear-cut difference between sustainability and institutionalization**: the former is referred to financial, human and technical resources, both within and outside an organization, while the latter is described as a specific form of sustainability, when the promoting organization is ensuring "permanent" commitment to all or some of the foreseen actions of GEPs, by integrating it into its structures. This distinction offers an interesting lens to look at the EQUAL-IST sustainability plans, wherein several cases internal and external resources were leveraged to ensure continuity and different 'embedding mechanisms' to integrate gender equality measures in existing rules, procedures and routines that have been put in place. The STAGES methodology towards sustainability is quite similar to the one adopted within EQUAL-IST, and it has proceeded via 4 phases, whereas each partner institution has set up its Sustainability Plan:

- a screening phase to identify viable options and actions from the GEPs to be confirmed as sustainable; consultation phase to collect recommendations from both internal and external stakeholders;
- a design phase leading to a provisional sustainability plan;
- a transition phase to test the new arrangements during the last six months of the project for delivering a final and updated Sustainability Plan.

The TRIGGER Project Guidelines have articulated sustainability along five strands, shedding light to the multifaceted layers of institutional change spanning from cultural, symbolic, procedural and structural aspects within research institutions, highlighting the need for including gender in different ways:

- "inclusion of gender in monitoring systems: data as a pre-requisite for sustainability ('no data – no policy' motto);
- inclusion of gender in scientific excellence to create awareness of how gender bias pertains not only to science as a specific

working environment but also to science as a specific form of knowledge, and the criteria of scientific excellence, which regulate it, such as merit, creativity, skills or specific moral attitudes (such as courage or commitment);

- inclusion of gender considerations in service provisions to support women through services geared to make science a gender-friendly environment;
- inclusion of gender in the organisation's standards, set of organisational rules, established procedures, norms, protocols, or standardised documents;
- inclusion of gender in the organisation's structure and mission to create institutional spaces, dedicated roles/units". (Deichlich, D'Andrea 2017)

It is worth noting how most of ongoing H2020 projects on institutional change for gender equality experience sustainability of GEPs after the project's life-span as a hurdle: a relatively recent Cluster Workshop organized by Research European Agency (REA) on 28th February 2018 gathering all the structural change projects hosted a dedicated session where sustainability of GEPs was confirmed to be a key challenge. In that framework, a series of ideas and examples were raised to the discussions, spanning from an inward-looking/strictly institutional perspective, to a broader reflection on how external enhanced national/ EU policies (national legislation enforcing GEPs or incentive-based measures such as awarding/ certification systems) could enhance sustainability (European Commission, REA 2018).

2.2 The EQUAL-IST Approach Towards Sustainability

The first elements of the EQUAL-IST approach towards sustainability of Gender Equality Plans were outlined in the State of the Art Analysis Report (Sangiuliano 2017), one of the initial building blocks of the project,whereas some of the dimensions used to identify good practices in the research process pointed to sustainability and stability of change explicitly and straightforwardly, such as:

- Process started at IST/ICT Faculties and expanded to the whole University.
- The EQUAL-IST project is applying a sectoral approach to GEPs design and implementation: Faculties-Schools-Departments specialised in IST/ICT are taking the lead in initiating the process and have the goal to expand the GEPs since the initial steps of the process. Strengths and potential risks-weaknesses of such an approach are of interest for the consortium.
- Balanced bottom-up and top-down design and implementation to be carried out both ensuring engagement and commitment

of highest hierarchical representatives (academic and administrative levels) and taking into account needs and voices of employees, students and stakeholders at the involved research organisations.

Furthermore, a series of GEP's Impact Dimensions where identified, as per the table below, grounded on available literature used in the State of the Art Analysis itself: 6 out of 7 of the selected dimensions are directly related to sustainability: iteration of GEP and time-related sustainability; active engagement of staff with permanent roles, leaders/top managers support; integration into policies, regulations, processes; regular and continuous monitoring activities; assigned resources (both human and financial); embeddedness into national regulations.

Table 3 GEP's Impact Dimensions: the EQUAL-IST approach

	Criteria	Description – analytic categories
1	Effective Impact	The GEP has provoked visible and measurable results: "positive change of access to goods, services, status, decision-making and opportunities; rectification of power imbalances; expansion of the subjective and objective range of legal, social and psychological choices available to both men and women; break gender stereotypes, norms and patterns" (EIGE 2013)
2	Sustainable impact in time	The GEP has undergone a full implementation phase and has been eventually renewed for more than one cycle
3	Sustainable impact _actors involved	Promoters/institutional owners have permanent roles at the University; Top Managers in strategic sectors are supporting the Plan Implementation
4	Sustainable Impact as integration into internal policies, regulations, processes	The GEP is integrated into internal policies such as Performance Evaluation Plans, ERA Human Resources Strategy 4 Researchers Processes. Gender Equality Actions are embedded into existing and well established institutional processes and working routines
5	Regular monitoring against defined indicators & KPIs	Indicators and KPIs (Key Performance Indicators) have been defined and monitoring, evaluation procedures are in place
6	Assigned resources	The University is assigning both human and economic resources to the structural change process and the GEP management
7	Integration into national regulations	The GEP is stemming from national provisions and/or is monitored upon the initiative of National Authorities or has lead (or has functioned as the best example leading) to significant changes in national regulations policies.

The criteria mentioned above were informing the 19 in-depth interviews with the RPOs implementing GEPs conducted and analysed always in the framework of D2.1: 11 of the presented good practices had GEPs in place which has already completed their first cycle of implementation, most typically lasting three years. As far as the sustainability of GEPs was concerned, the key lessons learned were the following ones:

- Sustainability is enhanced for RPOs where the GEP is framed into national –federal level regulations which make it compulsory for Universities to establish such policies and national resources are invested in specific programs to make Higher Education more Gender Equal. Still, even in such conditions, it is frequent that GEPs are designed and approved to comply with regulations but end up staying on paper only. Even the most solid GEPs experiences benefitting from State funding can consider their achievements under fragile conditions, and in continuous need of an institutional owner, i.e. an Office for Equality as, without this is a place, all provisions could quickly evaporate.
- Establishment of an Office – Unit which is in charge of Gender Equality within the administration to complement the work of Equality Officers and Commissions seems like a key element to facilitate sustainability or at least a path that several RPOs have been pursuing.
- Making (human and financial) resources to RPOs to proceed with GEPs implementation, is a key aspect influencing sustainability.
- Integration into internal policies and regulations includes many different aspects, and several respondents have referred it to particular documents or policies where gender has been mainstreamed as a parallel effect of having a GEP in place: recruitment guidelines and procedures, official University Strategy Document, work-life balance provisions are some examples.
- Establishing active collaboration networks with local, regional and national level stakeholders has proved to be important for strengthening their internal strategies at different stages of implementation.

All EQUAL-IST partners received clear-cut guidelines about the importance of taking sustainability issues into account since the design phase of their GEPs, and in the capacity building sessions organised to support the gender audit process and crowdsourcing of GEPs. All supporting actions within the two GEP implementation iteration phases relied on a concept of GEP's implementation as geared towards building sustainable change.

Additionally, all evaluation activities from self-assessment to the external evaluation addressed sustainability issues and provided the needed reflexive elements to the process.

After the first iteration, from September 2018, the EQUAL-IST sustainability strategy was defined and agreed upon more in details, by taking all the elements drawn from the available literature, solutions implemented in other similar projects, and results from the State of the Art Analysis into account: this led to focus on a set of specific sustainability dimensions to be explored throughout each one of the Areas of Interventions the project has focused upon (HR and Management Processes, Teaching and Services to Students, Research Design and Delivery Institutional Communication). The table below illustrates the final choice for the sustainability dimensions.

Table 4 Dimensions of the EQUAL-IST Sustainability Plans

Sustainability Dimension	Description/guidelines	Examples
Rules and procedures	Integration of actions into existing management policies and regulations. Ensuring constant monitoring. Set up material and immaterial Incentives	Mandatory Sustainability Plan including short, middle and long-term solutions, Integrate GEPs into existing management policies and regulations, Mandatory annual Gender Monitoring Report, Establishment of budgetary incentives to Departments and faculties, at local or national levels
Structures	Assign existing structure the responsibility to carry out the activities. Establish a new structure/body. Make both of them accountable	Clear attribution of the activity as a task of a given structures/position; establishment of a (funded) GE Board/Committee, Establishment of a (funded) GE Office; creation of a new position to support the activity;
Resources	Safeguard the allocation of the needed resources, both financial and human, for each activity. Balance internal and external funding sources	Ensuring continuing financial resources for activities and human resources to support to GEPs both by establishing incentives such as freedom from other tasks to already employed staff or by hiring new personnel
Knowledge and expertise	Make sure that the necessary (internal or external) Gender Knowledge in place internally to sustain this activity.	GE knowledge mandatory in job profiles and integrated into leadership training, Gender equality training regularly offered by the RPO, GE Implementation Logbooks
Consensus	Ensure support from internal and external stakeholders from the regional national Research and Innovation ecosystem.	Internal/regional/national interdisciplinary networks or communities, Setting up GE Portals within the RPOs' websites

Additional effort was spent from the side of each RPO on emphasising the internal sustainability aspects of institutional change processes and elaborated a dedicated Sustainability Plan to actively seek for the approval/endorsement of their highest management levels before the

end of the project. This proved to be very useful in the overall process of self-reflection on the impacts and the achievements and to design a strategy to make on the one hand the first initial steps in structural change more stable, and on the other hand to build pre-requisites to further and more transformative changes in the upcoming years. The figure below illustrates the process which was followed to approach sustainability within the project.

Sustainability Plans of each partner RPO were prepared following the guidance/instructions contained in a template which was designed on purpose. It was suggested to:

1. Structure the Plan along the EQUAL-IST Areas of Interventions already in use for the GEPs, and will build on the results of two rounds of implementation.
2. Design it away so to answer two main questions:
   - what actions/measures initiated within EQUAL-IST are foreseen to be continued in the years beyond the project's termination? How will they be sustained?
   - are any new actions/measures going to be established as a result of the EQUAL-IST GEPs? If yes, how will they be sustained?
3. Articulate it along with a 3 years timeframe approximately, although this can be adapted to the specific contexts and circumstances.
4. Frame it by reflecting what the University is actually committed to doing in the next 3 years to continue with gender equality measures
5. Build consensus from the side of the Management level on its content: the ambition as a consortium, was to ideally aim at having each Sustainability Plan approved and signed by the Department and/or the University high management levels.

Figure 1 EQUAL-IST steps toward sustainability

3   EQUAL-IST Sustainability Plans Overview

All the six (6) EQUAL-IST Sustainability Plans were elaborated with the full involvement of the GEP Working Groups in an iterative process of different meetings/rounds of discussions; in some cases, further specific meetings were organised with the main stakeholders involved in the implementation of specific actions.

The table below illustrates how in almost all RPOs an expansion process featured the Gender Equality policies along the 2 GEPs iterations and also thanks to the design of Sustainability Plans: while at the beginning of the project most of the actions included in the first design and the first version of the GEPs were focusing on the Unit or Departments levels, the majority of actions kept in the Sustainability Plans are implemented at the Faculty or the whole University levels. Still, this dynamic did not appear as related to factors such as equality policies being already existing and functioning at the central level. The diagram below shows how the scope level was distributed between the different RPOs: "higher level" approaches are prevailing: they correspond to actions taking place at the entire university level for UMINHO, UNIMORE, and KHNUE, and at Faculty or School levels for WWU and KTU.
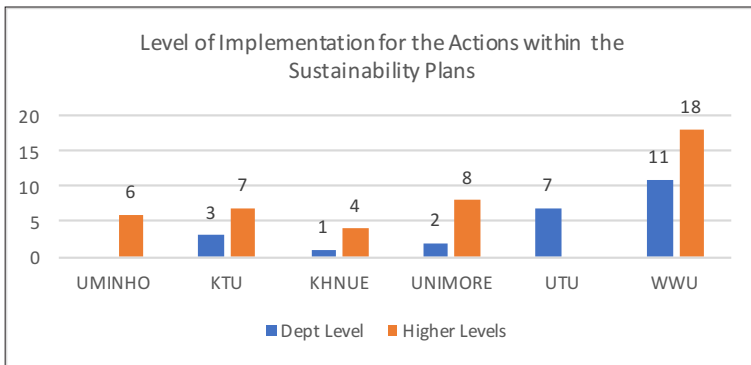
Further elements which proved to be of key importance for the Sustainability Plans' design are to be highlighted, such as:
- include/embed the EQUAL-IST GEP Actions into strategic Documents on EQUALITY at the University Level (achieved at Unimore; foreseen at UTU)
- leverage on existing policy documents/rules and regulations to enhance the sustainability of GEPs (strongly pursued at WWU and UNIMORE)

- having the opportunity of real planning of change-related actions if compared to the initial GEP design phases, when most efforts had to be put on raising the awareness and overcoming resistances.

To understand whether a significant shift occurred along the project life-cycle in terms of the contents and type of actions included in the Plans, we compared the aggregated results from the 1st GEP iteration with (Sangiuliano, Canali, Gorbacheva 2019) divided by area of intervention, with a count of the actions included in the Sustainability Plans of all RPOs. The two pie-charts below illustrate how a substantially similar distribution of actions across the main areas of interventions featured the entire process
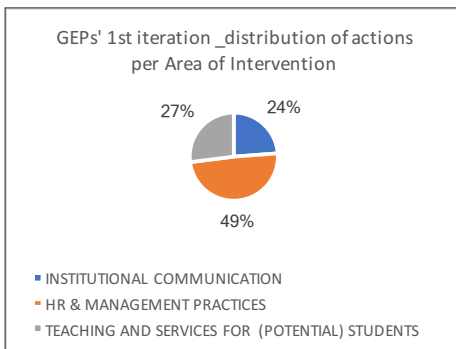
Figure 3 EQUAL-IST Results GEPs First Iteration. Distribution of actions per Area of Intervention
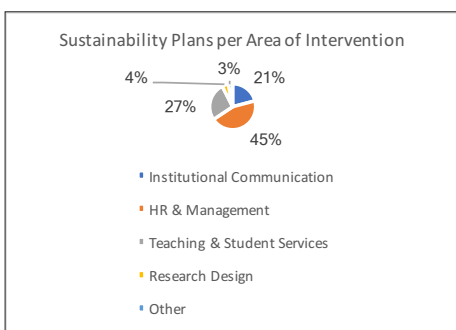
Figure 4 EQUAL-IST Sustainability Plans. Distribution of actions per Area of Intervention

HR and Management clearly appears to be as the most populated area in Sustainability Plans as it was the case during the first iteration as well, mainly due to the fact that it is quite a comprehensive one and it includes two different already quite broad domains: Human Resources (including staff recruitment, retainment and career progression, and well-being/work-life balance) and Governance (entailing functioning of internal structures/bodies involved in consultations and/or strategic policy design and approval; gender equality machineries; inter-institutional agreements and framework protocols). We can also notice some minor progress in respect to the Research Design Area of Intervention: this proved to represent a difficult issue to be tackled for all RPOs, and in fact, no actions were foreseen during the 1st GEPs iteration. During the course of the GEP's firt iteration, the need and importance for specific actions aimed at embedding a gender perspective in ICT/IST research design and content was stressed in different occasions at the consortium level and an additional specific support action was delivered in the form of a dedicate webinar: as a consequence a few partners (UNIMORE and UMINHO) managed to initiate dedicated actions along the second GEP's iteration and to stabilize them in their Sustainability Plans. The Teaching and Students' Services and Institutional Communication areas of intervention remained relatively stable.

4 Evidence of Impacts

A set of suggestions was drawn on how to make GEPs sustainable relying on the experience of our partners and exploring sustainability along the five main dimensions presented in figure 1, with a crosscutting approach to all possible areas of interventions. When reflectively elaborating our experience transferring it to other institutions, we refer to the following type of stakeholders:

- RPOs which have already set up Gender Equality Plans and Gender policies, still being at an initial stage of development
- Partners of new or ongoing H2020 projects on institutional change for gender in research.

A few overall considerations can be shared in the first place. In terms of the process to follow for achieving sustainable institutional change, lessons learned from the EQUAL-IST experience point at the importance of using bottom-up participatory methodologies jointly and in parallel with an iterative top-down series of consultations and discussions. It is very important to get the active engagement of those stakeholders and people who will play a role in the execution of each action foreseen in the Sustainability Plan.

Looking retrospectively at the steps already taken within the project, we learnt how the available time for internal negotiations on

discussing and agreeing on the GEPs Sustainability Plan was found quite limited by partners. Ideally, the process should start at an earlier stage, as soon as the results of monitoring from a first pilot iteration are available, in order to hold an evidence-based analysis and discussion with internal stakeholders. One possibility is, as WWU did, to include a dedicated Action on building sustainability in the initial GEP and/or in its redesigned version GEPs already, or in the design of the specific measure/action, in cases where there is not an umbrella type of policy such as a Plan in place. This would allow to formally address the issue either within meetings and events, or through other forms of consultation and action-research.

More specific suggestions refer to the 5 sustainability dimensions highlighted above **[tab. 4]**, as follows.

Rules and Procedures

Existing rules and regulations as well as strategic documents at the university-wide or School level, can be both leveraged and made more effective, if already favourable to gender equality, or changed and integrated so that they include a reference to gender equalityor specific measures, depending on the nature of the document.

Within the EQUAL-IST project, working procedures both at the administrative and academic levels were possible to be changed for some of the partners, jointly to the regulations that shape their routines and processes. All partners succeeded in changing data collection methods, procedures and tools to enable gender-disaggregated data collection permanently.

Structures

New structures, offices, units are created and assigned specific tasks and responsibilities in terms of gender equality. This can both happen by setting up institutional so-called gender equality bodies or machineries or by integrating already existing structures with new assignments related to gender equality. The first option implies a risk of 'isolation' of GE machineries and policies, while the second might lead to a lack of visibility or reduced prioritisation. Both have positive implications for sustainability as they incorporate an entity in charge of equality and accountable within the RPO's Organizational Chart. In EQUAL-IST, for example:

- KHNUE and KTU have created new commissions in charge of gender equality, the former with a more specific focus and responsibilities in tackling concrete harassment/discrimination cases.

- UNIMORE has set up a new dedicated working group in charge of supporting the continuation of the EQUAL-IST action within the existing Committee on Equality matters, which each University and Public Administration Body is obliged to set up based on Italian national law.
- UMINHO has included in its Sustainability Plan expanding the tasks of an existing Inclusion Office in order to attribute a new responsibility on gender equality
- WWU has succeeded in making the operations of its already existing Equality machinery more effective and impactful both at the School and Department levels, in a context where Universities are bound by national regulations to have Gender Equality Plans in place even though implementation is not always effective at lower (Department) levels.

Knowledge and Expertise

Create, nurture and transfer knowledge and expertise is key to sustainability. It relates both to knowledge and skills in change management and gender policies in particular. To this respect, training, capacity building, mutual learning and Communities of Practices are all extremely important tools. For all partners, the EQUAL-IST project itself played a knowledge transfer and capacity building role, enabling each institution either to build gender and change management expertise and/or to increase and further develop it. At the project level, different face to face and online sessions were held both presenting and discussing good practices on structural and institutional change from the beginning and along with the two implementation iterations. In addition to that, a highly participatory capacity building session was dedicated to training RPOs members on the Participatory Gender Audit methodology, and at the same time to customise it and refine it. Overall, five face to face training days were proposed, and five online webinars. Following this, further internal training sessions were organised at each RPOs. On the same note, EQUAL-IST worked as a 'Community of Practices' making several mutual learning mechanisms and tools operational along the project life-cycle. All Project meetings were functioning as opportunities to share and discuss good practices and challenges in the different phases.

Knowledge and expertise on how gender is relevant to ICT/IST research design and research content are not developed enough, and special efforts are needed to achieve sustainable change in this particular area: additional investment in specific capacity building and awareness-raising are needed.

- UNIMORE created an internal transdisciplinary working group/ network of researchers on Gender in Research content and de-

sign promoted by the University Research Office and network-
ing among all researchers with knowledge of gender issues and
those with interest in developing it. Whereas
- UMINHO has set up a dedicated EQUALITECH annual confer-
ence to continue along the years and to increase internal ca-
pacities on the topics at stake.

Resources

Multiple strategies need to be put in place to allocate human and fi-
nancial resources for the sustainability of GEPs, in times of shrink-
ing funds and increased academic competition globally. The emerg-
ing model points at a mixed approach based on three levers: relying
on internal staff with formal approval from management to incorpo-
rate gender-related tasks to their working hours, safeguarding addi-
tional basic funds for activities and actively fundraising from local/
national stakeholders or by applying to calls for proposals for more
ambitious projects.

The issue of making financial and human resources available for
gender equality policies needs to be framed in the broader context of
a continued austerity and economic stagnation in the EU, leading to
shrinking available resources to Universities particularly and state-
owned research institutions, along with an increased competition at
the global level calling for greater efficiency in resources' allocation.
The present scenario is posing some limitations, although it opens up
to a proactive fund-raising approach based on collaboration with ex-
ternal actors and the local/national innovation ecosystems and/or ap-
plying to calls for proposals at various levels. Therefore, in the tran-
sition from an EU funded project to the next phase, there is a high
risk to experience a significant gap: RPOs are endangered to shift
from a starting/piloting period featured by the possibility of having
dedicated staff in charge of gender equality issues and resources to
organize activities to an after-project time with reduced or near-to-
zero resources. Paradoxically, this might happen precisely in a mo-
ment when the institution would be ready to push toward even more
ambitious steps to achieve gender equality.

The resources' dimension for sustainability is for sure one of the
most critical ones for EQUAL-IST partners as well, as in the RPOs'
Sustainability Plans the prevailing approach is clearly to rely on in-
ternal personnel for carrying out the foreseen actions on Gender
Equality. On one side this is to be seen as a feature of a gender main-
streaming approach, and it is sustained by the fact that the persons
(to be) in charge and their supervisors/managers have been consult-
ed and agreed on the additional tasks to be performed. On the other
hand, the risk of over-burdening a limited pool of committed people

has to be taken into account, especially if, as it is often the case, they happen to be women researchers whose scientific productivity could be paradoxically hindered precisely by their commitment to equality.

Consensus

Consensus building on the the University/RPO continuing to promote gender equality policies proactively needs to be a constant endeavour, and it is strictly related to communication. Indeed, making the facts and figures about gender inequalities in the institution visible; communicating monitoring results on the actions that have been taken to clearly show what works; using multiple arguments and discursive incentives to convince as many stakeholders as possible, are all core elements of achieving enlarged institutional consensus. An additional yet important trigger for building consensus from managers in particular, on which more research and practice would be needed, is to use gender equality a way to raise the profile and position the institution towards external stakeholders in the relevant innovation ecosystems (at the local, regional, national or global scale): several of the EQUAL-IST partners have experimented at this level, and with positive outcomes, RPOs from Portugal, Italy and Ukraine in particular

Within the EQUAL-IST consortium, all partners have set gender-disaggregated data collection and gender analysis as continued efforts which will feature their Sustainability Plans. Having changed methods and tools for data collection to make them gender sensitive, is actually one of the solid achievements of the 2 EQUAL-IST iterations.

5   Conclusions and Future Work

EQUAL-IST has moved beyond the state of the art with its robust approach of participatory co-design of GEPs. The added value was to deliver new knowledge at fostering permanent institutional changes through the sustainability of the implemented GEPs. The project contributed to the achievement of ERA objectives by preparing the ground set in real action GEP in IST/ICT RPOs that involve more female researchers helping to the advancement of their careers, involving them in decision making and governance structures, improving their working conditions and attracting more women in the IST sector.

In order to maximise the project impact, a dedicated sustainability plan was developed at each organization, to ensure the optimal use and institutionalisation of EQUAL-IST results and for ensuring that the GEPs design processes and implementation will be expand-

ed from the Department-Faculty Levels to the whole Academic Institution. All RPOs have been motivated to embed the gender equality measures in their routine processes, procedures, administrative and strategic documents, to enhance institutional changes. All RPOs designed their sustainability plans and presented them to the highest management level, who finally expressed their interest and confirmation to commit to the Gender Equality Sustainability Plans and the related actions and measures, for the next two years at least.

Acknowledgements

Abbreviations

WWU	Westfälische Wilhelms-Universität Münster (DE)
UTU	Turun Yliopisto- University of Turku (FI)
UNIMORE	Università di Modena e Reggio Emilia (IT)
KHNUE	Simon Kuznets Kharkiv National University of Economics (Ukraine)
KTU	Kanunas University of Technology (LT)
UMINHO	Universidad do Minho (PT)

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**Section III
Institutional Change in Academia
and Research in Europe**

Planning Institutional Change for Gender Equality in Research
Reflections from a Study on GEPs Implementation in Europe

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Abstract   This chapter relies on and summarizes research and content delivered for the initial State of Art Analysis carried out within the EQUAL-IST project with the goal of providing an updated and comprehensive picture of the knowledge and practice on Gender Equality plans as tools for institutional change. Dimensions and criteria which allow GEPs adoption to be defined as good practice in terms of both methodological approach and impact have been elaborated. Based on the above mentioned criteria over 70 potential RPOs to be invited to in depth interviews were selected and finally 19 of them interviewed. Interviews's shortcomings are summarized and analyzed based. The study provides answers grounded to literature and empirical data such as experts feedback to 2 main research questions: which are the main dimensions to define a Gender Equality Plan implementation process as a good practice? To what extent and under which conditions Gender Equality Plans can prove to have an added value as systematic and comprehensive policies in promoting structural change if compared with specific interventions or actions addressing particular inequality areas? This study has fed into the knowledge base of each RPOs EQUAL-IST Team member as a learning resource and how-to-do guide based on experiences from research institutions which have already initiated such a policy.

Keywords   Gender equality in research. Institutional change. Gender Equality Plans (GEPs). Resistances.

Summary   1 Institutional Change for Gender Equality in Research. Overview on EU Policies. – 2 Research Methodology and Criteria to Identify Good Practices. – 3 Results of the Study. – 3.1 Different Contexts and Stages of GEPs Implementation. – 3.2 Audits and Internal Assessment as Enablers and as Part of GEPs. – 3.3 Gender Equality Plans, Institutional Gender Machineries and EU Funded Projects. – 3.4 Addressing the Lack of Women

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1 Institutional Change for Gender Equality in Research. Overview on EU Policies

Gender equality in research has been a addressed by European Commission's policies since 1999 and the establishment of the Helsinki Group as a well as the first Communication on 'Women and Science' (1) whose approach was mainly oriented towards giving women tools and support to meet requisites of academic and research employment. Integrating gender in research was already present as a policy goal across FP6 and FP7 with a gradual shift to measures designed for 'fixing the institutions' instead of making women more apt to be integrated into existing and male dominated higher education and research environments. As it happened more in general for gender equality policies worldwide, the following decades marked also a stronger orientation towards gender mainstreaming as a policy approach starting to complement equal treatment policies and positive actions and the affirmation of a double track strategy: on one side continuing to take initiatives targeting women and offering them tailored provisions to compensate gender inequalities and on the other approaching gender as a crosscutting issue, relevant for both men and women and in need of being incorporated across all sectors and stages of knowledge production and transmission (Stratigaki 2005).

