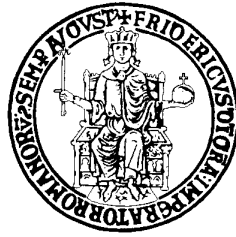


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PhD in Human Mind and Gender Studies

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**Through the glass labyrinth of science:
Mapping gendering processes in academia**

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Table of contents

Table of contents	I
Ringraziamenti	III
Abbreviations	VI
Chapter 1 Introduction	1
Chapter 2 Gender equity: a kaleidoscope of approaches and perspective	7
2.1 Visions and debates around gender equity	8
2.2 European policies on gender equality in Research and Innovation	11
2.3 Looking into mentoring programs as a strategy to analyse gender equality in academia	17
Chapter 3 Gendered science. Toward a Theoretical Framework	23
3.1 Gendered organisations	25
3.2 Situated knowledge in feminist epistemology of science	28
3.3 Gendered academia	32
3.4 Practices and mechanisms: doing gender and undoing gender. A post-structural analytical framework	34
Chapter 4 Through the glass door and onward	43
4.1 Career development in Italian academia	44
4.2 Gender analysis of Italian academic careers	46
4.3 A focus on temporary positions	57
4.4 Methodology, data collection and analysis	65
4.4.1 Data collection and methodology	66
4.4.2 Comparison of the gendering processes in Italian and Irish academy	69
4.4.3 Higher Education Institutions in Ireland	70

Chapter 5 Mapping the gendered labyrinth of science	75
5.1 Gendering processes in institutional academic and research structures	76
5.1.1 Processes of male-dominated hierarchical structuring	77
5.1.2. Gendered career recruitment and progression processes	82
5.2 Gendering processes in academic and research work	85
5.2.1 Gender impact on the pace of research	86
5.2.2 Gender division of the academic and research work	94
5.3 Gendering processes in academic and research culture	99
5.4 Intersectionality	108
Chapter 6 Gender mechanisms in the construction of gendering processes	111
6.1. Ambivalence of reputational system in science	111
6. 2 Ambivalence of extended present and other gender mechanisms in the division of scientific work	118
6.3 The double bind of women in science	121
6.4 Redefining scientific norms	124
Chapter 7 Deconstructing gendering mechanism through positive gender practices in mentoring	129
7.1 The Mentoring Program GENOVATE@UNINA	130
7.2 Mentoring as strategy to address gendering mechanism in science and academia	140
7.2.1 Mobilizing femininity	141
7.2.2 Breaking the double bind	143
7.2.3 Back to the future	146
7.3 Arianna’s Mentoring	149
7.3.1. Only women vs women and men	152
7.3.2 A (not schematic) scheme for new programs	154
Chapter 8 Conclusions. The thread of Arianna	161

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Abbreviations

ANVUR	Agenzia Nazionale di Valutazione del Sistema Universitario e della Ricerca = National Agency for the Evaluation of University and Research
ASN	Abilitazione Scientifica Nazionale = National Scientific Qualification
CNR	Consiglio Nazionale delle Ricerche = National Research Council
CRUI	Conferenza dei Rettori delle Università Italiane = Conference of Italian University Rectors
HEA	Higher Education Authority
INFN	Istituto Nazionale di Fisica Nucleare = National Institute for Nuclear Physics
MIUR	Ministero dell'Istruzione, dell'Università, e della Ricerca = Ministry of Education, Universities, and Research
UCC	University College Cork
UNINA	Università degli Studi di Napoli Federico II = University of Naples Federico II
VQR	Valutazione della Qualità della Ricerca = Research Quality Evaluation

Chapter 1

Introduction

Since the Nineties, national and international scientific institutions have started to develop initiatives aimed to address the under-representation of women recorded in Science and Technology fields. Despite the relevant support provided by the European Commission, that in the last two decades have promoted significant and numerous programs to encourage gender equality in science, women are still significantly under-represented in academia and scientific contexts. According to the latest *She Figures* Report, the main source of European statistics on the representation of women and men amongst PhD graduates, researchers and academics published every three years by European Commission, across Europe, the proportion of women heads of Higher Education Institutions has risen from 15.5% to 20.1% during the period 2010 to 2013, in 2013 the 45% of researchers were women, having increased their presence by 1 percentage point since 2007. However, only 21% of Full professor were women; a 58 percentage point difference with men. The under-representation of women continues to characterise participation in science and technology occupations (She Figures 2015).

What are the reasons for this slow pace, by scientific institutions, in tackling what the figures show to be an evident injustice consumed daily within their walls? One of the answers to this question is that gender inequality is commonly denied; it seems not visible or a residual heritage of a fading past history.

To make visible the processes responsible for the different scientific trajectories of women and men in science and to unveil the underlying mechanisms that sustain these processes are the main aims of this research study.

To this purpose, this study develops a theoretical framework working through different perspectives on issues related to women's participation in science, while linking specific institutional and dynamics to broader societal ones.

Three perspectives at least seem to be relevant to this aim: a) studies on practices (practice theory) that identify gender as practice in the gendered scientific organisations and gendered academia; b) research on the role of gender in the construction of scientific knowledge and its epistemic legitimation; c) research on the co-construction of science and society.

The first perspective analyses the **gender as social practice in science and academia**. In the recent years the feminist literature have focused on gender practices, as micro-level interactions between individuals, to understand the more complex and subtle means through which the gender order is structured in institutions and organisations (Acker, 1990; Bird and Sokolofski, 2005; Britton, 1999, 2000; Butler, 1993; Connell, 1987; Martin, 2001, 2003; Myers, 2004; Pyke and Johnson 2003; Schwalbe et al. 2000). Gender practices (Martin 2003) are a set of activities available to be performed in accordance with cultural gender expectations. This approach makes gender centred on the dimensions of social and relational construction and leads to conceptualise gender as situated social practice, actualised through social interaction (Poggio, 2006). Gender practices are in the discourse, symbols, the ways in which people talk about concepts and in their behaviours. Ely and Meyerson define gender as “a complex set of social relations enacted across a range of social practices that exist both within and outside formal organisations” (p. 113). According to this perspective, gender is a core organising principle that shapes social structures, knowledge, and identities. Gender is in the processes, in the practices, in the images and ideologies, and in the distribution of power in the various sectors of social life and of organisations; gender is an integral part of the processes that attribute gendered characterisation to the organisations.

This approach, stemming from Acker's (1990) gendered organisations theory, is central in the investigation about academia as a gendered institution and the "gendering of academic careers". In these field of studies, gender scholars give several explanations of gender inequalities in academia: some research focused on excellence and scientific quality as gendered social construction (Benschop and Brouns, 2003; O'Connor and O'Hagan, 2015, Van der Brink and Benschop, 2011, Harding, 2002; Knights and Richards, 2003; Bailyn, 2003; Knights et al., 2003; Deem 2007), others show the existence of gendered networking by gatekeepers, marginalising women in academia (Bagilhole, 2002a; Benschop, 2009, Van den Brink, and Benschop; 2012a, 2014).

Feminist epistemology of science provides a second perspective needed to understand how women and men do gender in science and academia. This theoretical approach recognises the constitutive role of background assumptions of the scientists in the knowledge acquisition and evaluation (Longino, 1990). According to feminist epistemologies, the ideal of the autonomous knower represent visions and interests of a privileged group of white men, while the value of objectivity obscures subjective elements, which are a constitutive part of it.

Donna Haraway challenges the uncritical attitude of the discourse of Science, discussing the ambiguity of the modern conception of scientific objectivity, while identifying the Modest Witness as a key figure in the rhetoric of science as knowledge pretending universal value (Haraway, 1966). She takes the term "modest witness" from the book of Steven Shapin and Simon Schaffer *Leviathan and the Air-Pump: Hobbes, Boyle, and The Experimental Life*. The authors point to Boyle, universally recognised as the father of chemistry – as a key actor-network in the emergence of the Scientific Revolution of the VIII Century and of experimental practice as the method of science. According to Shapin and Schaffer, in the 1650s and 1660s, three technologies anchored the scientific method as it was

then introduced: a) a material technology in the form of the air-pump (the experimental mean), b) a literary technology by means of which the phenomena produced by the pump were made known to those who were not direct witnesses (the scientific paper), c) a social technology that established scientific conventions for evaluating knowledge-claims (the peer community) (Shapin and Schaffer, 25). According to Haraway, this process created the apparatus of production of what we know as scientific knowledge, defining the boundaries and standards to define and control what could count as scientific knowledge and what could not. Haraway reveals the “situated” nature of this process that has formed the basis of scientific method, and on how “situated knowledge” was constructed (while being hidden as such) as universal knowledge, to have the capacity to ground social order *objectively* (Haraway, 1966). In this thesis, I argue that the social nature of this “situated objectivity” is one of the most relevant causes of gender asymmetry in science and academia. This ambiguity is strongly connected with the normative co-constitution of science and society, so with the third approach proposed, **Science and Technology Studies (STS)**.

Overview of Chapters

Chapter 2 provides a review of gender equality in science and academia. Different visions and theoretical perspective of gender equality are described and the European policies to implement programs for gender equality in science and research are reported. Moreover, a brief review about mentoring, as an exemplary practice to address gender bias in science, is presented.

Chapter 3 focuses on the construction of the theoretical framework orienting our research study about science as a *gendered institution*. To understand the creation and re-creation of the gendered understructure in science and in academia, I provide an interpretative framework, based on the three above mentioned perspectives.

Chapter 4 provides a contextual analysis of the national and local academic institutional contexts within which research field-work was done. This chapter is composed of two parts: the first seeks to analyse the effects in terms of gendering academic paths of the current system of recruitment and career progression in the Italian academia. An original statistical analysis is provided to identify and quantify vertical and horizontal segregation in the Italian university, also introducing a new indicator referred to the recruitment stage, called the *glass door index*. The second part describes the data collection and the methodological and interpretative tools used in the qualitative analysis of gendering processes and mechanisms in academic and scientific contexts.

Chapter 5 provides a map of the gendered practices emerged as result of the analysis of the biographical narrative interviews to 44 women scientists, and a background validating comparative the analysis of the Italian with the Irish case.

Chapter 6 provides a theoretical framework to explain the (re)construction of gendered practices in academia. It gives a systematic order to the different interlocking mechanisms that contribute to shaping gendering processes in science. In this framework, the gendering mechanisms are connected with the ambivalence in the normative system of science, considered as anchoring enduring discursive and legitimating practices, notwithstanding important changes in the understanding of science by the STS approach and in its regulative system after neo-liberal inspired reforms.

Chapter 7 analyses mentoring to identify the practices acting within these programs for gender equity that are able to contrast and deconstruct the gendering mechanisms responsible for the gender segregation processes and the underrepresentation of women in science. The Arianna's mentoring is proposed as a new scheme to face gendered mechanisms in science and academia.

Chapter 8 provides a final overview of the key findings, including the proposal of the glass labyrinth as an insightful metaphor to describe gendered practices and mechanisms in science. The flexible character of gender actions inspired by this metaphor – included Arianna’s mentoring scheme - are argued as essential to face the negotiation and renegotiation of practices, doing and undoing gender in everyday interactions, within scientific contexts. According to this position, rather than an outcome to achieve, gender equity in science is proposed as a social practice itself.

Throughout this dissertation the expressions “scientific knowledge”, “scientific research/studies” refer to all “scientific disciplines”, and they are not restricted to STEM fields, which are instead clearly indicated as such whenever they are mentioned in this study.

Chapter 2

Gender equity: a kaleidoscope of approaches and perspectives

Gender equity is a concept in evolution that has assumed - and is still assuming - different meanings in different time and contexts. Even if the public debate around gender mainstreaming policies is usually obscured by a generic and consonant idea tailored to fit on the prevailing paradigm, there is not a unique consensus on what gender equality means within politics and among civil society, practitioners and scholars.

Gender equity is a controversial concept also in feminist literature. Since the birth of gender equality policies in the 1970s until now, the cluster of meanings that this concept can assume is still producing an endless chain of questions and a myriad of dilemmas. Recently, gender scholars Mieke Verloo and Emanuela Lombardo have explored the contested nature of gender equality and found out three levels of analysis for explaining the differences in perspectives: 1) visions of gender equality 2) political and theoretical debates that arise within the framework of these visions 3) meanings of gender equality in different national contexts (Verloo, 2005; Verloo and Lombardo, 2007).

The present dissertation suggests a fourth level of analysis to investigate the concept of gender equality: the institutional (and policy) field in which gender equality is being scrutinised. The field to which this research is addressed is science.

In the next paragraph, visions and debates around gender equality are briefly resumed. Paragraph 2.2 reports the main steps through which European policy on gender equality in research and innovation developed during the last two decades,

listing the different approaches emerged towards gender equality in academia. Finally, Paragraph 2.3 gives a brief review about mentoring as a strategy to address gender bias in science and introduce the analysis of mentoring practices as a useful lens through which gaining a new insight about gendering processes in academia.

2.1 Gender equality: visions and debates

Recently, feminist scholars have identified three main theoretical approaches to gender equality, to which different strategies and goals for gender policies may be associated (Walby, 2005). Table 1 schematically reports the three main perspectives, within feminist theory, and the main goals for gender equality policies associated to each distinct approach.

The main idea of the so-called “equal opportunities” perspective, based on liberal feminism, is that all individuals, unrelatedly to gender, should have the same rights and the same opportunities to compete as equals in the labour market. According to this approach, gender equality is conceptualised as a problem of achieving equality as sameness: the goal for gender equality is to eliminate the barriers that determinate women’s exclusion from politics and from key-positions in society, without challenging the male norm inscribed within organisations (Calás and Smircich 2006: 290, Meyerson and Kolb 2000: 560).

A different point of view is provided by the “difference approach”, based on standpoint feminism (Harding 1986; Smith 1987) that recognises men and women as different. According to this perspective, difference should be enhanced and valued instead of being used as a form of power by one gender above the other. Accordingly, the stated aim for gender equality is not to integrate women into the current order but to

recognise and reconstruct the (women’s) non-hegemonic gendered identities in policy and society, while breaking the male-dominated order (Squires 1999: 117–118).

Perspectives of feminist theory	Theoretical background	Main idea	Main aim of gender equality
Equal opportunities	Liberal feminism	Women and men are equal, and should have equal rights, equal access to and equal representation in public life	To enable women and men to compete as equals in the workplace and the labour market and to create equal opportunities by eliminating structural and procedural barriers to women’s success
Difference approach	Standpoint feminism	Men and women are different but this difference should be celebrated instead of read as inferiority	To lessen the power of the male order
Post-equity / Transformation	Post-structuralist feminism / social constructionist feminism	Gender is a social practice that constructs norms with white, heterosexual, class-privileged men as the neutral and objective standard	To challenge this gendered world

Table 1. Gender equality in the main perspectives within feminist theory

In the last years, a third perspective has spread in feminist studies. The “post-equity” (Meyerson and Kolb 2000) or “transformation” approach (Squires 1999) stems

in post-structuralist (Butler 1990, 1992) and social constructionist feminism (Lorber 2005; West and Zimmerman 1987). According to this approach, gender is a social practice rather than an individual variable. Norms tailored to white, heterosexual, class-privileged men are daily proposed as the neutral and objective standards, making values and perspectives, held by the non-dominant gender, invisible or marginal. The goal for gender equality, according to this approach, is to modify gendered structures that define a gendered world (Verloo and Lombardo 2007, Verloo 2005): that is, undoing gender.

Within the framework defined by these visions of gender equality, a variety of different theoretical and political debates take place. One of the most relevant discussions focuses on the intersection of gender with other inequalities. Race, class, age, sexual orientation, ethnic origins, ability, and other complex inequalities entered feminist discourse as key issues to understand and address inequalities in society, as well as gender (Anthias and Yuval-Davis 1990; Harris 1991; Lord 1984; Nussbaum 2000). Another crucial debate concerns the duality between “expertise” and “democracy” in gender mainstreaming policies (Beveridge et al. 2000; Walby 2005; Verloo 2005). On the one side, gender equality policy is conceived as a political process of democratization through which women’s voices are included in the policymaking process (Walby 2005). On the other side, gender expertise is considered a crucial aspect for progressing in gender equality policies, to the point that, more and more often, gender equality policy is conceived as a technical process. Additional relevant discussions about the meanings of gender equality and the complex problematic in gender mainstreaming policies are analysed and reported in the literature. The intertwining of the public and private domains, and the reproduction of the distinction among them while changing the demarcation criteria, is one crucial issue through which gender mainstreaming policies are scrutinized and questioned.

Finally, Verloo and Lombardo analyse how the different contextual locations contribute to differentiating such visions and debates over gender equality that take place in actual policy practices (Verloo and Lombardo, 2007).

In conclusion, more than as a simple lens, as it is frequently described, gender equality can be imagined as a kaleidoscope of meanings and perspectives. These conceptualizations and points of view are not necessarily exclusive, but each of them address gender equality from a distinct perspective. Intentionally or, very often, unintentionally, they lie behind each gender equality program - even in programs aiming to promote gender equality in science.

2.2 European policies toward gender equality in Research and Innovation

Since the Nineties, national governments and scientific institutions have started to develop initiatives aimed at addressing the underrepresentation of women in Science and Technology fields. Towards the end of the last millennium, gender equality has become one of the priorities of European policies on Research and Innovation and, in the last two decades, European Commission (EC) has been promoting significant and numerous programs to encourage gender equality in science. As a consequence of the huge funding allocated by EC during these two decades to support women researchers, the European bodies have designed specific frameworks for gender equality policies in science that have driven the roadmaps for interventions moved by national and local scientific organisations.

In 1999 the EC set two European bodies to better understand mechanisms thought which the exclusion of women from science was generated: the *Women and Science Unit* in the Directorate-General of Research, and the *Helsinki Group*, an advisory group

of the Commission on Gender in Research and Innovation (The *Helsinki Group* mandate was renewed in 2013 with tasks listed in Table 2).

- To reflect and advise the Commission on the development of initiatives within the different policies and frameworks related to science, research and innovation (eg. the Innovation Union, Europe 2020 Strategy, the European Research Area, Framework Programmes, etc.) with a view to:
 - Enhance gender equality in R & I , including work/life balance issues;
 - Integrate the gender dimension in research contents and programmes,
 - Modernise research institutions;
 - Mobilizing stakeholders in order to promote gender equality
 - Facilitating the development of the gender priority in ERA
- To exchange best practices on the measures and policies which have been devised and implemented at local, regional, national and European level with a view to facilitating MS and AC joint activities;
- To support and advise the European Commission in the preparation of comparable European statistics and indicators on gender equality in R & I;
- To create awareness at national level on European and national activities related to gender equality in R & I, through Ministries and/or the national Steering Committees (if relevant) involved in research and innovation.
- To mobilise stakeholders.

Table. 2 Tasks of the Helsinki Group mandate¹ (April, 2013)

¹Information available at http://ec.europa.eu/research/swafs/pdf/pub_gender_equality/new_mandate_helsinki_group_FIN_25%2004%202013.pdf#view=fit&pagemode=none

The *ETAN Report on Women and Science* (European Commission, 2000) was the first official document on this matter, published by EC in 2001. It provided a preliminary view of gender issues in science in Europe that has signed the pathway of studies, funded in the following years by EC, aiming at investigating the nature of the obstacles inhibiting or slowing down women's scientific careers, and of programs directed to increase the participation of women in the process of scientific research and innovation.

At this stage, intervention strategies in research and academia were mainly conditioned by the "equal opportunities" perspective to gender equality, and the emphasis was prioritizing the "fixing the women" approach. All these measures, based principally on mentoring, role models, networking, etc., were finalised, on the one hand, to encourage girls to undertake scientific studies, and on the other, to retain women in science and technology careers. The work of collection and assessment produced within the project PRAGES (Seventh Framework Programme) provided a detailed map of practices developed in Europe, North America and Australia in the first step of gender equality in science policies (Cacace, 2009).

Moreover, every three years since 2003, the European Commission releases the "She Figures", the main source of pan European, comparable statistics on the state of gender equality in research and innovation. This report constitutes a key evidence base for policies on gender equality in research and innovation, defining the main indicators to measure gender gaps in scientific and innovation outputs. It analyses the proportions of women and men among top level graduates, academic staff and research boards, with a further focus on the working conditions for women and men researchers, and, more recently, on the integration of the gender dimension in the content of peer reviewed scientific articles.

In 2009 the Helsinki Group provided the document *Gender and Research Beyond 2009* (Helsinki Group, 2009) that urged the EC to adopt a new recommendation: to move the focus from women to institutions. With the Seventh Framework Programme, the EC's activities on women in science changed their character, and the Structural Change era started ("fixing the institution" approach).

A third vision on the interventions for gender equality in science has been moving forward in recent years: the "fixing the knowledge" approach. Starting since 2011, studies have been highlighting the relevance of gender analysis as a factor contributing to developing new ideas and fostering innovation in research (Schiebinger, 2011, *Gendered Innovations Report*, 2013). The *Gendered Innovations Report*, published by EC on 2013, aims to provide relevant guidelines to integrate the gender perspective into research priorities and research questions. The intent is to stimulate innovation in the design of new products, processes, infrastructure, services and technologies to promote human well-being and gender equality, to meet the needs of complex and diverse users group, and to enhance global competitiveness and sustainability (*Gendered Innovations Report*, 2013).

Subsequently, the promotion of gender equality, including the integration of the gender dimension in research and innovation content, is enshrined in the three core documents of Horizon 2020 projects (European Commission, 2016).

Recently, since the 1st July 2017, the Helsinki Group (WG) on Gender Equality in Research and Innovation moved to the Council and became a Standing Working Group (WG) of the European Research Area Committee. According to the Mandate of WG, the main activities of Standing Working Group are: a) to provide support to address policy challenges related to gender in R&I, including developing guidance to facilitate the implementation of guiding targets for gender balance in decision-making bodies

and for professors; b) to promote mutual learning regarding gender equality policies / strategies and recommend good practices to effectively implement and assess the ERA national action plans or strategies; c) to facilitate joint transnational activities, to be implemented with appropriate means; d) to develop joint guidelines on a gender perspective for international cooperation in STI; e) to advise and contribute to the elaboration of indicators to monitor and assess policies and initiatives on gender equality in R&I; f) to facilitate the regular collection of sex-disaggregated data for the She Figures and, where possible, of gender indicators in the field of R&I, in collaboration with national statistical offices; g) to liaise with H2020 National Contact Points (NCPs), national and European stakeholders and raise awareness on all matters relating to gender in R&I and support training as needed (ERAC, 2017).

Approaches	Aims	Actions
Fix the women	Enhancing women's confidence and self-esteem, empowerment, capacity-building; encouraging women to be more competitive, assertive and risk-taking.	Mentoring, role models, networking, trainings on leadership, encourage, programs to encourage girls to undertake scientific studies.
Fix the organisation	Gender mainstreaming, institutional transformation e.g. gender equality policies, processes and practices, challenging discriminatory structures, gender impact assessments, audits and reviews, introducing work/ life balance schemes including flexible working.	Making decision-making transparent; removing unconscious bias from institutional practices; promoting excellence through diversity; modernising human resources management and the working environment.
Fix the knowledge	Identifying bias, curriculum change e.g. the introduction of gender as a category of analysis in all disciplines, gender and women's studies.	Improving research by integrating a gender perspective.

Table 3. Approaches to gender equality in science

In this dissertation, visions of gender equity underlying these approaches are analysed. I argue that, even if at a first look, *the fixing the institutions* and *fixing the knowledge* approaches draw their inspiration from the perspectives of difference and transformation, their link with the equal opportunity vision (and the neoliberal system) still remains strong. Moreover, Gendered Innovation, promoted as a flag of the *fixing the knowledge* approach, provides research methodologies mainly to take into account the biological characteristics (sex) and the evolving social/cultural features of both women and men (gender). However, few examples are developed to show how the research process, through which scientific knowledge is produced, might change towards new epistemologies.

2.3 Looking into mentoring programs as strategy to analyse gender equality in academia

Among the initiatives promoted by universities and scientific organisations to address the underrepresentation of women in science, mentoring programs specifically aim at supporting women's career trajectories.

Over the last two decades, mentoring has become highly popular in a number of countries (mainly in North America, UK, Australia, North Europe) as a way to address social exclusion and to develop professions. The success of mentoring as a policy tool² is confirmed by a great academic attention on mentoring revealed by the increasing number of papers on this topic presented in the scientific literature over the last years (Allen and Eby, 2007; Ragins and Kram, 2007; Dubois and Karcher, 2013, Wright, 2016).

². Just to mention some notable examples, we can consider ADVANCE-IT as in one of the most successful mentoring programs in the United States, and Eument-net as a significant experience of Network of Mentoring Programs in Europe.

In this dissertation, the theoretical understanding of mentoring programs implementation is conceived as a way to gain new insight into the gender equality issue in science. Formal mentoring programs present a dual character, as they intersect gendering processes both at the institutional and interactional levels. On the one hand, they must be strategically aligned with the values and mission of the organisation that is promoting them; on the other, the core of mentoring and the conditions for its success are founded on the interpersonal relationship between the mentors and the mentees. In the case of mentoring programs aimed at changing institution towards gender equality, this dual character can be interpreted as an inherent contradiction, as far as people involved in mentoring are simultaneously invited to adhere to the values of the institution and to change them. The main idea of this research is that this paradox of mentoring opens up a privileged point of view to analyse gender equality strategies, and their ambiguities, in academia. My standpoint, while approaching to the conclusion of this research path, is very near to the idea that in this indissoluble link between interaction and structures the potentiality for changes towards gender equality lies.

In its traditional version, within work organisations, mentoring is defined “as a relationship between an older, more experienced mentor and a younger, less experienced protégé for the purpose of helping and developing the protégé’s career” (Ragins and Kram 2007). Differences exist between *informal mentoring*, grounded in personal and individual activities, and *formal mentoring*, developed with organisational assistance or intervention (Ragins 1999).

Within organisations, mentoring programs were first introduced as a lever for the socialization of younger cohorts within the organisational culture; later on, to contrast apparent biases in mentoring functioning, special programs developed with the explicit aim to support under-represented groups, such as women and racial minorities (particularly popular

in the US, see Ragins 1996). In the last decades, mentoring programs have been popular as a strategy to address gender inequality in work organisations and especially within academia³.

Very different approaches to mentoring have been developed and recognised within the literature on mentoring. To describe the wide ranges of perspectives that can be tackled by using these programs, the “mentoring continuum” concept has been introduced and developed (Figure 1). The continuum spectrum of mentoring programs starts with the “instrumental approach”, as one extreme, and go forward to the “developmental approach”, on the other one (De Vries, 2010).