A first EU wide investment has been made to raise the awareness and enhance gender competences among researchers and research support officers across all member states by way of the Gender in Research Project running from 2010-12: tools have been provided and disseminated to guide RPOs and RFO in integrating gender in the entire research cycle and gender trainings organized with support of the FP7 National Points of Contacts.

Evidence base for these policies has been provided by the comprehensive and EU level She Figures Reports Supported by the year 2012 the issue was fully integrated into European Research Area policies leveraging on the argument of fostering research excellence and avoiding women's talents to get wasted (European Commission 2012a, 2012b): the Commission has officially invited member states to foster the removal of any barriers to women's career progression in research, gender inequalities in decision making and launching a 40% target of the under represented sex in all decision making bodies as well as recruitment and research evaluation committees.

By measuring and comparing national results, the European Research Area has started sparking competition among member states with regard to accomplishment of gender equality in research: in 2009, 19 countries – 17 Member States and two associated countries (BG, CY, CZ, EE, FR, GR, HR, HU, IL, IT, LT, LU, LV, MT, PL, PT, SI, SK, TR) were identified as 'relatively inactive' countries coinciding with academic systems of so called 'lower innovation', providing limited policy impulses to gender equality.

> In contrast, systems of rather 'higher innovation' fall into the category of 'global leaders' (EC 2009: 21) when it comes to gender policy implementation: Finland, Norway, Sweden, Denmark and Iceland; or as a further category 'proactive' countries: Austria, Belgium (Flanders), Germany, Netherlands and Switzerland, as well as the UK, Ireland and Spain. (European Commission 2014)

It has gradually become clear how the main goal is to change structures and institutions rather then women the policy goal has become and been framed as "structural change" and gender sensitivity made integral part of RPO's and RFOs modernization processes and an Expert Group on Structural Change has been appointed by DG Research to provide policy guidance in the field.

The official report drafted by the Group articulates 3 main problems faced by RPOs in terms of Gender Inequalities:
- Opaqueness in decision making- lack of transparency in recruitment
- Institutional practices inhibiting career opportunities as due to shrinking resources insufficient time is dedicated mentoring colleagues and to review research materials in evaluating candidates
- Unconscious bias in evaluation
- Cognitive errors in research due to missed integration of gender as a research variable/dimension
- Employment policies and practices

Elements of and solutions for structural change are also highlighted as summarized in the figure below:

Table 1   Elements of Structural Change (European Commission 2012b)

Knowing the institutions	Ensuring Top level Support	Generating effective managemet practices
• Gender Audits • Gender Statistics • Morale / Climate surveys with staff members	• Top level management in policy formulation • Gender equality proposed as key factor for postioning in international academic & research competitiveness • Administrative managers involvement • Gender Equality Officers: possibly chosen from Faculty and provided with staff and budgets	• Make faculties aware of facts and figures of gender inequalities in their contexts • Raise the awareness on implicit gender bias in purely merit based recruitment processes • Promoting a management culture valuing transparency, accountability, peer learning

A full set of possible actions and examples on how to address the 5 above mentioned critical areas for Research Organizations is also put forward and among final recommended actions to RPOs and RFOs willing to concretely endorse structural change, the adoption of an Equality Plan is included: a plan, it is suggested, shall include include audit results (gender disaggregated statistics) in annual reports comprehensive of gender pay gap, staff statistics and senior committee membership.

The 2014 ERA survey has measured progress made by EU 28 RPOs in adopting gender equality plans and detected a positive trend, as 64 % of the respondent organisations implement such a plan, although it is stressed that a large portion of participating RPOs avoided to answer to this specific question of the Survey (European Commission 2014).

Only 8 Member States were found to have above the average GEPs adoption rates (AT, DE, FI, FR, MT, NL, SE, UK). Framework contexts at national levels seem to impact as almost all of them (all but MT) are featured by national measures or strategies to improve gender equality in public research which the other 20 countries are equally split between those featured by supporting provisions (BE, BG, CZ, DK, EE, EL, ES, HR, LT, SI) and others where such measures could not be identified (CY, HU, IE, IT, LU, LV, PL, PT, RO, SK).

A triggering role in the increase of the adoption of Gender Equality Plans at EU RPOs has been for sure played by the establishment of a EC dedicated call for project proposals under FP7 Science in Society and more recently H2020 on the promotion of structural change and equality in research: under those calls for proposals the estab-

lishment of Gender Equality Plans has become a central requirement in the articulation of projects' work plans.

More recently, the European Institute for Gender Equality have included the topic among its priorities and research areas and has commissioned a Study on the subject which has included a EU level mapping of good practices in structural change implementation and the release of the *Gender Equality in Academia and Research Toolkit*. In the toolkit, the core role of Gender Equality Plans as suitable measures to adopt a systematic approach towards the promotion of gender equality is confirmed. The tool includes a step by step guide from analysis to implementation and monitoring of Gender Equality Plans.

2 Research Methodology and Criteria to Identify Good Practices

This study has meant to start investigating into the following research questions:
- Which are the main dimensions to define a Gender Equality Plan implementation process as a good practice?
- To what extent and under which conditions Gender Equality Plans can prove to have an added value as systematic and comprehensive policies in promoting structural change if compared with specific interventions or actions addressing particular inequality areas?

In the process of identifying Gender Equality Plans at national and EU levels to be included in the study, the comprehensive EIGE definition of good practices in gender mainstreaming has been taken into account: "a practice that, upon evaluation, demonstrates success at producing an impact which is reputed as good, and can be replicated" (EIGE 2013, 10).

Desk research has been conducted on EU Funded Projects on structural change in research and and their coordinators have been contacted via e-mail to collect relevant literature and outputs. 9 proiect's leaders have replied and provided information and resources: TRIGGER, INTEGER, GENDERTIME, LIBRA, STAGES, PRAGES, EGERA, GENERA and GARCIA.

To complement the desk research, all EQUAL-IST partners have uploaded and filled in the an on line Database with 48 GEPs mostly from their own countries: among them only partners from Lichtenstein and Ukraine have been found as having no Research Institution with a Gender Equality Plan in place at present.

Based on desk review of existing literature on structural changes process and deliverables from other EU funded projects with the same priority, a set of criteria has been designed and agreed upon among partners which was used both to guide partners during the

continued collection of information on GEPs in their own countries to be uploaded on the EQUAL-IST Database, especially in those countries where the rate of RPOs/RFOs having an approved GEP is high (such as Germany and Italy, where Universities and Research Institutions are obliged by National Regulations to have Gender Equality Plans or so called Positive Action Plans in place) and to filter from the initially collected data those GEPs which could be considered as good practices invited to be interviewed.

A first set of selection criteria derives from the particular EQUAL-IST approach and methodology [tab. 2], while a second type set of criteria oriented to take the impact of the GEPs into account has been included to identify those Gender Equality Plans which have gone through effective implementation: we referred to these types of criteria as 'impact oriented', driven by the choice of focusing on good practice and therefore putting at the centre their 'working well' characteristic, and they are listed below in table 3.

Table 2   Criteria based on the EQUAL-IST approach and methodology

	Criteria	Description – analytical categories	Background
1	**Areas of intervention of the GEP_ balanced coverage**	HR practices and management processes (recruitment, career advancement, evaluation and performance assessment, work life balance, leadership, gender disaggregated data collection) ICT-IST Research design and delivery Teaching and Student services (gender sensitive teaching methods and practices, initiatives to attract more girls, career guidance, mentoring etc.) Institutional Communication	As we have defined in the Technical Annex, EQUAL-IST quadruple dimensional approach is confirmed at least as a direction we aim at tending towards. Such a balance would be interesting to be found within each one of the selected GEPs but if not feasible it should feature the totality of the selected GEPs- good practices
2	**Leadership issues addressed through concrete measures**	Problem: glass ceiling/gender segregation in top academic and administrative positions Type of interventions: Gender quotas in selection's criteria Gender quotas in selection committee panels Soft measures to raise the awareness	According to the EC survey conducted within ERA on GEPs implementation, leadership is one of the areas which have been less frequently addressed by Gender Equality Plans so far. For IST and ICT studies it has particular relevance (European Commission 2016)

	Criteria	Description – analytical categories	Background
3	**Gender Mainstreaming and positive actions_ balanced coverage**	Use of measures that balance the two prevailing approaches to gender equality policies: Mainstreaming approach and Equality measures: crosscutting measures targeting both men and women and all areas of the institutional operations Positive actions: measures addressing women in particular in order to favour women in particular in order to counter balance their structural discrimination	Coherently with most knowledgeable literature on gender equality policies this is a productive tension/dilemma The EQUAL-IST approach was formulated and presented as a mixed one as well.
4	**Balanced Bottom up – Top Down approach**	Design and implementation to be carried out both ensuring engagement and commitment of highest hierarchical representatives (academic and administrative levels) and taking into account needs and voices of employees, students and stakeholders at the involved research organizations.	Most EC studies on structural change in Research Institutions stress the importance of top management support. Critical studies on gender equality policies raise the concern the field has become affected by excessively technocratic normative approach (Squires 2008). Participatory approach to GEPs' design is crucial in EQUAL-IST. Participation of beneficiaries is also embedded into the "good practice" definition of EIGE (EIGE 2013).
5	**Process started at IST/ICT Faculties and expanded to the whole University**	The EQUAL-IST project is applying a sectoral approach to GEPs design and implementation: Faculties-Schools-Departments specialized in IST/ICT are taking the lead in initiating the process and have the goal to expand the GEPs since the initial steps of the process. Strengths and potential risks-weaknesses of such an approach are of interest for the consortium.	Available studies don't seem to have focused on this particular aspect so far. The EC is investing on both projects which are undertaking a sectoral approach and those encompassing different Faculties and Scientific fields. The expert communities on Gender in Research are paying attention to this as it is witnessed by the agenda of the Gender Summit 2016 where the panel on structural change is featured by 2 sectoral projects.
6	**Intersectional approach**	While gender inequalities remain the core focus of EQUAL-IST, the project will pay attention to the complex intersections of gender with ethnicity, age, social class, sexual orientation etc. Projects which have addressed these aspects and therefore created synergies between equality and diversity policies might therefore have interesting lessons to teach.	EQUAL-IST Technical Annex and ESR valuing this aspect under the Excellence evaluation criteria. Vast literature on intersectionality in gender equality policies (see for example: *Social Politics Special Issue*, 2012, 19, 4).

Table 3   GEPs' Impact Criteria

	Criteria	Description – analytic categories	Background
1	**Effective Impact**	The GEP has provoked visible and measurable results: "positive change of access to goods, services, status, decision-making and opportunities; rectification of power imbalances; expansion of the subjective and objective range of legal, social and psychological choices available to both men and women; break gender stereotypes, norms and patterns" (EIGE 2013)	EIGE 2013
2	**Sustainable impact in time**	The GEP has undergone to a full implementation phase and has been eventually renewed for more than one cycle	GenderNET Project 2015 EC, 2012b EC, 2014
3	**Sustainable impact _actors involved**	Promoters/institutional owners have permanent roles at the University; Top Managers at strategic sectors are supporting the Plan Implementation	GenderNet Analysis Report EC, 2012b EC, 2014
4	**Sustainable Impact as integration into internal policies and regulations**	The GEP is integrated into internal policies such as Performance Evaluation Plans, ERA Human Resources Strategy 4 Researchers Processes.	GenderNET Project 2015, D2.6 EC, 2012b EC, 2014
5	**Regular monitoring against defined indicators & KPIs**	Indicators and KPIs (Key Performance Indicators) have been defined and monitoring, evaluation procedures are in place	GenderNET Project 2015, D2.6 EC, 2012b EC, 2014
6	**Assigned resources**	The University is assigning both human and economic resources to the structural change process and the GEP management	GenderNET Project 2015, D2.6 EC, 2012b EC, 2014
7	**Integration into national regulations**	The GEP is stemming from national provisions and/or is monitored upon the initiative of National Authorities or has lead (or has functioned as a best example leading) to significant changes in national regulations policies.	GenderNET Project 2015, D2.6 Genovate Project 2016 EC, 2012b EC, 2014

Positive feedback on impact from knowledgeable experts at national or international level can be taken into account)

Overall 83 GEPs (48 collected on the on line Database and other additional 35 GEPs identified from other EU funded projects on Structural Change) have been collected and based on the above reported criteria a selection have been made of 70 contacts from just as many research institutions which have been invited to participate to the EQUAL-IST research and asked for their availability for an in-depth interview.

A set of guiding questions have been derived to cover all the above mentioned criteria, complemented by 2 additional questions included on Challenges and Resistances in order to allow a more thorough and complete understanding of the process which could respond to EQUAL-IST partners' learning needs.[1]

In the following paragraphs, reference to the institutions is included in each quotation as agreed with research participants, apart from the sections of the interviews referred to Challenges and Resistances which have been de-identified as potentially including sensitive information.

Overall, 19 RPOs out of the 70 invited institutions accepted to be interviewed with slightly more than a 27 % response rate. Interviews took place in the second semester of 2016.

Only one out of the 24 participants was a man, confirming the high prevalence of women gender equality policies and research implementers. Significantly enough, most of the interviewees (10) are researchers- academics who, jointly with their role of change agents on gender equality policies at their own universities, have structural change and gender equality as their own research subjects. Among the others, we had mostly administrative or staff with roles within the Gender Equality Institutional Machineries (7) or having taken the role of main drivers of gender equality policies at their own universities/departments (3).

Table 4   List of Participating RPOs

Institution	EU funded Project	Involved Depts	Country
Lulea Technical University (abbr. Lulea)	GENOVATE	ICT	Sweden
Siauliai University (abbr. Siauliai)	INTEGER	ICT	Lithuania
Università di Padova (abbr. UNIPD)	GenderTime	Entire University	Italy

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[1]   Full set of questions available in D2.1.

Institution	EU funded Project	Involved Depts	Country
Università di Ferrara (abbr. UNIFE)	//	Entire University	Italy
Politecnico do Porto (abbr. Porto)		School of Educational studies	Portugal
Lausanne University (abbr. Lausanne)	GARCIA	Entire University	Switzerland
Research Centre of the Slovenian Academy of Sciences- ZRC (abbr. ZRC)	GARCIA	STEM & Social Sciences	Slovenia
Università degli Studi di Milano (abbr. UNIMI)	STAGES	Health – Medical Studies- Agricultural Sciences	Italy
Universiy of Iceland	GARCIA	Entire University	Iceland
Sumy State University (abbr. Sumy)	//	Humanities Faculty	Ukraine
Università di Torino (abbr. UNITO)	//	Entire University	Italy
Pantheion University (abbr. Pantheion)	//	Entire University	Greece
University Ioan Alexander Cuza of Iasi (abbr. UAIC)	STAGES	Entire University	Romania
Universidad de Tras of Monte –(abbr. UTAD)	//	Entire University	Portugal
Dortmund Technical University (abb. TU Dortmund)	//	Entire University	Germany
Radboud University (abbr. Radboud)	STAGES	2 STEM Faculties	Netherlands

3 Results of the Study

3.1 Different Contexts and Stages of GEPs Implementation

The 18 collected good practices cover a wide range of national, institutional and policy contexts and and the Gender Equality Plans of the participating institutions are at different stages of implementation.

All RPOs have Gender Equality Plans in place or under approval (ZRC), but two institutions (Pantheion, Greece and Sumy, Ukraine) who are either still in the process of having started internal dialogue between their Centre/Department and the highest academic levels (Pantheion University) or in an internal assessment/audit phase triggered by a nation wide project funded by International Cooperation Funds (Sumy University). We decided it would still be meaningful to interview them as both the Greek and Ukrainian institutions are found to be national contexts with limited or null presence of RPOs with GEPs in place (in Greece only 2 Universities, while only one in Ukraine): furthermore, from initial contacts it was clear how both cases had considerable expertise in gender policies and showed promising recent developments.

All the remaining Institutions have come to put GEPs in place either in compliance with national legislations or policies requiring to do so (all Italian Universities, Dortmund Technical University, Lausanne and Hasselt)[2] or as an outcome of being partners in a EU funded project (UAIC, Radboud, ZRC, Siauliai, Lulea) or both (Universities of Milano and Padova, University of Iceland). A peculiar case is represented by the three Portuguese Universities, in connection with a co-funded Government- ERDF Program providing seed funds for enhancing structural change in Universities and Public Administration bodies.

Also in terms of stages of implementation we have a quite differentiated picture:

- Auditing- assessment – internal research phase completed and GEP at a draft stage (ZRC)
- Auditing – assessment internal research phase completed and GEP finalized and validly adopted (UBI)
- GEPs started and implemented directly without preliminary internal assessment (Lulea, UAIC)
- GEP recently put in place following a series of mixed actions (internal audit/assessment and implementation of measures) or in parallel with those actions (Radboud)

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2 In Germany, Switzerland and Flanders, national or federal regulations making GEPs a compulsory policy measure are specifically targeting Universities or framed in High Education programmes and allocate fundings for implementation.

- GEP already iterated for several terms with recurring internal assessment as monitoring of the GEP itself (Lausanne, Dortmund, Ferrara, Iceland).

Processes have been targeting STEM Faculties for the following ones among the interviewed Universities: ZRC (one STEM and one SHH), Lulea, Radboud (one STEM and one SSH), Siauliai, TU Dortmund.

UTAD, UBI, Polytechnic of Porto have been implementing their GEPs mainly at Social Sciences, Humanities and Educational Studies Departments, Milano has involved Health- Medicine and Agricultural Studies, while the remaining ones have taken an overall scope targeting the entire universities for their GEPs and actions (UNITO, UNIPD, Lausanne, Dortmund, IS).

3.2 Audits and Internal Assessment as Enablers and as Part of GEPs

Assessment and internal auditing have been interpreted in many different ways, so that the boundaries between assessment and implementation phases appear to be blurred in structural change processes: they are not always deemed necessary especially in cases where gender equality is already institutionalized like in the Swedish Lulea University, while in other contexts internal assessment and state of the art analysis have been reported to form integral part of the GEPs themselves.

The option is to have a quantitative measurement of the main indicators for gender equality across HR, share of women in academic leadership positions, student population, use of existing work life balance measures and services, and in most cases mixed methodologies are used including interviews and focus groups to better grasp more subtle aspects of gendered organizational cultures.

The institutions where GEPs are better embedded into gender equality machineries are also those where routine assessment of gender statistics are systematically conducted and it becomes a section of the Gender Equality Plan for the next period or the baseline for the GEP itself: this is for example the case at Dortmund Technical University and at the University of Ferrara. At Ferrara an Annual Gender Report combines Data Collection and monitoring of previous GEPs' actions results and is also integrated with the GEP itself:

Mixed methods for the assessment seem to be the most typical option, combining statistics and focus groups or in depth interviews.

Some respondents stressed how the assessment phase allowed them to reach out to broad audiences and sometime constituted also an initial raising awareness opportunity: at UTAD being still in the auditing phase they organized series of seminars and focus groups which also worked as effective tools to stimulate an internal discus-

sion on the issues. At the Porto Polytechnic, the audit involved more than 300 people into trainings and about 600 into research actions.

Also the Hasselt University included an Audit directly as part of its GEP and precisely with raising awareness purposes and the intention to target the so called 'business culture' of both administrative and academic units:

Difficulties in retrieving gender disaggregated data during the assessment phase can easily lead to specific internal surveying actions which might end up being part of GEPs, aimed at **changing and innovating the way data are collected and analyzed in order to mainstream a gender perspective in internal statistics**.

The case of ZRC is very interesting from this point of view: starting from trying to make and assessment and facing a lack of gender disaggregated figures at the HR level, a software company was hired to set up a new tool designed for having sex/gender and variables in HR data management and analytics. Attaching a gender equality measure to an organizational technological innovation in HR data collection has proved to be positively received at ZRC.

Missing gender disaggregated figures can create the opportunity for a dedicated Action in the GEP on Engendering statistic and data collection, like it happened at Padua University, also thanks to the creation of a permanent Observatory as a result of the EU funded GenderTime Project.

3.3 Gender Equality Plans, Institutional Gender Machineries and EU Funded Projects

Among the interviewed countries, Island, Italy, Germany, Switzerland and Belgium- Flanders are operating in the framework of national legislations which, although in different ways and through different provisions, make compulsory for Universities to formally set up gender equality plans. In all these contexts, apart from Belgium, Officers for Gender Equality are also in place (elected and/or appointed) as well as other bodies such as Equality Commissions. (Gender) Equality Offices might be also having an implementing role in GEPs, and sometimes, like it is the case of our interviewees in Germany, Switzerland and Italy, this goes along with being in charge of broader internal policies and services, like welfare and/or diversity.

It's worth stressing that judgement about the ***efficacy of institutional gender equality machineries*** seems to vary a lot. Complex organizational settings with different, sometimes overlapping competences (Committees, Commissions, Officers, Administrative Units) are indeed featuring those countries where Gender Equality Plans are foreseen by Law (Iceland, Italy, Germany, Switzerland). Few interviewees have reported about effective synergy established among

the different layers of the Institutional Gender Equality Machinery (University of Ferrara, Lausanne University, Dortmund Technical University); others have expressed frustration about gender equality machineries addressing problems and approving GEPs mainly at a bureaucratic-procedural and formal levels stated (University of Torino, University of Milano) or being hindered by lack of time and resources (University of Padua and Torino) and more nuanced standpoints where the effective functioning of institutional machineries has been seen as dependent on political willingness of promoting change by the top academic positions (University of Iceland).

Plans to create institutional owners of GEPs in the form of Gender Equality Commissions/Groups or Committees are undergoing at those RPOs where GEPs still have to be formally adopted and implemented as only the first stage of internal assessment and/or design have been completed (UTAD, ZRC) or where commitment has been publicly but no formal adoption steps have been made (Pantheion). In these cases, our a crosscutting composition of academic, administrative staff and in some cases students as well is foreseen.

A considerable part of the surveyed good practices have also operated in the framework of EU funded projects on Structural Change, while at the same time having already in place institutional gender equality bodies in charge of designing and implementing GEPS to comply with national regulations. These where the cases of the University of Lausanne (EGERA), the University of Milano (STAGES), the Iceland University (GARCIA) and the University of Padua (GenderTIME).

At the University of Lausanne the process of responding to national legislation and setting up GEPs had started in 2013, one year before the kick off of the EGERA project which allowed to provide an international framework for implementing the Plan, as well as additional resources.

At the University of Iceland, concreteness seems the main added value brought about by the GARCIA EU funded project trough additional research and internal raising awareness and communication actions, beside the legitimacy of an international platform playing a role into triggering a real commitment from the Leadership:

In Padua the Positive Action Plan formally due by the CUG (Single Guarantee Committee composed of administrative personnel only) proceeded in parallel with a GEP designed and implemented by the GenderTime team which instead focused more on academic and research levels and led to the creation of an Gender Equality Observatory to work on engendering statistics and providing gender equality indicators as a baseline for all gender equality policies at the Academic Level. Synergy among the two parallel actions resulted in having gender data analysis and collection as Objective n° 1 of the Plan, in collaboration with the Observatory itself.

In Milano, also due to the parallel effect of the Reform of Education and internal changes in the structure of the Gender Equality machineries, the STAGES project implementation and related GEP was the initiative of the University Centre on Gender Studies whose team decided on purpose to minimize collaboration with the official Committee and to work on a parallel track: the Committee was not considered as a suitable actor to establish collaboration with at that time. STAGES implementation finally led to a peculiar and quite effective way of mainstreaming results and achieving impact also at the levels of the internal Gender Equality machinery, as illustrated in Chapter 3.4.5 on Impact.

Although as already clarified, the main interest of this study is to spotlight on the process of implementing comprehensive and systematic gender equality policies via GEPs and not on investigating nature and effectiveness of specific actions/measures to enhance parity, our respondents have referred about multiple actions covering all the 4 main areas of interventions foreseen in the EQUAL-IST approach: Human Resources and Management; Teaching and Student Services; Research Design and Content and Institutional Communication.[3] An additional area of action has been mentioned by five of the interviewed RPOs (UNITO, UNIFE, UBI, Pantheion, UNIPD) and it is Gender Based Violence, including Sexual Harassment and Domestic Violence.

We found the bulk of provisions are concentrated in the HR and Management macro area and, within this area of potential intervention, Work life Balance is definitely the most addressed meso level, possibly under the influence of nation level policies which have tended, some times controversially, to incorporate gender equality issues into family –organizational welfare and wellbeing. From the interviews with RPOs which have focused their GEPs on initial audits of their organizations and on proposing inception measures (UTAD, Porto Polytechnic, Sumy University), it also emerged how work life balance seems more easily approachable at least as an initial step of GEP implementation.

Our small sample of interviewees confirms what is already reported by the ERA survey on GEPs which is showing the same type of prevalence in work life balance as a feature of GEPs across the whole EU, jointly with the trend of leaving measures to enhance gender balance in leadership behind (European Commission 2013). Structural changes to promote gender balance decision making appear as clearly more challenging to be addressed in STEM faculties in particular where lack of women in full professorship prevents female access to

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3 A comprehensive map of actions from the GEPs of institutions taking part to the study can be found in D2.1.

leadership positions or as an alternative to the over – exploitation of the few ones in charge.

3.4 Addressing the Lack of Women in Leadership Positions Via Measures Included in Gender Equality Plans

Studies on academic leadership have identified three main categories of academic-research leadership, namely research centre leadership, university administrative leadership, and discipline leadership.

STEM centre leaders have formal coordinating positions at university labs and research centres or institutes. Administrative leaders include deans, department heads and chairs, provosts and other formal university administrative positions, while discipline leaders are defined as scientists with roles in professional science associations and regulatory organizations (Parker, Welch 2013).

The first two of definitions have been covered by our research on good practices in GEPs implementation while during the interviews some of the partners were also including in their answers about measures to foster female leadership actions they are taking to raise the share of female professorships as preliminary measures to enlarge the pool of potential candidates to top leadership positions: we will also refer to those in this chapter, as they at least partially cover the category of 'discipline leaders'.

Studies have investigated how social networks, research productivity and reputation, grant production as well as gender are impacting as determinants of leadership attainment in academic and research environments within STEM and Engineering. They found that women are more likely to be in discipline leadership positions and less likely to be leaders of a research centre or to have an administrative university leadership position, roles which are more strongly associated with science productivity and collaboration networks but also, as in the case of administrative leadership, to grant submission and production. According to the same authors, the importance of social networks as leadership determinants and the inverse correlation between a gender balanced network composition and leadership attainment indicate the role that should be played by policy in this field:

> Currently, leaders who have significant impact on faculty promotion and development need to pay particular attention to the potential for biased selection of leaders. Policy must also anticipate potential for inequitable distribution of leadership positions among men and women. Practices need to be devised at the department, university and national levels (e.g. federal granting agencies) such that women receive greater opportunity and encouragement to ob-

tain research-related leadership positions. It is no longer enough to provide grant funding opportunities for women as single investigators or primary investigators on projects. This research shows that greater attention needs to be placed on intentional creation of STEM centre leadership positions for women. (Parker, Welch 2013, 346)

Along these lines, we have intended to explore strategies and measures put in place by universities through GEPs to support female leadership and have found a variety of practices included into the Plans. We will consider those aimed at increasing the number of women leaders given the above mentioned definitions. In addition,

Policy measures to promote female leadership have been conceptualized into two main typologies as 'supply or demand side' actions. Supply side actions typically entail initiatives such as networking, mentoring, training basically addressing women and prepare or better qualify them as potential candidates.

As supply side strategies alone have demonstrated to be insufficient to increase the proportion of women in senior leadership (Pande, Ford 2011), complementary strategies have been also set, and are defined as "demand-side" which are clustered into three sub categories:

1. Reporting requirements imply measuring the gender gap in leadership positions, analysing its causes as well as eventually discussing envisaged counter- measures.
2. Targets set goals refer to expected shares/number of women or each gender in leadership positions, but with minimal or no enforcement mechanisms or sanctions in case of non compliance. They are also defined as *soft or voluntary quotas.*
3. Quotas are mandatory percentages of representation or numbers of women or each gender in leadership positions accompanied by monitoring and enforcement mechanisms for non-compliance.

Distinction between targets and quotas has been clarified as revolving around the existence or not of sanctions and enforcement procedures.

Challenging goals, particularly those that challenge conventions or norms, are more likely to be rejected or ignored without some accompanying consequences. Therefore, the level of enforcement of regulatory actions should impact the performance and outcome. Targets and quotas both include assignment of specific goals, but the two strategies differ in the consequences for failing to achieve the goals. Quotas are effectively targets with enforcement strategies or sanctions for failure to achieve the goals. Hypothesis 3 is that goals for representation of women in leadership that are

set with clear accountability and enforcement mechanisms (i.e., quotas) will be more effective in increasing female representation than goals without enforcing mechanisms. (Sojo et al. 2016, 521)

Reference has to be made to the fact that positive actions –positive discriminations such as quotas in particular tend to be received with critical remarks and often opposition arguing about the limits of identity politics as contradictory measures applying unfair methods to contrast inequalities, therefore exposed to the risk of violating meritocratic principles (Bacchi 2006).

Targets are usually presented as more viable and more easily accepted measures within Higher Education and research institutions, where meritocracy is strongly embedded into the organizational culture and objective and measurable evaluation of research and knowledge production stand as main variables in defining career progression criteria. Although gender studies have shed light on the dark sides of objective research excellence standards and explored the gendered constructions behind them and the ways they are operationalized in evaluation procedures (Van der Brink, Benschop 2012a; Van der Brink, Stobbe 2014), still quotas find substantial resistance in academic environments in particular.

A recent study on the subject has stressed again how one size fits all measures such as targets or quotas seem to face difficulties in acceptance and implementation in academia, while at least in the realm of hiring professors a new so called flexible 'cascade model' seems to prove to be successful, although it is still at its initial steps of implementation. In the cascade model quotas are based

on the percentage of women at the level immediately below for each type of position, are applied to all career levels, mandated by a government and with strong financial incentives and sanctions for non-compliance. The benefits of this model are that it is based on real numbers for each individual department or other unit, precluding the dangers of one-size-fits-all quotas that do not reflect the recruitment pool; and, the model requires the active participation of the unit in defining their quotas, thus ensuring that the values are attainable. Potential advantages to be gained from the incentives may also ensure the buy-in of academics. The caveats include unnecessarily complicated calculations, potentially leading to a skewing of the estimated target values, and the possibility of perpetuation of small numbers due to low numbers at the entry level. (Wallon, Bendiscioli, Garfinkel 2015, ii)

Overall in the last years, according to the European Research Area

Survey, there has been a raise in the adoption of such softer measures:

> since 2008, the number of countries applying some type of target or quota regulation (fixed quota (10), cascade model (11) or flexible quota (12) has increased from eight to 18 countries today [...]. Besides the use of quotas and targets, in a total of 19 countries, policies are in place to establish clear rules for the composition of selection panels, including roles and gender balance. (European Commission 2014)

Our respondents answers on the issue of leadership can be grouped into several types, mostly approaching the problem from the demand side (11 organizations), showing mainly adoption of soft quotas (4 cases applied to leadership positions; 3 cases applied to full professors recruitment) and other 3 different initiatives put in place and aiming at changing internal processes and procedures.

Only 4 institutions have applied supply side measures, and one of them clearly stated they were not adequate to meet the goal.

3.4.1 Soft Quota/Targets Applied to Academic Boards and Council Composition

- The University of Ferrara has established a mandatory quota forcing to have a minimum of 1/3 for each sex among candidates to the positions of Administration Board's members and for the Rector, by a Resolution of the Academic Senate and the University Board; if the requirement is not met, the deadline is postponed for a second time and collection of candidates has to be continued. This provision didn't work for the Rector's election but it was successful for the Administration Board where for the very first time there was an equal share of candidates.
- The University of Iceland applies to its University Council a National Law from 2008 referred to all public bodies committees where 40% of each sex has to be ensured and, it was said, the target it is 'more or less' met.
- The University of Milan took the opportunity of a change of Statutes required by the Higher Education National Reform to include gender quotas (3 out of 8 members minimum for each sex) in the Board composition (elected by the Academic Council), which is now met.
- The University of Hasselt is applying a so called 'gender norm', after on 13 July 2012 the Flemish Parliament enacted a decree according to which Hasselt University (and the University of Antwerp) are bound to obligations aimed at ensuring a balanced representation of men and women in management bodies, councils and commissions, although with some acknowledged diffi-

culties in implementation tackled via further flexibility measures also presented in the interview.

3.4.2   Soft Quotas/Targets Applied to Professorship Recruitment

- University of Lausanne applies a target quota stating that women should represent 40% of all newly appointed positions between 2013 and 2016, jointly with other measures aimed at ensuring transparency in recruitment and overcome of gender bias (see interview). The target was only partially reached to 30% and then is kept as target goal in the 2017-20 GEP. The preference rule (in case a choice has to be made between two equally qualified candidates) is mentioned in intern regulations of UNIL but it's not legally binding to be applied to individual hiring process.
- At Radboud University target quota to ensure women candidates to be invited to interviews was adopted in one of the participating STEM Institutes as an outcome of the institute's leaders attending the STAGES Project Academic Leadership Course.
- At Dortmund Technical University the two combined levels (Federal and State level) have led first to applying a voluntary cascade quota to professorship levels as part of the DFG (German Research Foundation) Research Oriented Standards on Gender Equality and then, as the High Education Act of North Rhine-Westphalia was renewed in 2014, the issue of gender equality in leadership positions was pushed even further by setting up gender soft quotas for the professorship level.
- The University of Padova took a softer approach to the issues as the Senate issued a Recommendation to take gender inequalities into account in hiring choices and resource allocation, why the GEP (Positive Action Plan) is not including any measure as it is only referring to administrative staff where vertical segregation is not a strong issue.

Lulea University is opting for mainstreaming a gender perspective into recruitment processes and guidelines: raising the awareness of HR and Centres/Department leaders on the need and profitability of attracting women's talents were mentioned as an alternative measure to achieve the same goal in a context were quotas are not seen in a favourable way as they would lead to identifying women as weak subjects.

A specific and quite unique demand side provision has become part of the Sialuliai University GEP consisting of **lowering seniority requirements to be eligible as Council's members** from 10 to 5 years of experience in management and supervising**,** in the framework of the Council Elections Tactics and Strategy put in place with-

in the INTEGER EU project:

Also UAIC –Iasi University situated their actions on the demand side type of interventions, but choosing a particular scope (female leadership in research meant as increasing the number of women as research coordinators and applicants to research grants) and a specific strategy: **lobbying National Research Funding Institutions for changing external structural conditions by way of changing eligibility requirements and evaluation standards in research funding applications.**

Among our respondents we found also 3 examples of 'supply side' measures aimed at supporting and motivating women to candidate to leadership positions:

- At University of Beira Interior and ZRC, women academics have been offered **training sessions** to this purpose. In the Slovenian Research Organization, trainings are going to be targeting both men and women who plan to apply for promotion and to become appointed as members of Committees, while at Beira women considering to candidate to top leadership positions have been addressed as the only beneficiaries. Interestingly, Beira has experienced as training does not represent an effective strategy to overcome women's resistances to apply for leadership positions.
- **Motivational and communication actions** have been at the core of the successful GEP for the electoral strategy at Siauliai University where mainly eligible women have been addressed to motivate them to get candidates and leadership bodies members have been consulted and approached by way of meetings and raising awareness/communication activities. Communication and role models promotion have also been extensively used by UAIC in Romania as well as by UBI in Portugal.

Finally, few of the interviewed RPOs stated leadership issues are not identified as a priority at their institution (UTAD) or not even perceived as an issue to be tackled (Porto School of Education, University of Torino). In the latter case, our respondent referred to how strongly male dominated power networks are resisting to change in a caustic and ironic way which might be worth reporting:

3.5 Including Measures Based Both on Gender Mainstreaming and Positive Actions

Feminist interventions to influence public policies have accumulated a long story from the second half of the XX Century until today and extensive literature in political studies has contributed to critically disclose and analyse its developments: the table below, elaborated

based on some of these studies, is summarizing main existing typologies and their guiding principles/policy goals (Rees 2005; Squires 2005; Booth, Bennet 2002).

Table 5 Types of Gender Equality Policies according to their policy goals and principles

	Principles/goals	
Type of Policies	Equal opportunity- equal treatment	Equality-redistribution
	Positive Actions/Women Policies	Difference-recognition
	Gender Mainstreaming	Process and structures transformation

As far as EU gender equality policies are concerned, the predominant strategy has been initially based on equal opportunities and equal treatment. Positive actions have been introduced between the second half of the '80s and the '90s and more recently as equal treatment policies have progressively shown to bear the intrinsic limit of treating the symptoms of inequality and missing to tackle conditions and structural- material causes hindering full equal rights possession (Lombardo 2003).

Positive Actions policies have been grounded in the difference and recognition principles presuming that, precisely due to inequalities and differences, citizens cannot make use of equal rights to the same extent: adopting positive actions – positive discrimination and specific actions to support women, the purpose is to counterweight to given initial conditions in order to make equality between men and women possible in reality. This has been translated into the creation of Committees and Agencies on Women Politics and the establishment of positive actions have been set up and legislated (including quotas) often leading to harsh debates on the adequacy of such measures and their contradictory nature of promoting equality by mean of discrimination.

As in parallel the debate has been shifting from women as subjects/victims of inequalities to 'gender inequalities' meant as a structural problem pertaining to the relation between men and women and a new focus on 'gender' has been gained, gender mainstreaming has become the new predominant policy orientation , after the Beijing UN Conference on the Advancement of Women launched it globally in 1995. The idea behind gender mainstreaming is opening up the boundaries of separated gender/women policy structures and embedding a gender view in a cross cutting and transversal way, addressing and structurally changing all public policy areas. The Council

of Europe has provided a comprehensive definition of gender mainstreaming highlighting its radical orientation in terms of promoting structural changes:

> Gender mainstreaming is the (re)organisation, improvement, development and evaluation of policy processes, so that a gender equality perspective is incorporated in all policies at all levels at all stages, by the actors involved in policy-making. (Council of Europe 1998)

Several risks and limitations have been highlighted also for gender mainstreaming policies, such as that the broadened scope would risk to make policies more superficial and less specific (Hoskyns 1999). The risk of dismantling existing infrastructures, machineries and programmes has been also foreseen, and a dilution of gender expertise as gender issues would become "everyone's responsibility but no-one's job", have also been highlighted (Lombardo 2003).

Partial implementation has been attributed to difficult legislative and political or financial conditions, difficulties to establish synergies, necessary for an horizontal policy approach such as Gender equality in a mainstreaming perspective, and also resistance towards its goals (Mósesdóttir, Erlingsdóttir 2005; Lombardo, Meier 2006; Pollack, Hafner-Burton 2002; Stratigaki 2005).

Within a process of increasing institutionalization of gender policies, technical reductionism, bureaucratization, managerialism have also been spotlighted as detrimental drifts of gender mainstreaming as it tends to focus on processes and tools and gender expertise losing grasp of needs and active participation of women and grassroots (Squires 2005; Benschop, Verloo 2011).

As gender Mainstreaming's limitations have been extensively debated, the prevailing orientation is at present the so called **"double track" approach combining equal treatment and gender mainstreaming, integrated with actions targeting women only as well as targets and soft quota**.

Looking at the type of actions included in the Gender Equality Plans of our responding organizations, the dual – triple track orientation is clearly the most commonly adopted approach where equal opportunity interventions targeting the 'disadvantaged sex' (or both sexes in their parenting – care givers roles as far as work life balance is concerned), are complemented by gender mainstreaming measures and by different types of actions aimed at supporting women in particular to compensate existing disadvantages.

8 respondents (Universities of Milano, Beira Interior, Padova, Radboud, Lausanne, UAIC, Ferrara, Technical University of Dortmund) have explicitly stated that they have opted for a mixed and comprehensive approach combining the three types of approaches to gen-

der equality, although if we give a closer look at the measures which have been actually mentioned as implemented, we see how many more have pursued it in practice, and indeed the totality of our interviewees use both discursive frames based on equality of treatment and gender mainstreaming.[4]

The above mentioned debates on limits and critical aspects of the different approaches have been reflected also in the accounts of our interviewees, as for example the Technical University of Dortmund puts in place a series of different actions, several of them targeting women only, but made use of a main argumentation based on gender equality as a goal and gender mainstreaming whereas it has been acknowledged how the focus on women only, until recently kept in the official state policies and regulations on the matter, was not fully understood and accepted.

It looks like positive actions can get increased legitimacy if they are argued for and presented as specific measures and as part of a more comprehensive and broad policy framework which has gender equality as one of its goal.

Sometimes it is a matter of official policy labels being overcome or re-framed in practice, like it is the case of the Italian "Positive Action Plans" required by Law and which definitely go beyond a positive actions approach, encompassing mainstreaming and equal opportunity measures.

What was reported to be seen as really problematic in several contexts is actually the use of quotas:[5] 6 RPOs (UTAD, Porto Polytechnic, University of Iceland, Siauliai University, Lulea University, ZRC) have stressed how these would be a problematic issue in their institution and would be contested or not popular for several different reasons such as their being perceived as discriminatory or as policy measures which are part of the past and not relevant any longer.

As we have seen above, 7 institutions among our interviewees have set up targets or soft quotas to foster gender equality in academic leadership, and among them only 2 have chosen to formulate them as women's quotas, while for the others the measure applies to the under represented sex.

At Hasselt University, in spite it was not a popular measure, the Flemish government issuing a decree on gender quota made it a necessity to call faculties and central services to become accountable about the gender neutral composition of boards and commitees, it

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4 Although a more fine grained textual analysis which was out of the scope of this study would be needed to create a nuanced map of discursive frameworks at play.

5 As the formulation used in the guiding questions was referring to women's quota, it is likely that the comments where referring to this type in particular.

worked as a raising awareness process so that gender balance started to be seen as an evident need.

3.6   Balancing Bottom Up/Top Down Approaches

There was clearly a common trait among all interviewed RPOs stating the importance of having support from top management at administrative and academic levels. The top down side of structural change processes is actually strongly highlighted as one of the main features in most of the EU funded reports and policy documents on this issue (European Commission 2012a, 2013).

Our respondents have referred to several types of reasons to argue for the importance of having top internal decision makers on board:

- Credibility and legitimacy of the entire policy
- Institutional support and facilitating/ensuring overall implementation and transition from a policy "on paper" to real operations and action
- Support to mainstream gender across several strategic policy areas and documents of the institution
- Facilitating the engagement of other levels of the organization by allowing employees to take part to GEPs related activities as part of their job's duties.

Involvement has meant direct engagement into project teams or consulting top decision makers by inviting them as members of Advisory Boards or reporting on particular occasions. It can also be pursued, as in the case of Hasselt University, when the whole establishment of GEPs has been an outcome of joint initiative of Rectors, like in the case of Hasselt and Lausanne University (as well as for Radboud, even if for the voluntary set up of target quotas for women professors only).

For Lulea University, a top down approach and having top decision makers as members of the Genovate –GEAP Advisory board has meant also opening the advisory board to other external leaders of organizations from the regional –national ecosystem where LTU is active and, particularly relevant for the ICT research center where the Genovate Gender Action Plan was implemented, engaging ICT companies CEOs: the main trigger to embed a gender perspective into the design of mobile applications came directly from their request to have more customized and more marketable ICT products.

The bottom up –participatory approach to structural change for gender equality policies was definitely subject to a greater variety of different interpretations. First of all it is worth saying that none of the RPOs we interviewed has structured a participatory process to designing their GEP in a similar way to what the EQUAL-IST consortium has foreseen. Participation is intended to better grasping re-

al needs, to make sure that the policy is backed by a lively debate in the institution, and to activate the right internal stakeholders on the right issues. Bottom up approach often means starting from/involving Faculties (*vs* the central level of the Administration): this peculiarity was stressed from RPOs where there is also a GEP in place at central level and where therefore coming to a more specific and Faculty-tailored GEPs is framed as a form of participation (Lulea, Dortmund, Lausanne).

More than one interviewee has referred to students as their main target when ensuring participation to structural change processes, also given their potential role as multipliers also towards their teachers.

Reaching out to the whole academic community through audit procedures is also seen as an added value and a form of participation.

Collaborating with associations, city councils, different stakeholders from the territory is yet another way of interpreting an open and participatory approach to gender equality.

Finally, one of the RPOs very explicitly stated that in their case participation was not an important element and this might be explained by the specific focus of action in that particular case, being Rector's and Council's electoral strategies the core goal of the SIAULIAI University.

More substantial criticism was raised towards structured forms of participation from the University of Beira Interior, as potential judgement from managers would prevent employees to express themselves freely within participatory processes.

3.7 Intersectionality in Gender Equality Plans

Intersectionality is defined as the interlocking, complex system of inequalities and differences in which individuals are embedded and through which identities, lived experiences, political alliances and relations and cultural representations are shaped and built, discursively and materially (Crenshaw 1991; Verloo 2006; Siim, Skieje 2008). The most common definition is broad and includes heterogeneous sites or differentiation axis, such as gender, race/ethnicity, social class, sexual orientation, age, disability and religion. It has been argued and demonstrated how gender equality policies which do not take the intersectional dimension into account strongly risk not to acknowledge differences among women and to over-generalize perspectives and solutions which mainly fit white-heterosexual middle class women's needs and that intersectionality adds on reflexivity to gender equality. It is anyway a matter of fact that intersectional gender equality policies are still rare in Europe and when intersectionality is taken into account, this is happening more at the level of diagnosis of issues and problems than prognosis and proposed-im-

plemented measures. This discrepancy and gap between theory and practice has been found to be related mainly to competing interesting and power relations among different group as well as scarce resources (Lombardo, Verloo 2009). As the EQUAL-IST consortium has identified intersectionality among one of the main features of its methodological approach, it was also included as one of the criteria for identifying good practices in structural change, although with the awareness of how as mentioned, in reality this is still a largely unexplored and poorly implemented aspect. All the interviews but 2 (University of Milano and Hasselt) have explicitly addressed this topic.

The picture which is drawn from our study is quite diversified and still more than half of the interviewees, namely 8 of them, have referred to intersectionality as an important element of their GEPs.

Among them, we have 5 cases where an intersectional approach is both put in place although in very different ways and identified as an added value (Dortmund, Ferrara, Beira, Iceland, Pantheion) and 3 of them where some difficulties in implementation have been met, someway reflecting the above mentioned gap between theory and practice in this field (Radboud, ZRC, Porto).

The University of Iceland has an Equality and not a Gender Equality Action Plan in place, and this is reported as a gain in legitimacy of gender equality policies as such as they were seen as too narrow in scope.

> An intersectional approach is accepted and embedded. We have diversity policies in place, the GEP refers to equality in a very broad sense; we have an active students' movement here at the University, as well as several queer and feminist associations, they cooperate a lot and we could say there is pressure from the grassroots and associations are very cooperative. We have several research institutes working on gender and diversity issues. When the Policy (Plan) was dealing with gender only, it was criticized for being limited, now that an intersectional approach is adopted, it is more legitimate. (University of Iceland)

At the University of Beira, raising awareness actions on 'sexual minorities' and students with migrants and refugees background are carried out:

> We continue to do a lot of raising awareness as this is always useful and there are changes in the student's population as well and not all people are motivated. We focused also on discrimination against sexual minorities as we realized thanks to our Observatory at the Commission, that this is happening in a quite conservative environment. There are more and more students from abroad (refugees, migrants) and the reaction of local student population

is not always open. We cooperate with other entities and NGOs on these issues as well. (University of Beira Interior)

The GEP or Positive Actions Plan of the University of Ferrara includes actions at the teaching level such as a cross departmental course on pluralism and intersected differences, but also initiatives on supporting students and staff with disabilities, up to the recent decision of setting up a dedicate Positive Action Plan on Disabilities. Both in Ferrara and in Torino, a specific measure to ensure transsexual students rights has been put in place:

> UNIFE has adopted the so-called "Alias career" for male and female students who are in situations of gender transition. Following the advice of the University of Torino, pioneer in this field, the University bodies approved a resolution to definite the necessary informative procedure for the allocation of an alias career, and the confidentiality agreement to be signed between the interested person and the University. Here the resistance came from some student associations who were opposing to this for ideological reasons. In order to overcome this opposition, the opinion of the Ethical Commission was demanded, opinion which was in favour. (University of Ferrara)

The University of Dortmund has reported an institutional arrangement where the GEP and the Work of the Gender Equality Officer is not featuring an intersectional approach whereas the issue is under the responsibility of a Department on Equal Chances and a Pro-rector on Diversity Management: it is argued that keeping a thematic separation and at the same time ensuring cooperation between the two levels is proving to be fruitful.

> The GEPs do not take an intersectional approach, but the overall philosophy of Gender Equality is intersectional. Issues concerning intersectionality rather fall into the thematic area of the administrative Department for Equal Chances, Family and Diversity as well as the Pro-Rectorate Diversity Management. In any case, we believe that linking diversity issues and gender equality gives more severity to fighting discrimination as a whole. There is an ongoing debate on whether Diversity Management shall also be the job of the Gender Equality Officer and at many universities in Germany this is actually the case; here at DTU we have this thematic separation and it works very well, but the cooperation between the two policy levels is happening thanks to the persons in charge and their good communication that finally makes the difference as far as collaborative attitudes are concerned. (Technical University Dortmund)

In some cases, like for ZRC, the intention of using an intersectional approach and taking it into consideration from a research perspective had to face some obstacles and resistances in practices, at HR and academic levels, due to different reasons and circumstances:

> It was a crucial issue for us as we wanted to avoid heteronormativity; the toolkit on gender in research and teaching included this approach and we took intersectionality into account also when collecting data. In research this was easier, less in practice: where it was much more difficult. The HR Dept. didn't allow to ask candidates about what was considered to be sensitive data and this is actually masking a lot of discriminations. Another dimension was ethnicity and in our team we have migrant academics and it was an issue to us as we are imbued in a quite nationalist academic discourse here in our country. People even commented the website should been our national language, there's a discussion on if English shall be included in university courses. It was difficult in this context to really pursue an intersectional approach but it was clear that threats came from several dimensions, not gender only. (ZRC)

At Radboud University also there's an overall acknowledgement of the issue as well as a comprehensive diversity policy, still implementation is limited:

> Diversity Policies at Radboud is including Gender Equality and Migration Background; having a diverse work force is the goal of the university is to become more international, to have more people with international background on board. Age or sexual orientation is not really on focus although on paper these are mentioned as important. In practice we didn't applied an intersectional approach to the extent we would have liked to do, but for example after one year we set up the Women Network for Early Stages Researchers we took a series of steps to involve more women with a migration background and now the board of the network is made half of Dutch women and half with migration background but it took some time and it was a learning curve. (Radboud University)

In 3 cases (Lulea, Padova, Torino) reference was made to attempts which have been pursued but not entirely followed up, and in the case of UTAD to a 'new issue still to be taken into consideration', and with a less pronounced positive view expressed about an intersectional approach to Gender Equality Plans.

In Lulea for example gender sensitive recruitment methods have been proposed as examples to address also age and ethnicity:

We tried to look not only to gender but also to age and ethnicity. Our strategy was that we proposed HR department to use our gender sensitive methods applying it to age and ethnicity when they were trying to attract younger people or people from minorities. We understood that we wouldn't be able to address all the intersectional differences. Still gender was our main focus. (Lulea University)

Finally, for the Universities of Siauliai, Sumy, UAIC and Lausanne, the issue was considered as not relevant, either with reference to their own context or in general, in one case using merit as an argument, in a similar way as it is used to resist to gender equality equality policies and actions.

We had a few cases and reported to the Ombud person but we found it was confusing to mix the issues. (Siauliai University)

It was not relevant to us, we took age into consideration only… probably age is the only dimension which is relevant and we addressed it through the young women researcher network as well as establishing awards for young researchers. Otherwise no, we didn't have any type of measures, because all and all the University is a meritocratic environment… if you come from a poor family this doesn't really matter. (UAIC – Iasi University)

The argument used by the University of Lausanne was probably the strongest one, identifying a political pressure to espouse diversity-intersectionality as a selling point to meet new excellence criteria for Universities in the context of internationalization policies, although not really linked to real needs of the academic community:

We don't face this issue as we are not a Diversity office. There is a political pressure to do so, and indeed we have already persons in charge of dealing with disabled persons, we have a campus which is equipped for doing so, but there is not a diversity strategy. The board of the Rectors' Network was institutionalizing and establishing a Diversity Delegation, changing name but without contents behind. The selling argument was prevailing and Rectors discovered that in the highly competitive framework of the Shanghai Rankings diversity is a selling point. UNIL is a very much internationalized environment with half of the professors and almost 30% of students not being Swiss, so politically speaking diversity is not an issue, there are not groups asking for the rights of under-represented groups whatever. But it has become an issue when people has understood diversity is a criteria for excellence; what is happening now is that Diversity Delegation is taking over exactly

what the equality and Gender was doing. The name has changed but we'll probably go on doing what we have done in the last 15 years. (University of Lausanne)

3.8 Perceived GEPs' Impact

Among the RPOs participating in our study we could group three main patterns in terms of impact perception, where for sure we can imagine that our respondents' statements to this question were influenced by many contextual factors that we cannot fully grasp within the limitations this study, and possibly subjective judgements to some extent too.

3.8.1 Successful Positive Impact and Structural Change Achieved

4 Universities presenting their impact level as a success in terms of achieving structural change, while all other Universities provided a more nuanced picture and described a partially achieved change, or a work in progress.

Significantly, self perceived success applies to Dortmund Technical University and University of Ferrara which have both National binding regulations making GEPs compulsory measures but still present dramatically different frameworks: the German policy framework being more articulated (a state law + federal standards from the German Research Foundation) and resourceful (funds made available to support projects of Gender Officers and 2 different Offices set up), therefore it is not possible to refer a positive perception of impact to national binding policies on Gender Equality per se. Furthermore, this was not the case for the other interviewed University (Lausanne) backed by a strong national policy framework to boost structural change who attributed full success just to few ones among their faculties, and identified many external context related factors.

At Ferrara impact is seen as an outcome of the **good cooperation and synergy established among the different positions and bodies of the Institutional gender machinery** and it is defined not only as successful implementation of the GEP (or Positive Actions Plans) but rather in terms of mainstreaming and changes introduced into policy and strategy documents (integration of Gender related Priorities into the University Strategic Plan, changes in the Statutes) and procedures (Senate Resolution imposing to present a gender balanced list of candidates to Senate and Board elections).