Instrumental Mentoring	Developmental Mentoring
Career/promotion	Broader development
Knowledge transfer	Guiding/supporting
Institutional need	Mentee centred
‘Sage on Stage’	“Guide on the side”

Figure 1. The mentoring continuum (De Vries, 2010)

In the instrumental mentoring perspective, the main task of the mentor is to assist the career of the junior colleague. To this aim, the mentor uses his/her knowledge and experience to teach and/or advise the mentee. Lately, feminist scholars have moved some warning about the pitfalls of instrumental mentoring as a strategy to attain gender equality (Colwell 1998; Gay and Stephenson, 1998; Zachary, 2000; Chao 2007; Greenhaus and Singh 2007; Lankau and Scandura, 2007; McKeen and Bujaki, 2007; Jarvis and Macinnes, 2009). They refer to instrumental mentoring as mentoring for ‘organisational fit’. From this critical perspective, this mentoring model is grounded on asymmetrical power relationships and lacks in asking

³ To mention some notable examples, we can consider ADVANCE-IT as one of the most successful mentoring programs in the United States, and Eument-net as a significant experience of Network of Mentoring Programs in Europe.

for any critical stance, on the part of the mentor, toward the organisation. Instrumental mentoring programs strictly focus on women's careers, aiming to improve their performance in a performative culture, while prioritising organisational goals rather than equity goals (Devos, 2008). In other words, they assist women to manage their paths within existing performance parameters that fit with the needs of the organisation, without interfering with its gendered structure (De Vries, 2010). On the other hand, the developmental mentoring approach favours collaborative and equal relationships. The mentor role is similar to that of a guide, supporting the development of critical stance by the mentee, without providing predefined answers to his/her dilemmas. Both partners are involved in a learning process aimed to develop greater insight into the organisational structure and functioning. This relationship is marked by less power distance than the instrumental one and centred on the mentee needs (Colwell 1998). In developmental mentoring, both the mentor and the mentee are involved in a reflexive process, fostering exploring attitudes, risk taking choices, and autonomy (Gay and Stephenson 1998).

However, both the above mentioned approaches to mentoring programs, aimed at increasing gender equality, focus on women as their target group while trying to overcome what is conceptualised as women's weakness rather than addressing the gendered organisation of academic institutions. In other words, according to some feminist scholars, mentoring programs for women are a way of *fixing the women*. Their only goal is to increase the number of women in science and the participation of women in academia; as a result, while individual women may become more successful within the organisations, the overall situation for women (and the implied gender order) may remain unchallenged and unchanged. In this perspective, mentoring schemes could induce adaptive behaviours rather than triggering transformative practices towards gender equality in academia. Despite good intentions, the priority given to the short-term agenda – that is, support to individual women –

over the long-term agenda - a transformative project for the organisation as a whole - causes the gender equality intent easily to be lost from sight (Cockburn 1991; Ely and Meyerson 2000; Meyerson and Fletcher 2000).

To give a response to these critical arguments to mentoring as a tool towards gender equality, Jennifer de Vries (2010) has developed the “bifocal approach”, to highlight the need for mentoring programs to focus on a dual mandate:

- to develop women’s careers (according to the *fixing the women approach*);
- to work for organisational change (according to the *fixing the institutions approach*).

By playfully drawing on the notion of bifocal spectacles, the bifocal approach opens up the possibility of focusing on both the close up vision, the shorter-term solution of developing individual women, and the distance vision, the need for longer-term organisational change.

Accordingly, Jennifer De Vries revised the mentoring continuum adding the transformative approach to the spectrum of mentoring programs.

Instrumental Mentoring	Developmental Mentoring	Transformative Mentoring
Career/promotion	Broader development	Gender insight
Knowledge transfer	Guiding/supporting	Partners for change
Institutional need	Mentee centred	Institutional change
‘Sage on Stage’	“Guide on the side”	«Tempered radicals»
Maintain status quo	↔	Challenge & change status quo

Figure 2. The mentoring continuum revised (De Vries, 2010)

An explicit focus on the mentors and their development is the main point of difference between the bifocal approach and other *women only* mentoring approaches, almost exclusively focused on the outcomes for the mentee. The inclusion of the mentors’ development within the outcomes of the relationship becomes the answer to the quest for making the mentoring process truly a transformative one.

Nevertheless, the adoption of mentoring program as an instrument to implement the gender equality in the institutions remains a choice not very widespread, and which may be the practices to implement a transformative mentoring is yet an open issue in the scientific debate (O' Grada et al. 2013; de Vries and Benschop, 2016; Picardi, 2017).

Chapter 3

Gendered science. Toward a Theoretical Framework

One of the more tricky aspects of processes that produce gender discrimination is their invisibility. Quantitative data and analyses are relevant tools to make the existence and the persistence of both horizontal and vertical segregations apparent.

However, making visible social dynamics responsible for maintaining gender asymmetry in social and scientific organisations is not as simple as counting women and men in the different positions and career steps. What does explain the existence of these gaps? What are the mechanisms that determine the depotentiation of women in science? Why do women's roles remain moderately feeble in the process of doing science? To make visible some of the processes that do science as a gendered social institution is one the main aims of this research.

Standard mainstreaming perspective considers organisations and their culture neutral to gender. This assumption is much more legitimate in science, an institutional field generally conceived as constitutively universalistic. The conception of organisations and their culture as neutral is one of the principal causes of the persistence of gender inequalities, which hides many of the causes that produce gender-based differentials.

As Judith Lorber (Lorber, 2005) suggested, the best way to deal with the injustice implicit in current order is to make it visible. Identifying and understanding the mechanisms that produce gender inequalities in organisations means advancing in comprehension of the phenomenon, but also providing an indispensable tool to tackle it and initiate a process of change towards gender equality.

In this chapter, I provide a theoretical framework for understanding universities (and research centers) as gendered organisations and Science and Academia as *gendered social institutions*. Science appears as a social institution to which the monopoly of the construction of scientific knowledge is allocated, historically developed by men *and* currently dominated by gendering (and gendered) processes and practices. Organisations devoted to give social actuality to Science are characterised by gendered hierarchical structures and career paths . In the first paragraph, I introduce the concept of gendered organisation, presenting different conceptualisations about the constructions of gender in social relationships and in the organisations. In Paragraph 3.2, I come back to how, according to feminist S&T studies, the exclusion of women was embedded in the constitutive birth-act of modern science and in its definition as universal empirical knowledge. The objectivity of the scientific method conceals the cultural and epistemological positioning of the scientific community that is actually classed, raced and gendered. In Paragraph 3.3. I enter the theoretical debate within practice theory to endorse an integrated approach where structural and analytical perspective can both give their contribution to the understanding of social practices and processes and to the resulting outcomes, in term of gender inequality.

Finally, in the last paragraph, I syntetise the specific frame through which gendering (and gendered) practices, enacted in scientific and academic contexts, will be reconstructed, and mechanisms identified, through which gendering processes in science and academia are produced and reproduced. This theoretical framework has been used to account for empirical results obtained in my own research work and to connect them to pre-existent literature in Chapter 5.

3.1 Gendered organisations

For more than thirty years, gender scholars have been striving for understanding the disadvantaged positions of women in organisations and made many notable steps forward. Most of these studies found their theoretical foundation in the innovative work of Joan Acker and her theory of organisations as gendered organisations. In 1990 with her groundbreaking article, *Hierarchies, Jobs, Bodies: A Theory of Gendered Organizations*, Acker argued that organisational structure is not gender neutral.

“To say that an organisation, or any other analytic unit, is gendered means that advantage and disadvantage, exploitation or control, action and emotion, meaning and identity, are patterned through and in term of a distinction between male and female, masculine and feminine.”

(Acker, 1990)

According to Acker, the gendered nature of the organisation partly hides in abstract concepts of jobs and hierarchies, assuming a disembodied and universal worker. Gender is not a variable intervening in an ongoing process conceived as neutral. It is an integral part of these processes that cannot be properly understood without a gender analysis (Connell, 1987; West and Zimmerman 1987). Gender is present in the processes, in the practices, in the images and ideologies, and in distributions of power in the various sectors of social life.

“The law, politics, religion, the *academy*, the state, and the economy [...] are institutions historically developed by men, currently dominated by men, and

symbolically interpreted from the standpoint of men in leading positions, both in the present and historically. These institutions have been defined by the absence of women.” (Acker 1992, *italics mine*).

Notwithstanding all the relevant literature about gender in academy and women in science, a clear statement about *science* as a *gendered social institution*, that is “historically developed by men, currently dominated by men, and symbolically interpreted from the standpoint of men in leading positions” (Acker, 1992) has not been clearly developed yet in relation to gender equality policy in academia.

In the next paragraph, I provide a feminist framework to bring science back in within gender inequality studies until now focused on academic institutions as work organisations. Bringing together within the same theoretical framework organisational studies and feminist STS approach will be my contribution to deepening our understanding of gendering processes at work in the scientific field.

To investigate the creation and re-creation of the gender understructure, Acker argued that it is necessary to look at organisational practices, the sites of concrete institutional functioning (Acker 1992). She describes how gendering occurs through five interactive analytic categories of processes (Acker, 1990). The first consists in the *construction of divisions along the lines of gender*, such as division of work, of allowed behaviours, physical space, power.

The second set of processes is the *construction of image and symbols* that explain, express, reinforce, or sometimes oppose those divisions. The third set is the *interpersonal interactions* (interactions between women and men, women and women, and men and men). The fourth set of processes produces gendered *components of individual identities*, such as the choice of appropriate work, language use, clothing,

and presentation of self. The fifth set of processes is implicated in the ongoing processes of creating and conceptualising *social structures*. These dimensions show the plurality of the processes by which gender differences and hierarchies are constantly produced and reproduced. Later, Acker dropped the fifth dimension, while introducing the notion of a gendered “substructure of the organization” (Acker, 1992, p. 259) and the idea that “the gender understructure is anchored in the privileging of organizations and in their successful claims for non-responsibility for human reproduction and survival” (Acker, 1998, p. 198).

With Acker, the concept of gender goes beyond the idea of socially constructed, binary identity and image. Her work is inspired by a current of thought that interprets gender as an analytic category (Connell 1987; Harding 1986; Scott 1986), as “a constitutive element of social relationships based on perceived differences between the sexes” and as “the primary way of signifying relationships of power” (Scott 1986).

According to West and Zimmerman gender is defined “as a routine, methodical and recurring accomplishment”, embedded in everyday interaction (1987, p. 126). West and Zimmerman suggested to move the focus from gender as ‘achievement’ to the process of ‘doing gender’, and therefore to ‘the activities of managing situated conduct in light of normative conceptions of attitudes and activities appropriate for one’s sex category’ (1987, p. 127). The new research agendas would, therefore, take as their subject the ‘complex of socially guided perceptual, interactional, and micropolitical activities that cast particular pursuits as expressions of masculine and feminine “natures” ’(1987, p. 126).

Some years later, Ely and Meyerson introduced a new conception of gender opening the way to the ‘post equity’ approach (Ely and Meyerson, 2000). Ely and Meyerson defined gender as “a complex set of social relations enacted across a range of

social practices that exist both within and outside of formal organisations” (p. 113). According to this perspective, gender is a core organising principle that shapes social structures, knowledge, and identities.

Ely and Meyerson work addresses the challenges in the ongoing social construction of gender at work. The focus, in this strategy, is on the processes generating gender inequalities as part of everyday organisational routines and interactions. The strategy advocates action-research projects that apply a specific form of critique focused on how gender inequalities are detrimental to organisational performance, followed by experiments that interrupt gendering processes while improving work effectiveness, and concluded by narratives about the experiments and their successes (Ely and Meyerson, 2000). Change depends not on the action of one actor but on fruitful collaboration between researchers and organisation members who understand and accept feminist critique and interventions that stem from that critique. Ely and Meyerson (2000) note how a dual agenda of gender equality and business success is difficult to maintain because of the dominance of business issues over gender issues. A dual agenda focus may foster a seductive discursive strategy that aligns to good effect with a managerial discourse about organisational performance (Benschop and Verloo, 2006). And yet, the risk of ‘losing gender’ to business issues is real, especially when targeted organisational routines serve the interests of those in power.

3.2 Situated knowledge in feminist epistemology of science

In recent decades, social studies in Science and Technology have highlighted the importance of different social dimensions in the building of scientific knowledge, including gender dimension.

According to feminist epistemologies of science, the division into female and male roles was amplified in science when the experimental method became its constitutive and foundational feature as well as the main tool for producing objective knowledge.

In the second half of the seventeenth century, the mechanical philosophy and mechanistic vision of the cosmos made their entry into the sciences. At this time the distinction between subjective and objective experience became a methodological necessity in the distancing process between the new evidence based knowledge and the one connected to the immutable Aristotelian categories.

Steven Shapin and Simon Schaffer (1994) reconstruct an important stage in the history of science that sees in the natural philosopher Robert Boyle (1627-1691), known as the father of modern chemistry, one of his major protagonists . In the Royal Society of London at the time of Restoration, Robert Boyle, a supporter of the corpuscular structure of matter, challenged Aristotle and his theory of *horror vacui*, according to which *natura abhorret a vacuo* (nature avoids the void), with the realisation of the vacuum pump. To distinguish “factual data” from non-objective elements that could have influenced the interpretation of the experiment, Boyle made public demonstrations of experiments where gentlemen were called as modest witnesses of experimental results. To take on the role of modest witnesses in the experimental theatre, however, two requirements were required: to be invisible, i.e., not to interact and/or to influence the experiment in any way, and to be disinterested, i.e., lacking any involvement and personal concern. Under these conditions, those men would have secured the separation between the existing and the non-existent, between technical knowledge and mere opinions (Shapin and Schaffer, 1994).

Shapin and Schaffer argued that scientific experiment became foundational through the simultaneous creation of technologies through which practitioners

developed ways of trusting one another. Three technologies were supporting mutual trust and giving modest witnessing concrete reality. Literary technology introduced a modest style of writing about “matters of fact”, with no expression of personal opinions. Technical, specific forms of appropriate experimentation in specific locations (laboratories) gave experimental method the concreteness of a practice to be shared by a community of practitioners. The designation of a class of people taken to be reliable as independent witnesses of those experiments and able to write about them – which in the 17th century was restricted to men of independent means, excluding women and servants - gave it social anchoring.

Donna Haraway points out from where, in to the apparent construction of objectivity within Boyle’s laboratory, conceived as a “theatre of persuasion”, women and technicians were excluded (Haraway, 1997). They were not allowed to participate in the process of objective validation of the experiment, not for some prejudice about their intellectual abilities, rather, for their status of dependence that characterised their social condition to limit their participation. Women and technicians were not considered sufficiently free from social and economic dependencies to be “reliable spokespersons of reality”. They did not respond to the criteria that ensured that disillusionment with the witnesses of science. They could participate in the experiment - actually, the technicians were involved in its organisation and implementation - but they did not have the opportunity to witness what nature was communicating through the instrument.

In Shapin and Schaffer’s account, gender discrimination is a contingent and not constitutive element of the practice of experimental science, based on historical social order; not a constitutive element of those practitioners’ new, agreed on, technologies. Unlike Shapin and Schaffer, Haraway (1997) argues that modest witnessing is itself a

gendered practice, actively productive of new versions of gender subordination. When science has affirmed the objectivity as a means of claiming its authority over cultural visions that were imposing strong limits on its development, it has also defined the adherence to a normative, cultural and epistemological model normalized on a specific category of people, considered able to guarantee autonomy of judgment. Thus, according to Haraway, the experimental method and its call for objectivity were instituted themselves with the epistemic displacement of subordinate social classes and the feminine gender (Haraway, 1997).

Feminist epistemologies of science argue that the ideal of the autonomous knower represent visions and interests of a small, privileged group of educated and prosperous white men (Goldenberg, 2006). Their material circumstances do not allow them to realise their positions of privilege and the grounding in it for their belief to be autonomous individuals without specific locations (i.e., gendered or raced). However, their appeal to the authority of objectivity obscures the subjective elements, which are a constitutive part of it.

Gender is present in the scientific processes, practices, images and ideologies, and distributions of power in the various sectors of science. Even if from the birth of the scientific method to today, many changes have been occurring in all institutions increasing the women participation in science, male gender still dominates the central scientific institutions.

Since the evidence is by no means objective or neutral, but rather part of a social system of knowledge production, many feminist epistemologists recommend social model of scientific practice. This model entails recognising our background assumptions as playing a constitutive (and not a biasing) role in knowledge acquisition and evaluation (Longino, 1990).

The gendered nature of science is obscured in the ways that this institution is conceptualised and theorised in gender-neutral terms. Understanding how the appearance of gender neutrality is maintained in the face of overwhelming evidence of gendered structures is an important part of analysing gendered scientific institutions. One conceptual mechanism is the assumption of an abstract scientist who, apparently, has no gender. On closer examination, the scientist almost always has the social masculine characteristics or stereotyped as masculine, even if that fact is not noted (e.g., Pateman 1988; Smith 1987). The gendered nature is partly masked through obscuring the embodied nature of work in science. Abstract job and hierarchies, common concepts in organisational thinking, assumed a disembodied and universal scientist. The dominant model of scientist is actually a man; men's bodies, sexuality, relationship to procreation are subsumed in the image of the scientist men. Images of men' bodies and masculinity pervade organisational processes, marginalising women and contributing to the maintenance of gender segregation in scientific organisations (Acker, 1992).

3.3 Gendered academia

More than two hundred years after the birth of the scientific method, scientific institutions - universities and scientific research centres - are predominantly male dominated institutions on a global scale: “gender inequalities in academia appear to be persistent and global phenomena” (Husu, 2001a: 172).

Gender scholars have documented several forms of social inequalities in the academic system. In the last two decades, the number of studies aimed at identifying gendering processes in academia is increasing fast. These research contributions show

ways in which social inequalities and complex and multi-faceted processes act gendering scientific knowledge, on the one hand, and academic careers, on the other (Van der Brink 2015, Deem, 2007; Eveline, 2005; Husu, 2001; Katila and Meriläinen, 1999, 2002).

Inequalities between women and men are persisting in salaries and benefits, rewards and recognition, in the processes that regulate recruitment and career progression (Currie and Thiele 2001; MIT, 1999; Probert, Ewer and Whiting, 1998; Ramsay 2002, Bagilhole, 2002a; Bailyn 2003; Husu 2000; Knights and Richards, 2003; Krefting, 2003; van den Brink, 2009).

Some academics turned their attention to their own experiences within the academy producing an extensive critique to universities as gendered institutions (Brooks and Mackinnon, 2001; Currie and Thiele, 2001; Martin, 1994; Morley, 1999; Morley, Unterhalter and Gold, 2001).

Other scholars showed universities to be constructed around the ideal male academic (Bailyn, 2003; Martin, 1994) who does not carry the weight of caring responsibilities (Raddon, 2002).

Gendering processes produce narrow definitions of career paths and merit (Benschop & Brouns 2003;), limits what counts as scientific knowledge production (Benschop & Brouns 2003; Martin 1994) and fosters competitiveness and individualism (Thomas 1996).

Women experience discouraging climate (Brooks 1997; Caplan 1994; Falkenberg 2003; Gersick, Bartunek & Dutton 2000), discrimination, sexist behaviours and gendered expectations (Leonard 2001; Wylie, Jakobsen & Fosado 2007).

In this thesis, I adopt an integrative approach that sees gender as potentially operating at multiple levels. Gender can be analysed at the structural level and at the

cultural level of organisations. Then a gendered division of labour and different and gendered access to power will appear together with gendered narratives and stereotypes that permit to see how gender is built and reflected in actual practices, norms and legitimating values (O' Connor, 2014, Wharton's, 2012; Risman, 2004, Connell 2002; Lorber 1994; Ferree, Lorber, and Hess 1999; Risman 1998).

3.4 Practices and mechanisms: doing gender and undoing gender. A post-structural analytical framework

In recent years, the concept of practice and the theoretical relevance of the theory of practice for gender studies (Bourdieu, 1980, Nicolini et al., 2004; Schatzki, 2001) has gained centrality in relevant literature, especially in organisational studies. This approach upholds a view of gender as situated social practice actualised through social interaction (Ely and Meyerson, 2000; Poggio 2006), closely centred on the dimensions of social and relational construction.

Ely and Meyerson focus on gendered practices as concrete manifestations of social relations that build inequities while appearing to be gender-neutral. These social practices “maintain a gendered social order in which men and a particular form of masculinity predominate”. Gendered practices are formal policies and procedures, and informal patterns of everyday social interaction; their function is to “build the mechanisms that produce and justify the allocation of resources, information, and opportunities in the culture of organisations”, according to gendered criteria (p. 114). Patricia Yancey Martin (2003) defines “gender practices” as a set of activities to be performed according to cultural gender expectations. They include discursive practices through which reality is made meaningful and individuals verbally position themselves

relative to others (Connell 2002; Martin 2003). Martin (2001, 2003, 2004) examines gendering processes regarding a two-sided dynamics: “gendering practices” and the “practising of gender” (2003). “Gendering practices” consist of activities culturally, discursively and physically available to be practised in social settings; while with “practising gender” Martin means the more dynamic part of gender construction, or, better, the diverse forms assumed by masculinities and femininities. Gherardi and Poggio (2001) emphasise the role of “cultural and symbolical practices” in producing and reproducing gender asymmetry in organisations. Starting from a symbolist interpretation of doing gender, Gherardi highlighted the ambiguity of gender in workplaces produced, on one hand, by the indivisibility of male and female and, on the other, by the opposition between them in the dominant symbolic order of gender (Gherardi, 2004).

The notions of gendering processes and gendered practices are used to understand how gender is constantly redefined and negotiated in everyday practices and interaction. They point to how men and women do gender in social interaction even as they claim and believe that they act in gender-free ways. They describe how social actors contribute to the construction of gendered identities by engaging in a process of reciprocal positioning (Barry et al., 2006; Benschop, 2009; Gherardi, 1994; Katila and Merilainen, 2002; Poggio, 2006; Van den Brink and Stobbe, 2009; West and Zimmerman, 1987, Scott, 1997, Van der Brick and Benschop, 2011).

According to practice theorists, social practices are implied in any kind of intentional action and constitutive of any kind of agency; they are culturally constituted and directly convey meaning (Sewell, Biernacki, Swidler). They are the infrastructure of repeated *interactional* patterns.

In this perspective, structures are nothing else than structured practices. They depend on the mutual reproduction of cultural schemas and resources. “Sets of schemas and resources may properly be said to constitute structures when they mutually imply and sustain each other over time” (Sewell, 1992, 13). This is where what Giddens called the “duality” of structure lies:

“If schemas are to be sustained or reproduced over time – and without sustained reproduction they could hardly be counted as structural – they must be validated by the accumulation of resources that their enactment engenders. [...] Schemas not empowered or regenerated by resources would eventually be abandoned and forgotten, just as resources without cultural schemas to direct their use would eventually dissipate and decay” (Sewell, *ibidem*).

Refusing the idea that practices are part of unifying systems, reflecting some single, underlying structural logic – as in structural-functional theory – practice theorists stress the “multiplicity, multivocality (‘polysemy’ in Sewell’s terms) and contradiction between structures, which vary from great and enduring to minor and transient” (Swidler, 2001). There is not a hierarchy of consistent practices, as in Parsonian theory of institutionalization processes. However, Sewell suggests that structures differ in “depth” (depending on how pervasive, invisible, and taken for granted their schemas are) and in “power” (depending on how great the resources they generate and depend upon).

A crucial question, in following this suggestion, is whether this way of categorizing structures does really help us think about whether and when some practices govern others. Does it capture the causal significance of cultural practice? What does anchor social practices? Why some seem firmly anchored – more enduring and more influential - than others?

Swidler advances some theoretical hypotheses: a) at least in some cases, there are *anchoring practices*, which play a key role in reproducing larger systems of discourse and practice; b) special attention should be given to practices that anchor or reproduce *constitutive rules*⁴; c) as constitutive rules define meanings, when looking for anchoring practices, it may be worthwhile focusing on *ritual practices* that define socially central but informally structured social relationships and may play an important anchoring role.

Nevertheless, practices do not explain their own enactment. Barnes (2001,22) points to the necessity, for any given explanation to be acceptable, “to ask what disposes people to enact the practices they do, how and when; and their aims, their lived experience and their inherited knowledge will surely figure among the factors of interest”. Moreover, the relationship of practices and people is more intimate and profound than this. “Shared practices are the accomplishments of competent members of collectives. They are accomplishments readily achieved by, and routinely expected of, members acting together, but they nevertheless have to be generated on every occasion, by agents concerned all the time to retain coordination and alignment with each other in order to bring them about. Although they are routine at the collective level, they are not at the individual level” (ibid, 25).

For each individual, “learning continues after the initial acquisition of competent member status, as part of the business of participating in the practice itself. It is part of the nature of a shared practice that learning what it is and enacting it are inseparable. This is one reason why shared practices change”. (ibid, 26) So, “it is only through the interaction of a membership characterised by mutual intelligibility and mutual susceptibility that [...] shared practice can be sustained, and its correct enactment distinguished from what is defective or incompetent” (ibidem). In such a theoretical

⁴ A *constitutive rule* is the one defining *what counts as* some defined entity: in the game of chess, the constitutive rule defining the queen is the one saying that it can move only through straight lines on the chess-board. In our society, the constitutive rule of marriage is the one saying that a definite ritual counts as a marriage.

perspective “human beings cannot be understood as independent calculative individuals; they stand revealed in their practices as profoundly interdependent, mutually susceptible agents” (ibidem).

In this dissertation, I argue the need to further articulate the analytical distinction between gendering practices and mechanisms in gender equality literature, to identify those key mechanisms responsible for gendering processes. My point of departure will be Ely and Meyerson above cited statement according to which gendering practices “build the mechanisms that produce and justify the allocation of resources, information, and opportunities in the culture of organisations” (p. 114).

I will relate it to Sewell (1992) articulation of the *dual* character of structure, as being the entrenched result of *virtual* schemas and actual resources. “To say that schemas are virtual is to say that they cannot be reduced to their existence in any particular practice or any particular location in space and time: they can be actualized in a potentially broad and undetermined range of situations” (ibid, 8). This generalizability or transposability of schemas is what makes them understandable as *mechanisms*.

The word *mechanism* has been used with different meanings in social science in the last decades and different definitions of “mechanism” can be found in the literature. Hedström and Ylikoski (2011) give a list of definitions, reported in Table 1.

As Hedström and Bearman (2011) have observed these definitions express the need of making understandable the existing regularities with the specification of how they were brought about.

The basic idea of explanation by mechanisms (Elster 1989b, 3; also Elster 1998, 47) is that to really explain something is to describe the mechanisms that mediate causes and effects and to show that this explanation actually holds true. The

mechanism-based explanation usually invokes some form of causal agent (Bhaskar, 1978) that generates the relationship between the entities being observed and this relationship is understandable by the explicit references to these causal agents, which, in social science, are always “individual actors” (Hedström & Swedberg,1998).

Author	Definition
Bunge (1997)	A mechanism is a process in a concrete system which is capable of bringing about or preventing some change in the system.
Machamer, Darden, and Craver (2000)	Mechanisms are entities and activities organised such that they are productive of regular changes from start to finish.
Elster (1989)	A mechanism explains by opening up the black box and showing the cogs and wheels of the internal machinery. A mechanism provides a continuous and contiguous chain of causal or intentional links between the explanans and the explanandum.
Elster (1999)	Mechanisms are frequently occurring and easily recognizable causal patterns that are triggered under generally unknown conditions.
Hedström and Swedberg (1998)	A social mechanism is a precise, abstract, and action-based explanation which shows how the occurrence of a triggering event regularly generates the type of outcome to be explained.
Stinchcombe (1991)	A mechanism is a piece of scientific reasoning which gives knowledge about a component of another, ordinarily higher-level, theory.

Table 1.1 Alternative mechanism definitions (Hedström and Ylikoski, 2011)

The scheme reported in Figure 1 shows as more - concatenated or combined into machinery (Gambetta, Hernes in Hedstrom and Swedberg, 1998) - mechanisms can concur to create and sustain gendered practices responsible for gender inequality. In the following chapters, I analyse how some practices, such as networking practices and evaluation practices in academia, are gendered practices sustained by several mechanisms.