At TU Dortmund the reported impression was definitely to have triggered structural changes thanks to enforced measures from external authorities and the availability of resources jointly with a pos-

itive role played by the Equality Officer in streamlining and simplifying procedures and processes. The definition of change which is emerging is a broad one: from improved numbers (vertical and horizontal segregation), to a new appointed position of Pro-Rector for Diversity Management and a dedicated Department in charge of Equality and Diversity, a panel group on Gender Studies but also some changed procedural documents such as recruitment guidelines with sections on gender bias and less measurable shifts such as those related to language use.

At UAIC the impact was described in terms of successful internal actions put in place at the University Level, increased numbers of women in top positions, but also an approved sustainability plan after the EU funded Stages project conclusion and (in other sections of the interview) and the change which triggered on National Policies and Procedures on Research.

When explaining the roots/causes of this success in terms of the adopted strategy, reference is made to **exploiting a rhetoric of modernization as internationalization of universities** and at the same time, **adopting a non oppositional discursive strategy**.

Also our respondent from Lulea University has defined their GEP as a successful one, referring to a +5% increase of women professors in 5 years, and +10% women researchers at the Computer Science Electrical and Space Engineering Department in 3 years, a toolkit and individual coaching to researchers to integrate gender into their research projects as well as changed recruitment procedures and their contribution to having a gender module integrated in the training course for Research Managers and Administrators – EARMA.

3.8.2 Distinguishing Successful GEP Implementation from Institutional Change as a Gradual Process

The majority of respondents built their answers on impact and the GEPs as transformative measures to achieve effective structural change using more cautious and less positive arguments where they distinguished the positive and successful implementation of Gender Equality Plans from the achievement of structural change or pursue of gender equality more broadly. The conveyed message was therefore stressing limits, constraints and results still to be achieved, in some cases resonating also in the 'Resistances and Challenges' section of the Interview.

The case of Milano is interesting: most of the strategy of the Gender Studies Centre through a series of EU funded projects on structural change in research has aimed at adding gender equality as a new specific competence of the already existing Welfare Office and linking the Centre's identity to the sustainability plan of the STAGES project. The main limit to impact seems to be found in temporary

research positions of the core researchers in charge of implementing the policy, and to lack of resources, whereas the strategy was successful as it allowed to ensure that the two main skilled gender researchers could continue their work, and one of them becoming director of the Welfare and Equal Opportunities Office. In the answer about to what extent the achieved change could be considered as structural, individual commitment and roles are identified as key factors playing in the process:

> Even if the project and its GEP were successful, equality is not achieved at all, as these are tremendously slow and complex change processes. It is really difficult to assess to what point we have achieved structural change, there's still so much to do [...]. It's a pity that there are first EU funded projects and then inevitably you experience a decreased scale of the actions. We are trying to keep the interest high but resources will not be available any longer to the same extent and this will make a difference. [...] In my experience equal opportunities policies are so much linked to individual personalities and commitment. For this reason we set among the Centre's objectives the sustainability of STAGES' results. And this was crucial as when now the Centre activities will be assessed and decisions will have to be made for the future this will be one of the main issues. And the strategy was also set this direction because all of the Centre's staff was working on temporary research fellowship contracts. (University of Milano)

As already mentioned, Siauliai University focused its Gender Equality Plan on Electoral Tactics and Strategies identified as a good practice by the EIGE, and the action is definitely presented as successful, based on results as the increased number of women into the University Board from zero to almost 40%, the revision of regulations for SU Council composition, and the success of other actions such as research grants to support parents, the training courses and other communication activities as well. In spite of this, our interviewee has stressed how **in order to define the achieved change as structural, more time would be needed**:

> I would define our impact level as average (mediate), as these changes take time, minimum 10 years to show substantial results. But we started disseminating also at other Universities (Lithuania and EU countries), in local Šiauliai Municipality and exploring new areas in gender research such as urban planning and gender equality promotion on city level. (Siauliai University)

Padova University marks several mainstreaming results (Gender Budget included as strategic objective for the year 2017, a new role

established as pro-rector for Equal Opportunities, an Observatory on Equal Opportunities): still it was stressed how **a long way to go to achieve a change would entail deep cultural change**.

> We managed to carry out everything we planned and to be successful, all seminars were organized, the help line in place and running. Anyway, in terms of transformativity, we can say *we started sowing some small seeds*. There is still a strong need for Positive Actions Plans to address what I consider to be a cultural issue. You have to think there are many of the women we dialogue with who refuse to sign using the feminine declination for their job position. This shows where we stand. It's part of a culturally entrenched system of prejudices where gender, age, disability are intertwined. (University of Padova)

At Lausanne University a complex Gender Equality Machinery is described and GEP established at the central level as well as Faculty level, all foreseen actions implemented, female professorships increased, but still partiality of results is highlighted, change described as non linear and at risk of backlashes, subject to external hindering structural factors (lack of welfare services, precarious research jobs, violence against women) but also, internally, change of people in key roles.

> The project Vision 50/50 had a transformative and sustainable impact in 2 faculties, Earth Sciences and Life Sciences, with Action Plans, concrete measures, influent people behind the plans, and – in Earth Sciences – the nomination of 2 new women professors following their newly developed and very innovative recruitment guidelines procedures. Good support of the Rectorate and also from some Deans of Faculties; success depend on the people, and if they change…. You can have a Leninist type analysis here like '1 step forward and 2 steps backwards.' We are just experiencing it now when we try to promote gender sensitive language as the French are very resistant to this almost philosophical issue were the masculine is the norm, this is just a small example.
> Important restrictions are coming from national policies, from a lack of care welfare system and cultural factors, especially in the German part of the country, where the mentality is to have the mother at home. We cannot establish all alone enough child care offers here at the university when there is a lack in general, overall the country and at local level. After the first action plan we made analysis and monitoring, both qualitative and quantitative and overall we can see there is quite a positive impact, 25 measures and actions implemented out of 26. But the change is not really measureable, and change is not linear, we are going back and

forth even when progressing. Sexual harassment will be an issue more and more, sorry to say but also due to an increasingly inter-nationalized campus environment. It might be we'll have discussions on burkas on the campus one day. Violence is still being an issue on campus level. It's not only about more women into professorship, it is a broader issue about relation between men and women in the society. Inequality is exacerbated by more precarious working conditions at Universities, project based and temporary positions which mostly affect women, and this requires actions at the level of how you structure academic careers and promotion plans. (Lausanne University)

At Iceland University the slow pace of change is also emphasized, although assessed in a longer term perspective ("last 10- 20 years) and **achievements set more at the discursive than the structural level**, with main obstacles identified as the new scientific excellence mainstream concepts pulling to an opposite direction than gender equality, and **the attractiveness of internalization rhetoric's** seen as a trigger by others, it is here judged **as an obstacle to gender equality**:

Impact goes very very slowly and there is informal and formal resistance, mostly informal. So now we can say that in 10- 20 years we have been making progress, but still I would say it more about awareness raising and discursive acceptance than structural change.

The main contrasting factor is that since 2005 there is a strong emphasis on internationalization, the dream of becoming Harvard, and on performance based measurements. Research funding's have become based on publications on high impact journals. And all these trends are pushing us towards an opposite direction than gender equality and what our Equality Policy would aim at. So we are in the middle of two opposite directions. In our project and GARCIA in particular, we worked to de-construct the concept of scientific excellence because it is very much gendered: pressure towards excellence it about increased competition, tougher working conditions, publish or perish ideology, therefore it is worsening gender inequalities, but marginalized groups in general based on race, gender, disability and precarious research staff are becoming more vulnerable and have less opportunities to make it under tougher circumstances. And we see this as one of the reasons why gender structural change is not taking place to the extent we were expecting. (University of Iceland)

Also at Radboud considerable impact meant as **having a GEP in place** (funded and with human resources) **and soft quota as well,** is deemed *as something different from structural change and*

depending on political agenda of leaders. The enduring hindering factor is *organizational cultures in research* which prevent people to make use of the measures that have been already set, such as work life balance.

> "I have to be nuanced about our having achieved structural change: at the raising awareness level by now, but the Deputy Rector is very much in favour of changing the organizational culture and becoming a family friendly university. This has become her agenda point. We already have facilities, we have paid parental leaves, opportunity to go on part time schemes or work flexible hours but this is all about organizational academic cultures and researchers' fear that devoting time to family and using these arrangements will hinder their careers or that they cannot afford to take that time, but this is a great hindrance". (Radboud University)

Three RPOs were found to be less than cautious or moderate and more prone to be either negative or to suspend their judgement on the GEP's impact in view of future development to be assessed.

At ZRC in Slovenia, participation to the GARCIA project has led to make recruitment procedure more transparent and the project some impact in raising the internal awareness and allowing the design of a GEP which still be approved:

> "Best impact we achieved when working on selection procedures, where we manage to make concrete implementation jointly with research: we made sure that Recruitment Committees had minutes and that full list and short lists of candidates were made available, gender of candidates was not known which was not a normal procedure until now […]. The rest is to be settled and verified: we are going to establish a Gender Equality Internal Group to take the ownership of the Gender Equality Plan, which is currently a draft.

At Torino University, the final conclusive remarks on impact tend to define internal Gender Equality measures and the GEP as a policy which is not implemented, based on individual efforts only under difficult and unfavourable circumstances.

> "I have to say behind the GEP there's my individual work… it would be a transformative policy but I don't see it is really implemented. I spent so many hours on organizational well being surveys that I almost lost hope.
>   We have really hard times into putting gender equality up on the policy agenda. The issue is touching on young women with temporary research positions in particular and they are not represented by trade unions, so there's a bottleneck here. Trade unions are

the leaders in well being policies and they don't have very much advanced policies in my view. So we keep going working on the right to part-time and flexible working hours for permanently employed women, but then we have enormous amounts of non permanent contracts with zero protection and rights. It's very difficult... we have PhD candidates in Medicine who wait as much as possible to communicate they are pregnant or to decide to become mothers. There is no reflection made on these issues. This would really be an issue to work with together with top directors and for a long term strategy but I don't see this a realistic possibility.

At BEIRA the GEP (implemented at the School of Education level only and with main focus on work life balance) was said to have achieved superficial results, as the increase in the number of women in leadership cannot be attributed to the GEP only but was also an effect of retirement and generational changes, and outcomes in work life balance came as this is the easiest topic to be addressed.

> If you ask about transformative change, my answer would be that we achieved superficial results until now, so we are still far from what we would need to be. Work life balance was the easiest topic to get for women and people in general, so much connected to personal distress that many experience. We improved work life balance, like flexible schedule is getting more usual and the number of men asking for it has increased, as well as men asking for parental leaves and care related leaves, but still there's a long way to go and gender inequalities are embedded in the culture in a way. This issue is so much easier for people to understood, more than access to leadership positions: in this area women tend to attribute their not trying to access top position to either their own fault of not managing to balance career and private life or their own choice of prioritizing family. We had impact in terms of women representation among head of faculties and departments, currently women count for 30% of them while as head of faculty we still have one woman out of 5. There's also a generational effect, due to retirement of the older male top academics, we like to think that is also due to the project impact. Students welcoming rituals for newly enrolled students are an example: they are highly gender biased and discriminatory. We made research on these phenomena as they imply harassment, they cause problems at the community level but it is accepted and recognized as a tradition. (University of Beira Interior)

The remaining Universities such as Polytechnic do Porto, UTAD, Sumy and Pantheion described their actions as initial or preliminary stages of structural change processes therefore could refer to

impact only to a minor extent (initial outcomes like gender sensitive language use or specific child care actions or referring to initiatives successfully carried out in the past on which they could rely for future steps) or didn't even mentioned it.

3.9   Sustainability of Gender Equality Plans

In our question the issue of GEP's sustainability was connected to 3 main indicators:
- Having completed a full implementation cycle
- Being supported by institutional owners in permanent positions
- Being integrated into internal Policies and Regulations

11 of our good practices had GEPs in Place which has already completed their first cycle of implementation, most typically lasting three years.

Most optimistic and positive views on sustainability were offered by RPOs where the GEP is framed into national – federal level regulations which make it compulsory for Universities to establish such policies and national resources are invested in specific programs to make Higher Education more Gender Equal.

As one of the most solid GEPs experiences among our interviewees, Lausanne University, where the Federal State allocates the equivalent of 200.000 € per year to each University implementing its Plan, still considered its achievements under fragile conditions and in continuous need of an institutional owner, i.e. an Office for Equality as, without this in place, all provisions could quickly evaporate:

> If you ask about sustainability in time, I can say that if the Equality Office should be dismantled, the results we achieved might be dissolved in 12 months because if you don't have someone who is sensitive and vigilant and ringing alarm bells all kind of not gender sensitive practices could be put in place, also from the side of women professors, we know that for sure.
>
> Unless there is continued investment of time and money on these issues there is no guarantee that things might be undone. (University of Lausanne)

Establishment of an Office – Unit which is in charge of Gender Equality within the administration to complement the work of Equality Officers and Commissions definitely seems as a key element to facilitate sustainability or at least a path that several RPOs among our respondents have been pursuing: Milano, Lausanne, Dortmund, Ferrara as main examples.

Still, not all RPOs operating by making GEP mandatory had the same type of experience as it is a matter of fact that obligation to set

up an Gender Equality Plan can be met also in a purely formalistic way and take the shape of a 'lip service' policy: both our Nordic interviewees from Iceland and Sweden witnessed how before implementing a EU funded project GEP their institutions had their own institutional GEPs in place at the university levels but they were not implemented or implementation was fragmented (IS). Also the Italian RPOs with a national law in the background requiring all Public Administration bodies to set up a Committee against discriminations and approve a GEP have shown different sustainability models but 3 of the four interviewed universities (Milano, Padova and Torino) were pointing at several limitations of their GEPs in terms of sustainability and resources, lack of monitoring, management support and integration into internal policies.

Overall, 12 RPOs reported either unsufficient and/or shrinking resources as one of the main challenges they have to face to proceed with implementation, iteration of GEPs or both. Only 5 of our respondents manifested the perception of having enough funding and HR at disposal was predominant (Dortmund Technical University, Lausanne University, Ferrara University, Radboud University), while neither for Sumy University or Pantheion this was a relevant issue as they find themselves at very preliminary stages of the process.

A peculiar position is the one of all RPOs which have been partners in EU funded projects which are now concluded: they are experiencing a reduced scale of action for their GEPs and still define them as sustainable if economic and human resources are allocated to continue and institutional support from key stakeholders is ensured.

The issue of **integration into internal policies and regulations includes many different aspects and several respondents have referred it to particular documents or policies where gender has been mainstreamed as a parallel effect of having a GEP in place**: recruitment guidelines and procedures, official University Strategy Document, work life balance provisions are some examples.

If for many of our respondents establishing active collaboration networks with local, regional and national level stakeholders have proved to be important for strengthening their internal strategies at different stages of implementation (Lulea, Beira Interior, Radboud, Hasselt, Milano, Ferrara, Siauliai, Sumy University, Lausanne among the others), some of our respondents as it was the case of UAIC, put particular efforts in lobbying towards National RFOs to influence change in eligibility mechanism for accessing research funds by taking gender into consideration.

3.10 Challenges and Resistances

When it comes to challenges met into promoting structural change through Gender Equality Plans, we could detect both challenges connected to external and internal factors.

Several respondents referred to hurdles being part of the socio-political-economic context where their Institutions are operating and therefore potentially or effectively harming their action. Some example are more or less directly referred to the **economic crisis impact**, which could have consequences in reduced incoming resources, both from public and private sources and could make gender policies be perceived as a luxury.Other external factors mentioned in different sections of the interviews and when referring to impact in particular **lack of welfare support to families,** and **gender biased new definitions and performance indicators of excellence in research in connection with international ranking systems**: these were found to be penalizing women and youngest precarious researchers in particular.

Also internal **power related issues** were mentioned, linked to the low status as temporary research fellows of the main spokespersons and implementers for the GEP policy, when almost entirely funded through EU projects and highly exposed to the impact of academic politics and changesand turn over among (the few supportive) decision makers.

Another interviewee has referred to the structural contradiction of enforcing gender equality in leadership positions through internal regulations in contexts (like it is the case for STEM and ICT in particular) where there are few women employed at the Grade A professorship levels and procedures to justify exceptions have to be put in place to adapt to particularly segregated academic environments.

STEM professional identities and cultures were found to be strongly gender biased and lacking awareness

The cultural trait which was pinpointed can be summarized as lack of sensitivity to social issues and found to be particularly relevant for ICT – IST research institutions. Lack of awareness has been reported jointly to the perception of gender inequalities as potentially disturbing questions upon which staff members would feel unease to disclose information in gender audit processes, or would deny the problem.

Lack of time and/or resources was also quite a recurring issue in several interviews, also recalled into the impact and/or sustainability related part of the dialogue to justify limitations to expected or desired impacts of policies and GEPs (not reported here). The argument was built according to two different frames: either lack of time by invited stakeholders from the management or teaching side, asked to join the process and finding it difficult to schedule and prioritize this agenda, or as lack of time (and resources) by the Gender Equal-

ity Machinery and/or other implementing stakeholders not getting enough resources to address very complicated issues and processes.

A few respondents pointed at the **lack of engaged men** and the typical situation where mostly women are engaged into gender equality policies and project, leading to isolation of gender equality policies in academia.

Several strategies were suggested to address challenges, among others the added value of steering the process with a careful and balanced involvement of the right stakeholders at the right moment and the necessary support of top level professors with high internal reputation.

> What is needed is to know the organization well and *to orchestrate the process by activating the right persons on the right issues,* so to *activate stakeholders without extenuating them*. If you involve everybody on all issues than you will miss them all, you disperse energies.
>
> Overall, in these processes *is very important to be an insider and know the organization very well but also have a position*, possibly having a full professor as driver, with also membership in National level Boards, for this I could be listened by the top decision makers at the University, which cannot really happen if you have lower positions, while I see that in several projects there are post-docs or people who are not even employed or just for the project duration.

A tension between researching & implementing structural change was revealed, pointing at the challenges of building internal gender expertise in research institutions. There's certainly a need for gender expertise to sustain gender equality change processes, in fact it is not by chance that several of the responding RPOs had and still have Gender Studies Centre or Research Units as main institutional owners of their GEPs. Still, there are a few implications of having gender scholars as main implementers of gender equality policies at RPOs that needs to be taken into account.

On one side, within scarcely funded policies, having scholars involved who can have gender structural change as part of their research subjects allows to leverage additional and non (entirely) funded extra work as potential publications can motivate efforts spent on the subject by researchers who can benefit from them in their career.

> It will really depend a lot on the individual people involved in the process: there's a need to recognize the work which is done on gender equality and recognize it as real work beyond voluntary pro bono commitment. This recognition has to come from the Management and this would mean for us Institutionalize the Commis-

sion. For us it is in a way easier as sociologists and psychologists as these topics involve directly our scientific research as well and we publish on these topics, and we manage to involve several students contributing, so to be honest I wouldn't say it is entirely voluntary work, it is complicated involvement although all the organizational work is not.

On the other side, researchers with specific gender expertise who undertake this type of projects/activities most likely happen to have hard sciences departments where gender inequalities are more severe as implementation sites, even if their career progression as researchers depends on social/political sciences, which might imply a series of contradictions-trade offs, as another respondent stressed.

> If we look at actions we implemented, there's one thing to be said: they were extremely time consuming with negative impact on careers of the involved researchers. It was really hard to pursue structural changes and at the same time to continue doing research and publications. Keeping the Department of Social Sciences out of the porject in terms of implementation was a deliberate choice in order not to have too much high level sociological scientific expertise and theoretical debate on the issues at stake and to privilege a pragmatic approach which is so much easier with hard scientists who are not interested in developing their own theories on the subject. They were also much more available to give us visibility as this was not hindering their own academic profiles. Priority was to achieve change more than studying change processes. The trade off of this positive alliance with hard scientists is that finally all the organizational and logistic aspects were entirely on our shoulders.

Resistances to gender equality policies are inevitable as they are typically sites of productive tensions (Walby 2005a) aiming at achieving change and therefore implying a certain degree of conflict and resistance from stakeholders willing to maintain the status quo.

The work of Lombardo and Mergaert has offered a comprehensive classification of resistances in gender mainstreaming processes along three main axes: implicit/explicit; individual/institutional; gender specific/general (Lombardo, Mergaert 2013) which we have found well reflected across our interviews.

Great emphasis has been put by most of our respondents on individual/explicit and gender related resistances.

Nevertheless, one examples of generic resistance was also made, which could be described as **resistance to critical discourse and change**:

Someone labelled us as "those people who like to criticize everything" and took our discourse a direct personal critique to their own research work. This is sensitive, really, in particular when we dealt with gender and research issues.

Some have stressed that there was **no real resistance but rather influence of gender stereotypes** although in most cases these type of answer came from institutions being at their preliminary or initial stage of implementation and this might have an impact in that sense.

One respondent referred to implicit resistance as due to specific cultural elements where critical thinking has a negative connotation and another interviewee pointed at implicit resistance she met as a consequence of using a strongly consensus oriented strategy precisely to avoid conflict.

A recurring argument in most of the interviews was indeed the 'individual' factor also in terms of constructive support to gender equality change stressed well beyond the last question of the interview.

Gender, age, type of job and position were referred to as main variables. Their academic- scientific research professional identities are found to make people prone to think they are immune from bias.

"Resistance is coming from men and women at same level. The fact we have men who support is very important factor. It is also resistance from HR Departments, there are professors from older generations but also very young professors can be resistant as well. To this point having a top down approach is useful".

"Resistance is always individually based, across gender and roles. You can have women who think they are very supportive of gender equality but when it comes to concrete actions they are not, they might lack knowledge. You could have administrators and bureaucrats who are supportive, have learned how things go by life experiences".

"Academic staff are among the most resistant groups, neither on positive actions and women representation or on discriminations. The average professor feels free from biases, they don't want to even listen if you refer to gender quotas".

Interests related to staff employment position are also mentioned, recalling long time debated conflicting perspectives of **class and gender** (Scott 1986) both with regards to members of Trade Unions among employees and some top managers who seem to be attracted by academic internationalization policies much more than gender equality.

"I have already mentioned Trade Unions, they care about minimal wage raise for all already employed workers and don't care about the precarious ones…and then there's a "Gotha" of top managers and leaders who have totally different interests. Many of them only care of relations with Chinese Universities … which is fine but just not the most equal rights oriented environment".

"I guess it was also a generational issue as he was very old, he is now retired and luckily he cannot influence any longer. There will be soon an intergenerational impact as things are changing in terms of more equally shared care responsibilities in couples".

Three respondents pointed at women and two of them at **senior academic women** as the most resistant subjects in their experience. Their accounts are recalling studies which have identified a so called "queen bee phenomenon" where women in top positions within male-dominated organizations can end up to distance themselves from more junior women therefore in a way being not supportive towards gender equality or reinforcing gender inequalities in their work place (Derks, Van Laar, Ellemers 2011).

"Resistance was that senior women academics were a bit threatened by these younger women organizing themselves they were hostile to us in the beginning and it was not encouraging at all. What we consciously did to overcome this was to make the very junior women in their 20s the network as chairs and secretaries of the women's board and contact the senior academics and this finally worked and they started to support us and joined our meetings and invited us to their meetings".

"We only encountered minor resistance from senior female academics (in particular regarding the replacement fund), stating that they "had made career without 'supporting' measures".

"Many resistances come from women. We have three female Directors in three different Departments and they were all opposing our suggestion to use the feminine declination of their job position. Same for female students at the faculty of engineering. We experienced that gender stereotypes are sometimes deeply rooted in women".

Different discursive structures of the arguments are brought as examples of resistance within the ILO Gender Audit Train the trainers workshops:[6] trivializing, denial, inversion, dilution, selection, subversion, compartmentalization, tokenism, shelving, lip service, investigation.

In the collected interviews, one of the most commonly reported forms of resistances has been '**politically correctness'** intended also as 'lip service' or formal agreement not followed by concrete availability to offer support, which were also the most typical forms of implicit resistance.

> "Challenges and resistances in our country have mostly to do with politically correctness: it is not possible to disagree and state you are against gender equality or do not acknowledge this as a problem".

> "We also met lack of Interest and lack of time in people who initially committed to support the process while most of the time we got support from male colleagues although often only for politically correctness".

Denial, trivialization & naturalization seem to constitute the prevailing resistance modes: gender equality is not perceived to be a problem any longer or it is not the case at one's own university/committee or group (denial), it is not a priority or doesn't have importance, it's a trendy topic; sexist jokes are made to feature the main gender equality spoke persons (trivialization), or the status quo is due to different choices men and women 'naturally' do (naturalization):

> "In terms of resistance some people made jokes and didn't want to participate and spend time on the project making statements such as 'we have real problems to deal with' so to diminish the importance of what we were doing. Many of them were women".

> "'This doesn't matter'; 'we have already dealt with this'. They can manifest this in similar ways although the arguments are different".
>   "We didn't meet any resistances, but rather gender stereotypes, among the most common ones:
>   'Girls and boys have different preferred disciplines'; 'The topic is not that urgent'".

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6 See the on-line Presentation: "Type of resistances and Strategies" https://ecampus.itcilo.org/pluginfile.php/25084/course/section/3468/S4_4%201%20%20types%20of%20resistance.pdf.

"Resistances we met them, sure, denial and sentences like 'they are all women in this Committee/Panel' or for example when we tried to have the gender course accredited, one female professor told us this was something similar to fashion, or a non scientific -trendy topic".

"An example of resistance: an important influential man stating in a conversation 'don't mention anything against gender equality as otherwise she will come and beat you with a sweep!'".

"On the other side he was supportive but for him it was a pain, something he had to comply with although against his own will. It's a double flow, there's the official side, but also the other one".

"It is the typical resistance to gender equality: naturalization of the problem, not seeing it as a priority, don't see the benefit of this type of policies if it is really good for the organization, being considered as a secondary issue and this is the most difficult part to my view. It can happen that you meet people who say no we are against it and this is non-sense, but more common is to have people whom after the workshops or trainings they come to you and say 'yes, I never thought about these issues, now I can understand, it is important' but then finally the don't prioritize them".

Only one interviewee mentioned they met no resistances at all, due to their GEP being enforced by national policies.

"Our action is strictly connected to overall top down legislation and provisions. Since the 1999 law on gender equality was titled "for the advancement of women" the Gender Equality Officer experienced some communication problems and reactions like "now we have to do these things for women" as if gender equality was for women only, but this was really more of a communication problem than real resistance. The whole discourse improved a lot with the Gender Equality Standards by DFG and their change of approach dealing with the underrepresentation of women; but since 1999 there was never any real room for resistances as it was due by law. We didn't experience any real resistance. The deans were positive on the proposed measures and the members of the sounding board were very enthusiastic about the fact that University wanted to address work-life issues in general and gender issues in particular."

Several **strategies to tackle resistances** were mentioned and reported by respondents, that we can summarize as follow:
- Continued Raising awareness and training are needed
- Keep a positive – consensual approach and use different media to touch on cultural elements

- Be patient and aware: it is a long process
- Use multiple arguments, adapt them to the type of resistance and the type of audience
- Show the benefits of equality, highlight the negative impacts of inequalities
- Strategically hide gender on certain occasions
- Leverage on the personal level
- Connect with what is there already and make use of unused resources

A final remark on the 'economic benefits' arguments which were recalled in several of the answers: these are considered as useful means to react and tackle resistances to gender equality as they resonate with the request from leaders and managers of achieving increased quality and productivity. This has been one of the hottest and most contested topics in the debate on gender and political studies (Elomaki 2005; Rönnblom 2004, 2009), often contested for ending up hindering the transformativity of gender equality policies.

Among our respondents only one main critical view was expressed about the use of the economic benefit It was highlighted how in practice the use of this argument to legitimize gender equality policies needs to be supported by scientific proof of evidence in order to be effective, and it is therefore exposed to generate further resistances if not sustained by facts & figures in an appropriate way:

> "I thought a lot about the economic benefit argument, I see it can be useful to stress how women's employment can sustain the social security system or overall their participation in active life can benefit organization of society as a whole, but it has to be extremely well prepared and well sustained as an argument with accompanying figures as people from the management side in particular could counter argue and you need to dominate the issue quite well otherwise it could generate further resistances".

4   Concluding Remarks

At the beginning of this study we identified some key dimensions to define a Gender Equality Plan implementation process as a good practice in structural change for gender equality: our 19 interviews confirmed that most of the highlighted criteria are meaningful and perceived as such by respondents in framing quality and potential impact of Gender Equality Plans. It might be worth repeating how our goal was not to achieve an objective impact evaluation of the good practices participating to our study but, more limitedly, to collect perceptions and self reflections of subjects directly involved into GEPs implementation about their own strategies and achievements.

We have been aiming at improving our understanding of the conditions under which Gender Equality Plans can prove to have an added value as systematic and comprehensive policies in promoting structural change if compared with specific interventions or actions addressing particular inequality areas. Within the limitations of this study, we had the opportunity to start exploring this encompassing research question, and got a confirmation from the field that Gender Equality Plans can be effective in catalyzing interest and commitment from Research Performing Organizations as a suitable strategy to go beyond single, one-time actions to promote gender equality.

More in details, one main take-away from interviews is that GEPs risk to be put in place as merely formalistic excercises to comply with existing regulations, especially in cases where they are proposed as binding measures that Universities have to adopt but adequate funding for implementation is missing.

National policy frameworks and regulations where GEPs are required and linked to incentives/funds as well as to human resources and staff allocation to support GEPs implementation seem to constitute the optimal scenario to establish and sustain consistent institutional change processes. Still, also in these cases implementation is often uneven and works better in certain specific departments/faculties more than others, depending on individual contexts and decision makers support.

Strong motivation and active commitment from core groups of researchers, employees active in Gender Equality Bodies, as well as gender experts can represent a crucial factor enabling to attract further resources, such as National, Regional or EU funding to support GEPs implementation: several of the good practices we identified have benefited from this, leveraging on the networking capacities of the involved subjects.

Gender Equality machineries and bodies can be crucial players in these domains but not necessarily have a triggering role in pushing the structural change process forward as they might find themselves stuck into contradictions such as formal approval of GEPs on one side and lack of substantial backing and concrete endorsement from the organization on the other.

Structural change processes are acknowledged to be in great need of 'problem owners' and committed actors and mostly from the management levels: the quest for a top down support and approach in policy implementation is clearly emerging with a common understanding of what it should all be about: support from the Rectorate, Council, Head of Departments and Administrative (mainly HR) managers leading in the best case to integrating GEPs and Gender equality Actions in Strategic Plans of the University and official Recruitment procedures. Instead, the added value of a bottom up strategy was found to have a much more blurred meaning: it is seen as a tool

for raising internal awareness and consensus building, involving Faculties and Departments as opposed to a centralized strategy only, to engage young and non permanent researchers and/or students in order to connect GEPs as much as possible with real needs of the academic community.

The so called dual –triple track approach to gender equality policies combining equal opportunities strategies, affirmative –positive actions and gender mainstreaming is still considered as the most adequate strategy at EU level and in the literature on this topic: it also seems to feature most of the practices which were interviewed in our study. Resistances towards quotas perceived as inadequate measures were also mentioned by several RPOs with reference to academic and research cultures where meritocracy and evaluation of research quality are taken as objective criteria and their gendered, non neutral construction is ignored. Still, in several cases the setting up of targets – soft quotas for the under represented sex seems to meet consensus and be an effective tool in several of the cases we involved in our research.

Intersectionality was perceived by the majority of respondents as an added value for gender equality policies increasing its legitimacy (with reference to ethnicity, age, disability and LGBT identities), although some implementation concerns were raised and several of the challenges already highlighted by the literature on this subject were spotlighted during our conversations. Few other respondents stated they don't consider intersectionality as relevant, or they are concerned about risks to disempower gender policies in favor of more blurred diversity measures, or it would be subject to meet strong internal resistance. This is confirming the need to work more thoroughly to highlight how intersectional gender equality policies can be operationalized and be useful to avoid oversimplified 'universalistic' measures not taking structural differences and inequalities among women into account.

Overall and in terms of the challenges met in promoting institutional change through GEPs, sustainability and continuity in time were identified by most respondents as the biggest hurdle. There is a widespread awareness that change is uneven, discontinuous and slow as well as strongly subject to backlashes, even if it is pursued by way of a systematic approach through Gender Equality Plans. As anticipated, lack of sufficient human and financial resources is a big issue in many cases, that RPOs strive to face by making use of pro-bono work and, as said, external funding. Active engagement of gender researchers who can therefore take implementation as their own research subject and invest in it for their academic career in absence of dedicated resources is also a pattern in use, although research and policy implementation objectives opearate at different levels and are likely to collide at one point or another.

Resistances are acknowledged as to be met at several levels and across gender, age, employment sectors and career ladder's steps.

The interviews report which we collected are actually mirroring the tensions among different discursive frameworks and arguments used to promote gender equality which have been subject of a wide number of studies in political sciences in the latest decades: strategies to tackle resistances are either more apt at consensus building and adaptation to existing mainstream rhetoric's (the benefits of gender equality for academic productivity and excellence, and internationalization as main examples mentioned) or at struggling to highlight contradictions between recent research and higher education policy developments and gender equality. In both cases change is generated from the dynamic between dealing with existing power structures and achieving support from within and continuing to pushing the boundaries

A final mention could be worth making of the great variety of actions, measures and projects which are comprised under Gender Equality Plans, whereas few main concluding notes could be brought to the attention:

- Internal assessments and audits turn out to be more than preparatory research to feed into gender equality plans design and monitoring their implementation: they can become actions planned and included in the GEPs and availability of gender disaggregated data is always crucial.
- The trend is to have work life balance as a preferred topic in GEPs implementation and perceived as an easier topic to be addressed also at initial stages of structural change processes, varying from directly offering child care services or facilitated access to them, to promoting parental leave use, supporting research trips to parents or revising researchers' mobility schemes.
- Strategies and actions to address under-representation of women in academic and research leadership position seem to focus on the so called demand side and the use of soft quotas or targets is widespread and considered as effective, jointly with reframing recruitment guidelines and procedures to make them more gender sensitive.
- While initiatives to attract female students in STEM are definitely more common and risk to shift the focus outside the institution itself to target high or middle school girls students, gender as a dimension in STEM research and design is still less explored as a topic: there is strong a need to build understanding and internal capacity among STEM researchers and computer scientists on societal and gendered implications of research in their disciplines.

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GENERA: How to Commonly Address Gender Equality in Physics

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Abstract   Physics research may benefit from the greater presence of talented women at all levels, however, gender awareness and gender competences are not very much developed in this research field. In September 2015, 11 physics institutes and two professional support organizations started the EU-funded H2020 GENERA project with the motto "from physicists for physicists". After having assessed the status quo, the GENERA consortium prepared tools necessary to tailor, design and implement Gender Equality Plans (GEPs) and measures in the participating institutions. In the GENERA toolbox, for example, more than 100 good practice measures to support gender equality in physics institutions have been compiled. Supported by research on careers in physics and guided by project internal evaluation, the physics institutions created and implemented their GEPs. The GENERA project officially concluded its original three-year run on 31 August 2018. During its lifetime, GENERA has boosted awareness on the issue of gender equity in physics. A series of Gender in Physics days – one-day national events invented by GENERA and organized by the project partners – was particularly helpful and demonstrated that commonly addressing gender equality in a network is beneficial for all. This is why the partners of GENERA were setting up the GENERA Network to continue with the original project's activities after the end of the project, and to study the impact of GENERA on physics in the long run. Meanwhile, the GENERA Community of Practice has been created as part of the EU-funded ACT project to advance knowledge and collaborate in learning on gender equality.

Keywords   Gender equality. Physics.

Summary   1 Introduction. – 2 Gender in Physics – Assessing the Status Quo. – 3 Measuring, Monitoring and Evaluating the Progress. – 4 Customizing and Implementing Gender Equality Plans in Physics Institutions. – 5 Networking and Establishing a Sustainable Structure. – 6 Summary and Conclusion.

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1   Introduction

The GENERA (Gender Equality Network in the European Research Area) consortium has been formed to enhance gender equality in the field of physics research. Physics is a research field with a low representation of female researchers and a masculine image, and, this field, represented by different institutional actors, was targeted as the basis for GENERA analysis and interventions. GENERA brought together 34 Research Funding Organizations (RFOs), Research Performing Organizations (RPOs), and higher education institutions (HEIs) in the field of physics. The starting consortium carrying out the project was continuously extended during the three-year period to involve other interested major physics research organizations in European countries as associate partners or observers.

The GENERA consortium received funding from the European Commission under the call GERI.4.2014 "Support to research organization to implement gender equality plans", within the Horizon 2020 Science with and for Society work programme. Its aim was to perform the following coordination and support actions with a focus on physics research and a keen eye on cultural differences throughout Europe:

- Assess the status of gender issues in the partner organizations.
- Identify gaps in existing Gender Equality Plans (GEPs) or activities and determine specific needs or actions to enhance gender equality and women careers in physics.
- Monitor and evaluate the existing activities of the involved organizations (partners and associates) to address gender issues.
- Formulate customized GEPs and create a roadmap for their implementation in physics, with the potential of application in other research fields.
- Support participating organizations in implementing customized GEPs.
- Create a network of RPOs, HEIs and RFOs that can continue promoting gender equality in physics after the project ends.
- Set up a long-term monitoring system allowing organizations monitoring the impact of their GEPs in physics with the potential of application in other research fields.

2   Gender in Physics – Assessing the Status Quo

Throughout the project, GENERA followed a "from physics for physics" approach considering (a) the characteristics of physics research as a field and (b) how physicists usually tackle a problem (take data, identify the problem and find a solution).

As a starting point GENERA carried out a comprehensive literature study to understand causes of gender inequality as well as to map and identify successful gender equality measures and conditions for improving research cultural environment in the fields linked to physics.

In summary, "the cause of gender inequality in physics – and in science in general – is a complex issue and cannot be based on a single factor. In a growing number of analysis of impediments to female scientific career, it has been demonstrated that gender imbalance in science results from an interplay of many institutional, social, cultural and individual factors. They include – but are not limited to – gender stereotypes and implicit biases, traditional image of an ideal scientist connected with the masculine nature of science, gendered understandings about supposedly 'appropriate' and 'natural' male and female interests introduced at the early age and continuing throughout adolescence and adulthood, unfavourable academic climate for female scientists (commonly referred to as a 'chilly climate'), sex segregation of occupations, social norms of burdening women with excessive family responsibility for childcare, elderly care and household management, demands of full work-devotion within academia and STEM in particular, covert discrimination in the form of old boys' networks, biased hiring practices, unfair distribution of resources, cultural perceptions of femininity and masculinity, bullying and harassment, as well as career preferences and lifestyle choices" (citation from the GENERA Report on how to improve the research cultural environment).[1]

As a second step, many events to raise the awareness about the importance of gender equality were organized all over Europe. A concept for organizing Gender in Physics Days (GiPD) was developed in order to determine the current status of activities in participating countries oriented to promote gender equality in research, and gender equality plans in particular, focusing on cultural environments as well as identifying successful approaches and innovative ideas. The task of the GENERA organizations was to organize a tailored GiPD in their country. With the successful series of 10 GiPDs in total, more than 1,000 physicists and staff members became engaged in discussions about gender issues. The events were outstanding in promoting the importance of gender equality in physics. The GENERA project itself gained more visibility which helped the GENERA partners in their institution to design and implement GEPs. All stakeholders involved in gender equality were brought together to discuss jointly how to overcome gender imbalance and increase the involvement of men.

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[1] GENERA project, deliverable D2.2, report on how to improve the research cultural environment, 2016, `https://www.genera-network.eu/gip:howtoimproveresearchculture`.

Figure 1   Results of a workshop during a GIPD are presented and discussed with participants

For example, during the Italian GiPD, a school competition "Women in Physics: stereotypes and gender bias" was organized to address Youngsters and therefore the potential future generation of male and female physicists. The response was overwhelming, and the Italian GENERA partners received more than 100 hundred videos and articles from students. The winners of this competition were selected by a committee and awarded during the GiPD. The videos have been uploaded to YouTube.[2] Due to the success of this measure it was suggested to regularly repeat the school competition. The presentations and results of the GIPDs are available in the GENERA website.[3]

To analyze career paths and working conditions in physics, a study of interviews was carried out from 2016 till 2017. In total 83 semi-standardized and expert interviews were conducted with male and female physicists in research performing organizations, including both physics research institutes and physics departments of universities. The goal was to identify gender balance conditions in physics through assessing career paths of successful female and male physicists as well as the major challenges and obligations in their workaday life, through evaluating the supporting and hindering conditions for their career progression.

One of the main findings was that career paths in physics are less linear and more shattered and precarious than they used to be in the past . Such new emerging career pathways bring more difficulties especially for scientists with care responsibilities and thus a need for a certain level of security. Most scientists working in physics have a great passion and satisfaction for their research. On the other hand, the non-permanent contracts, the need for being flexible and mobile,

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2   GENERA project, Italian Gender in Physics Day school competition "Women in Physics: stereotypes and gender bias" videos, Italy, 2017, YouTube, `https://www.youtube.com/channel/UCxZx0CFc19g0HQqeQf2gIxg/videos?view=0&sort=dd&shelf_id=0`.

3   GENERA project, results of the series of Gender in Physics Days, `https://genera-project.com/index.php/gender-in-physics-days`.

the amount of working hours and the general work overload create dissatisfaction. Furthermore, micro-aggression towards female researchers is a common experience.

The main findings from this study and recommendations for Gender Equality Plans in physics have been described in the GENERA summary report and guidelines of the interview results available in the GENERA website.[4]

3 Measuring, Monitoring and Evaluating the Progress

As previously mentioned, GENERA followed a "from physics for physics" approach taking into account the characteristics of physics research as a field such as being data-driven as well as acting on evidence. Therefore, GENERA decided to define a common framework for collecting gender relevant data in physics research organizations.

In order to develop this framework, many existing examples of gender equality plans or similar gender equality audits have been examined to identify which categories of data are commonly collected. Based on this information a data template was prepared that includes fields pertaining demographics, education qualification career path, work organization, and research output. GENERA partners have been provided with this data template to check the actual accessibility of gender related data in their organizations, while considering that many data, collected for different administrative purposes, may be, however, difficult to access (e.g. because of privacy issues) and thus to use and analyse in the project.

As a result of the data accessibility in the partner institutions, the standard GENERA Data Set has been defined as laid out in table 1. This data have been collected for the first time by the GENERA partners for year 2017. Figure 2 presents the share of male and female in the distinct career levels over all GENERA partners.

Table 1   Description of the standard GENERA Data Set and the definition of the career levels

GENERA Data Set

	Variables
Work organization	**Functions/units responsible for gender equality/ diversity** (with organizational chart)
Demographic Data	**Gender** (man, woman, other) **Age** (in 5-year steps)
Career Path	**Staff x current level x gender** (1 to 4 levels including early stage, for definition see following table)
Work status	Full time Part time Fixed position/Time bound contract

Career levels

	Short label	**Definition**
Level 1	Leading researcher/ Research Director/ Professor	Top researchers, full professors, research directors. This level includes the top management and organizations directors. Activities primarily focused on high level research and specialist teaching, including research project leading/ research and institutional policy orientation.
Level 2	Established researcher/ Senior scientist/ Assistant professor	Senior researchers/scientists/lecturers including research managers and research group leaders. Activities could include research management, research group coordination and teaching.
Level 3	Recognised Researcher/ Post doc/ Junior Academic	Researchers/scientists/lecturers and postdoctoral scientists. Activities primarily focused on research and on teaching and programme management. This is considered the basic level of the career development in the organizations.
Level 4	First stage researcher/ Research assistant/ Doctoral candidates	Research and project assistants/doctoral students/ research grant winners pre-doc, including any researcher without doctoral degree. Activities focused on supervised research and training. Frequently participating in a structured programme or working collaboratively in a larger team. They may have student status and/or be employed by the organizations. This is considered the entry level in the organization.
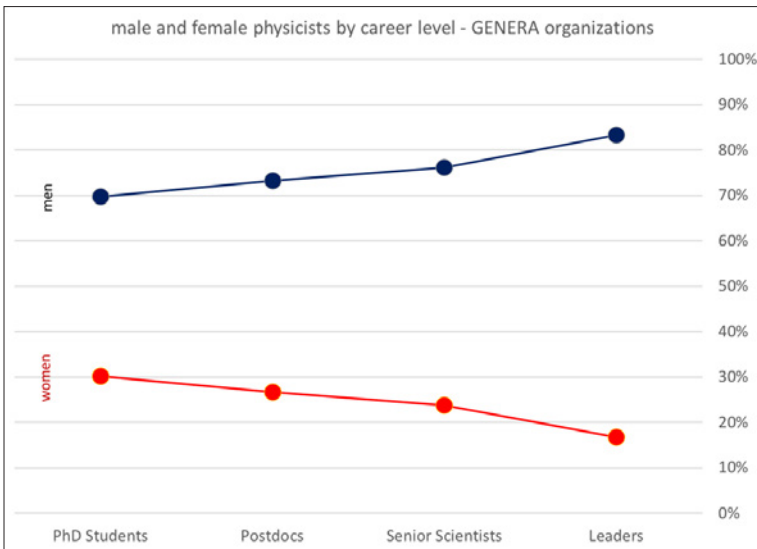
Unsurprisingly, the plot demonstrates the lack of women in physics research in all career levels and their disappearance as they advance on their career (leaky pipeline effect). It is especially important for physics research organizations to increase the number of female PhD students entering the academic system (30% in GENERA organizations) entering the academic system. Activities with children, pupils and students like the GENERA school competition (chapter 2) are thus highly recommended.

The GENERA data set forms the basis of the long-term monitoring to be performed as part of the GENERA Network and Community of Practice. The second data collection round has been started in March 2019.

4 Customizing and Implementing Gender Equality Plans in Physics Institutions

The overarching goal of the GENERA project was to support partner organizations in tailoring Gender Equality Plans (GEPs) to their individual needs, to provide help in the implementation of the GEPs and to monitor and evaluate this process.

Each implementing partner had to nominate a so-called "Implementation Manager" (IM). It was the duty of the IMs to liaise with all relevant institutional stakeholders and prepare or supervise the

preparation of GEPs in the implementing partner organizations. The IMs were asked to keep the management of their institutions informed and take care of the GEP implementation process as described in the implementation roadmap. The group of IMs came together for a regular exchange on the progress of the implementation in the individual organizations. Critical success factors for the GENERA change agents (or IMs) were the following: knowing the organization as well as having prestige and power, being supported from the highest management level, having competences in organizational change processes, having gender and diversity competences on a theoretical and practical level as well as organizing themselves in a team or committee within the institution. Last but not least, being provided with the suitable amount of resources to avoid that e.g. especially women have less time for their research due of their involvement in (gender) projects.

An extensive review of available toolboxes and toolkits for gender equality measures was carried out to prepare the GEP implementation. It has shown that there is a tendency to argue that "this measure might help in social sciences; however, physics is different!". After a careful discussion, the consortium decided to develop a toolbox for physicists by physicists with the focus on measures that (1) have been successfully implemented, (2) are systematically embedded in the institutional culture, (3) are sustainable, (4) are transferable to other disciplines and (4) ideally are innovative.

By the end of the project, the GENERA toolbox contained more than 100 gender equality supporting measures structured in six "fields of action" such as "structural integration of gender equality", "engaging leadership", "flexibility, "time and work life", "presence and visibility", "gender inclusive/sensitive organizational structure", and "gender dimension in research and education" and addressing eight different target groups: management and leadership, administrative personnel, scientific personnel, professors, postdocs and mid-career scientific personnel, PhD students/candidates and research assistants, students (undergraduate and graduate), and pupils. The GENERA toolbox is designed as a living document and will enable implementing organizations to tailor GEPs specific to their individual needs. The toolbox describes in detail the implementation objectives of each measure, as well as the difficulty of its implementation, which is classified as "easy", "advanced", "well advanced".

Inspired by the GEAR tool developed by the European Institute for Gender Equality (EIGE), a roadmap for implementing GEPs has been developed by GENERA. This step-by-step guide describes all the activities supporting the implementation of customized GEPs:

1. "learn": understand the structure of the organization and its rules
2. "analyse": analyse the state of affairs using gender indicators

3. "design": design a tailored GEP, define specific aims and develop dedicated measures
4. "implement": implement the GEP and its measures
5. "monitor and adjust": monitor the progress and adjust the specific aims and measures
6. "final evaluation": based on the results, adjust the GEP and move forward.

Having in mind that organizational change processes are far from being linear, the GENERA Roadmap helped to serve as a practical guidebook for the GENERA IMs throughout the entire implementation phase in the individual organizations. Training workshops thematically focused on the six roadmap topics have been organized for the IMs to enable exchange, mutual learning and empowerment as well as getting advice from the GENERA experts. Providing a strong support for the IMs was very important since change processes imply frustration and need patience, tolerance and persistence.

The accompanying project internal evaluation provided up to date information and knowledge about the status quo of implementation processes and, therefore, enabled to recognise activities where efforts were not realised, or were not effective and could be improved. Accompanying evaluation in this sense was a learning process, which supported the implementation activities and provided important information for modifications and adaptations.

As structural change processes are long-term efforts, the evaluation tried to assess the outputs, outcomes and impacts of measures for promoting gender equality in the partner organizations, providing also a monitoring tool therefore. The assessment of gender equality in the partner organizations – as part of the impartial evaluation performed by one project partner – has been advanced by the following three measures: first, a policy survey has been performed, to be aware and better prepared for a series of ex-ante interviews with important stakeholders of the institutions. This policy survey provided more information about the kind and scope of measures already implemented in the partners in GENERA. Second, fact sheets per partner organization have been developed out of the policy survey. Third, the series of ex-ante interviews with the GENERA partners has been prepared.

Target groups were specified, a guideline for interviews was developed and both were presented to the consortium. The different target groups were management, equality officers, HR leaders, local GENERA personnel including the implementation managers, female researchers and other relevant stakeholders. Partners were able to decide between face-to-face interviews at their premises or skype/phone interviews. The intention was to visit each at least once, either for the ex-ante assessment or the ex-post assessment.

Ex-post interviews were conducted near the project end. Throughout the project it became clear that the interviews not only had the function to gather data, but they also supported the processes within the partner organizations by providing a signal that gender in physics is on the European agenda and gave those involved the chance to talk about existing issues.

Driven by the limited project lifetime that mainly allowed to design and put GEPs in place, the project partners decided to develop an overall frame to monitor GEP progress – out of which each organization can choose measures and targets best fitting for their implementation work. The resulting PAM (Planning – Action – Monitoring) tool[5] is not used to compare on a macro-level, but to monitor progress within a research organization. PAM allows users to find measures, indicators and targets for GEPs. The tool has been designed along the experiences that were made during the lifetime of GENERA. It is therefore a tool based on the experiences in physics organizations and it has been specifically conceptualized to monitor gender equality plans and measures in physics.

5 Networking and Establishing a Sustainable Structure

The GiPD events and all the other dissemination activities created a growing interest from institutions to join GENERA. Throughout the entire project lifetime, it was possible to extend the GENERA consortium by integrating additional physics and related institutions interested in GENERA project, who were granted observer status. Figure 3 shows the map of all 13 beneficiaries, 3 associates and 18 observers of the GENERA consortium as of August 31, 2018.

In contrast to the beneficiary organizations, whose work in the project was funded from the project grant and whose role was clearly defined and monitored, the observers could decide whether they only want to follow the project activities or get involved in the project tasks.

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5 GENERA project, Planning – Action – Monitoring Tool, 2018, `https://www.genera-network.eu/pam:pam`.

It was already defined in the GENERA project work program to plan and establish a sustainable structure (GENERA Network) responsible for a long-term monitoring, impact evaluation and consulting for future gender activities. To introduce GENERA achievements and plans for GENERA Network to the entire physics community in Europe, all 5,000 physics institutes and physics departments and faculties listed on the PhysNet website[6] have been contacted and invited to two combined networking and policy briefing events.

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6 List of European physics departments, PhysNet, `http://de.physnet.net/Phys-Net/europe.html`.

Figure 4 Panel session during the second networking and policy briefing workshop with Gareth O'Neill (EuroDoc), Fabienne Gautier (Euraxess), Ana Arana Antelo (European Commission), and Cécile Gréboval (Council of Europe)

During the workshops many ideas were collected, that helped shaping the objectives and tasks to be addressed with GENERA Network. Based on this, the GENERA consortium prepared the GENERA Network Memorandum of Understanding (MoU).[7] The MoU describes a lightweight structure with no financial or legal obligation, designed instead to establish firm commitment by the members to participate in the data collection and monitoring and improving gender equality in physics. At the GENERA final event on August 31, 2018 the GENERA Network was officially launched, having established the required minimum of five member organizations signing the MoU. Details about the GENERA Network consortium can be found on the GENERA Network website,[8] in June 2019 GENERA Network comprised 26 member organizations and four organizations that received the Friends of GENERA status.

7 GENERA Network, Memorandum of Understanding, 2018, `https://www.genera-network.eu/mou`.

8 GENERA Network, consortium members, 2019, `https://www.genera-network.eu/network`.

6   Summary and Conclusion

The GENERA project was able to bring together major players in physics research in Europe to address gender equality in a cooperative way and sustain its activities by creating the GENERA Network. All the dissemination activities together have created a great visibility and helped establishing GENERA as a brand. The great interest in the physics community all over Europe and beyond confirmed the importance of the subject and that GENERA as a collaboration on gender equality at the European level had an impact on the strengthening of the gender dimension at the institutional level. It is assumed that in the coming years GENERA work may also affect national and European research programmes dedicated to physics research and beyond.

Tackling gender equality issues as a joint activity in a collaboration has been proven successful. It was quite helpful that physicists are used to work in larger cooperative environments when intellectual and material resources need to be pooled to build and maintain large research infrastructures and many countries must join forces.

The present status of activities in participating institutions oriented to promoting gender equality was assessed Successful approaches and innovative ideas for gender equality measures have been incorporated in the GENERA toolbox and roadmap. By analysing existing GEPs, GENERA was able to identify missing elements and develop new features to complete the GENERA toolbox. With this toolbox all GENERA implementing partners and some of the GENERA observers were able to customize GEPs. The roadmap served as guidebook for the implementation of the GEPs.