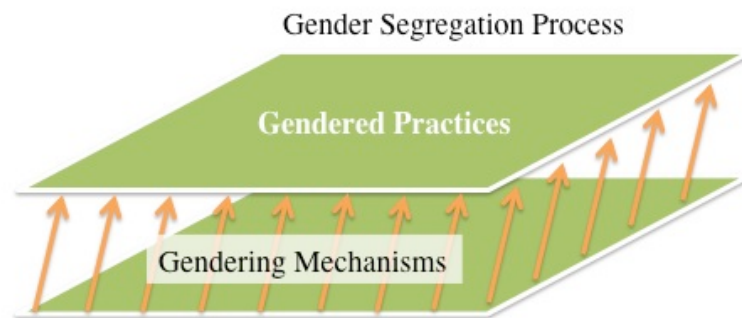


Figure 1. The concurrence of mechanisms and practices in determining the gender segregation processes

This work aims to understand how one or more mechanisms, and which ones, work to produce and re-produce gendered and gendering practices responsible of gendering processes in science. In Chapter 5 and Chapter 6, I identify some gendered (and gendering) practices and mechanisms and the relationship between them and the resulting gendering processes.

Then, it would be possible to describe through which kind of positive gender practices these mechanisms could be de-constructed and undermined, triggering transformative action and structural change.

Chapter 4

Through the glass door and onward

This Chapter provides a contextual analysis of the national and local academic institutional contexts which this research work is addressed to.

The first part of the chapter briefly describes the current system of career development in Italian academia, analysing the transformations in terms of recruitment and career progression recently reformed by the comprehensive reform of the university. Paragraph 4.1 introduces the reader to recruitment rules and career progression procedures, as defined by the new regulations introduced by Law n. 240/2010; while Paragraph 4.2 provides a gender analysis of academic career paths in Italy. The analysis of official data (provided by the Italian Ministry of Education, University, and Research [MIUR] and the CINECA, the largest Italian computing centre) shows significant differences between the careers of women and men in science, in terms of vertical and horizontal segregation. The use of suitable indicators (*Glass Ceiling Index*, *Gender Index*) reveals also relevant differences among disciplinary fields. Paragraph 4.3 focuses on a gender analysis of temporary positions, covered by early career researchers. The study shows a relevant horizontal segregation in this stage of scientific career, revealing longer and less prestigious paths for women than for men. By analogy with the Glass Ceiling Index, the *Glass Door Index* is defined in this thesis, as a quantitative indicator of gender inequity in the recruitment phase in academia.

The second part of the chapter provides a description of the research design (including data collection and methodological analytical and interpretative tools) guiding the field work which the theoretical work, developed in the next chapters (Chapters 5, Chapters 6, Chapters 7), is grounded on. The aim of this work is to provide a systematic assessment of the gendered mechanisms at work in the Italian academic institutional context through which

gender inequality is produced and reproduced and of possible actions through which gender inequality can be un-done. Focus on mentoring programs as viable ways of triggering these latter ones will be a specific topic of the research design.

4.1 Career development in Italian academia

In December 2010 the institutional governance and the organisational structure of Italian academia have been profoundly changed by a comprehensive reform, known as “Gelmini reform” (Law 240/2010) after the Education Minister Maria Stella Gelmini.

In addition to modifying the Italian state university institutional governance system (Donina, 2015), Law 240/2010 has established new rules concerning recruitment and career progression in Italian university that have significantly changed academic career paths.

In the new academic path outlined by Law 240/2010 we can distinguish two main stages comprising temporary and permanent positions. One of the most distinctive effects of the Gelmini Reform can be observed in the drastic modification of the former permanent researcher position, which used to represent the first appointment on the academic career path. The former model has now been replaced by two different fixed-term positions (type A and type B) to be filled by researchers who have earned a PhD degree and are expected, by employment contract, to do research work, undertake a variety of teaching and tutoring duties, and be available for office hours.⁵

Type A researchers have a three-year contract that, upon positive evaluation of their teaching and research duties, can be renewed for two years only. Type B researchers have a three-year contract, which is granted to researchers who had previously been hired as type A researchers; to grant holders; to post-doctoral research fellows hired for at least three years

⁵ These two types of research positions have replaced those formerly provided by Law 230/2005. More precisely, though, only one research position provided by Law 230/2005 has been implemented and, although nearing completion, is for now still in place.

(consecutive or otherwise) or to researchers who hold similar positions abroad; and to scholars who have earned the National Scientific Qualification (ASN – *Abilitazione Scientifica Nazionale*).

Whereas type A research contract is in many aspects similar to the post-doctoral research fellowship, type B research contract can be described, to a certain extent, as a tenure-track position and it may be compared to the associate professor position (Arienzo, 2017). Law 240/2010, therefore, has given prominence to type B fixed-term research position (Arienzo, 2017) and has in fact indicated, once the PhD has been completed, an ideal temporary-position career path articulated in two steps:

- Post-doctoral research fellowship / Type A fixed-term research position
- Type B fixed-term research position

After the temporary position stage, the academic career path entails two more career steps:

- Associate professor (*Professore di II fascia, professore associato*)
- Full professor (*Professore di I fascia, professore ordinario*).

In accordance with Law 240/2010, recruitment and career progression procedures follow a two-step timing and a two-level deliberation process:

- first, at the national level, national committees (one for each research field) have to select the candidates that deserve the ASN, that is a formal entitlement to cover a position either as associate professor or full professor;
- second, at the local level, each Department opens job vacancies to recruit, through formalized competitive public procedures, associate professors and full professors in specific research fields.

National committees are composed of five members, extracted – every four years – from a list of all Italian full professors, who meet some pre-defined scientific requirements (identified by bibliometric and/or other indicators) in their research field. .

4.2 Gender analysis of Italian academic careers

This paragraph illustrates gender statistics of MIUR data relative to university staff in 2016 and provides a gender-sensitive quantitative analysis of academic career paths in Italy⁶.

Data analysis results are represented in the scissors diagram of academic careers (Figure 4.1) that identifies gender patterns of career progression and represents a striking evidence of vertical segregation in Italian academia. The diagram shows an initial pattern of gender equality in the first stage of the academic career path, with 51% of women and 49% of men holding research appointments. Yet starting from the first level of career progression, at the stage of fixed-term researcher, the percentage of appointed women (42%) suddenly drops.

The negative derivative that marks women's career progression curve, though, shows a slight turnaround at the stage of permanent research positions. Actually, these figures have to be interpreted by taking into account that the permanent contract research position is currently no longer effective and it represents an exhausted category; the presence of a larger number of women in this position depends on the higher transition rate of men to the role of associate professor⁷.

⁶ Data are available at <http://dati.ustat.miur.it/dataset/2016-personale-universitario>.

⁷ The medium stay time for men in that position is 12 years long; for women, 15 years long.

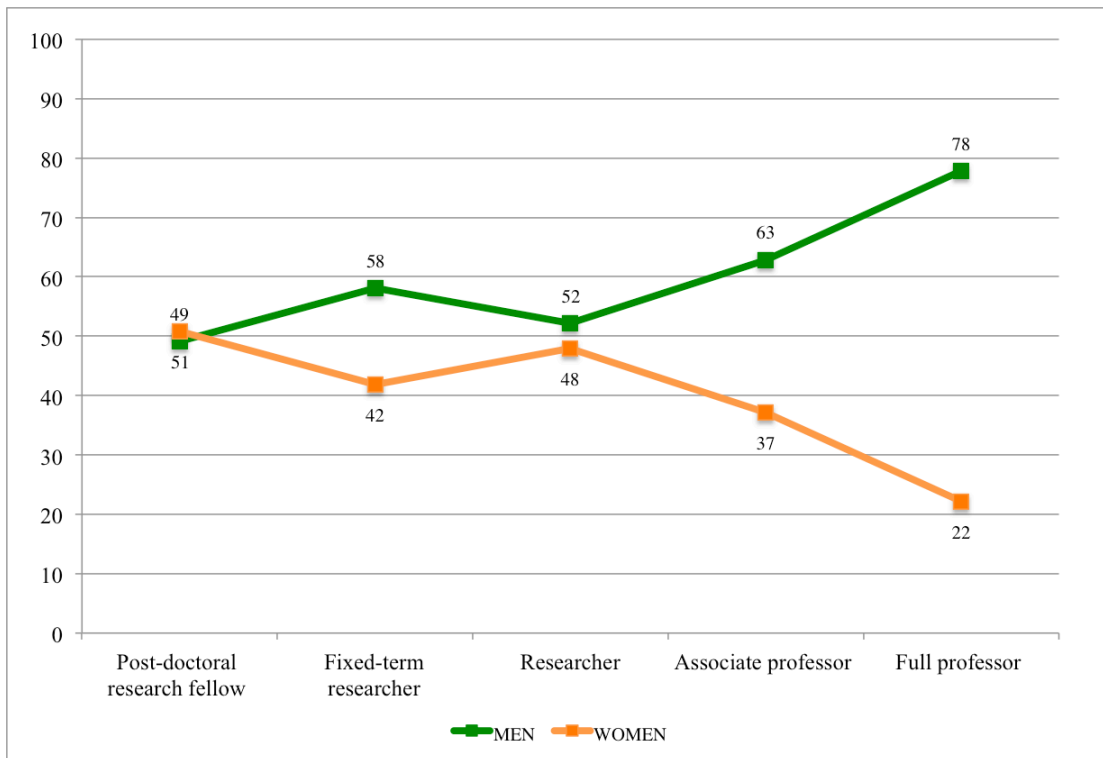


Figure 4.1. Scissors diagram of academic careers in Italy

(My elaboration of MIUR data, 2016)

A more detailed analysis shows that gender patterns in scientific careers can be quite different in different disciplines. Figure 4.2 illustrates scissors diagrams of careers in the macro-sectors Science & Technology (Fig. 3.2 (a)), Life Sciences (Fig. 3.2(b)), Humanities and Social Sciences (Fig.3.2(c)), each one of them comprising the sub-sectors listed in Table 4.1.

Science and Technology fields
Mathematics and Computer Science
Physics
Chemistry
Earth Sciences
<i>Civil Engineering and Architecture</i>
<i>Industrial Engineering and Information Systems</i>

(a)

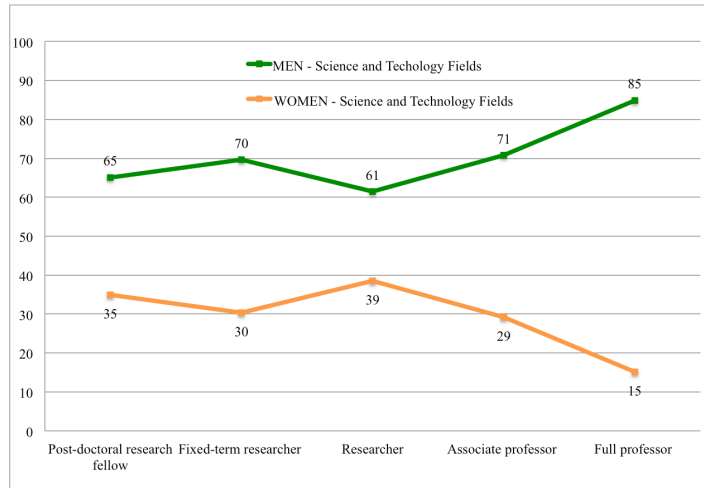
Life Sciences fields
Biological Sciences
Medical Sciences
Agriculture and Veterinary Sciences

(b)

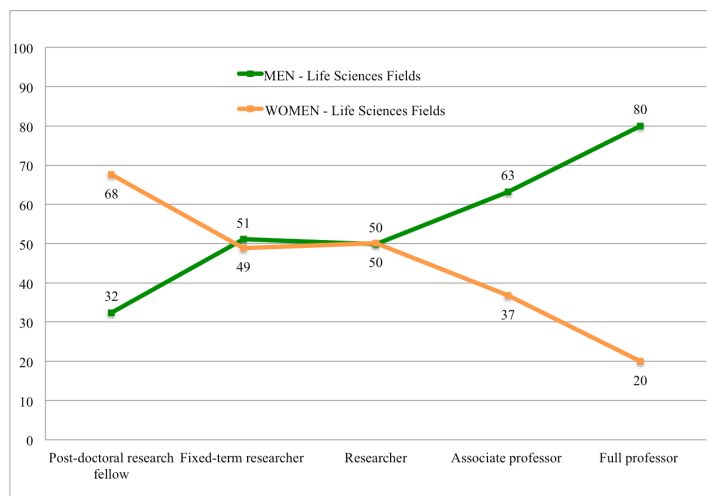
Humanities and Social Sciences fields
Classical studies, Philology and Literature, History and Art
History, Philosophy, Education and Psychology
Law
Economics and Statistics
Political and Social Sciences

(c)

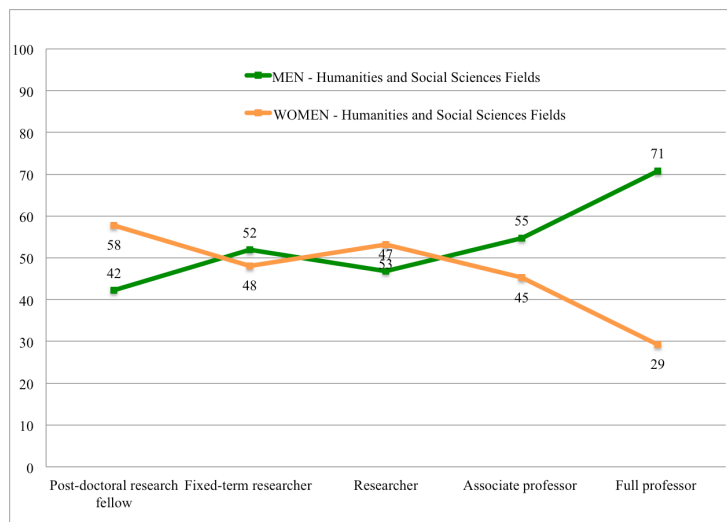
Table 4.1 Science and Technology fields (a); Life Sciences fields (b); Humanities and Social Sciences fields (c)



(a)



(b)



(c)

Figure 4.2. Scissors Diagram of Science and Technology fields (a); Life Sciences fields (b); Humanities and Social Sciences fields (c) (My elaboration of MIUR data, 2016) (My elaboration of MIUR data, 2016)

Comparison among these macro-sectors indicates the presence of considerable gender segregation across disciplines, that is accompanied by very different trends of the career progression curve within the three macro-sectors; in particular, in the Science and Technology field the percentage of men is always significantly higher than the percentage of women along the entire career path, during both the initial (65%) and the top-level position (85%) stages. Nonetheless, also in the case of Humanities and Social Sciences, where gender gaps appear less pronounced, a strong vertical segregation becomes evident as the scissors widen along the career path, whereby women holding a full professor position only reach 29%.

In order to analyse the differences across disciplines more in detail, the *Gender Index* (GI), defined as the ratio between the number of women and the number of men in a specific field and academic position in a given year, has been calculated (Liccardo, 2016). Table 4.2 shows the results through different colours so as to visualise gender ratios in each career stage and academic field more easily. White indicates an even number of women and men; orange indicates a higher gender index for women; blue shows a higher gender index for men.

The first dimension of gender asymmetry in academic careers becomes apparent by looking at the uneven distribution of orange and blue colours. In fact, the table contains sixteen peach-colour cells (ratio of women and men comprised between 1-2) and twenty-six light blue cells that show an inverted gender ratio (ratio of men and women comprised between 1-2).

Only in one sector, which corresponds to the most precarious stage of the research career (post-doctoral level), women represent more than double the number of men (GI >2), while in ten cells of the whole table the number of men has more than quadrupled the number

of women (GI >4).⁸ Moreover, the sheer lack of brown and wine colour (GI >3), which are women's counterpart of men's blue and dark blue, (GI <0,33) is also noticeable. This means that even where women outnumber men, the actual number of women never equals men's over-representation in so many academic fields.⁹

The Gender Index table highlights a sharp segregation across disciplines in the early stages of career, illustrated through very different Gender Indexes across different disciplines. Whereas the Gender Index of all the post-doc research fellows is close to one (GI =1,04), in Mathematics and Computer Sciences, in Physics and Engineering the number of men is more than double the number of women (GI <0,5). Gender Indexes show substantial gender balance in Law and Political and Social Sciences (GI ~ 1). The number of women is slightly larger than men's (1 < GI <2) in the Humanities and Social Sciences, in Life Sciences and in Chemistry, and, only in the case of Medical Sciences, the number of women is more than double the number of men (GI >2). These data show how the majority of STEM disciplines are still male-dominated, while in Life Sciences, in the Humanities and in Social Sciences women's presence in the early career stages is roughly equivalent to men's.

Gender ratio significantly changes in the subsequent career stages. In fact, as women shift from the post-doctoral level to the fixed-term contracts, we clearly observe a first decline of their number with respect to their male counterparts (GI ~ 0.7). On the one hand, the presence of women drops in all fields – thus making gender segregation across disciplines less evident; on the other, male over-representation in STEM disciplines remains constant. In particular, in Physics and in *Industrial Engineering and Information Systems*, the number of men is four times higher than the number of women (GI <0,25).

⁸ In order to better analyse these data a closer examination of Medical Sciences departments would be necessary inasmuch as Medical schools follow specific career patterns that are different from other academic sectors.

⁹ A noticeable exception to this trend is represented by Biological Science fields, where women instead outnumber men.

Fields	Post-doc Fellows	Fixed-term contract researchers	Researchers	Associate Professors	Full Professors
Mathematics and Computer Science	0,34	0,43	0,77	0,56	0,24
Physics	0,48	0,24	0,36	0,27	0,13
Chemistry	1,21	1,05	1,59	0,90	0,29
Earth Sciences	0,73	0,45	0,51	0,45	0,23
Biological Sciences	2,00	1,22	1,85	1,10	0,48
Medical Sciences	2,63	0,86	0,76	0,37	0,17
Agriculture and Veterinary Sciences	1,32	0,87	0,94	0,68	0,21
Civil Engineering and Architecture	0,85	0,81	0,68	0,44	0,23
Industrial Engineering and Information Systems	0,37	0,24	0,29	0,22	0,10
Classical studies, Philology and Literature, History and Art	1,57	1,28	1,64	1,23	0,73
History, Philosophy, Education and Psychology	1,59	1,04	1,15	0,88	0,54
Law	0,98	0,75	0,97	0,66	0,30
Economics and Statistics	1,41	0,78	0,97	0,64	0,28
Political and Social Sciences	1,16	0,74	0,97	0,64	0,36
Total	1,04	0,72	0,92	0,59	0,29

Table 4.2 Gender Indexes of Faculty, Researchers and Post-doc fellows across different fields (My elaboration of MIUR data, 2016)

GI	Women/men ratio	Colour code
$RG < 0,25$	$> 4: 1$	
$0,25 < RG < 0,33$	$4:1 - 3:1$	
$0,33 < RG < 0,5$	$3:1 - 2:1$	
$0,5 < RG < 1$	$2:1 - 1:1$	
$RG=1$	$1:1$	
$1 < RG < 2$	$1:1 - 1:2$	
$2 < RG < 3$	$1:2 - 1:3$	
$3 < RG < 4$	$1:3 - 1:4$	
$RG > 4$	$> 1:4$	

Legend of colours in Table 4.1

At the stage of permanent-research contract (Law 230/2005), the Gender Index is close to one again ($GI = 0,92$). The figures of the Gender Index for the subsequent stages ($GI = 0,59$ for Associate Professors, and $GI = 0,29$ for Full Professors) reveal nonetheless that a larger number of women in this exhausted contract position can be interpreted as evidence of the stronger challenges that women face along their career advancement path (vertical segregation).¹⁰ It should be noticed that the number of men is more than the quadruple of the number of women in seven academic fields out of fourteen within the full professor category; also, only in two sectors of the Humanities the ratio between men and women drops to a number of men that is slightly less than double the number of women. In this phase no gender equality can be found in any sector.

In order to provide a quantitative analysis of women's differential disadvantage against men in reaching top level positions, studies on gender segregation use the Glass Ceiling Index (GCI). This is defined by the *She Figures* Report as "a relative index

¹⁰ As already mentioned, once Law 240/2010 has come into force, the permanent contract research position was expunged from University terms of employment and has become an exhausted category of contract: that is, permanent contract positions will be in place until all researchers under this contract are promoted to the subsequent career stage or they retire.

comparing the proportion of women in academia (grades A, B, and C) with the proportion of women in top academic positions (grade A positions) in a given year” (*She Figures*, 2015).

So, if we divide academic careers in three progressive stages C, B, and A (researcher, associate professor, and full professor respectively), the Glass Ceiling Index (*She Figures*, 2015) is defined as:

$$\text{GCI} = \frac{(F_{AY} + F_{BY} + F_{CY}) / (F_{AY} + F_{BY} + F_{CY} + M_{AY} + M_{BY} + M_{CY})}{F_{AY} / (F_{AY} + M_{AY})}$$

with

F_{AY} (M_{AY}) = number of women (men) full professors in Y year

F_{BY} (M_{BY}) = number of women (men) associate professors in year Y

F_{CY} (M_{CY}) = number of women (men) researchers in year Y

The GCI can range from 0 to infinity. As resumed in Table 4.3, a GCI of 1 indicates that there is no difference between women and men in terms of their chances of being promoted. A score of less than 1 means that women are more represented at the grade A level than in academia generally (grades A, B, and C) and a GCI score of more than 1 indicates the presence of a glass ceiling effect, meaning that women are less represented in grade A positions than in academia generally (grades A, B, and C). In other words, the higher the value of the GCI, the stronger the glass ceiling effect and the more difficult it is for women to move into a Full Professor position.

In the academic context, women’s relative possibility of being promoted to full professors with respect to their male counterparts is measured by the GCI through the proportion of women’s and men’s relative presence in all career stages.

GCI < 1	Women's over-representation at the A level/stage
GCI = 1	No glass ceiling
GCI > 1	Women's under-representation at the A level/stage

Table 4.3 Range of values of Glass Ceiling Index

	IT	EU-28
2010	1.76	1.80
2013	1.73	1.75

Table 4.4 Comparison between GCI in Italy and in Europe from 2010 to 2013
(She Figures, 2015)

Table 4.5 shows GCI values calculated in the different academic fields and how the total GCI of Italian university in 2016 is equal to 1,77 – which is greater than the values provided by *She Figures* in the 2015 report (She figures, 2015) that are outlined in table 4.4¹¹.

¹¹ For the sake of these calculations, C level here comprises all research positions (that is both permanent, and A and B type fixed-term contracts). Indeed, totals only display variations of few decimal points if type A fixed-term research contracts are taken out from C level. As detailed in paragraph 4.1, type A and type B are in fact quite different job positions. In this case the total GCI value is 1.76

< 1	
1 < GCI < 1,3	
1,3 < GCI < 1,6	
1,6 < GCI < 1,9	
2,2 < GCI < 2,5	

Legend of colours in Table 4.5

01 - Mathematics and Computer Science	1,81
02 - Physics	1,79
03 - Chemistry	2,18
04 - Earth Sciences	1,65
05 - Biological Sciences	1,76
06 – Medical Sciences	2,28
07 - Agriculture and Veterinary Sciences	2,28
08 - Civil Engineering and Architecture	1,80
09 - Industrial Engineering and Information Systems	1,95
10 - Classical studies, Philology and Literature, History and Art	1,42
11 - History, Philosophy, Education and Psychology	1,44
12 - Law	1,76
13 - Economics and Statistics	1,79
14 – Political and social sciences	1,61
Total	1,77

Table 4.5 Glass Ceiling Index in the different academic fields (My elaboration of MIUR data, 2016)

4.3 A focus on temporary positions

The gender analysis above provided has outlined how vertical segregation and segregation across disciplines represent two different and yet convergent aspects of gender asymmetry in the academic career path.

Segregation across disciplines can be seen as a peculiar representation, in academia, of the breadth of women's marginalization in the organisational and work spheres. This is known as horizontal segregation, which consists in appointment of roles that are less prestigious and entail lesser career development opportunities to women and, conversely, in appointment of roles that are more prestigious and with more career development potential to men even when both genders share the same qualifications, and/or women may sometime be, to various degrees, more qualified than men.

Horizontal segregation takes different forms. This will be discussed in the next chapter through a qualitative analysis of women researchers' interviews, which reveal gender asymmetry patterns in the division of academic and research labour. In this paragraph only a specific aspect of horizontal segregation is analysed through a more detailed analysis of gender statistics of temporary positions. The analysis also includes data relative to research collaborators¹² grouped under a multifaceted umbrella that encompass several non-staff positions in Italian university.

Figure 4.3 illustrates an analysis by age of Post-doc Fellows, type A and type B researchers (Fig. 4.3 (a)), and contract Faculty (Fig.4.3 (b)).¹³ Interestingly, type A and type B researchers mostly are in the 30-35 age range (post-doc fellows = 42%; type A researchers

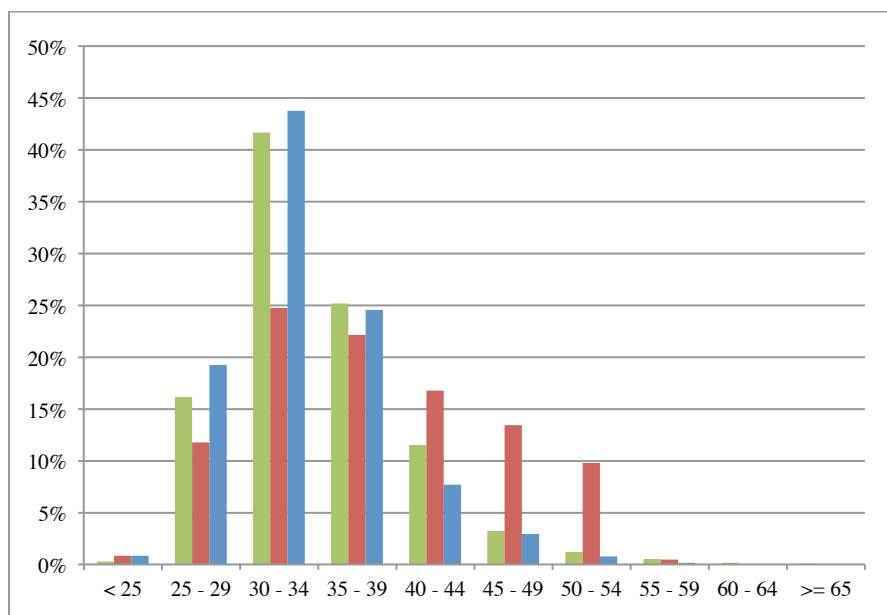
¹² MIUR collects in category of "research collaborations" data concerning: research scholarships and grants; post-doctoral fellowships; casual work contracts for research programs; medical specialty training contracts; ICT personnel; research group and research project assistants.

¹³ Data provided by MIUR are not disaggregated by gender

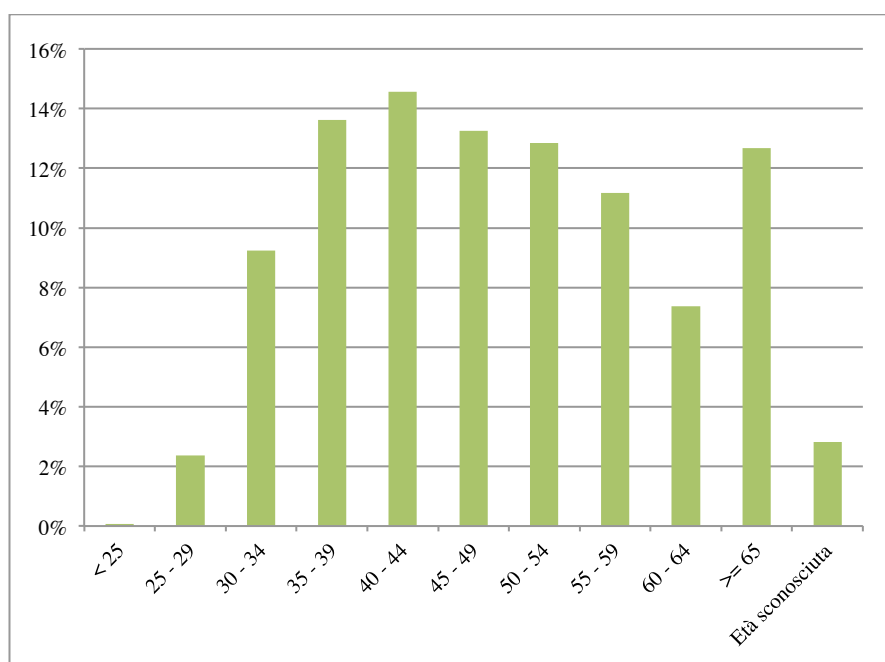
= 24%; type B researchers = 44%) but age distribution varies considerably in the three clusters: 25% of post-doc researchers are between 35 and 40 years old, and 16% of them are between 25 and 30 years old; 22 % of type A researchers are between 35 and 40 years old, and 16% of them are between 40 and 45 years old; 25% of type B researchers are between 35 and 40 years old, and 19% of them are between 25 and 30 years old.

These trends can be understood by taking into account that post-doc research positions and type A fixed-term contracts do not differ significantly in terms of career progression, also due to the fact that post-doc research contracts are subject to age restrictions. Furthermore, as it has been emphasized by recent analyses, any attempt to create a more linear path for temporary research positions with respect to the former model (in place until Law 240/2010 has come into force) is obstructed by the scarcity financial of resources, and by turnover limitations that determine an inappropriate use of post-doc and scientific collaboration contracts (Arienzo, 2017). Numerous studies have in fact discussed the thin line that often separates precarious and unpaid labour in Italian universities, especially in the case of post-doc researchers (Bellé, 2017; Ferri, 2017).

Type B fixed-term research positions, although representing a more advanced phase on the academic career path, are filled by relatively younger researchers and, more rarely by researchers who are over 45. This may indicate that obtaining a type B research position is the preferred path for young researchers with differential entitlement to a fast track career trajectory.



(a)



(b)

Figure 4.3 Analysis by age of: (a) Post-doc fellows (green colour); type A fixed-term researchers (red colour); type B fixed-term researchers (blue colour); (b) contract Faculty. (My elaboration of MIUR data, 2015)

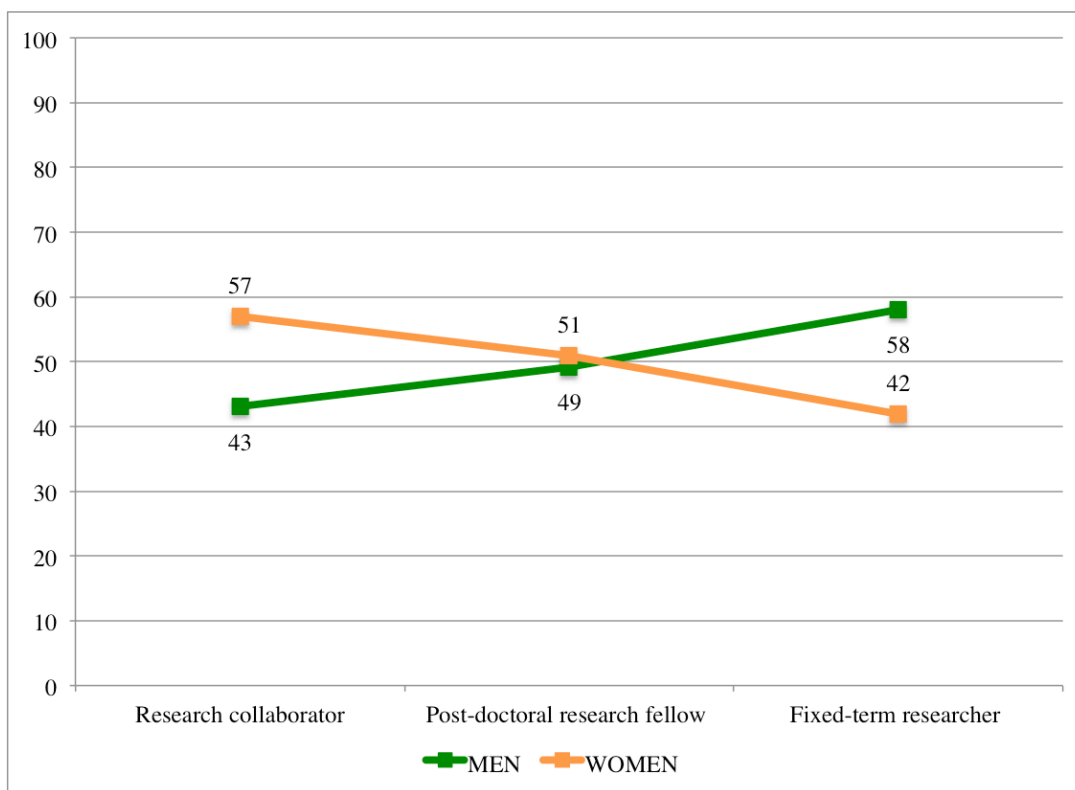


Figure 4.4 Gender distribution of temporary positions. (My elaboration, MIUR data, 2016)

The analysis by age of contract Faculty highlights the specific characteristics of this position, which cannot be associated to temporary research, inasmuch as it can include collaborations that can be carried on even beyond 65 years old – and even by professionals who have permanent positions outside of academia. Analysis of this position will not be provided in this chapter. Figure 4.4 illustrates the percentages of men and women who hold research collaboration positions, post-doctoral research contracts, and fixed-term research contracts.¹⁴ As discussed above, these stages do not define a pattern of career advancement *tout court* but describe the different opportunities related to temporary research that can

¹⁴ Data relative to research collaborators are also collected by MIUR. The category of academic collaborations comprises research scholarships and grants; post-doctoral fellowships; casual work contracts for research programs; medical specialty training contracts; ICT personnel; research group and research project assistants.

unfold – or otherwise – along the academic career path. The graph shows a larger number of women in the precarious stages of research work: women represent more than 57% of collaborators in research activities; 51% of post-doctoral fellows; and 42% of fixed-term researchers. In other words, women are over-represented in those contract positions that are more precarious and that do not necessarily evolve in a more stable career path.

To better understand gender asymmetry in the recruitment stage (a crucial phase in career development) Gender Indexes of type A and type B fixed-term positions across the different disciplines have been analysed¹⁵. Table 4.6 illustrates the significant gender differences in these two roles. In particular, as a sum total and in almost all disciplines, the Gender Index of type B fixed-term researchers is inferior to the Gender Index of type A fixed-term researchers, which demonstrates that the career path leading to a tenure-track position (via different types of collaborations and contracts) hides an invisible barrier – we may call it a glass door, in tune with the more popular metaphor of the glass ceiling – that in fact contributes to gender discrimination in the tenure-track application stage.

¹⁵ Because MIUR does not provide gender disaggregated data for type A and type B researchers, data have been retrieved from CINECA database.

RG	Ratio women/men	Colour code
RG < 0,25	> 4: 1	
0,25 < RG < 0,3	4:1 – 3:1	
0,3 < RG < 0,5	3:1 – 2:1	
0,5 < RG < 1	2:1 – 1:1	
RG=1	1:1	
1 < RG < 2	1:1 – 1:2	
2 < RG < 3	1:2 – 1:3	
3 < RG < 4	1:3 – 1:4	
RG > 4	> 1:4	

Legend of colours for Table 4.6

Fixed-term researchers	Type A	Type B
01 - Mathematics and Computer Science	0,37	0,52
02 - Physics	0,23	0,26
03 - Chemistry	1,48	0,69
04 - Earth Sciences	0,42	0,50
05 - Biological Sciences	1,50	0,94
06 – Medical Sciences	0,91	0,74
07 - Agriculture and Veterinary Sciences	0,99	0,67
08 - Civil Engineering and Architecture	0,81	0,84
09 - Industrial Engineering and Information Systems	0,24	0,22
10 - Classical studies, Philology and Literature, History and Art	1,10	1,37
11 - History, Philosophy, Education and Psychology	1,12	0,80
12 - Law	0,71	1,00
13 - Economics and Statistics	0,81	0,71
14 - Political and social sciences	0,94	0,43
TOTAL	0,74	0,67

Table 4.6 Gender Indexes for A and B fixed-term research positions in the different academic fields (My elaboration of CINECA data, 2016)¹⁶

In order to verify and quantify gender differences in the recruitment phase, by analogy

¹⁶Data are available at <http://cercauniversita.cineca.it/php5/docenti/cerca.php>

with the Glass Ceiling Index (GCI), the Glass Door Index (GDI) is introduced here. This is defined as

$$GDI = \frac{(F_{DY} + F_{EY} + F_{FY}) / (F_{DY} + F_{EY} + F_{FY} + M_{DY} + M_{EY} + M_{FY})}{F_{DY} / (F_{DY} + M_{DY})}$$

with

F_{DY} (M_{DY}) = number of women (men) type B researchers in year Y

F_{EY} (M_{EY}) = number of women (men) type B researchers in year Y

F_{FY} (M_{FY}) = number of women (men) post-doc researchers in year Y

In other words, given women's relative presence in all temporary research positions, the GDI measures the relative possibility for women of filling a type B research position with respect to their male counterparts.

Table 4.6 shows the figures of the Glass Door Index in all disciplines. It is noticeable how high GDI figures appear in Political and Social Sciences, in Medical School, in Biological Sciences, in Agricultural and Veterinary Sciences, and in Chemistry, which are all fields where the Gender Index bends in favour of women throughout the first stage of their careers, as shown in Table 4.2. It may thus be inferred that the glass door establishes a gender selection of researchers so as to consolidate men's systemic privileges and advantages in academia. The low GDI value in Mathematics and Computer Sciences depends on the low percentage of women throughout the fixed-term contract stage in this field.

< 1	
1 < GDI < 1,3	
1,3 < GDI < 1,6	
1,6 < GDI < 1,9	
2,2 < GDI < 2,5	

Legend of colours for table 4.6

01 - Mathematics and Computer Sciences	0,78
02 - Physics	1,43
03 - Chemistry	1,33
04 - Earth Sciences	1,19
05 - Biological Sciences	1,32
06 – Medical Sciences	1,54
07 - Agriculture and Veterinary Sciences	1,35
08 - Civil Engineering and Architecture	1,00
09 - Industrial Engineering and Information Systems	1,43
10 - Classical studies, Philology and Literature, History and Art	1,01
11 - History, Philosophy, Education and Psychology	1,29
12 - Law	0,95
13 - Economics and Statistics	1,26
14 – Political and social sciences	1,63
Total	1,20

Table 4.7 Glass door indexes (CINECA 2016 data for type A and type B researchers; MIUR 2016 data for post-doc researchers. My elaboration)

Given that type A researchers can have their fixed-term contracts renewed – in different departments and universities – up to six times, the role embodied by the two fixed-term researchers (type A and type B) in the new academic recruitment system can be metaphorically represented as a revolving door (researchers move from one type A fixed-term contract to another) through which in the end only some researchers are allowed to pass and move to the more stable type B fixed-term stage. The vast majority of them, however, after spinning through a few times, may hit the doors, miss the turn and, at last, get left outside.

4.4 Methodology, data collection and analysis

How to understand the figures provided in the previous paragraphs? Statistical analysis reveals the existence and the quantitative dimension of gender inequality in science, but without explaining them. How do gendering processes work in academia? Which actions can be implemented to face gender segregation in science? To answer these questions, this research thesis develops a qualitative analysis of narratives of women in science and academia able to make visible how gender impacts in academic and scientific contexts.

The purpose of the research is double.

On the one hand, this analysis aims to reconstruct a map of gendering processes currently acting in science and academia (described in Chapter 5). This map identifies the practices and mechanism - with their connections - that generate and sustain gendering processes. A comparative analysis of gendering processes in Italian and Irish academia supports the results of this study.

On the other hand, the research identifies which practices may play a role in building gender equity in science, and under which conditions (Chapter 6). In this thesis, the field of

investigation is defined by a mentoring program, but the level of analysis chosen – focusing on gendering processes and mechanisms - makes the results generalisable to a wider category of programs for gender equity in academia, which seeks structural change, while leaving the change effort responsibility to individuals. (De Vries and Van den Brink, 2016).

4.4.1 Data collection and methodology

The qualitative study has involved a large group of women with different experience and sensibility about gender issues in academia.

A considerable part of the research has been carried out in Naples in 2014-2016. It is based on the qualitative analysis of 44 in-depth semi-structured interviews and three focus groups that involved women researchers and professors from the University of Naples Federico II (34 women), from national scientific centres (4 from CNR, 2 from INFN), from University of Ferrara (1), from University of Bologna (1), from the University of Bath (1) and a visiting professor at UNINA (1) from the University of Ataturk (Turkey).

The involved women work in various disciplinary fields: 26 women in STEM fields and 18 women in SSH fields (24 Senior researches, 20 Junior researches).

Each interview and focus group, that generally lasted 60–90 minutes, has been taped and entirely transcribed.

The participants were invited to talk widely about their scientific career and their work-based experiences and I was able to prompt them to discuss how they thought that gender dimension affects science. Table 4.8 reports an overview of interviews and focus groups topics.

This research involved a variety of methodological tools aimed at describing the different scientific biographies, attitudes, and resources of women in science and at

comparing visions and behaviours in different cohorts.

The data were analysed using qualitative content analysis (Lieblich et al., 1998) and discourse analysis (Van Dijk 1997; Fairclough, 1992; Wodak and Meyer 2009; Fairclough, 2003). To explore, classify, code and analyse the data, I used the NVivo software¹⁷.

At the first stage of the analysis, the text was scanned and split into units of content on the basis of four areas of interest identified at the beginning of the research: interests in gender issues in academia, scientific biographies, perception of gender dimension in science. By the analysis of the data, new codes emerged in a process of multiple iterations and cross-checking. Then a holistic method of content analysis permitted to interpret parts or categories of the text according to the rest of the text (Ollerenshaw and Creswell, 2002). From these steps, we could identify the main gendered practices acting in academic and scientific contexts. Later on, I have compared the results obtained with the results from the literature about gender equality in academia in order to identify the primary mechanisms that contribute to construct the gender order in academia and science. The results of the overall analysis allowed to reconstruct the map of gendering processes in science and in academia.

¹⁷ NVivo is a software produced by QSR International to support qualitative - and mixed methods – research.

	Topics
<p>Interviews: 44 interviews</p>	<ul style="list-style-type: none"> - Institutional position and career development - Recognition of their role models in science - Recognition of group as “peers” - Reflections on their self-perception as membership of the scientific institution - Relationships with colleagues within the academia and scientific groups - Aspirations and expectations about their scientific career - Experience in research-life balance - Reflections on the differences careers paths between women and men in science - Reflections on different styles of leadership - Reflections on gender dimension in research - Reflections on gender policies
<p>3 Focus group: 1 group: 7 women 2 group: 8 women 3 group: 12 women</p>	<ul style="list-style-type: none"> - Reflections on new rules of recruitment and career progression in academia and research - Comparison between scientific careers of different cohorts - Reflections on gender dimension in the scientific career development

Table 4.8 Overview of interviews and focus groups topics

In this research, consistent with the positioned knowledge approach, the author of this thesis recognises her positioning as a white woman of the middle-class and feminist researcher and do not pretend to reach an (unachievable) objectivity (Acker et al., 1983).

Moreover, the experiences and considerations mentioned are no generalisable to the experience and the personal elaboration of all the interviewed women who, on the contrary, are concerned about very different gender issues, engaged in diverse career paths, and refer to strongly characterised disciplines. Finally, they combine experiences from separate cohorts. As a result, the processes, practices and mechanisms outlined in this chapter are to be interpreted as a reading of the experiences of an aggregate collective, constituted by the interviewed women researchers. These data, though their interpretative nature, still allow to draw a map of the production and reproduction mechanisms of gender differentials existing in academia and in the research field.

4.4.2 Comparison of the gendering processes in the Italian and Irish academy

The final stage of this research thesis has been conducted in the Institution of the Social Sciences in the 21st century (ISS21) of University College Cork (UCC) in Summer 2017 (June-August 2017).

This study in Cork focuses on an analysis of gendering processes acting in Irish academia. It involved as key informants two gender scholars with expertise in a gender program for women in academia. Their involvement was necessary to gather data and information about the scientific career paths in Ireland and to understand the relevance of cultural and legal frameworks in defining gendering processes in science and to elaborate innovative strategies to address gender equality.

The gender scholars were also invited to two focus groups (lasting one hour each) to

discuss the map of the gendering processes emerging from the analysis of the Italian academic context and reflect on their paths in the academia from a gender perspective.

The comparison with the Irish Academy has several reasons for interest.

In this research the Irish academia is a privileged comparative context to develop a reflection about gendered transformative practices and mentoring as a tool of investigation on gendering processes, considering that the mentoring model implemented at the University of Naples Federico II and studied in this thesis as a transformative tool for gender equity in academia was strongly inspired by the scheme proposed and implemented at UCC.

In addition, academic policies in Ireland, as well as in Italy, serve as a mirror of the transformations required by global scaled changes of the academic system, but at the same time show differences due to the different local responses. This analysis tries to compare from a gendered perspective the impact of these global academic transformations in these two different contexts.

The following part of this paragraph gives a brief overview of Higher Education Institutions in Ireland¹⁸.

4.4.3 Higher Education Institutions in Ireland

Over the last twenty years, the neo-liberal discourse has become dominant in Ireland, as in other Western countries. Once a poor island on the edge of Europe with a conservative culture dominated by tradition and the Church, Ireland has become one of the countries involved in the globalised economic competition, and in its contradictions.

After the strong economic recovery of the years 1997-2007, the so-called Celtic Tiger years, coupled with the optimism that followed the ceasefire in Northern Ireland, this country

¹⁸ Data on HEI in Ireland collected from EURYDICE (<https://webgate.ec.europa.eu/fpfis/mwikis/eurydice/index.php/Ireland:Overview>), The European University Institute (<https://www.eui.eu/>)

has seen the 2008 financial collapse marked by the explosion of the real estate bubble, bank rescue, austerity plans, and rising unemployment, and later, a new economic recovery: at the end of 2013 Ireland exited the bailout successfully. Lastly, in recent months, politics, economics as well as higher education organisations are wondering what the implications for Ireland will be of UK leaving the European Union (EU), while attempting to identify potential consequences or opportunities opened by the negotiations for the Brexit.

All these economic, political and social transformations are reflected in the university.

O' Connor (2014) provides a critical analytical framework that aims to understand the transformation of Irish academia from a broad range of perspectives (social, economic, cultural and political), while exploring the challenges faced by Irish society, given present conditions. According to her analysis, in Ireland as elsewhere, higher education has effectively been redefined by neoliberal pressures in order to serve the needs of the market, with a stress on the transmission of employment related skills and the undertaking of commercially useful research. As a consequence, disciplines as science and technology, which are seen as having the greatest use value in the market, are prioritized, while, disciplines such as social sciences and humanities are generally devalued (O' Connor 2014). Moreover, the increasing strong relationship between market, state and universities has reflected in a number of policy measures and in the adoption of "strategic objective indicators of success against which institutional performance is measured and funding allocated" in the context of its Performance Evaluation Framework for Higher Education" (HEA 2013).

The academic career structure in Ireland is characterised by a high degree of competitiveness, and less possibilities for new hires to obtain permanent contracts.

Ireland's Higher Education system is based on a binary system with universities and institutes of technology. Higher Education is provided by universities, institutes of technology, colleges of education, as well as private, independent colleges. All universities in

Ireland are monitored by the Higher Education Authority (HEA), an intermediary agency between the state and the universities with planning and budgetary responsibilities for the university sector.

After gaining the PhD degree, there are two possible career paths: a) research posts; b) academic posts. Research posts are temporary 'fixed-term' positions generally financed by a grant to develop research activities on a specific topic for at least one year. They can be of different levels: post-doc, senior post-doc, research fellow, research support officer, research assistant (for these last two positions the PhD degree is not required).

The academic positions are: a) Lecturer (two grades: below the bar, above the bar), b) Senior Lecturer, c) Associate Professor, d) Professor. Most new academic staff at an Irish university are usually appointed as lecturers (below the bar). Contracts for Lecturer are often temporary, lasting one, three or five years. After a certain number of years, a lecturer below the bar is eligible to apply to progress 'above the bar'. Permanent Lecturer positions have a probationary period of 12 months. At the end of this time, the promotion committee (composed of senior officers of the university together with four elected academic staff representatives) decides whether to award tenure or extend the probation period.

Becoming a Senior Lecturer is a very competitive process. The assessment process for this promotion is based on the following achievements: 1) research scholarship, 2) teaching, 3) contribution to school/college/university/society.

Positions of Associate Professor and Professor require internationally recognised research, a substantive publication record and academic experience. Promotion to the Professor level is possible for all academic staff that has achieved tenure and has not reached the normal retirement age. The assessment process for promotion is based on providing evidence of achievement under each of the criteria required to become an Associate Professor.

Each university has its own recruitment and promotion standards, following national guidelines and criteria.

According to the latest Figure report in Ireland, as of March 2016, only 19% of the heads of Irish HEIs were female: there are four female presidents out of fourteen IoTs (29%), one female president out of five in the colleges (20%), and there has never been a female university president.

Data show that undergraduate students, postgraduate students, and lecturer staff are gender balanced when assessed using a three year average (2013–2015), but there is a striking difference between the number of women and men in senior posts over the same time period. In particular, when analysed by staff grade, only 19% of professorships across the universities were filled by women compared to 81% which were filled by men (Figure 4.5)

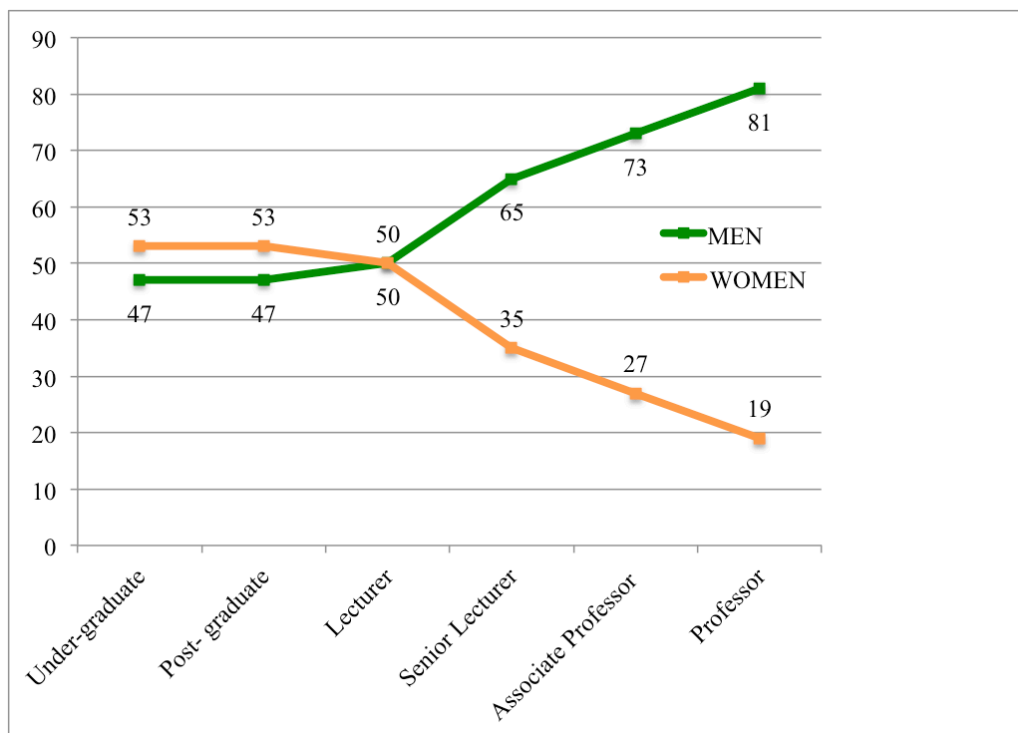


Figure 4.5. Percentage of male and female senior academic and lecturer staff in all Irish universities (three-year average 2013–2015. My elaboration of data reported by Sé Sí: Gender in Irish Education, 2007)

Chapter 5

Mapping the gendered labyrinth of science

This chapter illustrates gendering processes in academic and scientific contexts with the aim to provide a map of the practices and mechanisms that connect gender, as social practice in itself, to the dynamics and processes of academic and research institutions. Mapping gendering processes represents an interpretative tool that can be useful to both understand phenomena that create and recreate gendered inequalities in scientific paths, and to pinpoint tools that can be adopted to neutralise the mechanisms that contribute to gendered asymmetry in science.

Paragraph 5.1 describes the gendering processes and the gender practices that create and sustain these processes, identified by field analysis in an Italian and in an Irish University. At this step, the main findings of the comparative analysis between gendering processes in Italian and Irish academia are also reported.

Even if the way in which gendered practices are developed in different national contexts may differ, and different procedures may concern for, example, the research quality exercise, recruitment processes, promotion processes, the joined study in Italy and in Ireland reveals very similar patterns in terms of practices acting in institutional structures, in the organisation of academic work, and in academic culture. In their everyday life, women and men face these invisible ways to do gender in science and academia and, while unaware, they design gendered paths within the glass labyrinth of practices of science.

5.1. Gendering processes in institutional academic and research structures

Three different kinds of gendering processes in academia and in research may be identified in our empirical data: those acting at the structural level, concerning cultural schemas and resources; those acting at the organizational level; those acting at the cultural level (Figure 5.1).

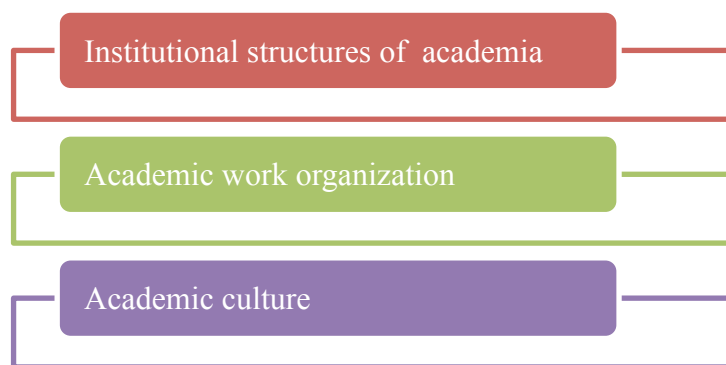


Figure 5.1. Structure of gendering processes in academia and in research

Two types of vertical segregation processes emerge from the analysis of women scientists' narratives, revealing gendered biases in academia and in research:

a) structural male dominance, which determines power structures informed by male dominated hierarchies and by patriarchal relational models;

b) recruitment and career advancement processes that contribute to consolidate gender hierarchies through tacit double standards for men and women.