The design and implementation of GEPs was accompanied by a professional internal monitoring and evaluation. All implementing partners received feedback and strong support on how they could improve their gender balance, identify gaps and suitability of recent gender actions, and how to continue the monitoring and evaluation beyond the lifetime of the project. The PAM (Planning – Action – Monitoring) tool was developed to monitor progress of gender equality.

The approach to have an impartial evaluator, a GENERA consortium partner, was effective, stimulating and helped to make the design and implementation a success. The GENERA "critical friend" (as the evaluator was named) served as a source of expertise and guidance to early communicate also potential difficulties.

By a consecutive extension of the GENERA consortium, during the project lifetime and with the founding GENERA Network at the end of the project, an European alliance of RPOs and RFOs responsible for a long-term monitoring, impact evaluation and consulting for future gender activities was established.

Several GENERA partners participate in the EU-funded ACT project, which shall build up so-called "Communities of Practice" (CoP)

to share knowledge on GEP implementation and related topics. GEN-ERA Network will be forming one of the ACT CoPs. ACT will support GENERA Network to enable a knowledge transfer and sharing the evidence of the benefits of implementing gender equality plans and thus increase the number of RPOs and RFOs making use of GENERA achievements and implementing GEPs. Therefore, it can be assumed that, in the medium- and long-term, GENERA activities will contribute to the achievement of ERA by increasing the number of female researchers, improving their careers and mobility and thus contributing to research intensity. The existence of a GEP and good working conditions in a physics institution might become a selection criterium for researchers in Europe.

The tight bilateral or multilateral cooperation and communication between partners and individuals involved in GENERA is expected to last beyond the project lifetime. This will foster the overall impact of GENERA. Furthermore, some GENERA partners were able to organize a GiPD or a school competition again. It can be assumed that within GENERA Network GiPDs can be established as regular events.

The diversity of the GENERA consortium was immense in terms of sex, disciplines, researchers vs. practitioners, young researchers vs. professors, national backgrounds, languages, cultures of working together, different levels of gender competences and the amount of gender activities in the involved organizations. The positive effects of diverse teams are well proven (for example Catalyst. *Diversity Matters*. New York: Catalyst, October 1, 2014). However, making diversity accessible in teams is an additional task and the way to get there can be intense and complex. Success factors to create a fruitful and learning environment within the GENERA consortia was (a) focus on the similarities and (b) sharing the common vision of a diverse research culture with less gender discrimination. With doing so, GEN-ERA has created a unique collaboration between physics and gender scientist supporting the GENERA community now and in the future to commonly address gender equality in physics.

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The How, What and When of Project Monitoring

Facilitating Successful Implementation of Gender Equality Plans in European Research Institutions

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Abstract   This paper focuses on monitoring as a key component of successful structural change projects. Project monitoring is usually defined as an on-going collection of project data in order to assess whether a project is going in the right direction and follows the pace and stages set beforehand. This paper elaborates on the how, what and when of successful project monitoring and describes the strategies and approaches to monitoring that was used in the international, collaborative project GenderTime. In this project seven different tailor-made gender equality plans (GEPs) were implemented in seven research institutions in seven European countries. The seven GEPs contained a very diverse set of over 100 actions to improve gender equality and strengthen the position of women researchers in these institutions. GEPs are inherently complex, constructed to solve complicated, multi-dimensional and contextually dependent problems concerning gender inequality. The project data in GenderTime, that needed to be monitored, was thus characterized by being qualitative diverse and quantitatively extensive. This paper describes the monitoring strategy that was developed to fit this context and the monitoring tools that were designed and implemented. The overall aim of the paper is to share and disseminate the knowledge gained regarding monitoring during the four years of the project.

Summary   1 Introduction. – 2 Monitoring principles. – 3 Monitoring Toolbox. – 3.1 Cultural Staff Survey and National Survey Reports. – 3.2 Peer Consultation Reflection Session. – 3.3 Incremental Transformation Process Monitoring Tool. – 3.4 Most Significant Change Technique. – 4 Concluding discussion.

1   Introduction

Evaluation and monitoring are essential elements in programmes and projects that set out to produce some kind of change in behaviours, events, cultures or conditions in society, sectors or in organizations (Kusek, Rist 2004). The purpose of evaluation and monitoring activities is to find out if the programme is working as it is expected and planned (Pawson, Tilley 2004). Monitoring refers to the on-going collection of data to assess whether a change project is going in the right direction and complies with the pace and stages set in the project plan (Funnell, Rogers 2011). The purpose of adopting such an internal monitoring system in a change project is to gain a comprehensive understanding of the interventions, to learn from successes and challenges and to facilitate incremental corrections and improvements.

Monitoring contributes to systematizing change interventions and the implementation process. It can produce detailed and structured information about what is happening in the change project and how the interventions are going (Rossi et al. 2004). Monitoring identifies whether or not the desired results are achieved and can be used to develop corrective actions to optimize future achievements (Williams, Hummelbrunner 2010). It tracks progress and reports on achievements at different times in the project. This systematic knowledge can be further used to re-adjust objectives and goals and keep them realistic (cf. Kotter 1995). In addition, monitoring can systematize individual and shared reflection. It can thus be used to provide a framework to facilitate knowledge sharing between participants and stakeholders in a project (OECD 2002). These reflections can be used to improve the interventions and implementation of the change plans, but also to develop plans for how interventions can be adopted to other circumstances and transferred to other settings (Kusek, Rist 2004).

Although the benefits of monitoring seem obvious, it is often not given a prominent place in change projects and sometimes it is overlooked completely. The distinction between monitoring and evaluation is also often unclear. Defining monitoring and evaluation in relation to each other can prove challenging, particularly considering there are several different types of both monitoring and evaluation, some of which are overlapping (Equality Challenge Unit 2014). This seems to have resulted in that most projects put an emphasis on evaluation, and less so on monitoring, which could have as a conseuquence that certain crucial elements of evaluation/monitoring are understated.

The purpose of this paper is to fill a gap in the existing literature on project/program evaluation and monitoring, and draw special attention to the possibilities with monitoring. The aim is to present the strategy and the principles that guided monitoring in the GenderTime project and some of the most central monitoring tools developed and adopted in the project.

GenderTime,[1] a project funded by the European Commission between January 2013 and December 2016, aimed at increasing the participation and career advancement of women researchers in seven research performing institutions (RPOs), using tailor-made Gender Equality Plans (GEPs). Monitoring was a key component of the implementation of these GEPs. It involved frequent collection and analysis of information about the work performed in the project to be compared with previous set objectives and targets, and connected discussions about corrective actions (if necessary). This was done through regular face-to-face feedback during the project meetings and written reporting in between the meetings. Relevant procedures, tools and analytical indicators for monitoring were developed throughout the project: 1) to define tailor made indicators and to develop monitoring tools, and: 2) to monitor the outcome of the action plans in each GenderTime institution. A total of ten monitoring tools were designed and applied during the 48 months of project duration **[tab. 1]** (Peterson, Dahmen 2018).

Guiding the development of the monitoring tools were eight principles outlining the how, what and when of efficient project monitoring. These guiding principles were, however, initially only implicit in the monitoring work. They were elaborated in a more explicit manner parallell with the development of the monitoring tools themselves. The eight guiding principles for monitoring are the result of, and emerged from, the monitoring work during the four years in the GenderTime project. They comprise the lessons learned during the project. As such, they include references to previous research and build on theoretical starting points, but also draw on the empirical data collected and the experiences from developing and implementing the specific monitoring tools in the project. The eight monitoring principles summarize assumptions regarding the character of monitoring tools, the timing of implementing monitoring tools and other key features of a successful monitoring strategy. Below, these principles are described and explained.

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2 Monitoring Principles

1 Make monitoring an integrated part of the project

This is a comprehensive recommendation that has several implications for the overall planning of monitoring. To integrate monitoring in the project means that it considered a core part of the project and a continuous process throughout the different phases of the project. The implication of this is that monitoring activities should be planned parallel with other project activities.

2 Combine a deductive approach with an inductive one

This recommendation concerns the overall strategy for the process of developing the monitoring strategy. Combining a deductive approach with an inductive means to draw on research-based literature about organizational change but to also let the monitoring process be flexible and guided by empirical observations of the change process being monitored.

3 Combine qualitative and quantitative tools

This recommendation concerns how to design the monitoring tools. A diverse and unique set of monitoring tools should be adopted, with a wide range of methods and performance indicators; questionnaires, checklists, interview guides and workshop concepts for team discussions. Decisions about when to implement which tools should be based on considerations of the project phase. While the launching phase of a project may benefit from quantitative tools, the reflection phase may require qualitative tools.

4 Tailor-make monitoring tools

This recommendation concerns the character of the monitoring tools. Tailor-making monitoring tools means to design them while taking into account the specific, local, context that they will be implemented in and allow for them to be adapted to this context. This tailor-making aspect cannot be achieved without monitoring being an integrated part of the project or without it being a collaborative effort.

5 Collect diverse and varied data

This recommendation concerns the data collected. Monitoring tools should collect data and information with a focus on diversity, variety and inclusion. The implication of this is that monitoring tools should include the direct involvement of both project members and so-called target groups or beneficiaries of project activities.

6   Make monitoring a collaborative effort

This recommendation concerns the question about participation and who should be involved in monitoring activities. Making monitoring a collaborative effort means involving all project members. This involvement concerns not only the collection of information but also the assessments and analyses of the data gathered. Feeding back the results from the monitoring activities to the project members creates a dialogue about future improvements of the project– also of monitoring. This dialogue is essential for adopting an inductive approach.

7   Adapt to the project phases

This recommendation concerns the timing of monitoring. The intensity and frequency of monitoring should take into consideration the specific project phase. The implementation phase e.g. might call for more intense monitoring than the launching phase. The monitoring tools should also have different design depending on the phase. During the final phase, they should e.g. allow for reflections of the complete implementation process (and thus might overlap with certain evaluation activities).

8   Allocate sufficient resources to monitoring activities

The final recommendation concerns the budget and person months dedicated to monitoring activities. Monitoring should not be regarded as a side-product to the actual implementation work. Rather it is an important accompanying measure, which helps to understand underlying processes for enhancing the effectiveness of the practical work. Therefore, sufficient time and financial resources are necessary for both the persons undertaking the monitoring and for the monitored actors.

3   **Monitoring Toolbox**

The construction of each of the ten monitoring tools followed a systematic and innovative approach that built upon a thorough meta-analysis and bibliographical review of previous research. This was combined with a carefully constructed theoretical framework. In order to even further solidify the soundness of the monitoring approach, international gender equality experts were interviewed about their experiences and advice additionally.

Table 1 below displays the monitoring tools developed and implemented within the project. The table illustrates the different approaches, concepts and contents of the tools and in which phase of the project the tools were implemented.

Table 1 Overview Monitoring Tools in the GenderTime (GT) project

Monitoring tool	Approach	Performance indicators	Phase	Target group	Content	Significant results
Cultural Staff Survey	Quantitative	Survey questionnaire	Launching phase	Staff	Baseline	Status quo/Benchmark
National Report	Quantitative	Report template	Launching phase	Staff	Baseline	National/Institutional differences
Exchange Workshop	Qualitative	Workshop	Implementation phase	GT members	Implementation process	Success cases and challenges
Operational Process Monitoring Tool	Qualitative	Report template	Implementation phase	GT members	Implementation progress (objectives)	Identifying supporting/challenging factors
Self-Assessment of Change Agent Role	Qualitative	Questionnaire	Implementation phase	GT members	Change drivers	Resources for Change Agents
Interim Feedback Report	Quantitative/Qualitative	Excel sheet	Implementation phase	GT members	Implementation progress (actions)	Success factors and hindering factors
Peer Consultation Reflection Session	Qualitative	Workshop	Implementation phase	GT members	Implementation process	Overcoming challenges/using support factors
Incremental Transformation Process Monitoring Tool	Qualitative/Quantitative	Workshop	Reflection phase	GT members	Indicators, goals and impact	Step by step achievements
Most Significant Change Technique	Qualitative	Interview guidelines/workshop	Reflection phase	GT members, staff	Indicators and impact	Significant individual/organizational changes
Final Feedback Report	Qualitative/Quantitative	Report template	Reflection phase	GT members	Impact	Overall evaluation of process and impact

Four of these monitoring tools are described more in detail below. The selection of these tools was made because they are characteristic for the systematic and innovative monitoring approach in the GenderTime project (Dahmen, Peterson 2017).

3.1 Cultural Staff Survey and National Survey Reports

The Cultural Staff Survey was the first monitoring tool applied in the project. The aim of this monitoring tool was to provide the seven national project teams with a quantitative indicator they could use to measure the level of gender equality at the participating institutions at the start of the project, i.e. to establish a baseline for the implementation of the GEPs.

The Cultural Staff Survey was based on a Culture Analysis Tool[2] developed by UKRC-WISE, as part of the HEFCE funded national HE STEM programme with the aim of sharing good practice in gender equality in higher education. The aim of this questionnaire is to help university departments understand how male and female staff experience their working environment and what, if any, improvements may be needed to ensure equality of opportunity. It focuses on four areas:

1. Participation and promotion practices
2. Workplace culture
3. Leadership and management commitment
4. Institutional reputation and social responsibility

Six months into the project the national teams were involved in tailor making the survey to fit their specific national and cultural context but also to fit the intended target groups of the survey (research staff and/or administrative staff). The questions were adapted to meet the specific context of each institution also with regard to already existing gender equality activities of the organization. The surveys were translated into national langugaes and applied as online survey, which allowed a better dissemination of the questionnaire within the institutions/organizations (Barnard et al. 2014).

The implementation and analysis of this survey symbolized a benchmarking for the national teams about the work culture in their institutions. It is a useful tool for getting information on staff member's perceptions of working conditions, management structures, communication flows and organisational environment not only with respect to gender equality matters. For achieving gender equal workplace conditions, it is important to focus on the prevalent organisational structure itself (Castaño et al. 2010). The results further showed that the implementation of gender equality measures or GEPs can be even more difficult if actors in an organisation are not well informed about the legal, national and organisational context (Achterberg, Dahmen 2017).

A tool like the Cultural Staff Survey offers the possibility for an ongoing reflection of the implementation process on a structural and in-

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2 See: https://www.wisecampaign.org.uk/resources/2010/06/staff-culture-analysis-survey for more information (2018-02-22).

dividual level, which is important since organisational culture is not a static concept, it is fluent, and therefore it is necessary to explore the beliefs and behaviours within institutions. For these reasons, it can be recommended to implement staff surveys periodically or at least at the beginning and the end of an intervention for comparing the effects and results.

Due to the complexity of the GenderTime project, regarding the different national contexts, the Cultural Staff Survey was complemented with another monitoring tool; the National Survey Report. The aim of *the National Survey Report* was to support and facilitate a cross-national analysis of the results of the Cultural Staff Survey. The tool provided the possibility to compare the survey outcomes cross-nationally taking in consideration the interpretation of each team on their respective results. Results offered indications for the further implementation as well as monitoring process.

This tool filled an important function in order to develop a shared understanding of the national, organisational, cultural and social context in which each of the seven GEPs were implemented. Without this context, it would not only be difficult to interpret the results of the survey, but it would be difficult to monitor the implementation of the GEPs. This context was also essential for the dialogue-based knowledge exchange between the national teams, which was a central feature of the GenderTime project. Without it misunderstandings and miscommunication could easily create problems.

All partners were asked to give more context information on some selected survey questions, which are difficult to interpret for external persons without having organizational background knowledge. Additionally, also general information about the implementation background of the survey at their institution, e.g. if they had received any feedback from staff members etc. should be provided.

The National Survey Report was designed as a Word-template and consisted of two parts. Each part included questions and text boxes where the requested data could be inserted by the national teams. The first part of the National Survey Report focussed general information about the Cultural Staff Survey. In the second part of the National Survey Report the national teams were asked to add their own interpretation of the data and the results of the Cultural Staff Survey regarding some specific questions.

3.2 Peer Consultation Reflection Session

The Peer Consultation Reflection Session was also a monitoring tool based on the monitoring principle about reflection as an important monitoring methodology (Coleman, Rippin 2000). The aim of the monitoring tool was to create an arena where participants in the Gender-

Time project could listen, reflect, share ideas and solve problems to-gether and learn from each other's experiences of the implementation progress across the national teams. The tool was inspired by previ-ous literature on peer consultation reflection exercises (Brown et al. 1999). Peer consultation reflection exercise is an innovative strategy for personal and professional development that can be used in many different settings, to create a valuable opportunity to interact and learn from colleagues. It is a method that encourages and helps peo-ple to see their situation from a different perspective and to under-stand problems in a different way.

The Peer Consultation Reflection Session monitoring tool was a workshop concept where the participants were divided into four dif-ferent peer reflection groups to discuss four different themes. After 30 minutes discussion in these four groups, four new groups were formed, discussing four new themes. Besides the discussion themes the participants were also provided with instructions for how to dis-cuss them. Participants were expected to switch between taking on the role as a presenter, i.e. a person that describes and reflects over a situation, action, challenge or good practice, and the role as reflec-tion facilitators. Reflection facilitators were expected to pose ques-tions to the presenter to further clarify the challenges or to further increase the understanding of the success factors. The participants in the groups form a peer reflection team that facilitates the reflec-tions of the presenter and contributes with their reflections on how to for example overcome challenges or how to best take advantage of success factors.

In order to facilitate reflections to be shared in a helpful manner and to stimulate sharing of good advice and solutions to challeng-es the discussion themes were constructed as so-called "how to"-themes. The first round of reflection sessions was organized around the following four themes:
- How to assess equality in complex organisations?
- How to understand the gendered career through interviews and focus groups?
- How to raise awareness within the organization?
- How to support women through mentoring?

The second round of reflection session was organized around the following four themes:
- How to monitor through gender sensitive indicators?
- How to identify career obstacles through exit interviews?
- How to disseminate good practices outside the organization?
- How to challenge male dominance through women's networks?

The participants in the workshop were divided into the Peer Con-sultation Reflection Sessions groups based on information reported by the GenderTime partners in the Interim Feedback Report but also in two previous monitoring tools: *the Operational Process Monitoring*

Tool and *the Self-Assessment of Change Agent Role* (information on these two tools is available in our published Monitoring Handbook [Peterson, Dahmen 2018]). The groups were thus constructed based on whether the participants could construct helpful advice based on previous experiences within this field of subject – or whether they had requested or could use such advice in the near future.

After 60 minutes everybody had participated in two Peer Consultation Reflection Sessions and a short "check-out" phase commenced, where one rapporteur in each of the eight teams reported back their main reflection results and the key insights that had surfaced during the reflection sessions. This "check-out" round revealed that the workshop concept had been successful in providing an arena for sharing and reflection over a wide range of relevant and important themes. During the sessions there had also been a note taker in each eight teams and the notes were handed in to the workshop leaders on so called "reflection sheets".

3.3 Incremental Transformation Process Monitoring Tool

The *Incremental Transformation Process Monitoring Tool* is another workshop exercise concept that was implemented during one of the GenderTime project meetings. The workshop focused on setting and achieving intermediate goals and defining gender equality impact relatively and contextually in relation to the starting point in each participating institution. The workshop concept was developed with a theoretical base in Kotter's (1995, 1996) theories about organizational change.

For the workshop, one step from each of Kotter's three phases – form, generate and sustain – was picked out for three different groups to work on. The reason those three steps were chosen was that the previous monitoring tools had not targeted them although they were considered as essential to discuss and pay attention to. The first of the three steps that was selected for the monitoring workshop concerned forming a strategic vision and initiatives and the group that was assigned to work with this was given the following questions to discuss: What were your visions when GenderTime started? How do we know that we are getting closer to the visions? How have visions shaped strategies used? Have the visions changed over time? How have you communicated the vision? What can be learnt about visions from GenderTime?

The second of the three steps involved how to generate short term wins and the group that was assigned to discuss this step was given the following questions: What intermediate goals have you achieved? What measures provide evidence of these successes? What methods can be used to communicate the goals to motivate and increase credibility to gender equality change processes? What can be learnt about

short-term wins from GenderTime? The final and last of the three steps – how to sustain acceleration – was given to the last group to discuss with the following questions: How can you build on already achieved goals to continue to drive change? Can you keep looking for improvements or bring in new change agents? Can successes in GenderTime be built on to develop new actions for the future?

Each group was provided with a template where the questions were posed in a figure that illustrated the connections between them and the implementation process. The outcomes of the small group discussions were later reported on and discussed within the whole project consortium. The feedback from participants about this tool was very positive.

3.4 Most Significant Change Technique

While evaluation and monitoring tools usually adopt a deductive, theory-led, approach and use pre-defined indicators of change, the *Most Significant Change* (MSC) technique explores definitions of change among stakeholders, beneficiaries and field-level workers (Benning et al. 2012). It is based on stories told by participants and therefore gathers rich and "thick" descriptions that make intangible changes visible that would remain hidden if only more traditional, or conventional, quantitative evaluation and monitoring methods were used (Davies, Dart 2005). The MSC technique is a monitoring method that is dynamic and adaptive and particularly appropriate in complex programmes where the impact is difficult to quantify and involve social and culture change (Willetts, Crawford 2007).

The aim of the adapted tool was to collect MSC stories from two groups of participants: 1) stakeholders and beneficiaries of Gender-Time who participated in change activities, and, 2) the change agents working within the project. Previous literature on the MSC technique was consulted (e.g. Davies, Dart 2005) about how to formulate appropriate questions for a questionnaire/interview guide aiming to collect MSC stories. As a result, a questionnaire/interview guide, which included two complex questions was developed **[tab. 2]**.

Table 1   The two questions included in the questionnaire/interview guide
in the Most Significant Change Monitoring Tool in GenderTime

1) Describe the project related activity/measure that you took part in. Reflect over the most significant change that you personally experienced in relation to participating in the activity. It can be a direct change (you learnt something) or an indirect change (you made a change due to the information that you learnt). Please explain why this change is important to you. Examples: change in career possibilities and opportunities; change in awareness about gender and gender equality; changes in networks and contacts
2) In your opinion, what has been the most significant change that has occurred in your institution as a result of the project? Please describe why this change is/was important to you. Examples: change in attitudes, climate and culture; change in administrative routines; change in leadership and management; change in the physical environment etc.

Source: Adaptation of the MSC Technique, cf. Benning et al. 2012; Dart, Davies 2003; Davies, Dart 2005; Lennie 2011; UNDP 2009; Willetts, Crawford 2007

The questions were framed as open questions while at the same time encouraging the participants to be selective in their reporting. The MSC monitoring tool thus only used two predefined so called domains of change in the questionnaire: 1) individual and personal changes ("that you personally experienced"), and 2) organizational and collective changes ("in your institution") (as displayed in table 2). These two domains of change were also developed in previous research on organizational gender change (Benschop, Verloo 2012).

The MSC monitoring tool was used in three different ways: 1) as guidelines for face-to-face interviews with beneficiaries; 2) as questionnaire template for email interviews within the same group; and 3) as an interactive workshop concept, implemented during the last project meeting, with the change agents of the project core team as target group.[3]

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[3] A detailed description of the development and application of the Most Significant Change Technique as monitoring tool is available in: Dahmen-Adkins, J. & Peterson, H. Most significant Change: Closing the Gender Gap in Research. Proceedings of the 2nd International Conference on Gender Research, p. 151-158, (2019), https://www.re-searchgate.net/publication/332180557_Most_Significant_Change_Closing_the_Gender_Gap_in_Research (2019-07-14).

4   Concluding Discussion

This paper has presented in detail only a selection of the monitoring tools developed in GenderTime. It must also be noted that not all of the monitoring tools have yet been tested beyond the GenderTime project.[4] A remaining challenge is therefore to evaluate the monitoring tools and assess the possibilities to adapt and transfer them to other contexts. Most of the monitoring tools were however, appreciated and they were always developed while taking into account suggestions and requests from the GenderTime project consortium. In this way, the deductive approach to monitoring was combined with an inductive approach (Dahmen, Peterson 2017).

The primary aim of the paper was to introduce the systematic and innovative approach to monitoring that guided the development of the monitoring tools and the strategy used. These principles outline the most essential elements in the monitoring approach adopted. The main conclusion that can be drawn from our work, could be added as final principle: *Monitoring is necessary in order to reach sustainability of implementation processes.*

We hope that sharing our experiences of monitoring can inspire others and contribute to that monitoring becomes established as an essential part of the implementation of GEPs but also in other structural change processes. Our literature review identified a gap regarding documentation of monitoring activities that this paper addresses. More research is however needed concerning the relationship between evaluation and monitoring as these activities are sometimes, and perhaps inevitably, overlapping.

Besides being invaluable for the implementation process the monitoring tools also provided the project with empirical qualitative and quantitative data that can be further analysed and shared with the research community to provide new knowledge on gender equality change processes and success factors and hindering factors. We hope that this paper has contributed to this.

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4 Some of the tools are currently adpated within the Horizon 2020 project CHANGE, a so-called sister project of GenderTime with similar objectives and aims (www.change-horizon2020.eu).

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Gender Composition of Boards of Directors and Sensitivity to Gender Issues in Italian University Strategic Plans

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Abstract In the recent Italian regulatory framework, planning is the main point in the effective accomplishment of the mission of universities. Among the planning tools envisaged by the legislator, on one hand strategic plans outline the mission, the strategic guidelines and the objectives of the University, and on the other hand the integrated plan, which includes shorter-term objectives and strategies. Previous research suggests that women in boards of directors bring new perspectives to the board themselves. The objective of the essay is to verify if the gender composition of these bodies influences the quality of the planning process that produce effects on performance and achievement of results. The impact of board structure on gender sensitivity of the Italian state universities is thus explored, and it is verified considering both the process and the content of documents (Strategic Plans). In particular, we use the content analysis methodology in order to build a compliance indicator on the planning process and content. The empirical findings suggest that boards with higher gender diversity are positively related to the gender sensitivity of the strategic plans: the participation of women in the board of directors brings new perspectives to the board and addresses the gender sensitivity of the institution.

Keywords Gender. University. Italy. Planning. Control bodies. Boards of directors.

Summary 1 Introduction. – 2 Gender Composition of Boards. State of the Art. – 3 Gender Composition of University Boards. – 4 Strategic Planning in Universities: Process, Tools, Actors. – 5 Research Objectives. – 6 Research Methods. – 7 Results. – 8 Conclusions.

1 Introduction

Previous research shows that, although explicit gender discrimination has been outlawed for many years, management in organizations is not gender neutral, as it involves traditional gendered practices and subtle discrimination still exists (Broadbridge, Hearn 2008; Willemsen 2002). Despite the feminization of certain disciplines (women's concentration in social sciences, pedagogy, medicine), science continues to be a male-dominated activity. Although women are the majority among graduates, and their share grows among university staff (even in the highest rank) (European Commission 2012), career development is very much dependent upon the field of research, so that both horizontal and vertical segregation are present. At the same time, women are underrepresented in all key decision-making roles and men still dominate in corporate decision-making bodies, while women's marginal participation persists (Desivilya Syna, Palgi 2014), showing often subtle and implicit gendered processes at the top management levels (Nielsen 2010; Sheridan, Haslam Mckenzie, Still 2010). Heilman (2001) argues that gender bias in evaluations is one of the causes of the scarcity of women at the upper levels of organizations. In its report on gender segregation in education, training and labour market, the European Institute of Gender Equality (EIGE 2017) states: "Gender segregation narrows life choices, education and employment options, leads to unequal pay, further reinforces gender stereotypes, and limits access to certain jobs while also perpetuating unequal gender power relations in the public and private spheres", and it is one of the factors contributing to the shortage of STEM professionals, as well as to the inefficiency and rigidity of the labour market.[1] Academia is traditionally based on a highly institutionalised and bureaucratic hierarchical system, founded on sets of values that define and maintain a specific configuration of gender roles and relations, while the persistence of gendered structures and processes is largely attributed to the institutional culture that legitimises and ascribes neutrality to these processes.