Figure 5.2 shows, for each one of these categories, the practices, emerged from the analyses of the interviews of the women scientists who have participated in this study, as relevant in the making and remaking of these processes.

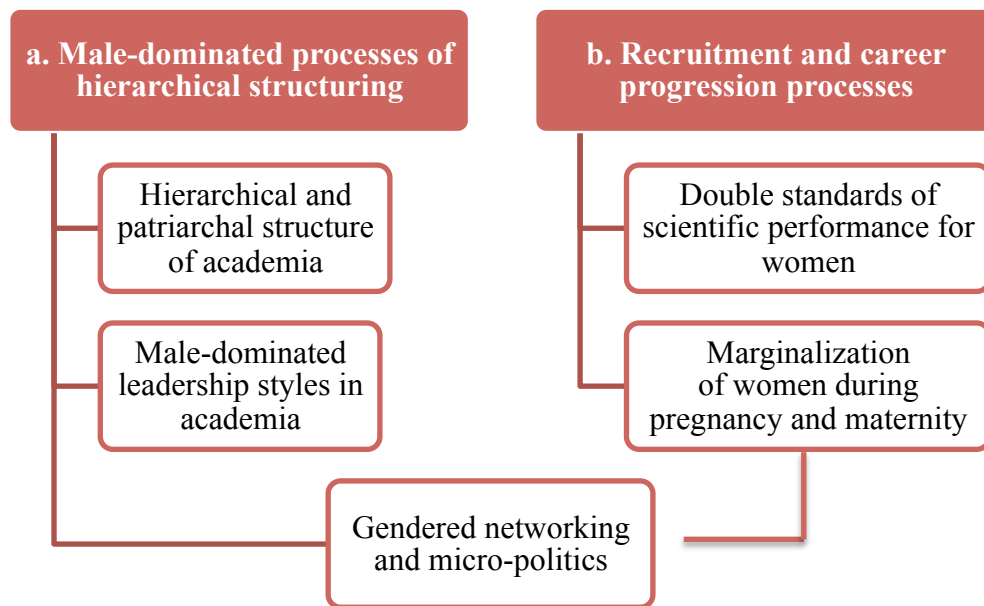


Figure 5.2 Gendering processes and related practices of academic and research institutional structures

5.1.1 Processes of male-dominated hierarchical structuring

As of September 2017, of the eighty-two rectors of the universities that constitute the Conference of Italian University Rectors (*Conferenza dei Rettori dell'Università Italiane*, CRUI) only six are women. The exiguous number of women is no exception in the statistical studies that measure women's presence in academia and in research centers, whereby it may be inferred that women's sparse presence in top-decision making bodies represents the norm. Statistical data about Italian universities and research centers actually show that top-level positions, in the academic, research and administrative spheres, are predominantly – at times exclusively – covered by men.

Data taken from the context analyses carried out by the Gender Observatory on University and Research of Università degli Studi di Napoli Federico II (UNINA) and published in the *First Gender Budget of the Ateneo Fridericiano* (Liccardo et al, 2016) are illustrative. Figure 5.3, for instance, shows that out of fifty-three directors of specialty

training schools only seven are women. Only 21% of institutional appointments is conferred to associate professors, while the remaining 79% is taken up by full professors. If we recall the data shown in the former chapter on the gender distribution of full-professor roles, hierarchical structures of decision-making bodies producing male-dominated gender hierarchies apparently show up.

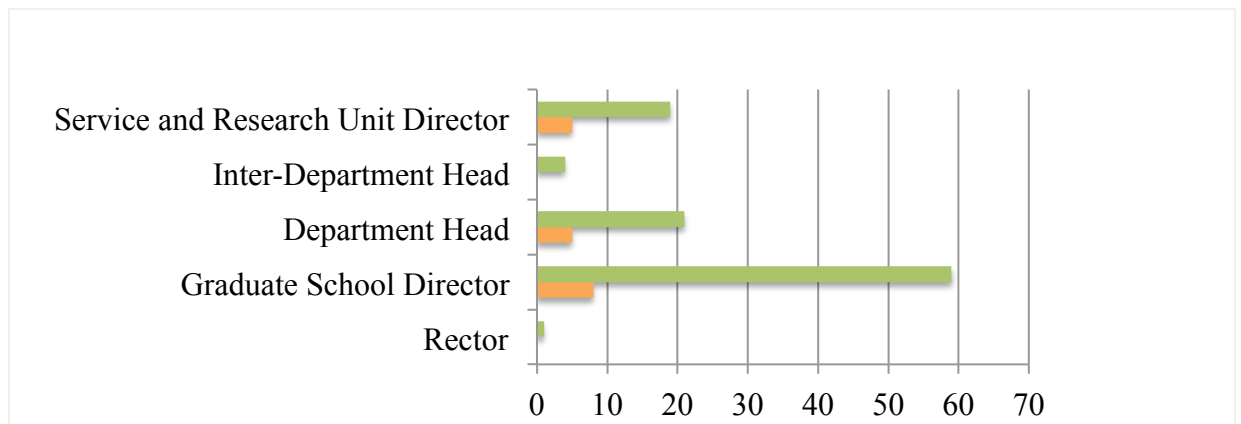


Figure 5.3 Distribution of institutional appointments at the Università degli Studi di Napoli Federico II (Data for 2014; Liccardo et al., 2006)

The male-dominated structure that informs university and research has become in itself ground for perpetuating this specific form of segregation as well as other forms of gender asymmetry. Hierarchical structures specific patterns of representativeness in top decision-making bodies – at the department level, at the discipline level, at the level of rank – contribute at reinforcing this system while obstructing change. Although enhancement of gender equality in academic senates and administrative councils has been recently included as a goal priority by a majority of Italian University Statutes, outcomes remain in fact modest for now.

The difficulty of pursuing individual autonomous paths in front of male hierarchies is recurrent in women scientists' discourses; this difficulty, moreover, is transversal to all different cohorts. Top decision-making hierarchies tend to perpetuate themselves in work

environments, in the lab, in research groups, etc. where younger scholars often tend to revolve around one or more ‘bosses’ towards whom they develop a reverential attitude or, as described by one of the professors interviewed, some kind of ‘scientific subjection’ that limits their independence, chances of autonomous experimenting and, at last, their professional growth. Not only do such hierarchies impact women’s careers advancement, but they also hinder possibilities of institutional change processes, among which those informed by gender equality goals.

“In quasi quasi 800 anni di storia dell’università Federico II c’è stata un’unica preside donna.” S3

“Viviamo in un sistema che non dà nessuna autonomia... non solamente ai giovani. Io a 50 anni su certe cose non ho autonomia... e questo purtroppo non è legato al genere... perché non è una questione di genere, è una questione di fossilizzazione della nostra realtà accademica.” S20

“Il problema, spesso, nel nostro mondo della ricerca è che le giovani ricercatrici o i giovani ricercatori non hanno dei progetti completamente autonomi.” S7

“Il mondo accademico italiano è molto maschilista e il capire come muoversi non è cosa banale a tutte le età.” S11

“Penso che tra le problematiche principali [delle giovani ricercatrici] sia uscire da un ruolo di dipendenza che è una dipendenza, o di sudditanza, chiamiamola, di sudditanza scientifica, nel senso che..., a seconda del mio ruolo, ho l’autorità per parlare 5 minuti, 20 secondi o un’ora, all’interno anche del gruppo... credo che questo limiti moltissimo le possibilità.” S11

Often, those few women who reach top-level positions in this hierarchical structure do not represent alternative role models, when compared to the hegemonic leadership

models. Some researches point out how, on the contrary, women in top-level positions often embody domineering and/or over-competitive leadership models, very similar to the hegemonic male models of authority.

“Ho la sensazione che le donne, anche quando sono persone molto aperte, progressiste, però quando poi si trovano a gestire ruoli di comando, di potere, hanno difficoltà a mantenere un atteggiamento bottom-up. Impongono il loro potere... Le trovo molto autoritarie [...] A volte ho la sensazione che le donne hanno un po'... quando c'hanno un po' il potere diventano così... in realtà hanno una difficoltà col potere.” J11

“Ci sono [dinamiche] legate a una gestione del potere che trova una sua dimensione anche nelle questioni di genere [...] Ho visto una gestione del potere che per me non ha le caratteristiche che dovrebbe avere quando voluto da una donna. Io vedevo un tipo di ragionamento maschile, cioè un tipo di ragionamento che ricalca degli stereotipi del mondo maschile sinceramente. Esiste una dinamica del potere che muove le persone sempre in un'unica direzione, anche in maniera inconsapevole.” J2

“Nella mia vita ho incontrato molte donne che sono arrivate in alto.. ti dicono sempre le stesse cose, gli stessi consigli: “tu devi sacrificare tutto, ti devi laureare meglio di tutti, devi dare sempre meglio di tutti perché se no non arrivi da nessuna parte”. Non lo trovo utile.. in realtà il modello di questa donna è sempre lo stesso, [...] è una donna che ha avuto successo sacrificando il proprio ruolo di donna, madre, moglie.. che è stata sempre la più brava della classe e che ha delegato molte cose... Io invece vorrei incontrare qualcuno che sappia insegnare dov'è che a volte è il caso di mollare per non perdere altro da un'altra parte” J18

Many of the women professors interviewed acknowledge stereotypical male patterns in leadership practices. In their view, the shaping of leadership on hierarchical and over-competitive models prevail on the possibilities of transforming leadership along more

cooperative, less hierarchical and less conflictual forms of leadership. That happens, notwithstanding many women tend to associate, somewhat stereotypically, collaborative leadership styles to more ‘feminine’ characteristics. Yet, identifying the hierarchical and over-competitive model as masculine and, vice versa, the masculine as hierarchical and over-competitive, ends up perpetuating male-dominant hierarchical structures, to which some women may comply in order to climb the ladder.

“Vorrei mettere in evidenza l’approccio diverso del genere femminile nel costruire un gruppo di ricerca, e un gruppo di lavoro in generale, rispetto a quello maschile. Credo che come donne siamo dotate della capacità di coordinare e di organizzare gruppi inter-disciplinari [...] Il forte contributo che il genere femminile potrebbe dare in maniera estremamente positiva qualora ci fosse un ribaltamento delle posizioni, se le donne fossero molte di più nelle posizioni di rilievo rispetto agli uomini, proprio all’opposto, è proprio avere un tipo di collaborazione completamente diversa. Gli uomini dominano, no? Il genere maschile propone e il resto del mondo dispone, no? Nella mia esperienza, anche quando sono leader dei gruppi che coordino, cerco di creare situazioni di parità, di equilibrio tra il ricercatore, il dottorando e l’undergraduate. La capacità di organizzare il gruppo senza essere schiacciante come leader, secondo me è una qualità che è proprio nel genere femminile e che non è assolutamente, come storicamente dimostrato, nel genere maschile. La capacità di collaborare, di creare network, è nel genere femminile, non è assolutamente nel genere maschile...” S7

Finally, in male-dominated contexts the few women who have access to decision-making venues appear invisible and report difficulties in expressing their ideas and perspectives. As women got caught in male-dominated networks, they often face isolation or become unable to create new networks with similar features: it is for this reason that academic and research relational networks tend to reinforce male dominance.

“A volte lo avverto che non ascoltano perché sei donna. [...] Sono gruppi quasi tutti maschili dove ci sono due o tre donne per cui delle volte sento un feeling simile solo con un'altra donna. Avere nel team altre donne è importantissimo, essere la singola diversità non funziona. Fai una fatica enorme! Se c'è una rispondenza dall'altra parte, qualcuno che riesce a entrare in sintonia con te riesci a fare delle cose, altrimenti no. Oppure ci puoi pure riuscire, ma con grande fatica. È questa la questione: faticare enormemente per ottenere qualsiasi cosa.” S14

“Quando un uomo si guarda intorno vede soltanto uomini, le donne non le vede proprio perché... perché ce ne sono poche. [...] Non serve essere l'unica, perché essere l'unica non significa spezzare le reti. Se le donne non possono fare rete o di essere nodi di queste reti... è ovvio che verranno sempre penalizzate.” S3

As some women professors have pointed out, a clear evidence of this phenomenon is represented by the fact that top decision-making positions, in universities and research centers, get usually filled by men, rather than by women, even when they have the same qualifications.

“Un collega uomo, con le stesse capacità di una donna occupa un livello più alto. È qua che io vedo la differenza [...] l'ho visto in tante situazioni, insomma... Laddove (ci) si deve sedere al tavolo del comando, allora si dice “Sì, è tanto brava, ma..”. M6

5.1.2 Gendered recruitment and career progression processes

In recruitment and career progression processes we observe the overlapping of meritocratic criteria and of peer acknowledgement practices – both of them gendered. The researchers interviewed perceive this double dimension of reputation in science as a

discrepancy between formal meritocratic evaluation procedures and unwritten rules that bestow roles and merits along criteria of affiliation and membership.

“Preferisco parlare di competenze, perché il merito è qualcosa i cui parametri sono assolutamente ridicoli.” M15

“Noi parliamo di un sistema trasparente, un sistema basato sulla meritocrazia, sul merito [...] in realtà conta se conosci, non conosci... anche negli UK è importante, ma lì ce la puoi fare anche con i tuoi meriti... il sistema italiano mi sembra un sistema dove essere conosciuto, avere qualcuno che ti appoggia, è molto più importante...” M2

“Le regole del mercato sono valide se queste ricercatrici decidono di andare all'estero dove sono in competizione su un mercato libero.. qui non è libero, come sappiamo” M10

Some women scientists show awareness of gender relevance in evaluation practices and very clear knowledge of women being asked more efforts to prove themselves.

“Ho sempre pensato di dover essere molto, molto, molto più brava dei miei colleghi maschi. Devo sempre dimostrare di più degli altri e devo sempre dimostrare che sono all'altezza intellettuale della situazione, che sono all'altezza concreta e pratica della situazione, che sono sufficientemente scaltra anche da un punto di vista politico. Questa è una cosa che non sopporto.” M12

“Secondo me la donna ha sempre un po' più di difficoltà nel porsi come leader del gruppo. Nel senso che la donna secondo me deve dimostrare di più... se l'uomo deve dimostrare il 50% di essere bravo, la donna deve dimostrare l'80% per poter assumere una posizione di leadership del laboratorio.” R20

Comparison with the Irish evaluation system provides interesting reflections. As discussed in the above chapter, the Irish academic system, as the Italian one, is going through a transformation phase based on international indications and prescriptions.

For the Irish academy the benchmark is the United Kingdom, of which Irish universities have adopted the procedures of research quality exercises. In Italy, the National Agency for the Evaluation of University and Research (ANVUR) has been established since 2010. ANVUR prescribes evaluation criteria for activities carried out in universities and research centres, and provides quantitative parameters for recruitment and career progression in academia. The Irish system has instead started this transformation more recently, only two years ago, but without providing clear prescriptions and criteria as the Italian ANVUR. Changes in daily academic work are becoming visible but they are not clearly defined yet.

“In Ireland, I don't know to what degree in Italy, but in Ireland that tends to mirror, in many ways, the UK system. So over the last couple of years, we've seen things like, research quality exercises, which the UK have had for longer but we have now, focusing on that output-based system which is interesting [..]. So there has been more and more focus on output measures of performance, but there still is an awful lot of ambiguity around what the actual job entails in almost a day-to-day sense.” C2

“So there are no definite benchmarks. Is two journal articles per year enough?” C3

Researchers therefore wonder about the gender impact of such a strict focus “on output measures of performance”, given that these new rules do not measure all academic outputs in the same way: a portion of academic work remains invisible in this evaluation system, and that is work done by women for the most part.

“Some things, like a publication, there's a very concrete output there. So, as you say, where's the benchmark? It's not entirely clear. And then where are the benchmark for some of the other more less well-defined activities? So when is a seminar good enough? When is the supervisory meeting with a Ph.D. student good enough? How much preparation do you put into commenting on more when you need someone like that? And if you're trying to perform at a fairly high level in all these things, is it possible?[..] So I think, if that continues in that trajectory, it could actually lead to poorer gender-related outcomes when you take into account that there's more and more pressure to have particular kinds of research-based outputs. And lower numbers of staff, with higher numbers of students inquiring the teaching, admin work, and pastoral care associated with it which is often quite invisible. So these have always been elements of an academic life, but with more and more kind of an intense measurement of some of the outputs. And more ambiguity around the process of accomplishing it.” C2

5.2 Gendering processes in academic and research work

The analysis of women scientists' interviews reveals that, at the organization level, gendering processes follow two main dimensions: a) the time dimension, which has brought to light how the pace of academic work and research can have a very significant impact on women's lives and which is connected to the exclusion of social reproduction – mothering and care work, in particular – from academic labour narratives; b) the dimension pertaining to the division of academic work and research, which is connected to parallel hierarchies of disciplines/job tasks/genders (and also affects the former dimension). The divide between social production and reproduction shapes many other contexts, yet it could be said it is more apparent in academia, in that it is somewhat intrinsic to it, as is the divide between matter of facts and matters of concern and care (de la Bellacasa, 2011).

5.2.1 Gender impact on the pace of research

Density characterises the experience of time in university and research centers. Academic and research time is articulated in ceaseless research projects and lab research, deadlines, meetings, teaching and administrative duties that go beyond standard working hours (*greedy institutions*, Dany, Louvel et Valette, 2011, Coser, 1974, Currie, Harris and Thiele 2000). Academic and research activities have are conceived as activities that require unlimited availability, to be carried out with no time restrictions, often by night and in the weekends. Motivating these efforts is passion for research and so is, at the same time, the challenge of proving oneself to oneself and to others, especially at the beginning of the academic career.

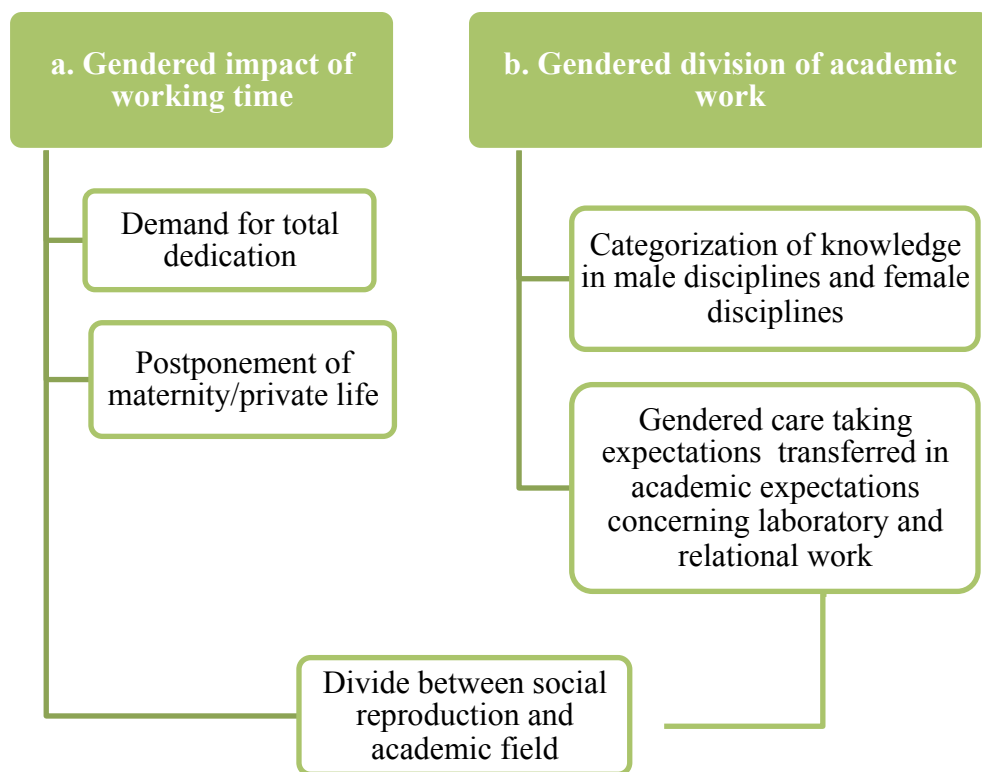


Figure 5.4 Gendering processes in academic and research work

“Nella fase di pre-ingresso, cioè in tutta la fase del dottorato, del post dottorato, non c'erano orari, quindi si stava in laboratorio e la vita privata è andata fondamentalmente in secondo piano, nel senso se c'era il progetto da fare, da scrivere, lo scrivevi anche alle due di notte anche il fine settimana. In linea di massima chi fa ricerca lo sa che è sempre così.” S8

“Sei così preso dal tuo lavoro, anche proprio in termini di ore, passi tante ore lì dentro soprattutto per una biologa che è proprio in laboratorio quindi stai là a fare gli esperimenti e non può lasciare, e quindi il sacrificio della vita privata viene di conseguenza.” S10

“Abbiamo lavorato lì dando anima e corpo [...] Abbiamo praticamente, mi viene da dire, ignorato la nostra vita privata a favore dell'istituto e di tutte le persone che lì sono cresciute.” S6

“Quando capisci che è questo quello che veramente vuoi fare, dopo, secondo me, non ci sarà nulla che tiene ... che senso ha dire “Io voglio stare qui, voglio stare all'estero”, ... lo fai pure appesa per i piedi secondo me. Una volta scoperto che quella era la mia passione non mi ha tenuto più nessuno, sarei andata pure sulla Luna, non ti tiene il fidanzato, non ti tiene il marito, non ti tengono i figli, non ti tiene niente e nessuno, se quella è la tua passione tu vai avanti, troverai il tuo spazio.” S21

For people who work in academia and in research centers, leisure time gets compressed enormously. Time compression has a strong gender impact, with tangible repercussions on women's lives. Women, in fact, still bear the burden of social reproduction, through parents and children, extended family, and, in general, the infinite possibilities of human relationships can emerge and thrive.

The women interviewed explain how some of them have had to jeopardize, or relinquish altogether, important aspects of their personal life, such as parenthood and/or having a partner. Some women put the blame of having to choose between career and personal life on at least two elements: on the one hand, lack of adequate support to their career commitments on behalf of their partner and, on the other, lack of support from colleagues who, more or less explicitly, may inhibit personal life development. Some other women experience the fact of having to choose between work and personal life very privately, and only very few of them say they have always been aware in advance of the consequences of their choices for themselves.

“La sua scelta lavorativa non è stata appoggiata completamente dal partner... ma peggio ancora... il responsabile del laboratorio aveva fatto capire che se avesse rallentato per qualche motivo, la cosa si sarebbe messa male...” S10

“La mia generazione non è stata tutelata in termini di maternità, di legami affettivi. Oggi non so se per le giovani donne effettivamente le cose siano un po' cambiate... ma in passato è stato molto duro, quasi ingiusto, insomma... questo ha avuto un'incidenza chiarissima nella mia separazione” S5

“Sicuramente mi accorgevo che volevo dedicare il mio tempo al lavoro... più di quanto, diciamo, non... più che alla vita privata... e questo sicuramente... però mi sembrava una scelta mia, personale, non una imposizione, come dire... non l'ho mai sentita come imposizione dal di fuori, o come necessità per poter fare carriera... non l'ho vissuta mai in questa maniera...” S16

“Volente o nolente, io stessa ho messo molti paletti. Ho sempre avuto paura che a un certo punto fare delle scelte in termini importanti, definitive, in termini di vita privata mi avesse in qualche modo tolto qualcosa, questa voglia che c'ho di fare, di arrivare in termini lavorativi e di ricerca” S11

In a majority of cases, however, women who postpone their personal life due to career development do not seem to be fully aware of their ‘choices’; as acknowledged by many of them, who have reflected on their life journey, their ‘choices’ have been heavily informed by rhythm of work, workload, and by the amount of dedication demanded by research. In the case of fixed-term researchers, time dilation of job security often influences delay of motherhood.

“Ho 39 anni e non ho figli... a volte penso chissà se questa cosa succederà [..] Vivendo in un contesto così complesso, difficile, hai tante paure, quindi essendo ancora in una situazione di precarietà, perché poi anche questo è il problema, rimandi, rimandi sempre, rimandi sempre, perché dici ‘adesso se faccio un figlio è la fine, ho fatto tanti sacrifici fino a ora...’” J11

“Il mio orologio biologico ormai si è rotto, non so che lavoro farò da qui a 4 mesi, quindi di certo la maternità è una cosa che in questo momento non riesco a immaginare. Di sicuro sarebbe impossibile avere un figlio finché resto all’università e ci resto precaria, questo è poco ma sicuro.” J10

Given that job insecurity time period overlaps with women’s reproductive timeline, postponement of maternity equals to abandonment of the idea, (un)willingly. People who work in academia and in research are caught in a hectic time schedule on a daily basis and they may end up desisting from planning making up family or becoming parents, to the point of breaking up with their partners. Some women researchers mention that they have devoted countless years to their work and career, to the point of “having forgotten” the possibility of motherhood to then reconsider it only when, biologically speaking, it was too late. Different women have different feelings about this, but for some of them it represents a heavy loss.

“Sono sposata, da molti anni. Non avere figli è stata una scelta in tutto il periodo iniziale della mia carriera, quando poi a un certo momento abbiamo cominciato a pensare di averne, non è successo naturalmente... e poi abbiamo scelto di non fare un percorso difficile di terapie, e abbiamo accantonato l'idea...” S3

“Non sono sposata, non ho figli, ho un partner da tanti anni [...] Il fatto di non aver avuto figli un po' mi dispiace... [...] non l'ho mai capito se è stata una scelta o se è stata in realtà un effetto [...] Ho la sensazione che in anni importanti della mia vita abbia perso un po' di vista la cura della mia vita privata, non lo vivo con... lo vivo con tranquillità e serenità però non sono convinta che sia stata una scelta [...] Tenere molto ferma la posizione dal punto di vista professionale mi ha un po' distratto rispetto al mio modo più complessivo.” S12

“Non so dire... non... non avrò saputo dare bene equilibrio... cioè non è una scelta quella di non avere avuto figli... mi ci sono trovata... quindi forse saranno stati fallimenti di conciliazione... Il lavoro ha avuto sicuramente un effetto negativo in questo, che non è una scelta... voglio dire, si può benissimo vivere senza figli... però non è una scelta... che ho fatto... mi ci sono trovata nelle cose, come andavano, come si sviluppavano.” S4

“Non ho figli... me ne sono dimenticata... ho perso il momento. Nella mia generazione, c'è una quantità buona, una percentuale alta di donne che non hanno figli, semplicemente perché non c'hanno pensato, nel senso che rimandi, rimandi, rimandi e ti scordi che ti puoi sentir giovane anche oggi a 60 anni, però... [...] Ci sono molte donne che non si son poste il problema... se lo son posto, e io con loro, dopo i 40 anni. Allora ci sono quelle che vabbè, dopo i 40 anni, i figli non li fai, pazienza, non è venuto, etc. Ci stanno quelle per cui è diventato un problema serio... che è diventato un cruccio, insomma... Sta di fatto che nella mia generazione, di scienziate senza figli ce ne stanno veramente tante...” S6

Marginalizing women on maternity is a widespread practice in academia. Because universities are highly competitive organizations, absence from work during the last

months of pregnancy and the first months of life of the newborn is considered disruptive to scientific production, which may affect women's career development in general and even more so for early career researchers. On the one hand, the overlapping of precarious employment and women's fertility timeline actually determines a productivity slowdown at the very moment when researchers are asked to become more competitive. On the other hand, lack of work continuity, due to fixed-term contracts, hinders compliance with coverage of basic entitlements, such as paid maternity leaves for instance, which law provisions guarantee to permanent positions.

“Non avevo contratto da un paio d'anni e in quei due anni ho continuato a fare ricerca nonostante non avessi contratto e arrivata al punto in cui ero incinta c'è stata la possibilità di dare un assegno che sarebbe stato naturalmente una cosa adatta a me e invece il professore ha ritenuto opportuno darlo a una dottoranda. A me invece è stato offerto un piccolo contratto perché avevo una bambina piccola e avrei potuto lavorare poco e quindi non potevo avere uno stipendio pieno. [...] Nonostante abbia avuto una gravidanza abbastanza difficile, un mese sono dovuta stare a letto, stavo per partorire prematuramente, ho sempre lavorato. Ferma a letto ho continuato a fare test, non mi sono fermata, ho continuato a lavorare, quando sono tornata ho fatto gli esami il mercoledì ho partorito il sabato, sempre tutto gratuitamente.” J9

Although many women scientists describe work problems and difficulties associated to maternity, at the same time for some of them maternity marks the time of down-to-earth decisions that help them use their time more efficiently. Some researchers tell motherhood was associated to greater awareness of time, resulting in better time management, to avoid wasting time and energy, and in more focused and productive work. Motherhood may have taken time away from the amount of time devoted to research, but for some women scientists the quality of their work has improved, to the point of increased scientific production straight after maternity. Other women emphasize the

surplus value brought to the workplace and/or to institutions in light of the motherhood experience, as well as the positive value of research work, which entails reflection and awareness, on family relations.

“Ho cominciato stranamente a produrre di più quando ho avuto i figli... Perché io ho cominciato a capire il valore del tempo. Prima potevo stare ore, e stavo ore, io non tornavo a casa mai prima delle 9... a fare che... dovessi dire... ancora oggi, bene non lo so... poi ho capito che invece se vuoi altro... insomma, forse all’inizio anche in modo stakanovista, non sempre gradevole... il tempo va ottimizzato, tu stai qua, lavori, non vedi neanche nessuno, non ti pigli neanche il caffè perché devi fare delle cose... la sera il bambino dorme, tu ti metti al computer e lavori... e quindi i figli, devo dire, da questo punto di vista mi hanno cambiato molto, diciamo, e in modo molto positivo.” S22

Ambiguity of the evaluation system is amplified by the ambiguity that exists in academic work and by the personal time that this work requires. Time of academic work is not measurable in a unique way: the same job can demand more or less time. Compression of time devoted to academic work occurs at the expenses of quality, and some researchers notice a gender impact induced by the introduction of evaluation parameters that validate individual activities more than collective academic activities and more than responsibilities towards students and the university at large.

“There’s ambiguity around the time and the work demands.” C2

“I suppose, for people who are in the same jobs to be working completely differently. So you have the person who is single-minded, career track, will only take the best Ph.D. students, will teach certain modules that they're expertise in and not anything else, will not take on administrative roles and they will progress faster and maybe they're enabled to do that. It's easier for them and then you have other people who

might be working towards the same goal, but not getting there because they have to take on-- they take on those responsibilities that aren't really useful, but they're useful for the university". C3

Some women professors at UCC consider the request of validating research products on behalf of the academic institution as a dilemma, whereby they have to choose between going on with support to younger researchers' activities (no matter how much they value these activities) and pursuing their own academic work.

"And that actually came up in some of the conversations[...], around that point, faux pas where they would say-- because a lot of people are very busy but they would say, "Okay, so I like to do a good job for my seminars. I like to give a lot to my post-grad students. However, I now recognise by doing that, I'm holding myself back in these other things. So I have a choice to make." C2

Adapting to a career model that is performance driven reduces the quality of activities to support younger researchers' professional growth. In tune with this perspective, the successful career model is represented as linear, thus neglecting its horizontal components that constitute many of the responsibilities of academic and research work, and that contribute to its enrichment. Quantitative and qualitative analyses reported in this dissertation show how the horizontal dimension prevails in women's careers.

"That to be identified as an expert in an area often requires a very kind of one-track, one path, and quite a narrow focus [...]. So that you're always at the same type of conference, always in the same type of networks, which can be useful to build up the contacts but does require that sticking to the one path." C2

“Yeah, and I think you do get a sense sometimes from looking at CVs of how people present themselves. And, yeah, I don't know. Sometimes, I think women maybe undersell themselves, and present their path as a series of tasks that they've done, things I have done, projects I have worked on. Whereas men maybe are more likely to present this unified narrative. Therefore even if it's not unified, it's about presenting it in a unified way. And who I am, what I'm an expert in, what I've done, as opposed to these are things I've worked on.” C2

5.2.2 Gender division of the academic and research work

According to the opinion of most women researchers interviewed, the experience that affects most women's (imagery about) career development is maternity. Many researchers are not aware of their difficulties as women - but rather as mothers - and the perception of the delicate issue of balancing research and family duties appears so dominant to be frequently identified as “the” issue of women in science.

“Non ho avuto alcun problema per il fatto di essere donna... assolutamente... però è innegabile che nella carriera di una donna ci siano delle cose di cui tener conto inevitabilmente... la gestione dei figli, della casa... sicuramente... è stato più pesante per me che per mio marito.” S17

“La percentuale delle ordinarie si attesta intorno al 20% nell'università, e questo dato rimane stabile. Non è un effetto generazionale, né un effetto di contesto. Penso che dipenda anche molto dal fatto che il nostro è un paese che non prevede servizi sociali... il grosso, vero, problema secondo me è proprio quello... che poi è anche l'ostacolo per l'ingresso delle donne sul mercato del lavoro, cioè non c'è un welfare degno di questo nome... delle politiche attive, di incentivazione della maternità.” S3

“Le donne devono assolvere una serie di funzioni dalle quali gli uomini, in linea di massima, sono esonerati, come la gestione della famiglia, dei figli. Il mondo sta cambiando, ma non è ancora veramente cambiato.” S16

These statements clearly show the persistence of a very strong gender division of household and care work, which is considered almost exclusively feminine. Consequently, in particular in a country such as Italy characterized by the weakness of welfare supporting parenting, it affects decisively in the professional career of women. It is worth noting that, among the women professors interviewed, 14 out of 24 either have no children [6] or have a single child [9], because the first child arrived late or because they believe that they would have not been able to go on, with two children. Among the 20 temporary researchers interviewed, who were 35 years old on average when these interviews were conducted (2015-2016), only 3 had a child and two were pregnant during the survey. Some women recognize that having no children has been a career development advantage.

“Con più di uno [figlio] non so se ce l’avrei fatta! Perché già due...” S11

“Con il bambino ho fatto cose tremende. L’ho portato in Africa, l’ho portato in Inghilterra, l’ho portato in America [...] Ho un solo figlio e meno male. Non poteva essere. Un solo figlio sì. Mio marito ha un’attività imprenditoriale non avrebbe mai potuto prendersi cura del bimbo, io non ho madre l’ho persa molto giovane, mio papà non poteva e quindi io... o non andavo o andavo col figlio.” S19

“Il fatto di non avere figli mi ha messo in una posizione privilegiata rispetto alle mie colleghe che avevano più problemi di conciliazione. Sicuramente l’aver figli è un ostacolo per come sono concepiti i tempi, e non solo nel lavoro universitario ma anche i tempi della politica, i tempi di tutta la strutturazione del lavoro nel nostro paese... infatti se si fa un’analisi delle carriere femminili, si scopre che la maggior parte delle donne che hanno avuto cariche, o non sono sposate, o sono sposate senza figli.” S3

Mothers-scientists perfectly know that they live a very different situation from that of their mothers who had to give up work to support their husband's careers and to care for the family. At the same time, they are aware that they have to face several more obstacles than men, who have not to account for their absence from the family for so many hours as required by research work.

“Mio padre se n'è andato un anno [per lavoro], mia madre era a casa a occuparsi della famiglia... La sua generazione non ce l'ha fatta. Spero che nel 2015, ci siamo le condizioni per dire 'Sì, figli e ricerca è possibile'. Dobbiamo cercare di superare gli ostacoli, fare in modo che le nostre figlie potranno fare ricerca, senza dovere giustificare perché non stanno là alle 6 e mezza del pomeriggio, perché non vanno in piscina...” S2

Trying to balance work and family is frequently experienced as a feeling of lack in both fields, and reconciling family and research is perceived by most women interviewed as a problem with no resolution, as “squaring the circle”.

“Quando ero giovane ho conciliato molto male! Penso di aver sacrificato parecchio della vita con mio figlio per questo lavoro.” S7

“Mica hai conciliato la tua vita lavorativa con la tua famiglia così bene.. anche adesso che c'ho una figlia che è grande, spesso c'ho i sensi di colpa.. 'oddio la lascio sola a casa, la lascio sola il pomeriggio ed io non ci sto oppure..' insomma non è facile [...] Tuttora quest'opera di conciliazione non... eh insomma non è facilissima” S9

“Il mio punto di vista sulla conciliazione è terribilmente pessimistico. È come chiedere la quadratura del cerchio. Io penso che se qualcuno trova la soluzione bisogna dargli un premio Nobel. Perché pensare di poter conciliare la vita familiare, e intendo la crescita dei figli in particolare, con il lavoro, un lavoro come

il nostro che è un lavoro a tempo pieno, che è come se fosse nati figli, per me è impossibile.” S21

However, the issue of work and maternity balance - in which there is a strong asymmetry between fathers and mothers' parenting tasks, persisting even in younger and less traditional couples (Naldini, 2016) - is however pointed at as a problem that does not involve the academia but the “external” society, social services and welfare. For women who claim access to science, maternity becomes a personal problem, to be privately managed, without questioning the greedy (Coser, 1974; Currie et al, 2000; O' Grada et al., 2014) character of the institution, which they aspire to be part of.

The gender division of work also has consequences in the research work itself, in different forms. An example is the hierarchical division of scientific disciplines. According to this kind of division the “high” or “hard” disciplines are of male dominance while the other disciplines are considered suitable for women. From the statements made by the interviewees emerges that this disciplinary gender division is sometimes reproduced also within the disciplines where a the division between investigation fields considered more masculine and investigation fields considered more feminine holds.

“All'inizio volevo fare una ricerca teorica, quindi ero sempre alla ricerca di qualcuno che mi desse una tesi... Mi sarebbe piaciuto affrontare il problema delle forze nucleari, un problema altamente teorico, e invece poi un po' per... a volte mi trovo a fare le cose anche perché sono più disponibile di altre, e un po' perché mi fu suggerito da un professore che per una donna, forse, la fisica nucleare era meglio di tante altre cose, insomma... Perché? Perché è fenomenologica, non è teorica... per affrontare la fisica teorica ci vuole una cap[a]... che probabilmente non era ritenuta appartenere alle donne.” S21

“Una volta laureata, nel momento in cui mi sono affacciata alle specializzazioni ... ho appreso che, tu pensa, non era vietato, ma fortemente sconsigliata la specializzazione in ginecologia alle donne.” S15

“Ho fatto il dottorato di ricerca scontrandomi con pregiudizi che derivavano non solo dal fatto che fossi donna, ma anche dal fatto che mi occupavo di un ambito che era proprio un ambito da donne, la didattica della fisica, dentro un mondo dove bisogna fare fisica hard. Quindi ho dovuto lottare per guadagnare la stima intellettuale, per mostrare che il lavoro fosse un lavoro intellettualmente valido. Ho fatto il dottorato di ricerca facendo questa battaglia, quindi mi sono scelta un argomento di tesi di dottorato molto difficile, per dimostrare che potevo farcela.” S12

Horizontal segregation in the division of work also shows up in expectations of care taking in the workplace. Women are expected to do care work also in work relationships and there is an horizontal division of work in the distribution of jobs and workloads.

“Ho avuto un rapporto terrificante con il mio relatore, pur essendo una studentessa brillante, poi dopo ho capito perché lui mi trattava malissimo. Le sue studentesse gli andavano a comprare il panino, gli portavano il caffè, facevano una serie di cose per me, figurati, inconcepibili, che non avrei mai fatto, non per conflittualità.. ma perché non mi veniva in mente a dirti la verità.” S9

It is common for temporary researchers to be involved in didactic and administrative tasks, of which they would not be in charge. This leads them to waste time, which would be useful to build their academic and professional growth. This work organization goes through two main ways: their state of precariousness puts early career researchers in a position of weakness, while they are facing the identification of role tasks, forms of early socialization and the activation of processes of relying on trusted figures of reference. This

happens for both women and men. What does change are systemic rewards and penalties when the former or the latter are concerned.

“Sono stata usata moltissimo nella didattica; sono stata utilizzata, tra virgolette utilizzata, perché nel gruppo in cui ero, con le vecchie metodologie, si lasciava poco spazio ai giovani e quindi c’era più un obbedir tacendo, questo era proprio lo slogan... dovevi fare quello che dicevano senza poter usare, aprire il tuo cervello, fare le ricerche.” J9

“Questo discorso mi ha fatto venire in mente il sistema ricattatorio a cui sono sottoposte tutte queste ragazze anche quando non se ne rendono conto [...] Adesso che il primo traguardo è una posizione a tempo determinato [...] questa ricattabilità è molto più pesante... Il termine, lo so, è antipatico però penso che renda bene l’idea del fatto che quando sei in un laboratorio, chiunque sia il tuo capo, ovviamente spesso sono uomini per i noti fatti che sappiamo, ci si aspetta che tu stia lì a lavorare e se sei una donna il rapporto tra i generi è ancora più complicato, soprattutto se c’è la cura della famiglia.” S10

“Essendo assegnista non ho incarichi ufficiali di insegnamento però collaboro col mio professore, come facciamo un po’ tutti quanti e questo è un aspetto che mi piace moltissimo, la formazione delle nuove generazioni mi piace tantissimo e penso che questo mi abbia permesso di sentirmi parte dell’università perché finché fai ricerca vivi lateralmente l’università, vivi la ricerca, vivi l’istituto di ricerca e vivi fuori dal dipartimento, mentre l’insegnamento ti fa entrare dentro e ti fa sentire parte di un sistema e ti fa sentire che poi dai il tuo contributo al miglioramento del sistema” J6

5.3 Gendering processes in academic and research culture

Two gendering processes pertaining to academic and research culture have emerged from the analysis of women scientists’ interviews: a) tacit requests to conform to the male scientist model (presented as neutral) as well as devaluation of personality traits associated

to this model (ambition, assertiveness, etc.) on behalf of women; b) denial of the relevance of the gender dimensions in science.

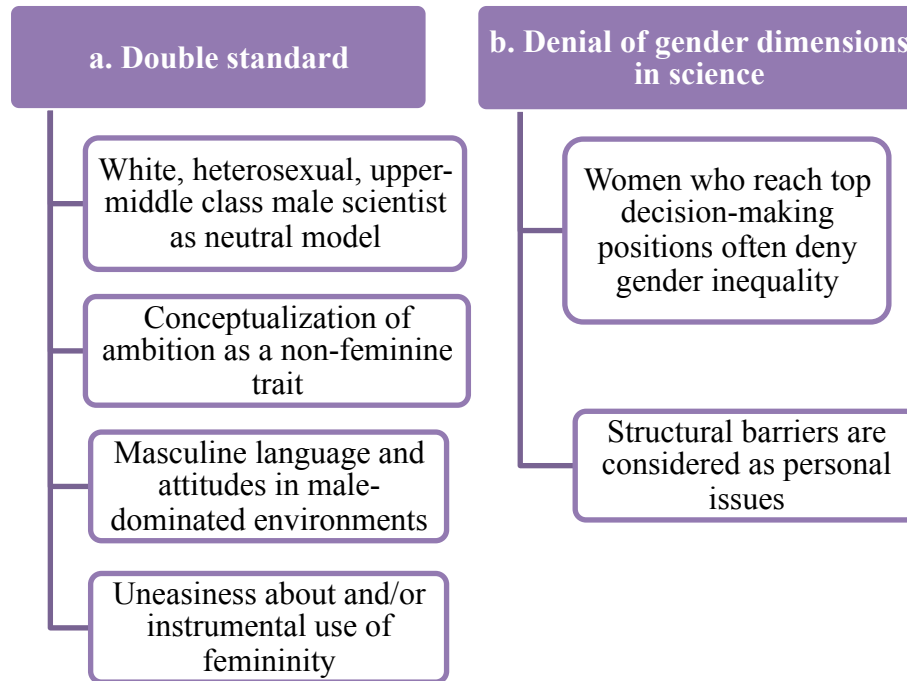


Figure 5.5 Gendering processes in academic and research culture

In general, scientific institutions are considered gender-neutral and so is scientific work, which is supposedly carried out by a ‘universal’ (gender-free) knowing subject. In this conceptual framework, the scientist is portrayed as ungendered but is, in fact, a male scientist. In science as elsewhere in prestigious professional work organizations, the hegemonic paradigm is represented by the white, straight, upper-middle-class male subject (Acker, 2006). Women’s and men’s bodies, sexuality, social relations, reproduction are all aspects subsumed under the image of the neutral, genderless scientist. Male imagery is accepted as the norm, contributing to create and reproduce practices of (gendered, racialized, etc.) exclusion and segregation in scientific organizations.

Some women professors, among the interviewees, seem to be aware of, and consciously analyze the pervasiveness of, a male-dominant model in science while, at the same time, remark how lack of awareness in this regard on behalf of younger women researchers may jeopardize their career.

“Io avevo un’identificazione di ruolo francamente maschile nel senso di neutra ma con una fortissima identificazione con un modello di ruolo che era maschile. [...]L’emersione di una possibilità di differenza è arrivata dopo l’elaborazione di una serie di esperienze in questo percorso di carriera nel senso che il modello era inteso neutro ma di fatto era maschile perché era un modello in cui la dimensione dell’io intellettuale conoscente non ha genere...all’inizio era così.” S1

“Il problema principale è per le giovani. Loro si sentono forti quando assomigliano ai maschi....e poi rimangono disoccupate, senza lavoro e senza famiglia.” S8

“It’s interesting when I think back on it that they were beginning, even at a kind of surface level and how they dressed, they could emulate. And there were more male staff, and they certainly were the more senior staff within the school”. C3

The analysis of younger researchers’ interviews reveals their ambivalence towards having to accept a model of de-gendered (yet male) scientist who collides with the characteristics stereotypically attached to women in academic and research venues. This ambivalence determines what could be defined as ‘double standard’ relative to role models prescribed by the hegemonic academic culture, which tends to label women’s career choices and attitudes as problematic. On the one hand, ambition, assertiveness, self-confidence – which are usually valuable assets in career development – are in general frowned upon if embodied by women:

“Sono cresciuta interloquendo ...con un modello di interlocuzione di discussione scientifica non autoritario ma molto legato alla costruzione del dibattito scientifico, con un dibattito aperto dove non ci sono ipse dixit o ruoli di autorità che non derivino dalla capacità di farsi ascoltare, di argomentare eccetera. E questa cosa quando ero ancora studentessa in alcuni casi non andava molto bene, con alcuni professori, con altri invece funzionava, qualcuno rimaneva un po' spiazzato dal fatto che io interloquissi senza troppi problemi e non avessi questo senso dell'autorità.” S1

“Dopo aver vinto il concorso una delle mie preoccupazioni principali è stata quella di aiutare i miei colleghi [...] la mia preoccupazione principale è stata lavorare affinché loro vincessero il concorso. Il risultato, non intenzionato, è stato che io in qualche modo ho frenato. Ho rinunciato su loro richiesta, a mettere la firma su cose che avevo io stessa contribuito a fare, in altre mi sono messa come secondo nome invece che come primo e...a poco a poco ho capito che forse se fossi stato una persona di sesso maschile probabilmente loro non se la sarebbero sentita di essere così espliciti ma soprattutto non è detto che quello avrebbe avuto questo tipo di esigenza psicologica di dare sostegno agli altri quasi chiedendo scusa per essere passato prima.” S1

“Una donna che possiede assertività viene...additata come aggressiva, isterica, tutte queste cose qua, cioè cose che si dicevano ai tempi di Freud, di Jung... e vanno ancora, purtroppo, di moda.” S13

On the other hand, the persistence of gender stereotypes on women in academia, and at the same time, their very denial rooted in a system that assumes objectivity as its foundational criterion, materialises in gossips and rumors. Some women researchers reveal their unease about working in male-dominated contexts, imbued with masculine discourses and attitudes. Conversely, in these contexts women experience femininity as something that does not go unnoticed and that it could also put at risk one's own intellectual reputation. These attitudes make women's presence in academia and their sense of belonging to the academic community more difficult.

“Molto spesso nel nostro ambiente sento dire di giovani donne, brave, ricercatrici brave, se sono belle, ‘è pecchè tenen’ o compar’... se sono brutte, ‘è pecchè tant’ chella nun ten’ niente a fa’... queste cose purtroppo ancora sussistono e sono veramente vergognose.” S13

“Le difficoltà più grandi che ho incontrato nel mondo accademico sono state legate al mio aspetto fisico, al fatto che sono una bella ragazza, perché uno più uno fa due tutti pensavano che il professore...stavamo insieme, roba del genere, quando in realtà non era assolutamente così. Tra noi c’è un rapporto di stima, da anni. Io mi sono laureata col massimo dei voti, bacio accademico, pubblicazione di tesi e dopo successivamente ho cominciato a fare delle pubblicazioni con lui quindi c’è una grande stima che ci lega, però, so per certo, che c’è gente che pensa che io sto là perché sono bella e il professore è innamorato di me.” J11

“Ci sono delle persone solo perché sei una donna ti guardano in maniera diversa. Ma già solo se semplicemente non ti metti i jeans, stamattina sono venuta con questo [vestito], ti guardano in maniera diversa. Perdi credibilità, non lo so...” J16

“Il mio è un gruppo prevalentemente maschile, non per numero di persone ma per atteggiamenti... è un gruppo in cui si respira un’aria molto confidenziale, molto conviviale.. in qualche maniera un po’ sul godereccio maschile diciamo! Questa modalità di ... di goliardia, che è tipica di certe dinamiche maschili, non agevola la presenza femminile” S1

For many of the women researchers interviewed, it is not easy overtly to address the difficulties and the ambivalences connected to the gender dimension, except when work-life balance issues are concerned. All other aspects connected to gender seem almost entirely neglected, though.

“Direi che i problemi non si incontrano in quanto donne, ma in quanto mamme”. S17

This is particularly significant if we consider the target group of women interviewed being composed of women who willingly had chosen to participate in a gender equality program in university and, therefore, were expected to be, at least more than others, gender-aware.

Widespread gender blindness appears to be the rule, throughout the interviews, when women researchers interpret the barriers they have encountered on their career path as personal issues. It is as if they thought of those lived experiences as belonging to a very intimate sphere, neither conceiving the opportunity to share them nor analyzing them from a gender perspective. Very often, obstacles with structural connotations are experienced as personal defeats, which women often put the blame of, on themselves.

“Io personalmente ho fallito completamente su tutta la sfera della costruzione della famiglia ect., ma è stata un’incapacità mia.” S5

“A parte la discriminazione subita da donna incinta e con bambina piccola no, fino a che non ho avuto la bambina, no. Nel momento in cui ero incinta o comunque ho avuto la bambina sono incominciate le osservazioni, le discriminazioni.”J9

Among researchers in STEM fields, in particular, the tendency prevails to consider gender either as a personal trait with no relevance in research or as a biological feature, conducive to differences that would determine which attitudes and cognitive strategies tend to prevail in one gender rather than in the other. The engine of research development is, according to the majority of STEM women scientists interviewed, the scientific method, whose practices and rules are gender neutral, precisely because they overlook personal traits of the knower. On the contrary, neurobiological differences between women and men are to be associated, for some interviewees, to different learning styles

and research approaches. These differences, however, would affect more explicitly research style and attitudes towards research, but they would not influence research questions and knowledge contents.

“Non penso che ci sia differenza nel modo di fare ricerca di una donna e il modo di fare ricerca di un uomo. C’è un metodo scientifico che secondo me esula dal sesso. La ricerca scientifica si può fare solo in un modo secondo me, cioè utilizzando il metodo scientifico, il rigore scientifico quindi non c’è un metodo donna e un metodo uomo. C’è una gestione diversa delle situazioni da laboratorio, certamente però non è un fatto di genere come affrontare la ricerca.” S20

“No, non direi la variabile di genere influisca nel modo di fare ricerca... no” S17

“È chiaro che un uomo e una donna ragionano in maniera diversa, ed hanno attitudini diverse ma il metodo scientifico è uno. Quindi il metodo scientifico deve essere seguito in eguale maniera da uomini e donne, che poi il cervello possa elaborare in una maniera, che ne so, più applicativa in un caso, elaborare in un modo diverso nell’altro, ma in queste speculazioni è veramente difficile creare le categorie.” S2

Interviewees working in the Humanities and Social Sciences fields, on the contrary, emphasize how the knower is a key element of the ‘research system’, through which phenomena under observation are transformed into ‘data’. They think that researchers’ position in the gender order is an essential component of the situatedness of knowledge, as well as of embodied scientific practices and interpretative frameworks.

“Non vorrei che si arrivasse a una stereotipizzazione di che cosa vuol dire fare ricerca al maschile e che cosa vuol dire fare ricerca al femminile, però ho imparato che l’io pensante non è separato dal corpo che lo tiene dentro e quindi in qualche modo, anche nella ricerca noi portiamo il nostro essere incorporati e quindi in questo

c'è una varietà di differenze e tra queste ci sono quelle di genere. Così come negli obiettivi della ricerca, nel contributo che la ricerca dà alla società nel suo complesso ci sono elementi che non sono un io pensante astratto.” S1

“Il genere influisce nel modo di fare ricerca soprattutto nel nostro settore, basato sulla ricerca di campo, sulle interviste, sui rapporti che si vengono a creare con l'intervistatore. A quel punto essere donna o essere uomo conta, anche nel modo in cui ci si pone, si pongono le domande, dall'età, da come ci si presenta, dal tipo di rapporto che si riesce a instaurare.” S18

“È chiaro che gli uomini costruiscono la loro narrativa dal loro punto di vista, quindi da una posizione maschile, e io invece, chiaramente senza volerlo, la spiego e l'analizzo dal mio punto di vista che è di donna, straniera, con due bambine. Penso che questo influisca molto, anche se non se ne parla. I modelli sono molto ideologici, sono molto costruiti. La cosa che mi stupisce è che la narrativa costruita dagli uomini diventa poi la narrativa normale”. S2

Extent of gender awareness greatly vary according to whether the researchers are at the beginning, or otherwise, of their career path.