Changes to gender equality in academia worldwide reflect wider societal changes, and they are also directly affected by legislation, regulatory frameworks, action plans, university strategies, and committed individuals. Research approaches and policy debates on gender equality in research have substantially evolved over the past

1 https://eige.eu-ropa.eu/rdc/thesaurus.

decades. In the 1980s, policy concerns in European and other Western countries were mainly placed on women's recruitment while research focused on gendered socialization and educational and professional choices. In the 1990s, research addressed issues of retention and career advancement over entry and qualification issues – shifting to an organizational approach towards an institutional transformation – and the focus was increasingly placed on research organizations, their implicit norms and standards, embedded structures of inequality in institutional practices, and power relations (Glover 2010). Changes in the higher education landscape can be observed across Europe since the 1990s and gender equality measures have been brought into university governance systems. The main claims for inclusivity have been: the Anglo-American "diversity management" model (mainly used in the corporate sector) and the "gender/diversity mainstreaming" approach – institutionalized in the state sector especially by the United Nations and the European Union. The relevance of these models varies across different types of higher education systems and contexts; however, "women's/gender equality" has become a powerful asset extending norms about rights and formal equality. Mainstreaming gender into universities has meant the development and the formalization of new indicators of gender equality for translating systematic gender gap into policy-making initiatives. The European Union has engaged in several initiatives that encourage universities to adopt positive actions, including measures targeting women to overcome their position of inequality (Rees 2007). In addition, several guidelines have been issued to support the dissemination of positive actions by European universities (European Commission 2012).[2]

Across the European Union, women remain significantly underrepresented in the labour market and in management, and their potential is not fully recognized and valued (EPP Group 2019, 5). At the same time, women are underrepresented in all key decision-making roles and men still dominate in university decision-making bodies, while women's marginal participation persists (Desivilya Syna, Palgi 2014), showing often subtle and implicit gendered processes at the top management sphere (Nielsen 2010; Sheridan, Haslam Mckenzie, Still 2010). Burkinshaw and White (2017) argue that the gendered power relations at play in universities stubbornly maintain entrenched inequalities whereby, regardless of measures implemented for and by women, the problem remains.

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[2] In recent years, initiatives such as Athena SWAN (designed to support the advancement of women in science, technology, engineering and mathematics) and the Leadership Foundation's female-only Aurora and Leadership Matters programmes have been introduced to increase the number of women in the leadership pipeline and to better prepare them for senior roles.

According to *Nature* (2018), female leadership at 200 of the top-ranked universities worldwide fell in 2018 to 17%. «Just 34 of the universities named in the 2018 Times Higher Education World University have female presidents, compared with 36 in 2017. Among the listing's highest-ranked institutions across 27 nations, there are the University of Oxford, UK; Harvard University in Cambridge, Massachusetts; Imperial College London; the University of Pennsylvania in Philadelphia; and the University of California, Berkeley. The rankings consider research, teaching and international outlook among other factors. In Sweden, 4 of the 6 institutions that made the list are led by women. The United States have 11 female-led universities in the rankings, the report's highest number». However, fundamental changes are underway in University's organization, requiring more leaders and a different type of leadership at all levels (Hannum et al. 2015, 65).

The presence of women in corporate boards and their impact on board effectiveness is one of the most contentious issues in corporate governance. This stems from the relatively low, though increasing, number of female executives in boards of directors around the world. Many women still face barriers, as invisible as unbreakable, which prevent their vertical mobility and preclude their acces to roles of responsibility within companies: they face a "glass ceiling" (Morrison et al. 1987) where they can see, but not reach, high-level company positions (Campbell, Bohdanowicz 2015, 121) in every sector, in society, in politics. The glass ceiling refers not only to barriers internal and external to the organization (such as procedures, structures, power relationships), but also to prejudices, stereotyped behaviours and subtle discrimination (the "second glass ceiling"; Pastore 2018, 196) they face after joining top level positions or corporate boards seats (Li, Wearing 2004). When this lack of representativeness of women in the boards manifests itself, their role in many cases is reduced to tokenism, as a symbolic presence (Kanter 1987; Bourez 2005; Konrad, Kramer 2006; Konrad, Kramer, Erkut 2008), unable to express a real decision-making power (Dang, Nguyen, Vo 2014; De Anca, Gabaldon 2014; Pastore, Tommaso 2016).

According to the She Figures 2018 (European Commission 2019),[3] while women now outnumber men at student and graduate levels and there is broad gender balance at PhD level, their distribution in the different scientific fields of study is uneven, which shows the persistence of gender stereotypes. The presence of stereotypes is especial-

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[3] Published every three years, the She Figures is the main source of panEuropean, comparable statistics on gender balance in science. The data also sheds light on differences in the experiences of women and men working in research – such as relative pay, working conditions and success in obtaining research funds. The report is produced in cooperation with the Member States, associated countries, and Eurostat.

ly strong in the field of science, technology, engineering and mathematics (STEM), where women remain underrepresented at all levels starting as students (32% at Bachelor, Master or equivalent level) up to top academic positions (15%). Furthermore, women still make up the minority of top academic positions.

The academic career of women in the EU is characterized by strong vertical segregation: their share at grade A is only 21% and the glass ceiling index is still high – 1.78. These issues are identified in the design of the She Figures reports, which have been published every three years since 2003. The most recent version (2019) presents data related to the pool of graduate talent, participation in S&T occupations, labour market participation as researchers, working conditions of researchers, career advancement, participation in decision-making, and R&I outputs. Despite their advanced degrees and work force presence in most professional sectors, including higher education, women are often absent from leadership roles. In higher education, women are generally overrepresented in entry-level faculty positions and underrepresented in senior-level and managerial positions (e.g., associate professor, full professor, dean, president). The EU is approaching gender balance among doctoral students: in 2016, women made up 47.9% of doctoral graduates at the EU level, while in two thirds of EU Member States the proportion of women among doctoral graduates ranged between 45% and 55% and the number of women doctoral graduates increased at a faster rate than that for men, even though the proportion of women among doctoral graduates still varies among the different fields of education (European Commission 2019). Gender inequalities persist in career advancement and in the participation in academic decision-making. In the EU-28, the proportion of women among heads of institutions in the higher education sector increased from 20% in 2014 to 22% in 2017[4] (24.4% in Italy) and the proportion among the heads of universities increased slightly over the same period from 14.1% to 14.3%[5] (only 8.2% in Italy). Women made up 27% of the members of boards of research organizations,[6] and 20% of the board leaders; this proportion ranged from 12% to

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[4] The highest proportions were found in Sweden (41.7%), Latvia (37%), Lithuania (32.6%), Slovenia (32.4%), Norway (31.3%), Croatia (30.8%), Estonia (30.4%) and Iceland and Switzerland (30%). The lowest proportions were observed in Spain (8%), Turkey (8.5%), Cyprus (10.4%) and Greece (11.1%).

[5] The proportion of women ranged from 0% in Estonia, Cyprus, Iceland, Luxembourg and Malta to 37.5% in Norway. The proportion was higher than 30% in Switzerland (33.3%), Latvia (31.3%) and Sweden (31.3%).

[6] The respective proportion at the national level ranged from 12% in Croatia to 54% in Norway. In nine out of the 32 countries in the She Figures 2018 (European Commission 2019) (NO, LU, SE, RO, BG, IS, FI, IE and SI) women constituted at least 40% of board members.

54% at the national level (20% in Italy), while in nine countries it was 40% or higher (8% in Italy)[7] (European Commission 2019).

Explanations for the under-representation of women in senior positions have focused on structural and/or cultural explanations, reflected in a variety of metaphors such as the leaky pipeline, glass ceilings, glass cliffs, labyrinths and so on. Research focuses both on the nature of recruitment/retention processes and on the transparency of procedures and career structures (Knights and Richards, 2003), but also on the profile of academic gatekeepers (e.g. journal editorships; research funding organizations) which are largely male. Cultural explanations have focused on organizational cultures (Morley 2013) and double standards regardless the level of competence. An increasing number of research institutions has been adopting a variety of measures to address the gender gap (Gvozdanović, Maes 2018), such as leadership training, implicit bias training, Gender Equality Plans and the Human Resources Strategy for Researchers (Cameron et al. 2015). However, these measures have not led to significant changes so far (European Commission 2019).

2 Gender Composition of Boards. State of the Art

As far as we know this is the first work that analyses the relationships between board composition and sensitivity to gender issues within the university strategic plans. Therefore, we can only refer to literature on gender diversity and gender role in (private and public) sectors different from universities.

The board of directors is the most important decision-making body in a (private or public) corporation. Its correct composition is considered one of the profiles of effectiveness of corporate governance systems (Zahra, Pearce 1989; Walsh, Seward 1990; Johnson, Daily, Ellstrand 1996; O'Neal, Thomas 1996; Westphal 1999; Kang, Din, Charoenwong 2010, 889), and its effects on the strategic decision-making process, on the company control system and on the economic and financial performance of the companies, have always fueled an intense academic and professional debate. Theoretical perspectives of the literature on governance assign heterogeneous roles to the board of directors (Decastri 2009): strategy formulation (stewardship theory: Donaldson, Davis 1991; Muth, Donaldson 1998); monitoring and control (agency theory: Jensen, Meckling 1976; Fama 1980); connection between the company and the external environment and

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[7] The proportion of women among board leaders ranged from 0% (CZ, FR, HR, CY, MT, PT, RO and SK) up to 73% in Bulgaria and 80% in Spain. Seven countries in total (SE, IS, NL, LV, IE, BG and ES) had more than 40% of women among board leaders.

the resources on which it depends (resource dependence theory: Pfeffer, Salancik 1978; Zahra, Pearce 1989); management support (managerial hegemony theory: Lorsch, MacIver 1989); coordination and mediation (stakeholder theory: Donaldson, Preston 1995).

Business economy literature and, specifically, studies on corporate governance have always underlined how diversity (in terms of: age, gender, geographic origin, socio-cultural and educational backgrounds) and the heterogeneity of skills and competences, professional profiles and knowledge, perspectives and visions, and personalities and gender:

- increase the independence of collegial corporate bodies;
- ensure the best possible representation and protection of all shareholders (Van der Walt, Ingley 2003; Rose 2007; Hoogendoorn, Oosterbeek, Van Praag 2013);
- make the decision-making process more effective and improve both executive control and problem-solving processes;
- create the conditions for a higher competitiveness of a company on the markets, a lower capital cost, and a greater corporate value.

Since the board of directors has the responsibility for economic governance and business results, the ability to effectively perform control over the work of management and at the same ti,e to support strategic decision-making is strictly determined by its composition (Hermalin, Weisbach 2003; Minichilli, Zattoni, Zona 2009; Agrawal 2012), with particular reference to personal characteristics and expertise of the members (Perry, Peyer 2005).

After decades of legislation towards equality, data continue to show that management is a male's field (Singh, Vinnicombe, Terjesen 2006) despite several studies have shown that gender composition is not indifferent in the board's decision (Singh, Terjesen, Vinnicombe 2008; Terjesen, Sealy, Singh 2009). Previous research has focused on female representation in corporate boards, which is both more common and more heterogeneous across firms (Daily, Certon, Dalton 1999; Hillman, Cannella, Harris 2002; Terjesen, Sealy, Singh 2009; Singh, Terjesen, Vinnicombe 2008) and, generally, their findings show that women on board are underrepresented. A large amount of work in this area has examined the causes of the underrepresentation of women on boards compared with their representation in management roles (Hillman, Shropshire, Cannella 2007). Other research instead considers how it might impact board decision-making processes (Chen, Crossland, Huang 2016). Companies which are open to everyone's contribution in top positions and corporate governance (which are different by gender, preferences, age, culture) work better and they can be positively received by the market (Baltrunaite et al. 2014; Besley et al. 2013). Moreover, according to Campbell and Bohdanowicz (2015, 121), appointing women to

boards allows companies to improve their performance as they exploit the full intellectual and social capital that women offer.

The issue of gender diversity[8] on boards or in top management teams has therefore become increasingly important, specifically in the literature on corporate governance (O'Rourke 2003; Kirsch 2018; Davidson, Burke 2011). Appointing women directors tends to make the composition of boards more diverse, which is thought to affect the nature of board processes and outcomes, and by extension, firm outcomes (Terjesen, Sealy, Singh 2009). Research focuses on the presence of women as contributing to better functioning through role performance (Wan, Ong 2005), execution of tasks and, ultimately, corporate performance (Carter, Simkins, Simpson 2003; Francoeur, Labelle, Sinclair-Desgagne 2008; Adams, Ferreira 2009). In Keatinge's words (2013, 2), a greater gender diversity in the board «can lead to a more diverse workforce, better corporate governance practices and improved stakeholder relations, which, in turn, will result in better financial performance». Higher female participation leads to more transparent management activities: firms with higher proportions of female directors display better earning quality and encourage more public disclosure. In this context, gender diversity is an indicator of board effectiveness, as the behaviour of female directors might differ from that of male directors (Adams, Ferreira 2009). Having more female directors adds quality to board discussion and decision-making, and a diverse board is more likely to provide a wider range of opinions, beliefs, networks and backgrounds (Liao, Luo, Tang 2015; Post, Rahman, Rubow 2011); to contribute other perspectives to debates, raising new concerns and providing new sensitivities that find expression in the discussions of boards (Burke 1997); to generate greater creativity in decision-making (Erhardt, Werbel, Shrader 2003). In addition, women on boards might bring an additional independent view that enhances the decision quality (Colaco, Myers, Nitkin 2011). Gender diversity and participation of women in boards can be also seen as important indicators of the social responsibility of an organization, and it can be a sign of the stakeholder orientation of the company (Oakley 2000), while the inclusion of female board directors has also proved financially beneficial, resulting in increased shareholder returns, and higher returns on equity (Hillman et al. 1998). Ultimately, gender equality in the boardroom is a basic tenet of equality, which seeks to offer the same opportunities for women as men (Conroy 2000).

More specifically, the literature on gender diversity and corporate governance has suggested that companies with a higher proportion of women on their boards are characterized by:

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8   The extent to which a group or organization is heterogeneous with respect to the gender of its members.

1. best corporate governance practices (and their transparency) and better organizational performance (Adams, Ferreira 2009; Nielsen, Huse 2010; Kakabadse et al. 2015);

2. a highest number of the board and control committee meetings (Gallego-Álvarez, García-Sánchez, Rodríguez-Domínguez 2010; Fitzsimmons 2012) and a generally higher attendance at board meetings than men (regarded as a proxy of the quality of firm governance, which in turn reduces the absenteeism rate of male members leading to the best possible strategic decisions);

3. better firm performance (Francoeur, Labelle, Sinclair-Desgagne 2008; Ben-Amar et al. 2013; Chapple, Humphrey 2014; Ali, Ng, Kulik 2014; Dezsö, Ross 2012), and economic value creation for the company (Francoeur, Labelle, Sinclair-Desgagne 2008; Miller, Triana 2009; Terjesen, Sealy, Singh 2009; Terjesen, Aguilera, Lorenz 2015; Davies 2011);

4. a better company reputation (Bernardi, Bosco, Vassill 2006; Bernardi, Bosco, Columb 2009; Brammer, Millington, Pavelin 2009);

5. a greater consideration for the employees' welfare, a stronger stakeholder (Van der Walt, Ingley 2003; Rose 2007; Hoogendoorn, Oosterbeek, Van Praag 2013) and CSR orientation (Hafsi, Turgut 2013; Zhang, Zhu, Ding 2013; Larrieta-Rubín de Celis et al. 2015; Ben-Amar, Chang, McIlkenny 2015; Bear, Rahman, Post 2010; Boulouta 2013; Harjoto, Laksmana, Lee 2015).

However, some scholars have pointed out the possible negative effects of diversity (Rose 2007; Baranchuk, Dybvig 2009; Ferreira 2010). According to these scholars, a higher percentage of women on boards generate longer board meetings to share different points of view and resolve disputes and this has a negative impact on the operative performance of the board and on the monitoring results (Pastore, Tommaso, Ricciardi 2017, 67, 80-1). The heterogeneity of interests represented within the board may increase the conflict, the difficulty of communication and the possible emergence of factions within the group which can lessen the board cohesion and negatively affect companies' performance (Dobbin, Jung 2011, 816).

In recent years, the potential benefits of gender diversity have also drawn the attention of European market players and Regulators (promoting gender equality is one of the fundamental values espoused by the European Union and a core activity for it) who have recommended to require to listed companies a heterogeneous gender composition both in top management and boards and to encourage the participation of women in decision-making processes, which is considered essential for the competitiveness and sustainability of the European Union.

In this respect, the EU 2010-2015 Strategy for Equality between Women and Men, the European Pact for Gender Equality 2011-2020 and the Strategic Engagement for Gender Equality for the period 2016-2019 have set out a target (at least) of 40% female representation on boards and senior and middle management of all private and public boards, including universities, by the end of 2020 in European countries. This European Strategy has been decisive in bringing gender policies into the political agenda of several Member States and in encouraging them to impose the balanced presence of women and men in the overall membership of their corporate and management bodies upon listed companies and the state-owned ones-either through law (as it happened, for example, in Norway in 2003, France in 2010, Belgium, Italy in 2011 – see box below, and more recently in Germany in 2015) or through self-regulatory and corporate governance codes (as in the case of United Kingdom, Luxemburg, Poland, Sweden, Finland) –, in order to accelerate the process towards economic gender equality, to promote women's empowerment, to achieve a greater heterogeneity in these boards and an improved decision-making quality.

In Italy, State Law No.120/2011 requires that public companies (from 12 August 2012 onwards)[9] as well as those majority-owned by a government entity (for which the rule was enforced from 12 of February 2013)[10] must renew/appoint their boards by reserving a quota to women (the under-represented gender) on corporate management and supervisory boards (boards of statutory auditors in the Italian companies), to be applied to the first renewal of these

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[9] It is the Act 12 July 2011, No. 120 (Known as "Golfo-Mosca" Law, after the names of the two authors), on Amendments to the Unified Text on finance-related intermediation under Legislative Decree 24 February 1998, No. 58, concerning equal access to the administrative and oversight bodies of quoted companies" (in Italian, "Legge 12 luglio 2011, n. 120, Modifiche al testo unico delle disposizioni in materia di intermediazione finanziaria, di cui al decreto legislativo 24 febbraio 1998, n. 58, concernenti la parità di accesso agli organi di amministrazione e di controllo delle società quotate in mercati regolamentati"). It was approved on July 12, 2011 and entered into force on August 12, 2012 (one year after, i.e., there was a phase-in period between approval and implementation).

[10] The Law no.120/2011 also applies to State-owned companies (i.e. public companies under the control of the government) after the entry into force of Italian Presidential Decree on equal access to the Board of State-owned companies, the DPR no. 251 of 30/11/2012 implementing Law 120/2011), on 12 February 2013. The provisions of law establish a legal dual-track: for publicly-listed companies, the discipline stem from the Act under reference, and in detail by a subsequent Regulation of CONSOB (Italian Stock Exchange Authority); for State-owned companies, the discipline is governed by a subsequent Regulation, the above-mentioned D.P.R., dated November 30, 2012. As for the latter, the oversight is attributed to the President of Council of Ministers or to delegated Minister for Equal Opportunities. See: Ministry of Foreign Affairs and International Cooperation, Inter-Ministerial Committee for Human Rights (2016), "Italy's Reply to UNWGDAW", September 15, 2016:2.

bodies (at least one-fifth of board seats) and for three consecutive mandates (from the second and third renewal of the corporate bodies, women must be at least one-third). Hence, Italian gender quotas on corporate management boards (applying to board nominations following August 2012) are temporary and gradual[11] and the Law is aimed at promoting the involvement of women in corporate activities as well as achieving positive actions for a period of time sufficient to generate processes of cultural change. In the first five years of implementation of the legislative quotas, Italy has achieved results higher than expected: the number of women in top positions has increased and the increases recorded have been so significant (Italy has already achieved the 33.5% target) as to allow Italy to exceed the EU-28 average (of 25.3% of women in corporate boardrooms at the end of 2017) and to position itself among the best European practices, since it has recorded the greatest progress in gender-balanced boardrooms (Source: European Institute for Gender Equality, 2018). It would have been impossible to achieve this result without a legislative measure such as quotas. It would be useful to examine whether the significant progress noted in the last five years are only a numerical result or if they represent a substantial change with regard to the composition of the decision-making bodies, the selection of members of the boards, and the role of appointed women (chairs, CEOs).

However, despite these various European initiatives, which have given rise to an acceleration towards equal opportunities, female corporate board directors remain a minority in most of the boardrooms of private and public companies the world (Branson 2012; Heidrick, Struggles 2013), «with women more likely to fill the role of independent, non-executive directors rather than executive positions» (Campbell, Bohdanowicz 2015, 122).

The picture is sadly, not different in universities. The gender imbalance in boards and executive management is replicated in the education sector, where women are underrepresented in leadership roles both in schools (Chard 2013) and universities (Morley 2013). «This relative dearth of women in senior positions reflects a failure to maxi-

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11 It is valid for three mandates, from August 2012 until 2022 (i.e. 9 years for each company: boards of companies listed on the Italian stock exchange are elected every three years). The corporate bodies renewed for the first time after the Law in 2014 will remain in office up to a maximum of 2023. With reference to the second issue, the measure is implemented gradually and remains in place only for three consecutive board elections. The required target of representation of either gender is set at least one-fifth (amounting to 20%) of the members of the Boards for the first election following one year of the coming into force of Law no.120/2011 (that is after August 2012), to be increased to one-third of the members of the boards (amounting to 30%) for the following two board elections, from 2015 up to 2022, when the Golfo-Mosca law will cease.

mize female talent» (Shepherd 2017, 82). In conclusion, one level of analysis that has received comparatively little scholarly attention is the gender composition of public institutions, which our essay aims at addressing focusing on the Italian universities.

3 Gender Composition of University Boards

European Universities have undergone regular reform process since the beginning of the 1990 (Pinheiro, Trondal 2014; Karlsen, Pritchard 2013), according to the principles of New Public Management (NPM) (Bolden et al. 2012). This process is still in progress particularly as regards matters pertaining to institutional governance (Engwall 2014). The literature on NPM and gender equality shows an ambivalent picture. According to Kreissl et al. (2015), the new organizational principles did not address the persistent phenomenon of gender inequality in academia, despite well-established gender equality agendas: while numbers indicate an increase in women's participation, numbers are still far off parity in higher positions along the steps of the academic career.

At the same time, few studies scrutinise: a) the impact of diversity management on organizational performance (Pitts 2006, 2007); b) the efficiency of different types of gender equality policies and measures in obtaining more balanced gender compositions in the academy (Castano et al. 2010) as well as c) the commitment and support from upper-management levels to the adoption and implementation of equality/diversity policies and programs.

According to Desivilya and Costea (2015), addressing gender inequality in academia requires leadership and action at all organizational levels, supported by adequate governmental policy mechanisms and incentives. Instead, academia is traditionally based on a highly institutionalised and bureaucratic hierarchical systems, founded on sets of values that define and maintain a specific configuration of gender roles and relations, while the persistence of gendered structures and processes is largely attributed to an institutional culture that legitimizes and ascribes neutrality to these processes. However, a «significant gender imbalance remains at executive management level within higher education despite a number of initiatives to increase the number of women in the leadership pipeline and ensure they are better prepared for these roles» (Shepherd 2017, 82). Yet, more women in leadership roles could improve working conditions for all women in organizations, could provide positive role models for female academics, and could encourage better gender balance and diversity at all levels (Sandberg 2013).

About the board appointment processes, Universities can make use of free of charge networks such as Women on Boards and KP-

MG Connect on Board, and organizations supporting specific professions and industries to advertise their appointments to a wider audience. This is the case, for example, of some Italian good practices such as: the "Ready for Board Women", an initiative, created by PWA-Professional Women's Association of Milan and Observatory on Diversity Management at SDA Bocconi; the "1000 Curricula Eccellenti" (One Thousand Excellent Curricula), promoted by the Bellisario Foundation; and the project ProRetePA (promoted by the Italian Department for Equal opportunities in collaboration with Friulian University) aimed to promote equal opportunities for women of talent in order to put them in touch with companies who are looking for talented women to enter in the organs of administration and control (Pastore 2018, 193).

Currently, leadership approaches include more plural and inclusive forms of leadership (Denis, Langley, Sergi 2012), and, especially, complex organizations, such as Universities, call for complex leadership (Marion, Uhl-Bien 2001). According to Ritt (2004), women, in general, may be better able to lead complex organizations and universities or to take part in their governance. However, women need both mentors and sponsors to help them navigate their careers, and to point them in directions they haven't thought about (Glover 2010). Specifically, women who sit on boards and have decision-making power could represent a role model for other highly-qualified and talented women who aspire to progress to the top of the corporate hierarchy (as key executives) or beyond a certain level of their professional careers (as first line managers). «Having role models that demonstrate a range of different ways of being in and successfully navigating a leadership role would help make the role more attainable and attractive and could serve to weaken assumptions and stereotypes» (Hannum et al. 2015, 73). These women can generate a positive effect on the motivation and commitment of other women (and all their collaborators in general) to all levels of the organization, offering them opportunities for growth and encouraging them to express their full potential and, on the other hand, to trigger a "towing" effect, inspiring and encouraging the inclusion of other women in the processes renewal of the corporate bodies. The increase in reference models and the improvement of women's expectations for career (as indirect effects of women's leadership) could keep in the job market many women who leave it because of distrust, widening the pool of talents from which to choose the best candidate to be admitted on the board of directors.[12]

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[12] In this regards, the quota system within governance bodies is also acting as a multiplier of initiatives, positive actions and good practices aimed at supporting the competent presence of women at every level in the labor market. These initiatives favor not only

As stated by the literature (Adams et al. 2007; Adams, Gupta, Haughton 2010; Soares, Carter, Combopiano 2010; Adams 2016) it will be expected that the increased presence of women boards makes wider functional talent and skills available, and improves the effectiveness (Hillman, Cannella, Harris 2002; Kim, Stark 2016; Kirsch 2018). The consequent greater heterogeneity in the composition of the boards:

- should increase their independence (Ferreira 2010; Lückerath-Rovers 2013);
- should favor the plurality of strategic approaches to the business (Huse, Solberg 2006; Sheridan, Ross-Smith, Lord 2014) as well as broader perspectives in the analysis of problems and in the taking of decisions (Hillman, Shropshire, Cannella 2007; Bart, McQueen 2013);
- could enhance the efficacy and monitoring capabilities of boards (Kesner 1988; Van der Walt, Ingley 2003; Triana, Miller, Trezebiatowski 2014);
- could strengthen the representation of all shareholders (Ntim 2015) and, above all, by combining the action of different styles of leadership, could influence positively the corporate reputation and its image (Pfeffer 1981; Bear, Rahman, Post 2010; Dang, Nguyen, Vo 2014), improving, consequently, the longer-term sustainable potential growth potential for the company (Balasubramanian 2013, 21).