“Ritengo che oggi sia un grandissimo problema la mancanza di percezione delle donne dei problemi di genere. Ma io lo vedo con le studentesse, con le dottorande, si pongono come soggetti forti quando senza percepire invece quanto il sistema poi le penalizzerà di qui a poco, e questa è la cosa forse più grave.” S4

“Lo dico sempre quando parlo con i più giovani: “Voi pensate che il genere non sia un problema, lo pensavo pure io”. Fino a che ho fatto il postdoc non ho mai pensato che ci fossero delle differenze di possibilità fra uomo e donna. Adesso, so che le capacità di una donna non sono valutate allo stesso modo di un collega uomo.” S6

“A me ha sempre colpito molto... per esempio nel contatto con le studentesse, quanto diventi per loro sempre meno rilevante la percezione, sempre meno forte la percezione della questione di genere... cioè le donne oggi, le ragazze giovani tendono

a dare per scontato il fatto che la parità sia raggiunta, che le pari opportunità ci siano... Poi si rendono conto delle difficoltà soltanto quando si scontrano personalmente con questo problema.” S3

“Originariamente il mio modello di ruolo era maschile. La consapevolezza di una differenza di genere è arrivata dopo l’elaborazione di una serie di esperienze, da cui ho compreso che il modello era inteso neutro ma di fatto era maschile”. S1

“Per anni ho pensato che la variabile di genere non influisse nel modo di fare ricerca; ma non è assolutamente così.” S21

“Prima pensavo che la ricerca si fa da una posizione neutrale, poi mi sono resa conto non è così.” S2

“Gendering at that stage, in many respects, I was completely naive. Didn’t see it. But this was the early '90's. Bought into the whole thing. Sure, we're all equal now kind of thing, and forgive me, I was about 18. [...] And it's interesting because, again, I was blindly naive, but those junctures where you get just that odd, that’s not how I see the world type of-- and you realise there are different assumptions being made than you would assume” C3

Gender blindness, therefore, is the rule; while gender awareness to slowly arise, along two main dimensions: one related to the research field, and the other related to the retrospective elaboration of experience, by senior researchers, while time goes on (Agodi, Picardi, 2016).

The UCC interviewees reveal how prominence of equal opportunities perspectives in academia may discourage the possibilities of identifying the deep roots of gender inequality as well as, consequently, their solutions. The introduction of gender equality regulations can determine some changes in gender practices, but these soon re-organize themselves to reproduce gender inequality. As long as mechanisms and processes will not

be understood and interpreted from a gender perspective that conceives gender as a social construct and practice and that acknowledges the importance of gender in the making and functioning of organisations and their culture, organisational structures may be shaken but they do not fall apart and they soon reestablish the former order.

“I think that’s related to, when you mentioned earlier, the ideas of a model like, equal opportunities. So I think a lot of people are aware of the fact that if you apply for a job and an organisation will have, “We are an equal opportunities employer” and that this means that processes will be discriminatory and all the rest of it. And because it may be seen from a kind of a compliance point of view. That you’re complying with what might be seen as a kind of a baseline, legal process that doesn’t necessarily always mean that processes are going to end up in a-- not having gendering processes but..” C2

“And you see it as something that can be fixed with a new policy or a measure. Yeah, that it’s kind of institutional and manageable. [...] If the rule is unfair we can change it, and then the problem is fixed. But in reality, you change a rule and the culture finds a way of-- very often finds a way of going around it.” C3

5.4 Intersectionality

One of the differences emerged from the comparative analysis with the Irish context refers to the more explicit role that intersectionality plays in shaping academic careers for what it pertains, in this case, to social class and religion.

The stronger emphasis on intersectionality in interviews collected in the Irish context has two distinct explanations. The first one is related to the disciplinary background of the researchers interviewed, working in the gender studies field. The second explanation refers to the roles that national and religious identities have in Ireland, when compared to Italy.

“At that point, there are decisions about whether you pursue professional training, but probably the most prestigious one would be seen to go into clinical psychology. And that's why I have these kind of bubbles around here because they're imagined futures, if you like. They're things that might happen, but you have to go a particular route for them to happen. So it could be clinical, it could be educational psychology. Work and organisational, or occupational, is the route I went. Why not clinical? Was there a gendering process in that? As I said, it'd probably be perceived as the most prestigious, so why would you not pursue that? I think partly, whether it was gender-- and I think the intersectionality probably had to do with class as well. Background I come from, you don't spend seven or eight years in university. I was the first person in my immediate family to go to UCC. So the idea of spending another three years trying to do unpaid internships to get on the clinical course - and there was a huge competition for it - just didn't compute. It just didn't seem like a real option. I'll put it that way”. C3

Chapter 6

Gender mechanisms in the construction of gendering processes

This Chapter provides a theoretical framework to explain the (re)construction of gendered practices in academia. It give systematic order to the different interlocking mechanisms that contribute to shape gendering processes in science and, although not exhaustively, accounts for the dynamics behind some of the most significant aspects of gender asymmetry in science. Paragraphs 6.1, 6.2 and 6.3 seek to understand some of the inner mechanisms that generate the gender practices described in the previous paragraphs, analysing also results emerging by the literature on gender inequality in academia.

Similarity between gendering processes in two different national contexts found by the comparative analysis provides further information about the nature of gendering processes in science. It confirms that gendering mechanisms in science and academia are rooted in deep layers of relevant social institutions. This dissertation argues that these mechanisms can be correctly understood only by investigating the constitutive and normative elements on which science and academia have been structured and continue to be structured, depending on the social, economic, and political transformation of society. This analysis is provided in Paragraph 6.4

6.1 Ambivalence of reputation in science

Figure 6.1 illustrates some of the mechanisms that operate within the scientific reputation system. These interlocking mechanisms produce and amplify processes of vertical and horizontal segregation as well as processes of gender asymmetry in the

distribution of research funding.

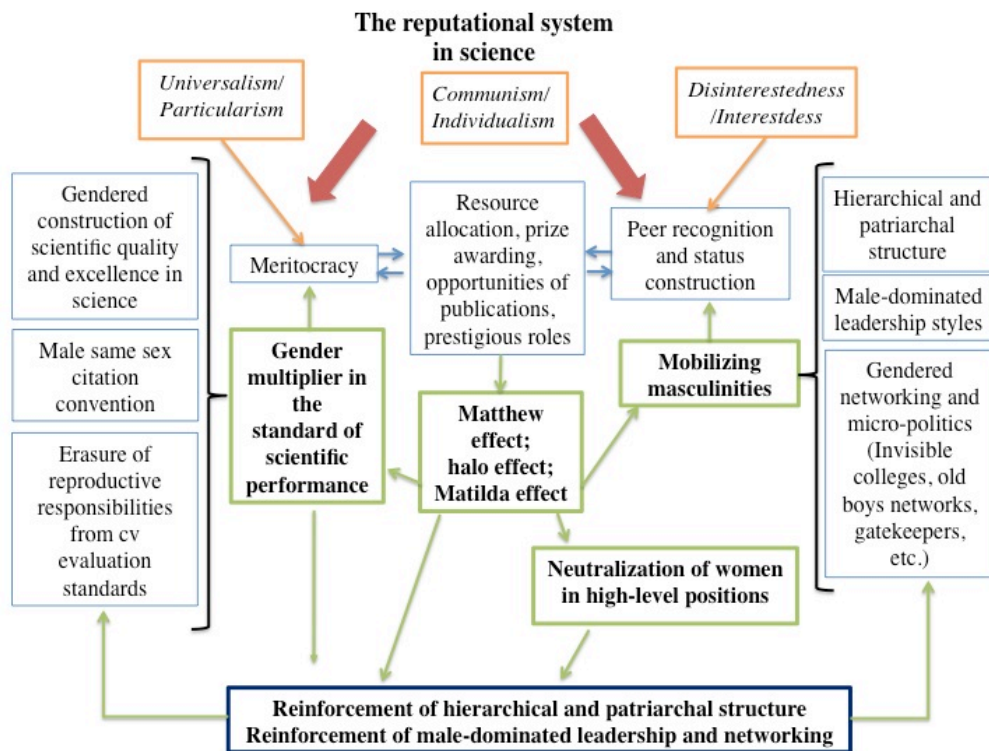


Figure 6.1 Segregation practices and mechanisms in the scientific reputation system (My elaboration)

Sociology of science appears on the scene in the 1950s, when Merton and a group of North-American scholars developed a series of studies on the normative system in science. According to them, not only did the institutionalization of science and scientists' social role entail the classification of knowledge practices through the experimental method, but it also entailed a bedrock of social elements, that is values and norms truly constitutive of science. For them science had been created as a social subsystem in relation to the rest of society and yet, at the same time, independent from it.

In this perspective, the scientist's prestige and personal satisfaction become the linchpins that characterize and sustain science normative system. When defining the norm of *Disinterestedness*, whereby the researcher pursues knowledge advancement primarily

as a collective and public good, while receiving personal acknowledgement only as a byproduct of his contribution to scientific progress (priority rule), the promoters of science normative structure explicitly refer to these categories (prestige and satisfaction) as domains in which the scientist's personal interests can be articulated.

“Scientists are expected by their peers to achieve the self-interest they have in work satisfaction and in prestige through serving the (scientific) community interest directly” (Barber, 1952: 132)

Moreover, we can distinguish another key element of science normative system in the norm of *Disinterestedness*: the presence of a peer group that benefit from, and have the privilege of bestowing the status of scientist upon somebody. Definition of peer networks that define the scientific community and their role has been the object of many academic studies (Price, 1963; Lievrouw 1989; Zuccala, 2006). Historians of science have adopted and expanded the concept of “invisible colleges” used by Boyle in the XVII century to describe the group of natural philosophers who formed the Royal Society (Price, 1963). According to Price, the “invisible colleges” confer the status of scientist in light of peer acknowledgement, they confer prestige, and they select a maximum number of members that can be managed through interpersonal relations. The invisible colleges, furthermore, can reasonably control knowledge fields in their charge, research funding, and the labs. Besides controlling personal reputation, they can intentionally or otherwise influence the course of new scientific ideas and they can decide development strategies of specific fields (Price, 1964).

Yet, with respect to other social groups, where prestige can become an indicator of the social position - of the amount of power at one's disposal – in the scientific community, according to the principle of *Universalism*, scientists' statements have to be assessed

independently from the person who sustains them. However, accountability requirements coming from societies enforced the introduction in scientific organizations of criteria to evaluate and measure their members' reputation 'objectively'. A meritocracy system, based on "objective and neutral criteria" was established for this purpose. Starting from the 1960s the meritocracy system has spread across the whole education system to the point that, according to the current rhetoric of self-representation adopted by scientists, it has become the hegemonic paradigm in the scientific profession. Meritocracy, however, has not removed 'traditional' reputation mechanisms (based predominantly on informal communication) completely yet; therefore, co-optation processes in scientific and decision-making networks remain crucial in academic and research systems.

Indeed, as shown in Figure 6.1, the current system of reputation building in science develops along two axes: on the one hand, meritocracy holds, based on Merton's *Universalism*; on the other hand, the concept of peer recognition, based on the value of *Disinterestedness*. The cultural dominance of formal evaluation nowadays (Pinto, 2012) hides the importance of peer recognition, which has been a key element in science reputation system and still plays a fundamental role in its governance. Moreover, hiding the role of peer support in science reputation system - while reducing it to what is measurable by citation indexes - make it come back as elitist management of power, through practices bestowing ambivalent connotations on the reputational system.

In the next paragraphs gender mechanisms acting in both dimensions of science reputation system are analysed.

Quantitative methods for standardized evaluation of scientific research increasingly demanded for nowadays rely on meritocracy as a neutral and objective criterion to determine roles, academic positions and research responsibilities. In this perspective, the

supposed objectivity of meritocracy legitimates in part the gender gap in decision-making bodies, in scientific panels, etc.

Yet a copious scientific literature challenging this supposed neutrality of evaluation has highlighted how the very definition of excellence is socially constructed and, as such, preserves and reinforces the social biases – the gender-based among many others – in which this construct has been developed (Scully, 2002; Harding 2002; Knights and Richards 2003; Bailyn 2003; Krefting 2003; Benschop and Brouns, 2003; Brink and Benschop, 2011; Picardi, 2015; O’Connor and O’Hagan, 2015).

The relevance of the gender dimensions in academic and research evaluation has been analysed by many studies that emphasizing how excellence is implicitly defined and measured by indicators anchored to male perspectives on career success (Knights et al., 2003; Deem 2007). These studies demonstrate that emphasis on quantity rather than quality of scientific results (papers, citations, patents, etc.) contributes to creating gender asymmetry by penalizing reflective research attitudes and publication styles, together with those scholars who may have been temporarily occupied with care work and quantitatively reduced their scientific production (Rice, 2011; Jacobson, 2013). Other scholars mention the presence of unconscious gender biases in recommendation letters (Trix and Psenka, 2003) and in evaluation of curricula (Moss-Racusin et al., 2012).

These gendered practices in research evaluation act as a “gender multiplier” in the scientific performance requested to women who have to do and/or wait more in order to be considered of the same level than their male counterparts (Van den Brink and Benschop, 2012). This phenomenon is also known as “double standard of excellence” (Brouns et al., 2004; Foschi 1989; Foschi 1996; Foschi 2000).

Emphasis on meritocratic evaluation does not capture many activities carried out by networks in science. The role of formal and informal networks has been analysed. They are a relevant tool to support career progression – also thanks to “the strength of weak ties” (Granovetter, 1973; Linn, 1999; Burt, 2004; Fleiming, Mingo and Chen, 2007).

They also reveal to be the result of an enacted practice, capable of producing isolation and marginalization, for some knots in the network (Bagilhole and White 2003; Martin 1994; Morley 1999; Morley, Unterhalter and Gold 2001; Ramsay 2002).

These studies show how one of the mechanisms behind network building to be homophily (and homosociality), that is the tendency to build social bonds with people of one’s own gender. Witz and Savage describe it as a form of “cloning oneself in one’s own image” (Witz and Savage (1992: 16). This process controls access to power and privileges their peers, thus guaranteeing the replication of socially homogenous candidates (Kanter, 1977). Homophily has been widely identified as a key factor in perpetuating specific gender models. Kanter and Hartmann (2007) have underlined the importance of male homophily in replicating male-dominant models at work, where male hegemonic groups shape and define leadership models that mimic qualities and characteristics typical of mainstream masculinity (Grummell et al., 2009: 335, Lipman Blumen 1976).

Further research highlight the widespread presence of this mechanism in science and in research (Essed and Goldberg, 2002; Hearn, 2004b), which translates into men’s preference for men at work. Male-to-male networking processes are very relevant in research itself, in research evaluation (Burton, 1998), in scientific career development, and in social construction of scientific excellence. However, while studies on homophily look at sex differences in networks, they neglect gender. They focus on the different positions of women and men, without taking into account the meanings of femininity and masculinity in organizations. Homophily studies use sex differences as explanation and

oversimplify – through network analysis modeling resources- the gendered processes of inclusion and exclusion in networks. In their seminal paper on gender in academic networking, Van den Brink and Benschop (2014) go beyond the sex differences that feature in network studies, and use feminist constructionism (Lorber, 2005) to understand gender as a complex social practice that can address organizational routines and norms that produce or counteract power inequalities (Acker, 1990). The ensuing concept is especially relevant: networking practices, where gender plays a key role, are indeed forms of mobilizing masculinity, in which also some women, in order to join strong networks, can be enrolled in. While the practice of mobilizing masculinities is predominantly liminal, it does illuminate the agency of gatekeepers. It shows how their routine use of formal and informal network relations reproduces gender inequality. Instead, the mobilizing of femininities is an intentional practice in which gatekeepers are prompted by equality policies. Scouting and supporting women may have some momentum now, but mobilizing femininities may not be able to alter the mobilization of masculinities in routine networking practices and counterbalance the disadvantages for women stemming from it. The lack of awareness of routinized gender practices in accounts of networking is, according to Van den Brink and Benschop, an important explanation for the persistence of structural gender inequalities. Practices intended to counteract inequalities do not always succeed as they may have unintended consequences such as the production of new inequalities (Van den Brink and Benschop, 2012a).

The gender multiplier in evaluation practices as well as male homophily in network building contribute to a number of social effects:

- a) the *Matthew effect*, which is a social mechanism described by Merton (1968) whereby people who have more resources are privileged when new resources get distributed;

- b) the *Alone effect*, which supports people who belong to more prestigious groups and institutions;
- c) the *Matilda effect* (Resister, 1993), which determines a systematic underevaluation of women's work and women's qualifications.

Through reputational systems scientists distribute resources, select keynote speakers or principal investigators in research groups, provide publication opportunities, awards, etc. Those receiving recognition and opportunities are in turn evaluated through meritocratic standards and peer review processes that further reinforce their prestige. The mechanisms behind the reputational system contribute to determine the systematic underrepresentation of women in research structures and contexts. Those few women who reach top-level positions in the hierarchy remain isolated, have less possibilities to implement change, or they get "recruited" (Latour, 1986) to the "boys' club" and may risk neutralizing, in the end, the positive effects of women's (very limited) presence in top-level positions.

In other words, gender mechanisms operating in reputation systems reinforce patriarchal hierarchies of academic and research organizations, male-dominant leaderships and networks, thus reinforcing in turn the gender gap in resource allocation, as well as vertical and horizontal segregation in science.

6.2 Ambivalence of extended present and other gender mechanisms in the division of scientific work

In previous chapters, we have seen the gender division of scientific work occurring through processes of time organization and processes of division of academic work.

Sociologists theorize time as a strategic medium to study social life. From this perspective, time contribution to social life structuration and its conceptualization as part of individual and collective agentic features gives us the opportunity to deepen our understanding of social actions, relations, institutional and organizational dynamics, but also cultural models in society (Adam 1995; 2004; Bergmann 1981; Hassard 1990; Leccardi, 2005; Nowotny 1993; Schöps 1980; Zerubavel 1985).

Time has a crucial role in career progression and in representations of it. Time in fact is one of the categories on which scientific evaluation rests: fast career growth is an indicator of excellence while, on the contrary, some professional positions and some grant opportunities have age restrictions. Job precariousness is nothing but an integral part of the scientific career path, which entails switching from one fixed-term position to another, with the objective of reaching a permanent position.

Statistical analyses of different career stages show clear gender differences (Cervia and Biancheri, 2017). Fast career growth is directly connected to gender structures of scientific organizations, in all its professional stages, from precariousness to stability, as well as for promotions.

In paragraph 5.2.1 we have seen how researchers' experience of time is characterized by specific features, such as predominance of research time over leisure time, and coincidence of precariousness with women's reproductive time that have of course great impact on women's life projects. Postponement of future is the result, or as discussed in sociology of time literature, the substitution of the category 'future' with that of 'extended present' (Nowotny, 1985).

The reasons leading to a dense and prolonged experience of present can be found in the fast pace that characterizes current western societies, ruled by "absolute prominence of speed (Rosa, Scheuerman, 2009; Wajcman, 2015) – or better, of simultaneity" (Leccardi,

2005). In particular, research time has been chasing productivity measurement, which has become one of its cornerstones in the last years. Research, however, with respect to other types of job, has peculiar characteristics, such as emphasis on vocation, passion, dedication, and even sacrifice, which have become criteria of (self)-selection for career development.

Women scientists adhere to the interpretive model that conceives science as a vocation rather than a job. Bracketing of personal life finds justification in the horizon of the extended present dimension. Nonetheless, the ambivalent character of extended present has problematic implications too, such as postponement of motherhood that often turns into giving up on motherhood altogether. Marginalization practices of pregnant women in scientific contexts reinforce this system; because they may end using fixed-term positions instrumentally, and because of ambivalent mechanisms operating in the science reputation system, women on maternity leave risk transforming the temporary interruption of research work in real (or perceived as such) withdrawal.

In addition to the acceleration processes already mentioned, the multiple sources of time pacing and deadlines further complicate the consequences of researchers' time management (Vostal, 2016). So-called "time generators" that mark deadlines and redefine, overlapping with each other, foci of attention and priorities for young researchers (Felt, 2017) collide in a crucial way – due to personal biographies and due to extended time mechanisms – with (biological and social) gendered time generators of personal relations and maternity.

Figure 6.2 shows practices and mechanisms through which feminization of disciplines translates into their descent down the ladder and into their loss of value. Statistical analyses reported in Chapter 3 reveal, since the first career stages, a sharp gender division between the so-called 'hard' sciences (engineering, physics, chemistry,

for instance) mostly male-dominated, and the ‘soft’ sciences (social sciences, humanities, etc.) mostly female-dominated. One of the consequences of the gender division of disciplines that are considered more or less prestigious, thus more appropriate for men or women respectively, is the reduced value of those fields (and of subfields) that are female dominated. This phenomenon is known as feminization of disciplines.

6.3 Double bind of women in science

Analyses of interviews reveal that denial of gender dimensions in science is articulated along two axes: the time axis, which shows how researchers become more gender aware appears quite late on their career path; the disciplinary axis, which shows how this phenomenon is more pronounced in STEM fields.

The different perception of gender blindness in time – women who are in a more advanced career stage show a different degree of gender awareness with respect to those who are at the beginning of their careers – is not to be interpreted as a cohort effect. Although it is true that younger cohorts are less sensitive to gender issues and often take gender equality for granted in western societies, the analysis of individual interviews and of focus group discussions actually reveals that gender awareness appeared late in the career path also for those cohorts who have entered research jobs in the 1980s.. Many of the senior researchers acknowledge to have experienced a slowly increasing sensitivity to gender issues in recent stages of their careers, out of their reflective looking back at the difficulties experienced along their path.

Furthermore, a more variegated spectrum of perspectives on gender in research has emerged from interviews and group discussions. Data show a precise discriminant in the variable distribution of these perspectives among interviewees, that coincides with the distinction among different disciplines in which women scientists work: the polarization

between researchers who work in STEM fields and researchers who work in social sciences and in the humanities is apparent (Agodi and Picardi, 2016). These different perspectives also derive from patterns of distancing and differentiation on behalf of women scientists (Rhoton, 2009) which are clearly connected to the ambivalence of role models available to them.

Denial of the gender dimension in science can be explained by looking at the researchers' attachment to the normative system of science, as if it were a *double bind*. Gregory Bateson introduced the concept of *double bind* to explain a situation in which communication is informed by incongruent verbal and non-verbal messages, whereby the person receiving them does not have any chance to get out of the framework.

Whereas difference between men and women in science is implicitly communicated through the multiple processes of differentiation above illustrated, in explicit communication the gender dimension is denied in light of the principle of objectivity (or *Universalism*). In other words, to be acknowledged as scientists, women have to accept a framework that denies gender dimensions in science, and that validates neutrality and objectivity in science thus erasing the situatedness of the knower (Haraway, 1988). Indeed, upon closer observation, the supposedly neutral knower who has also become the universal subject of knowledge is clearly imbued with hegemonic male values. In this framework male dominance in academic hierarchies and research centres, when proved by data, cannot be explained as the legacy from a distant past, when women were officially denied access to science due to dynamics partially external to science.

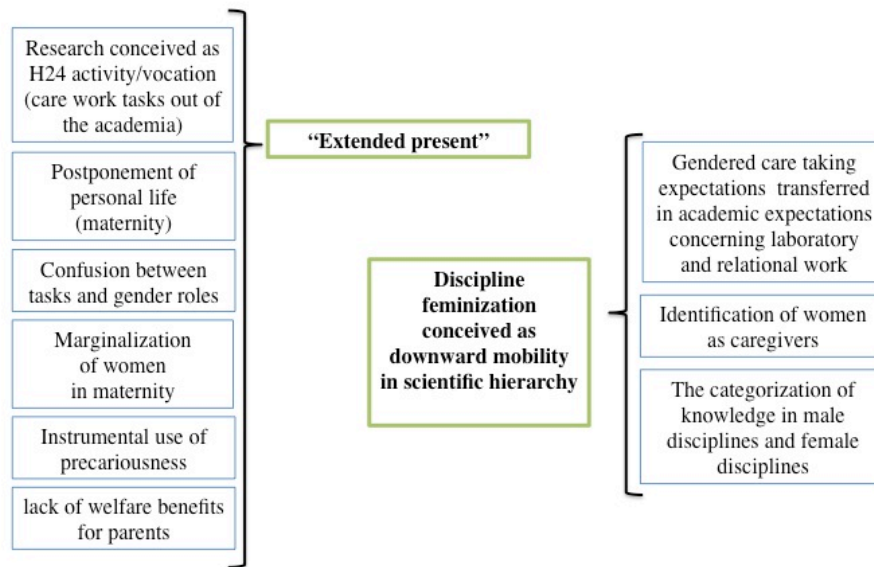


Figure 6.2. Practices and mechanisms related to the organization of the academic work (My elaboration)

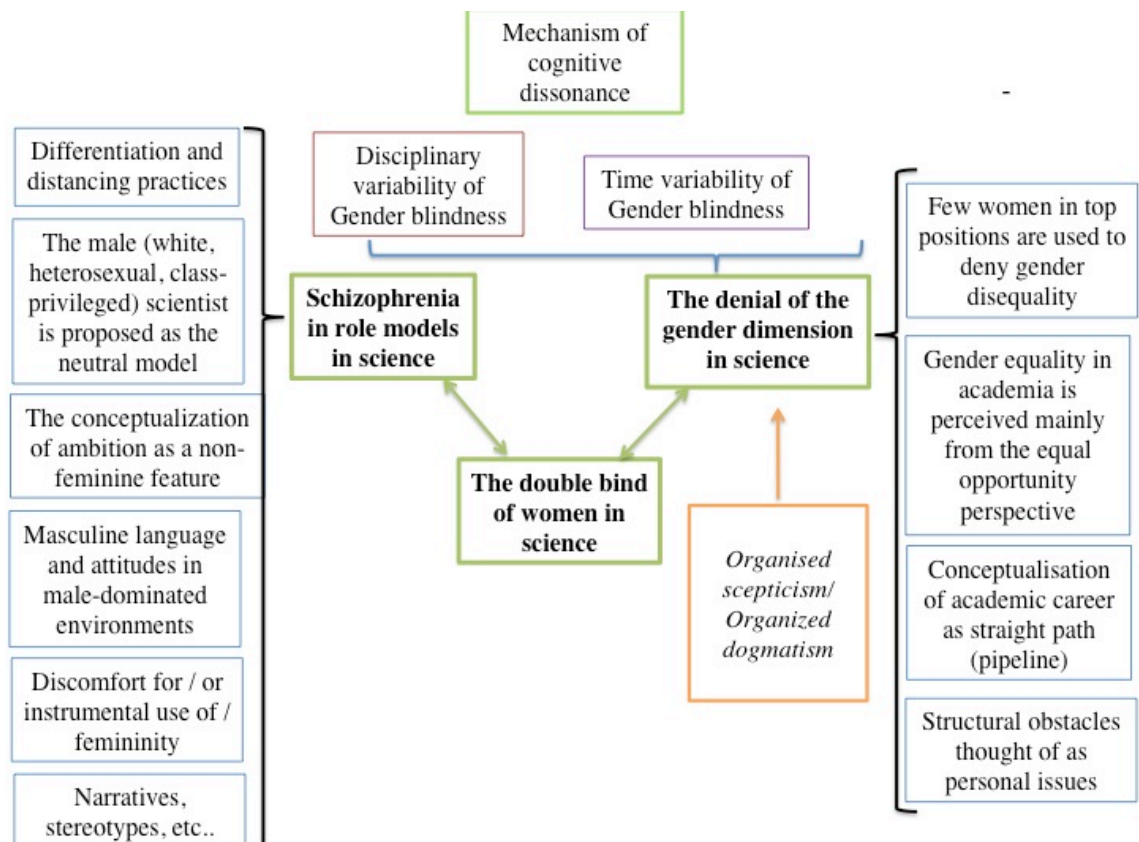


Figure 6.3 Practices connected to feminization of disciplines in the form of horizontal segregation (My elaboration)

6.4 Redefining scientific norms

In this study of gender mechanisms in science we have defined science as a social institution by emphasizing the importance played by norms and values (identified by Merton) to understand how science works.