The further challenge is to demonstrate how and how much the gender mix can positively influence company performance and market results (Dobbin, Jung 2011).[13] In this respects, a new challenge opens up in terms of the efficiency of this positive action, since it is not enough to increase the numerical presence of women on company boards, but it is necessary that the involvement of women be involved in executive roles, and analyze the consequent analysis of the quality of such leadership positions/of the appointed women.

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female employment but also the regeneration, transformation and innovation of work in Italy and they are helping to create an inclusive organizational culture. In this stream, several good practices, based on the implementation of training strategies, could promote women's leadership and so to allow the inclusion of excellent women on boards of directors or meritocratically cooptating the female component in all decision-making processes up to the top. Enhanced and more visible career prospects (especially for higher grades) could also contribute to facilitate the creation of a "woman-friendly" work environment within the company, which encourages employees' commitment and dedication.

13   A large body of theoretical and empirical literature carried out internationally in this field internationally (also outside the context of the gender quotas) has not been conclusive, delivering mixed and controversial results, whatever indicators chosen (both market-based measure, such as Tobins Q, and accounting-based measure, such as ROA, ROE and so on) to support (Campbell, Minguez-Vera 2008; Schwartz-Ziv 2017) or contradict (Van der Walt, Ingley 2003; Van der Walt et al. 2006; Rose 2007; Francoeur, Labelle, Sinclair-Desgagne 2008; Dobbin, Jung 2011; Gagliarducci, Paserman 2014) the impact of increasing proportion of women directors involved in the board on company's financial performance and outcomes.

4 Strategic Planning in Universities: Process, Tools, Actors

Like in other European countries, since the 1990s, the Italian university system has undergone a season of reforms led by the New Public Management approach. With regard to the gender issue, the reforms have focused on the steering mechanisms used for achieving gender equality. Drawing from that, Müller et al. (2011, 303) have observed that similar to other European countries, currently in Italy, «several policy instruments such as legal/rights measures, positive actions (such as quotas), co-exist alongside more recent 'mainstreaming' mechanisms and new steering instruments such as target/incentive-bound resource allocation». In particular, Italian Law number 125/1991 introduced positive actions. Furthermore, Decrees number 198/2006 and number 5/2010 (referring to the European Directive 2006/54) provide that every public organization (thus state universities) has to prepare a Positive Action Plan (PAP). PAPs are documents in which organizations disclose the positive actions planned for the following three years to promote gender equality, together with monetary and human resources devoted to achieve such positive actions. However, the regulation only gives very general indications, saying that PAPs have to include positive actions aimed at removing barriers that prevent the realisation of equal opportunities, promoting women's employment, achieving substantive equality between men and women, as well as improving the overall well-being at work. Nevertheless, no specific guidelines have been given with regard to the contents of PAPs. Consequently, each public organization has freedom of choice about the positive actions they may plan.

According to the principle of a greater autonomy of the university system (Italian State Law n.168/1989; Law n. 421/1992) and the application of the "new public management" approach (Hood 1995; European University Association 2007), all the Italian Public Universities assume a specific responsibility in developing planning and control processes (Italian State Law n.59/1997; Law Decree n. 43 dated march 31 2005) and drawing up a three-year strategic plan (DM n.506/2007 and DM n. 362/2007), as well as they have to develop functions to perform evaluation in all their activities (Cugini, Michelon, Pilonato 2011; Bronzetti, Mazzotta, Nardo 2012; Cassone, Sacconi 2013; Nardo, Mazzotta 2018).

The University's Strategic Plan is the programming document outlining the University's mission (Luxton 2005; Hinton 2012); it promotes governance transparency by formalizing a set of strategic objectives, the relevant implementing actions to achieve them and the indicators for monitoring and evaluation evaluating the process (Agasisti, Arnaboldi, Azzone 2008).

In line with current literature on strategic planning, and with analogous processes carried out by other institutions international-

ly, Italian Universities draw up a strategic map that conforms with the general guidelines for public university planning laid down by MIUR, the Italian Ministry of Education and with current regulation (Law 43/2005, Law no. 15/2009, Legislative Decree no. 150/2009, Law 240/2010).

Regarding the content, strategic planning in public universities helps top management to align its resources in the most efficient manner necessary for the attainment of strategic milestones and to stay competitive (Ofori, Atiogbe 2012, 67). The Plan concerns a three-year period (DM n.216/2006) with half-yearly reviews planned to monitor the work in progress. It is approved by June 30, and it «may be adapted annually by 30 July of each year on the basis of evaluation and monitoring carried out by the referent Ministry and the National Committee for University System Evaluation (NCSVU)» (Bronzetti, Mazzotta, Nardo 2011, 143). At the end of each year, on the basis of the achievement of the objectives, the Plan can be modified or integrated to take into account new requirements or circumstances. Every year, in the forecast budget, the economic sustainability of strategic actions will be carefully evaluated and objectives realigned with available resources. The fully implemented operation of self-assessment and accreditation models in university branches, courses and departments makes it possible to increase the effectiveness of permanent improvement cycles in research and teaching quality. The Strategic Plan begins with the analysis of the University's missions, in particular its primary institutional activities such as teaching, research as well as technology and innovation transfer. A further transversal dimension is quality.[14] The Quality Policy is a constituent part of the University policies; it is organic to strategic plans and to those of the University organizational performance related to the University's annual and long-term economic and financial planning. Then, there is an analysis of the University's comparative ranking (nationally and internationally), related to the results achieved in the recent past. A SWOT analysis leading to the definition of the strategic objectives and relevant actions aimed to addressing the areas where improvement is sought/desired. After conducting the gap analysis, needs identified are prioritized. The strategic priorities guide the focus in the direction of the institutions' vision. and priority areas for which targets and strategies are developed. Strategic priorities help determine how resources

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14 However, the ongoing reductions in the Ordinary Fund and other sources of national funding make it difficult to guarantee adequate levels of services and support for teaching, research and third mission activities, even in a medium-term time scale. On top of this, the introduction of the principle of standard cost in the allocation of Ordinary Fund contributions, irrespective of teaching or research quality evaluation, along with modifications to the same fund's Reward Quota criteria, could lead to a significant drop in ordinary funding.

may be best allocated for the benefit of the institution and its stakeholders (Hinton 2012). Finally, there are specific, measurable and verifiable indications for each objective. DM n. 506/2007 introduced a suite of performance indicators to evaluate ex post Italian Universities Plans and to assign financial resources according to these indicators, covering five areas (Academic courses, Development of scientific research, Services to students, Internationalization programs, Teaching and non-teaching staff policies). In this regards, the strategic planning process also helps leaders to focus resources available on the major strategies designed to help stakeholders better and attain the institutions of higher education's purpose (Paris 2003).

Regarding the actors, the Strategic Plan is the outcome of an iterative and participatory/collaborative process that broadly involves all the of University members (supported by experts and by resources specifically allocated to it by the Administration), including the departmental structures, as well as all the other components that contribute to results of the University and which will be involved in the implementation of the plan. The engagement steps include meetings with the entire academic community and specific reviews with the Rector, Senate, General Manager, the Board of Administrators and the other governing bodies until the final approval by the Academic authorities. The University Strategic Plan is also approved following of a continuous and extensive consultation with administrative staff, students, players active in local territory in the fields of industry, business and culture and other stakeholders (Paris 2003). By participating in the process, stakeholders provide valuable feedbacks pertinent to strengths, needs, opportunities, and threats to the institution. Among the external subjects involved in the planning and evaluation process since the definition of the general guidelines, there are also: the Conference of Italian University Rectors (CRUI); the National University Council (CUN); the National Council of University Students (CNSU); the National Committee for the Assessment of the University System (CNVSU). The three-year programming relies provides, in a nutshell, on the following procedure: a) definition by the Ministry of Education, having heard CRUI, CUN and CNSU of "general guidelines" for the university system; b) adoption by the universities, by 30 June of each year, of three-year programs, consistent with the aforementioned general guidelines; c) evaluation and periodic monitoring of implementation results , also for the purpose of resources allocation , on the basis of "parameters and criteria" identified by the Ministry, after consulting the CRUI, and the evaluation agencies; d) presentation by the Minister for Research and the University of periodic reports to the Parliament on the assessments of the previous point. The implementation of the strategic plan, it is facilitated by the definition and the application of resource allocation criteria consistent with it and developed ac-

cording to a logic of evaluation of Research, Teaching and Administration activities. From a management point of view, this involves coordination between the strategic plan and the forecast budget; to achieve this goal, an integrated university information system and an effective reporting structure (criteria, databases, decision support) are required.

5 Research Objectives

The section has been organized through sub-sections illustrating the research objectives and sample, the data analysis and data collection.

Objectives

Our hypothesis is that a board in which women directors are present promotes strategic plans more sensitive to gender issues. Following EIGE taxonomy, we define gender sensitivity as the «aim of understanding and taking account of the societal and cultural factors involved in gender-based exclusion and discrimination in the most diverse spheres of public and private life». Therefore, the purpose of this research is to analyse the gender composition of the board of the Italian public universities and to verify whether a relationship between the composition of directors' bodies and the sensitivity to gender issue in strategic document exists. Consequently, we posit the following research question:

R1: Do gender diverse boards promote strategic plans more sensitive to gender issues?

Sample

In Italy research, teaching and third mission activities are delivered by state and non-state universities approved by the national Ministry of Education. Universities are endowed with legal status and have scientific, teaching, organizational, and financial autonomy. State universities are public entities funded by the national government for about 90 per cent of their total needs; on the contrary, non-state universities are funded by the national government for about 10 per cent of their total needs (Siboni, Nardo, Sangiorgi 2013). The public universities are almost equally distributed in Northern, Central and Southern Italy.

We have chosen to analyse all Italian state universities. The list of state universities was found on the website Universitaly.[15] The reference population is made up of 68 Universities positioned in 20 Regions. From this population, 7 universities have been excluded, because their main activity is related to research doctorates. The final sample is therefore made up of 61 universities. The list of universities, their size and geographical location is shown in attached table 1. In keeping with the generally accepted subdivisions (Censis, Centro Studi Investimenti Sociali) we have divided the universities into small ones (less than 10,000 students); medium (between 10,000 and 20,000 students); big (between 20,000 and 40,000 students) and mega (over 40,000 students).

Table 1 Sample

Region	Denomination	Enrolled	Size
Abruzzo	University of Teramo	6,052	Small
	University of L'Aquila	16,919	Medium
	University of Gabriele D'Annunzio of Chieti and Pescara	24,947	Big
Basilicata	University of Basilicata	6,475	Small
Calabria	University of Mediterranea di Reggio Calabria	5,824	Small
	University of Catanzaro - Magna Grecia	10,008	Medium
	University of Calabria	25,487	Big
Campania	University of Sannio	5,128	Small
	University of Naples "L'Orientale"	10,805	Medium
	University of Naples Parthenope	12,799	Medium
	Second University of Napoli	25,285	Big
	University of Salerno	35,152	Big
	University of Napoli Federico II	74,037	Mega
Emilia-Romagna	University of Ferrara	15,488	Medium
	University of Modena and Reggio Emilia	22,065	Big
	University of Parma	23,851	Big
	University of Bologna	78,657	Mega
Friuli-Venezia Giulia	University of Trieste	14,750	Medium
	University of Udine	14,982	Medium
Lazio	University of Roma "Foro Italico"	2,200	Small
	University of Cassino e del Lazio Meridionale	7,561	Small
	University of Tuscia	7,865	Small
	University of Roma Tor Vergata	29,222	Big
	University of Roma Tre	32,214	Big
	University Sapienza	100,020	Mega
Liguria	University of Genova	31,496	Big

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15 http://ustat.miur.it/dati/didattica/italia/atenei-statali.

Region	Denomination	Enrolled	Size
Lombardy	University of Insubria	9,391	Small
	University of Brescia	13,862	Medium
	University of Bergamo	16,715	Medium
	University of Pavia	21,194	Big
	University of Milano - Bicocca	32,683	Big
	Politecnico of Milano	42,665	Mega
	University of Milano	59,596	Mega
Marche	University of Camerino	6,895	Small
	University of Macerata	10,061	Medium
	University "Carlo Bo" of Urbino	13,418	Medium
	University Politecnica of Marche - Ancona	15,336	Medium
Molise	University of Molise	6,935	Small
Piedmont	University of Piemonte orientale	11,623	Medium
	Politecnico of Torino	30,839	Big
	University of Torino	67,958	Mega
Puglia	University of Foggia	9,444	Small
	Politecnico of Bari	9,621	Small
	University of Salento	16,585	Medium
	University of Bari	44,278	Mega
Sardinia	University of Sassari	12,893	Medium
	University of Cagliari	25,379	Big
Sicily	University of Messina	22,762	Big
	University of Palermo	39,726	Big
	University of Catania	43,346	Mega
Tuscany	University for Foreigners of Siena	1,864	Small
	University of Siena	15,277	Medium
	University of Pisa	44,846	Mega
	University of Firenze	49,917	Mega
Trentino-Alto Adige	University of Trento	16,180	Medium
Umbria	University for Foreigners Perugia	875	Small
	University of Perugia	23,037	Big
Veneto	IUAV	4,060	Small
	Ca' Foscari University of Venice	19,603	Medium
	University of Verona	22,997	Big
	University of Padova	57,272	Mega

Source: our processing

6   Research Methods

Methods of Analysis

To analyse if board gender composition directly impacts on the gender sensitivity of the approved strategic plans, we started measuring gender approach on the basis of content analysis, a systematic coding and categorizing approach used for exploring large amounts of textual information to determine (among other) trends and patterns of words used and their frequency (Neuendorf 2017).[16] Count and amounts are numerical process, and a quantitative content analysis has as its goal a numerical summary of a chosen items' set. We identified 3 key aspects (characteristics, tool, policy) and 15 items (woman professor, gender, woman/women workers, researcher(s), sex – sexual, Positive Action Plan, Guarantee Committee, conciliation, equality, differences enhancement, diversity, exclusion, equal opportunity policies, gender policy, equity) summarized in table 2.

Table 2   Item used in content analysis

Characteristics	Policy
woman professor	8. conciliation
gender	9. equality
woman/women workers	10. differences enhancement
researcher(s)	11. diversity
sex – sexual	12. exclusion
Tool	13. equal opportunity policies
Positive Action Plan	14. gender policy
Guarantee Committee	15. equity

Content analysis is a technique for gathering data. It involves codifying qualitative and quantitative information into pre-defined categories in order to derive patterns. For content analysis to be effective, certain technical requirements should be met: the categories of classification must be clearly and operationally defined; data capture must be systematic; content analysis must demonstrate characteristics for reliability and validity (Guthrie, Abeysekera 2006).

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[16]   The purpose of content analysis is to describe the characteristics of the document's content by examining who says what, to whom, and with what effect (Bloor, Wood 2006). The goal of content analysis is to produce counts of key categories and measurement of the amounts of variables (Fink 2009). Content analysis is a method of codifying the content or text of a piece of writing into categories based on chosen criteria (Weber 1988). However one of the limitations of content analysis has been its focus on quantity rather than quality of disclosure

Content analysis has been defined as: "a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (Hsieh, Shannon 2005, 1278). The analysis is conducted by keywords and by sentences (Hsieh, Shannon 2005). For each occurrence (word or underlying means), we attributed a score of one: therefore, we can have a sub-score for each dimension. Once the analysis was completed, we added the score obtained for each University, named gender sensitivity approach (GSA), considering all the equally important items. Then for each Universities it is calculate the gender sensitivity approach index (GSAI), obtained normalizing the GSA taking as reference the highest recorded value. GSAI has a variability between zero and one, where 1 is the value recalling the best gender approach in defining university strategies and zero as the worst approach. Gender composition is analyzed in term of presence of female directors on the board, measured considering the numbers of female directors, and in terms of incidence of female directors on the board, measured as share of women out of the total members.

We collected information on universities' web-sites.

Content analysis and collection of data on board composition were conducted by reviewing the strategic plans, from which a list of features (subsequently compared and synthesized) was derived.

The theoretical paradigm underlying our research is the interpretive model too. In the light of interpretivism, sociological phenomena cannot simply be observed but must also be interpreted by the researcher. This means that there is not one absolute reality, but rather, different possibilities adopted to interpret the facts (Ryan, Scapens, Theobald 2002).

The approach is directed content analysis, in which initial coding starts with a theory and relevant research findings. The purpose of this approach is to validate or extend a conceptual framework or theory. Qualitative content analysis does not produce counts and statistical significance (Hsieh, Shannon 2005). Qualitative research is interpretive, and interpretation represents theoretical understanding of the phenomenon under study. It uncovers patterns, themes, and categories important to a social reality (Berg 2001; Patton 2002).

7 Results

Descriptive Statistics

Regarding the board composition, we analysed our sample considering the board at the 31 December 2017, i.e. the board that approves the 2018 strategic plan. The average size of the boards of Italian Universities is 10 directors. The average number of male directors is 7,

while the average number of female directors is 3 **[tab. 3]**. The number of women varies from a minimum of 1 (in 18% of cases) to a maximum of 7 (3% of cases).

Table 3   Board Composition of Italian Universities

	M	F	Tot	IF	EF	SF	%F	FR	GSAI
IUAV Venezia	5	1	6	0	1	0	17%	0	0.044776
Piemonte-Orientale	8	2	10	1	1	0	20%	0	0.014925
Politecnico di Bari	8	1	9	0	1	0	11%	0	0.19403
Politecnico di Milano	10	1	11	1	0	0	9%	0	0.044776
Politecnico di Torino	8	3	11	1	2	0	27%	0	0.238806
Università de L'Aquila	7	3	10	2	1	0	30%	1	0.253731
Università del Molise	9	2	11	1	1	0	18%	0	0.044776
Università del Salento	9	1	10	1	0	0	10%	0	0.014925
Università del Sannio	7	2	9	2	0	0	22%	0	0.044776
Università dell'Insubria	7	2	9	2	0	0	22%	0	0
Università della Basilicata	8	3	11	2	0	1	27%	1	0.104478
Università della Calabria	10	2	12	1	1	0	17%	0	0.164179
Università della Campania – Vanvitelli	8	3	11	1	2	0	27%	0	0
Università della Tuscia	5	2	7	1	1	0	29%	0	0.164179
Università di Bari – Aldo Moro	6	2	8	2	0	0	25%	0	0.447761
Università di Bergamo	7	4	11	2	1	1	36%	0	0.238806
Università di Bologna	8	3	11	1	2	0	27%	0	0.119403
Università di Brescia	6	3	9	2	1	0	33%	0	0.164179
Università di Cagliari	5	5	10	4	0	1	50%	1	0.358209
Università di Camerino	4	3	7	1	1	1	43%	0	0.029851
Università di Cassino	9	1	10	1	0	0	10%	0	0.014925
Università di Catania	8	3	11	2	1	0	27%	0	0.313433
Università di Catanzaro – Magna Graecia	8	2	10	2	0	0	20%	0	0.134328
Università di Chieti-Pescara	9	3	12	2	0	1	25%	0	0.119403
Università di Ferrara	6	4	10	2	1	1	40%	0	0.373134
Università di Firenze	8	3	11	1	1	1	27%	0	0
Università di Foggia	7	5	12	4	1	0	42%	0	0.134328
Università di Genova	10	1	11	1	0	0	9%	0	0.074627
Università di Macerata	6	3	9	3	0	0	33%	0	0.074627
Università di Messina	8	1	9	1	0	0	11%	0	0.014925
Università di Modena e Reggio E.	7	4	11	3	0	1	36%	0	0.029851
Università di Napoli – Federico II	8	3	11	0	3	0	27%	0	0
Università di Napoli – Orientale	3	7	10	5	2	0	70%	1	0.119403
Università di Napoli Parthenope	7	3	10	3	0	0	30%	0	0.014925
Università di Padova	8	3	11	2	2	0	27%	0	0.253731
Università di Palermo	9	1	10	1	0	0	10%	0	0
Università di Parma	9	2	11	2	0	0	18%	0	0.029851

	M	F	Tot	IF	EF	SF	%F	FR	GSAI
Università di Pavia	7	3	10	0	1	2	30%	0	0.029851
Università di Perugia	9	1	10	1	0	0	10%	0	0.014925
Università di Pisa	8	2	10	1	1	0	20%	0	0.044776
Università di Reggio Calabria – Mediterranea	8	2	10	2	0	0	20%	0	1
Università di Roma – Foro Italico	7	2	9	1	0	1	22%	0	0.134328
Università di Roma – Sapienza	8	2	10	2	0	0	20%	0	0.059701
Università di Roma – Tor Vergata	7	4	11	2	0	2	36%	0	0.19403
Università di Roma 3	9	1	10	0	1	0	10%	0	0.014925
Università di Salerno	8	2	10	2	0	0	20%	0	0.044776
Università di Sassari	7	4	11	2	2	0	36%	0	0.089552
Università di Siena	7	2	9	2	0	0	22%	0	0.089552
Università di Teramo	7	3	10	3	0	0	30%	0	0.014925
Università di Torino	7	4	11	2	1	1	36%	0	0.104478
Università di Trento	5	4	9	2	2	0	44%	0	0.343284
Università di Trieste	6	4	10	1	2	1	40%	0	0.014925
Università di Udine	7	3	10	0	1	2	30%	0	0.014925
Università di Urbino	8	3	11	2	1	0	27%	0	0.014925
Università di Venezia Ca' Foscari	6	5	11	2	2	1	45%	0	0.104478
Università di Verona	8	3	11	3	0	0	27%	0	0.044776
Università Milano Bicocca	7	5	12	3	2	0	42%	1	0
Università Milano Statale	7	4	11	2	2	0	36%	0	0.029851
Università per Stranieri di Siena	1	7	8	3	2	2	88%	0	0.044776
Università per Stranieri Perugia	10	1	11	1	0	0	9%	0	0.19403
Università Politecnica delle Marche	7	4	11	2	0	2	36%	0	0.014925
Total (media)	7,31	2,82	10,13				28%	5	

Legend: M=male; F= Female; Tot = male + female director; IF= Internal female director; %F = female director/Tot; EF= external female director; FS= student female director; FR = Female Rector; GAI= gender approach index

Source: our elaboration

Data show that the boards are dominated by men, except for the board of the University of Cagliari. In five Universities the Rector is a woman, one in the North of Italy (University of Milan-Bicocca), two in the Center (University of L'Aquila and University of Naples – Eastern) and one in the South (University of Basilicata). 60% of the women present in the board of the surveyed universities are women who work within the university (professors and staff) and about 13% are students.

Table 3 shows the GSAI for the surveyed universities, reported in the last column. The descriptive analysis shows that there is a lack of attention to gender issue, confirmed by a relatively low GSAI (on average in the 87% to cases with a GSAI of less than 0.25). This result could depend on the lack of presence of women in the boards

(on average approximately three in a board of 10 members). In order to understand whether there is a relationship between sensitivity to gender issues and the composition of the board, a quantitative analysis was also conducted.

Pairwise analysis was performed and the results are reported in table 4. The analysis shows that there is a positive correlation between GSAI and DExternal (p-value 0.093). The analysis shows that a larger size of the board means that more men are likely to be present (p-value 0.000).

Table 4   Pairwise correlation

	GSAI	Male	Female	USize	Female%	BSize	DExternal
GSAI	1						
Male	-0.096	1					
Female	0.067	-0.691***	1				
USize	-0.073	0.312**	0.008	1			
Female%	0.076	-0.849***	0.956***	-0.012	1		
BSize	-0.053	0.569***	0.212	0.414***	-0.063	1	
DExternal	0.217*	-0.356***	0.456***	0.046	0.440***	0.032	1

Legend: GSAI = gender sensitivity approach index; Male = number of male directors; Female = number of female directors, Usize = dummy university dimension; Female% = number of female director/board size; BSize = number of member of board of directors; DExternal = dummy for external female directors

* Significance level 5% ** significance level 10%

8   Conclusions

This essay aims both at contributing to the debate on gender equality in institutional decision-making processes – with particular reference to those taking place within universities – and at raising gender awareness within academic institutions. The objective has been, on one hand, to verify the female presence in the strategic planning and decision-making processes of the Italian State Universities, and on the other hand, to verify if this presence influences the gender sensitivity of university strategic documents: that is, the strategic plan and the integrated plan, in terms of both process and content.

The analysis was carried out by analyzing the 2018 Italian University strategic plan through a content analysis. Based on this analysis, a Gender Sensitivity Approach Index (GSAI) was determined for each university, and it has been related to the composition of the board of directors. The empirical findings suggest that: 1. there is a low heterogeneity into the boards (men prevail in several academic boards and there is a low attention to gender issues and policies); 2. gender sensitivity decreases with the larger size of the university. According

to general results, the geographic location of Universities has no influence on sensitivity to gender issue: universities which present the best values are: Università di Bari – Aldo Moro; Università di Cagliari; Università di Catanzaro – Magna Graecia; Università di Catania; Università di Ferrara; Università di Reggio Calabria – Mediterranea; Università di Trento.

Moreover, higher gender diversity of the boards is positively related to the gender sensitivity of the strategic plans, i.e. participation of women on the board of directors brings new perspectives to the board and addresses the gender sensitivity of the institution. In these cases, heterogeneity results in a broader perspective which allows team members to be involved in in-depth conversations, to process different alternatives and to make the best decisions in order to reconcile the different opinions and optimise the performance.

Results suggest that when the board has a certain level of heterogeneity, strategic plans are more oriented towards gender issues. The explicit reference to equal opportunities in the statutes of their has a positive impact in gender oriented strategic plans. However, this presence might be the result of a mere compliance with the statute.

The study has some limitations. First, the analysis only includes the 2018 Strategic plans; second, it does not include non-state universities. This opens the door to a further possible development of this study, i.e. a longitudinal analysis of strategic plans spanning several years and/or inclusion of non-state universities, in order to understand if any differences in approach arise. A third limitation is that we have considered the mere presence of women within the board, and not their real effective role on the decision-making process, such as we not consider the positioning of female directors in the university hierarchy. These limitations opens the door to a further possible development of this study, i.e. examining how and if the gender-related opportunities or the difference between women director's values from those of male directors' influence decision-making.

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Gender balance in research organizations is considered as a key step for ensuring research excellence and quality and inclusive-sustainable innovation. Still, in spite of an increasing number of HE and research institutions committed to make science more equal and some positive trends in figures on Gender equality in STEM research, it still appears to be difficult to prioritize gender equality. This is particularly true for disciplines such as ICT/IST where female representation at all levels is among the lowest ones among STEM topics and where a gender sensitive approach to ICT design and programming is far from being understood in its implications among computer and information systems scientist.

H2020 (PGERI and SWAFS programmes in particular), promoted the concept of institutional change for gender equality, insisting on the need for merging change management and gender policies.

The volume is focusing on a presentation and reflexive review of results and tools from the H2020 EQUAL-IST project to discuss opportunities to innovate and transform HR management and Institutional communication, research design, teaching & students services, via gender equality, and how such innovations could be multiplied and sustained with a focus on ICT and IST research organizations. The volume is complemented by contributions from other projects on institutional change in research.

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