Merton's "normative structure of science" has been the object of numerous critiques demonstrating how scientists' attitudes differ from Merton's values. Indeed, Merton himself clarified the non-prescriptive aspects of these values through the concept of "sociological ambivalence" to describe the situation in which some social actors are when they have to cope with conflicts among norms, values, and different roles, justifying these ambivalences as a "dynamic rotation of norms and counter-norms" (Merton e Barber, 1963). Counter-norms "particularism, individualism, interest, and organized dogmatism" are the counter-norms elaborated in contrast to Merton's scientific norms (Mitroff 1974) (Table5.1).

When describing the transition from academic science to post-academic science, Ziman has used new norms that interpret research as "propertied, local, authoritarian, commissioned, and expert". The founding father of the sociology of science, Robert K Merton, worked from the late 1930s through the 1960s to constitute the study of science as a legitimate branch of structural-functionalist sociology, while at the same time he attempted to constitute sociology as "scientific". What counted as "being scientific" was overwhelmingly taken from philosophical models of the natural scientific "method" (e.g. Parsons 1949:Ch 1). The same sensibility that persuaded Merton and his associates that sociological accounting had to stop at the door of scientific method and scientific knowledge (e.g. Merton 1970:xviii-

xix, 75, 199-200) also supported the claims of sociology to be a genuine science. Sociological understanding of science, as an institution, was so addressed to its normative system, whose specificity resided in its capability of giving scientific knowledge content its specific autonomy from social contingencies. When STS came into being it tended to talk of ‘the social construction’ of scientific knowledge. However, in much of STS the social has been dissolved as an explanatory and foundational category. If the social exists separately at all within the web of heterogeneous relations detected by the toolkit of actor network theory and its successor projects, or in Haraway’s feminist material semiotics, then it is a temporarily stabilised effect of those webs, in which particular parts are generated and treated as “social”. So, the “social” has disappeared as a basic analytical category¹; the term “construction” has also been eroded.

This is because, in this alternative way of thinking, the webs of relations only hold if they are enacted, and enacted again – which may or may not happen in practice, in a world of performance or enactment. Here then, STS in its (feminist and actor-network) material-semiotic forms is in the same conceptual space as Foucault’s archaeology or Judith Butler’s (1993) feminism: it is about performativity. It is arguing that realities (including objects and subjects) and representations of those realities are being enacted or performed simultaneously.

Since the real is relationally enacted in practices, if those practices were to change the real would also be done differently.

¹ As an index of this change, it disappears seven years on from the subtitle of the second edition of Latour and Woolgar’s (1986) which becomes *Laboratory Life: the Construction of Scientific Facts*.

Merton (1973)	Mitroff (1990)	Ziman (2000)	Latour (1986)	Haraway (2008), Mol (1999)
Academic Science		Post- academic Science		Gendered science
Universalism	Particularism	Local	Action at distance	Positioned knowledge
Communism	Individualism	Proprietary science	Actor-network	Situated science
Disinterestedness	Self- interestedness	Authoritarian	Enrolment	Gender equity
Organized skepticism	Organized dogmatism	Expert	Laboratories as obligatory passage points	Positionality

Table.6.1 Norms, counters norms, and new norms in science (My elaboration)

As feminist STS philosopher Annemarie Mol notes (2008, 91ff), practices are ramshackle, differ from one another, and relatively poorly co-ordinated. Then we are moved to the conclusion that more or less different realities are also being done, moment by moment, in those different practices. And this is the position that has been articulated in several of the post-structuralist variants of STS including ‘after actor-network theory’ and feminist material semiotics. And it is here that STS’s refusal of grand narrative and the macro (social or otherwise) and its grounding insistence on the specificity of the case study may have helped to save the post-critical day. How this might work can be seen for actor-network theory.

Its earliest studies tended to explore strategies for translation that extended into and ordered (or failed to order) asymmetrical networks of relations. Michel Callon (1986a; 1986b) Bruno Latour (1988b) while John Law (1986). These were studies, in some ways resonant with those of Foucault, which show how knowledge, realities, and productive but potentially asymmetrical versions of power may all be done together. In these studies other orderings existed, but they existed out with those being attended to. Difference was a constant threat (these networks were constantly at risk), but like the heterotopic, it lay outside.

More recent “after-actor network” studies have started to bring difference in from the cold. The proposal, then, is that the world is not simply epistemologically complex. It is ontologically multiple too. Or, to put it differently, the heterotopic lies within.

This is counter-intuitive and readily misunderstood, especially by those (including sociologists) who are comfortable with the idea that though there are many different perspectives on reality there is, none the less, a single reality in the end. But the turn to performance leads not simply to epistemological but also to ontological multiplicity. And then, since the heterotopic has been brought back in, it leads to a series of post-critical

strategies for thinking about politics and intervention. Perhaps the simplest way of making the point is to suggest that reality is not destiny. For if there are multiple realities then these may be played off against one another. Importantly, some will be preferable to others (though such judgments are themselves likely to be complex (Mol: 1999)). Though her vocabulary differ from those of Mol, Haraway's interventions work within a related political and analytical space. For Haraway there is no single and comprehensive reality. Instead (Haraway: 2008), there are different realities being enacted in more or less power-saturated practices.

The question becomes: how to interfere in and diffract realities in particular locations to generate more respectful and less domatory alternatives. How to trope, to bend versions of the real, to strengthen desirable realities that would otherwise be weak.

This, then, is the leitmotif of this turn to the ontological. It is to refuse to be overawed by seemingly large systems, and the seeming ontological unity of the world enacted by large systems. It is, instead, to make the problem more specific; to deal with the materialities of specific practices; to discover difference. And then to intervene in ways that might make a difference to those differences.

Chapter 7

Deconstructing gendering mechanism through gender practices in mentoring

In this Chapter, mentoring is analysed to identify the practices acting within these programs for gender equity that are able to contrast and deconstruct the gendering mechanisms responsible for the gender segregation processes and the underrepresentation of women in science.

The starting point of this reflection was the evaluation of the mentoring program implemented at the University of Naples in the 2014-2015 years within the GENOVATE project. Paragraph 7.1 presents a brief abstract of the mentoring scheme adopted and the main findings of the evaluation process developed within the GENOVATE project, described in more detail in *La dimensione di genere nelle carriere scientifiche* (Picardi, I., 2017). Paragraphs 7.2 to 7.3 are devoted to the research developed within this thesis work, aimed at evaluating the transformational potential of mentoring. The underlying goal is that of recognising the conditions for transforming a project of individual support into a project contributing to institutional and organisational change.

In Paragraph 7.2, (gendered) practices at work within the mentoring programme are analysed as tools to deconstruct the gendering mechanisms in science and academia. In Paragraph 7.3 a proposal for a new mentoring scheme is provided as a result of the evaluation process described in the previous paragraph and of the theoretical systematization reported in Chapter 6.

7.1 The Mentoring Program GENOVATE@UNINA

This Mentoring Program GENOVATE@UNINA was one of the main actions of the Gender Equality Action Plan implemented at UNINA within the framework of the FP7 project GENOVATE (January 2013-June 2017).

The Pilot Mentoring Program GENOVATE@UNINA can be considered a remarkable and innovative experience in the Italian academic context, where there is no tradition in mentoring programs. While the practice of providing informal support to junior researchers by established professors is rather widespread in Italian universities, formal mentoring was introduced as a recognised practice in some business companies but not in Universities, where – on the contrary – impersonal evaluation criteria are recently becoming more legitimised than any personal mediated practice. The introduction of a women-only mentoring program as a tool for contrasting gender inequality in academia is, therefore, a specific challenge. Just lately, within the framework of actions implemented by other Sister Projects, other Italian universities have experienced some kind of mentoring programs. The University of Trento (GARCIA Project) produced some online mentoring tutorials (Adam, 2016), and the University of Pisa (TRIGGER Project) implemented an experimental mentoring program for early career researchers in academia (Biancheri et al., 2015), but the GENOVATE@UNINA mentoring program is unique in Italy for being a *women only* program.

The GENOVATE@UNINA team established the mentoring program as one of the priority actions of its GEAP, to address the disciplinary barriers and the differences concerning career advancement between women and men,

The main goals of the program were 1) to help women to identify their own career goals and expertise needs and to help them focusing on these objectives; 2) to promote diversity and defy academic practices that may cling to gender-neutral assumptions in science.

The Pilot Mentoring Program GENOVATE@UNINA design was strongly inspired by the scheme provided by the *Through the Glass Ceiling* project implemented at the University College Cork (UCC) in the years 2010-2012, which appeared to be quite consistent with the Italian university contextual conditions (Grada, Laoire et al., 2015; University College Cork, 2012). The UNINA team slightly modified the UCC scheme to better fit the local context and address the specific needs of women researchers at UNINA, while taking also into account the requests and the suggestions moved by the stakeholders engaged in the design and in the implementation of the project².

The move from post-doctoral research grants to formal recruitment in University faculty is one of weakest stage in women' academic careers. As shown in the first gender budget of the University Federico II (Liccardo et al., 2016), the percentage of women in academia fall down quickly after the PhD degree stage (the trend is consistent with national data, reported in Chapter 4). These findings suggested the choice of women researchers at the first stage of their careers as the privileged target of the program.

The proposed scheme was a woman-to-woman mentoring (*women-only*) program. The design established a limited number of participants (20 mentors-mentees couples) for this pilot project. The program was a twelve-month scheme, and it was open to all disciplinary areas of UNINA.

² Main Stakeholders: representatives of management and of the administrative staff of UNINA; CUG INFN; Coordinamento napoletano Donne nella Scienza.

One mentor-mentee meeting every two months was suggested to participants. The mentor-mentee couples were identified through a “matching process”, aimed at: a) selecting mentors with appropriate expertise in the area of their mentees’ declared needs; and b) matching mentors and mentees from similar disciplinary areas but different field of studies and departments.

The scheme was oriented to combine aspects from both *developmental* and *transformative* mentoring approaches (De Vries, 2011). On the one hand, to support individual women, the program encouraged mentoring relationships aiming to enhance career development and self-confidence, on the part of the mentee. On the other hand, as part of the equality gender agenda, the program was intended as a collective action, aimed at reforming academic organizational structures and processes.

The mentoring program was supported by on-going evaluation activities aimed at assessing a) the design and the conceptualization of the program; b) the implementation process; c) the results of the program, in terms of outputs and outcomes, in accordance with the guidelines provided by *Evaluating Gender Structural Change* (Espinosa, Bustelo, Velasco, 2016),

This multi-focused evaluation (centred on the design, implementation, and results of the program), was able to render an overall picture of the evaluated action plan. The evaluation design was intended to assess through which mechanisms and with which outcomes the implemented mentoring scheme was capable of triggering organisational change in its implementation context. A realistic approach to evaluation was chosen (Pawson and Tilley, 1997), aiming at:

1. evaluating conditions encouraging or discouraging mentors’ and mentee’s participation in the program;

2. identifying strengths and criticalities of the mentoring scheme in the UNINA context, related to the involved mechanisms, triggered by the mentor-mentee relationships or de-constructed within it;
3. recognizing conditions for transforming a project of individual support into a project contributing to change the organisation.

The point of departure of the evaluation study was the analytical model developed by Pawson (2004) as a result of a realist synthesis of a number of mentoring schemes implemented in different contexts. The model synthesises the programme theory (Funnel and Rogers, 2011) underlying mentoring programs aimed at supporting individual development and social inclusion. According to this theoretical framework, the working of a mentoring program for the mentee can be represented in terms of possible shifts in social status (from outsider to marginal and then to insider), experienced as the result of the mentoring relationship. The different status conditions may be identified with institutional roles and triggered by “reference group” mechanisms. These are intended to operate through mentors’ agency and to be addressed to change mentees “social identity” and commitments (Pawson, 2004, Rosenberg, 1979; Merton, 1968). The model is specifically sociological, focusing on mechanisms connected to the construction of social identity and group loyalty, rather than on individual psychology. In the case of mentoring for women in academia, the social identity of participants was defined: a) by their academic and institutional position (post-doc/PhD, fix-term researcher, tenured researcher); and b) in terms of their reference group, being it or not identifiable with (a part of) the scientific community.

According to this model, successful mentoring occurs in the case of (see Figure 7.1):

- career advancement (*achievement mentoring*), on the part of the mentee, such as either a shift from a post-doc position to a fix-term position or from the last one toward a tenure-track position; or the achievement of relevant academic goals, such as to become the Principal Investigator of a scientific project (horizontal shifts in the grid in Figure 7.1)

- change in the mentee's reference group (*identity mentoring*); in this case, the mentee develops self-confidence, and more clear and defined aspirations in terms of her academic career (vertical shift in the grid of Figure 7.1), as a result of a clearer definition of the scientific community as her reference group³.

According to Pawson, mentors too bring their social identity in the mentoring relationship; they can use benefits and advantages stemming from their status to support their mentees in different ways. In some cases, mentors are deemed to act as role models, supporting with affective, cognitive and positional resources the mentee's change (mentor as *advocate*); in other cases, only cognitive resources are engaged in the relationship (mentoring cultivating mentee's autonomy). In adverse situations, the relationship may contrast the mentee's developmental process (adversary mentoring)⁴.

The analysis of mentor-mentees couples showed that, in the short run, identity effects – triggered by reference group related mechanisms - were more impressive than career advancement, showing affective and cognitive resources activated by mentors to be more productive of positive outcomes, than positional and competence-focused/attitudinal ones.

The highly competitive recruitment system in academia and research, with its long waiting times for position shifts, is a clear explanation for this result. Notwithstanding a

³ Pawson calls *engagement mentoring* the one resulting in a simultaneous shift along the two dimensions, visualised as a move along the diagonal line of the grid in Figure 7.1

⁴ Literature on mentoring also acknowledges a dark side of mentoring that occasionally can occur when mentors practice distancing and manipulative behaviour (Scandura, 1998; Feldman 1999; Eby et al., 2000).

number of mentees accomplishing significant achievements in terms of professional advancements during the program, it would require a longer time span for mentoring relationships to develop their effects. Repeated field-work campaigns by evaluators would also be needed to collect relevant data and attribute those outcomes to the working of the program.

Mentor's Reference Group	<i>INSIDER</i> <i>Tenured researcher</i>	<i>MARGINAL</i> <i>Fixed-term researcher/ PI</i>	<i>OUTSIDER</i> <i>PhD students- Post-doc</i>	Mentee's Reference Group
Advocate	1	2	3	Aspirational
Autonomous	4	5	6	Resilience
Aversion	7	8	9	Resistance

Figure 7.1 Pawson's grid adapted to the pilot mentoring program of GENOVATE@UNINA

However, going deeper in the resource-driven mechanisms working within the mentoring relationship, a heuristically powerful perspective is gained to the way in which the two component-shifts are triggered. Our specific contribution is a more specific adaptation of the scheme to academic mentoring.

Positional and professional resources (respectively, through access to experts, networks and research groups; and to expertise, publications, entitlements) trigger networking and scientific quality, both of them necessary conditions for scientific achievement and career advancement. Affective/experience driven and cognitive resources (respectively through experience sharing, acquaintance with heterogeneous academic contexts and rules, autonomy building, on the one hand; reflexivity, goal oriented attitude, capability of pursuing goal hierarchies) trigger the extension of time perspective and change in loyalty attachments, both of them conditions for gaining situational awareness and capability building (Figure 7.2)

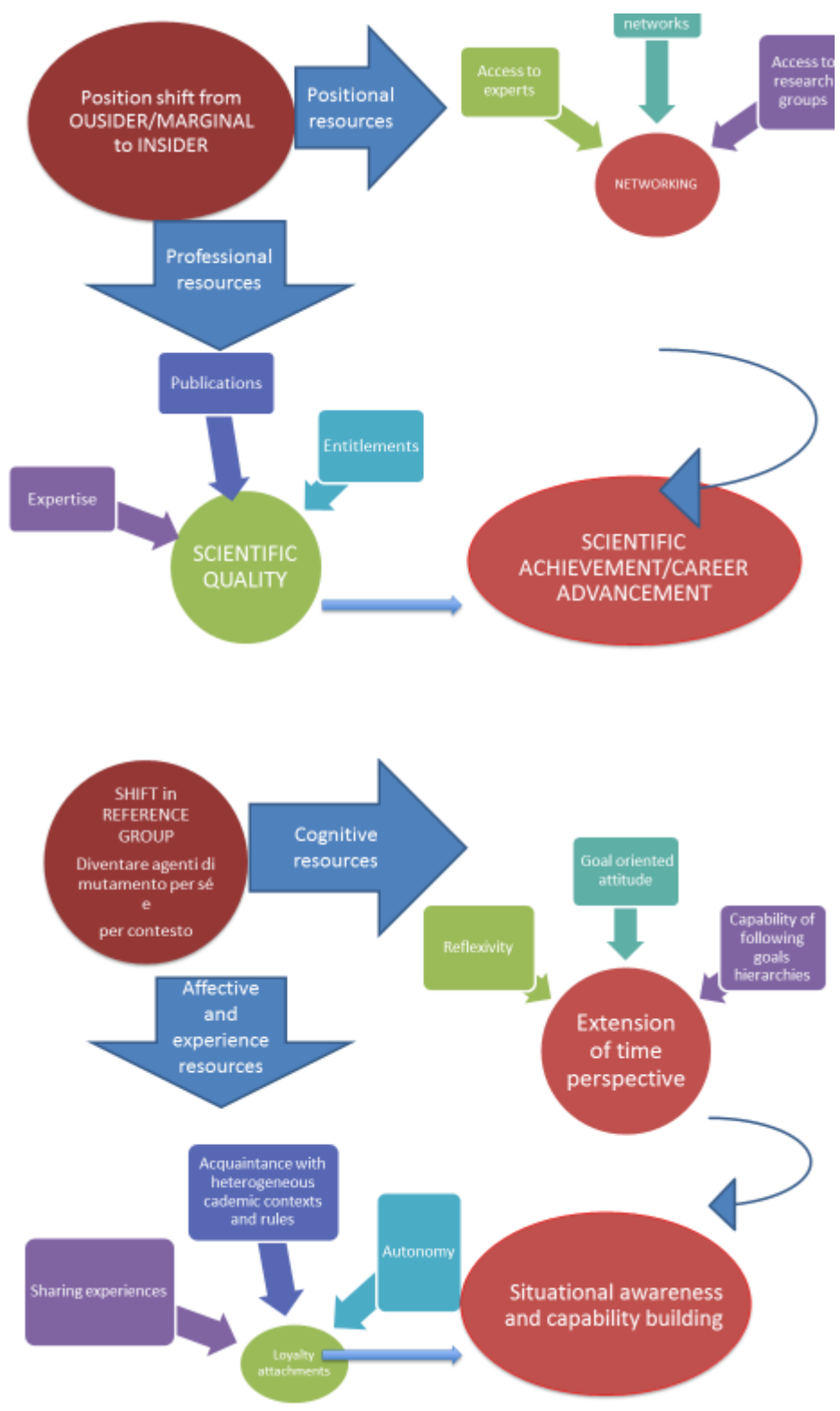


Figure 7.2. Mentoring working scheme

The mentoring analytical model proposed by Pawson proves to be a useful and theory-driven general scheme to evaluate a mentoring program, but it is actually gender blind.

However, according to feminist scholars, the assessment from a gender perspective is a crucial step for gender mainstreaming policies and strategies (Batliwala, & Pittman, 2010; Krizsan and Lombardo, 2013; Brisolaro, Seigart, and SenGupta, 2014, Bustelo et al. 2015; Bustelo, 2017).

Introducing the gender dimension in the evaluation scheme was a necessary step to make our evaluation process consistent with the dual purpose of our mentoring program, as inspired by the bifocal approach.

Trasformative mentoring			Gendered identity mentoring
Structural practices	Practices of time and work management	Cultural practices	Reference group
1	2	3	Post-equity science
4	5	6	Gendered science
7	8	9	Scientific community

Figure 7.3. The theory of the program for evaluating transformative mentoring

To introduce the gender dimension within the identity component of the change trajectory, in Pawson’s model, we reformulated the shift from resistant to aspirational identity in the mentees, considering the different perspectives through which the scientific community, as the reference group to choose, may be considered. It can be conceived either as traditionally intended (a gender-blind community), or as a gendered

community; or, furthermore, as the result of the transformation of the current, gendered, community of practice, towards a post-equity one.

To introduce the gender dimension in the achievement component of the change trajectory, in Pawson's model, the achievement content was reconceptualised. *Transformative mentoring* is the mentoring relationship within which both the mentor and the mentee develop the capability to transform cultural schemas, resource distribution criteria and social structures by de-constructing and neutralizing gendering processes producing gender inequalities in academia and scientific research field.

Under the focus of gendered evaluation three different change processes emerged as the potential outcomes of *transformative mentoring*:

- change in cultural processes, involving *cultural schemas*: narratives, symbols, images;
- change in power relationships, (involving *resource* distribution: time, laboratory access, authorship recognition, grants, etc.)
- change in structural practices, involving *cultural schemas and resources*.

The introduction of the gender dimension in the program evaluation made the arousal of participants' gender awareness to apparently show up as one of the greatest success of the pilot program. In the words of the mentees, this awareness opened to them a new perspective, whatever their position in the career currently was, and strengthened self-confidence in responding to professional challenges.

The awareness raising process involved both mentors and mentees. Many of them went on feeling involved in the gender agenda at UNINA, volunteering in other awareness raising initiatives; actively participating in projects of dissemination towards different audiences and targets; subscribing to specific actions directed at increasing women's presence in academic boards; signalling unfair rules in national evaluation procedures.

As the bifocal approach suggests (De Vries, van den Brink, 2016) “the building of gender insight – the capacity to see relational and systemic gendering, and the capacity to act – is key to any movement towards the transformative on the part of the individual”. The introduction of the gender dimension in the evaluation design reveals how the raising of gender awareness in mentorship relations works as a key condition to the effectiveness of the program, widening the mentees’ horizons and generating collective empowerment and self-confidence. The establishment of a network of women in the university sharing gender awareness and willingness to impress change to academic institutions was a second accomplishment. This is, in turn, an inescapable condition for collectively generating “the capacity to disrupt structures, norms and relations of gender, linking individual (agency) and organizational change (structure)” (ibid).

7.2 Mentoring to address gendering mechanism in science and academia

A step forward, in our evaluation process, used the “black box” of gendering practices in academia in our specific context – The University Federico II – as it had been opened in our interviews. Consistently with van den Brink and Benschop (2011) statement, we looked within our mentoring model for gender equality practices capable of *undoing* gender inequality. We decided to go deeper, inside the mentoring relationship as it had been framed by the mentoring program design, to look for gender practices capable of undoing gender inequality in the academic field. Undoing gender inequality was the core target of change, in the transformative interpretation of our mentoring program. In a realistic evaluation perspective, that sounds as looking for ways of counteracting or de-constructing mechanisms producing gender inequality.

Within the mentoring relationship, the kind of resources deployed by the mentors may act on different kind of gender inequality mechanisms in academia and, eventually, change them.

In this paragraph, the mentoring is analysed as a tool to address the gendering mechanism reported in Chapter 5; the practices triggered by the mentoring scheme are examined to understand their potential in deconstructing inequality mechanisms.

7.2.1 Mobilizing femininity

Opening new spaces and channels of communication among women in academia is one of the strongest successful outcomes of the implemented mentoring scheme. Thanks to the program, mentors and mentees have had the opportunity to meet each other in a safe space, where needs and values generally silenced in the discourse of academia could be expressed and thematized. In the mentoring relationship, the collaboration between women and the establishment of trust-based relationships appear to be viable as a way of contrasting mechanisms through which masculinity is mobilized in men's networking practices. As convincingly argued in another contribution by van den Brink and Benschop (2013), mobilizing femininities in networking, to counter gender inequalities, is only partially successful. It immediately appears as a 'marked' practice, while mobilizing masculinities does not. That is why - through gendered constructions of 'who one can trust' or 'who is a risk', also the few female gatekeepers "contribute to the persistence of structural gender inequalities" (ibid, 492).

“A dire la verità [questa relazione] mi è sembrato una specie di regalo. Mi è sembrato uno spazio dove io potevo andare, parlare [...] un luogo così diverso dalle relazioni all’università che invece sono su tutti altri livelli, anche se c’è molta quotidianità del vedersi, anche se c’è affetto, però non si parla mai di piani altri, almeno non mi succede. Quello che desideravo era proprio trovare un po’ un canale di alleanza con delle donne dove discutere un po’ e aiutarci a vicenda..”

R15

“Si è instaurato anche un rapporto di fiducia, di scambio tra di noi.. [...] c’è stato proprio uno scambio tra di noi, cioè oltre a questo iter che era quello del progetto, ci siamo ritagliate degli spazi per un confronto più diretto al di là del compito.” R5

Transdisciplinary matching allows to set up these trust-based relationships while escaping the micro-political dynamics that may act within disciplinary fields and the boundaries of local power dynamics.

“Uno degli ottimi risultati [del mentoring] è che c’è una persona esterna alla mia accademia con la quale posso confrontarmi e cui chiedere un consiglio, e so che è un consiglio competente! È un consiglio svincolato dalle trame politiche, locali, per cui se chiedo al mio capo, del quale ho stima, “che ne pensi di questo concorso?” è ovvio che lui deve tenere conto della geopolitica locale, invece lei da esterna mi può dare un giudizio molto più libero, svincolato.” R17

“Per fortuna era proprio molto lontana dalle persone con cui lavoro, sufficientemente lontana da farmi sentire libera di parlare liberamente, insomma...sia di cose positive che di cose meno positive che io percepisco e ho trovato anche molto la sua accoglienza, quindi sì, mi sono sentita...dopo magari i primi minuti che stava facendomi capire chi era, però subito mi è venuto facile aprirsi in qualche modo.”

R10

“Secondo me il mentoring è stato utile perché permette di dare dei consigli abbastanza distaccati [...] da un punto di vista diverso da quello del suo supervisore...”

di qualcuno che vede il campo in cui muoversi in maniera diversa... con prospettive di sviluppo diverse, o alternative a quelle a cui stessa è abituata...” M17

7.2.2 Breaking the double bind

As we have seen in the previous chapter, the mechanism of double bind may assume several shapes in the academic relationship. It results from the concatenation of two other mechanisms: the denial of the relevance of the gender dimension in science and the double standard and ambivalence in the definition of the role model in science.

The mentoring program experienced at UNINA has shown that this kind of program may achieve relevant results in raising awareness about the relevance of the gender dimension in science and in de-constructing Mobilizing femininities in networking is intended to counter gender inequalities, but is only partially successful. Through constructions of ‘who you can trust’ or ‘who is a risk’, gatekeepers exercise the power of inclusion and exclusion and contribute to the persistence of structural gender inequalities.he double standard.

“Sicuramente [l’esperienza di mentoring] mi ha fatto riflettere molto sul fatto di essere donna perché io ero molto più focalizzata sul fatto di essere precaria nel senso... non ho mai pensato di... non mi ero mai messa a pensare al problema tra virgolette di essere donna e come questo potesse...quindi questo sicuramente mi ha fatto molto più riflettere su questo...” R13

“Non avevo mai pensato a questa cosa ma non per non volerlo fare, perché nel mio laboratorio, così come nel laboratorio dove mi sono laureata, siamo tutte donne tranne il nuovo dottorando, quindi di fatto non è che mi fossi mai posta il problema. Poi effettivamente parlandone ho realizzato che il mio capo è un uomo, il mio grande capo è un uomo, il grande capo del laboratorio dove ho fatto la tesi era un uomo,

anche se in precedenza cioè prima che fosse lui era una donna e adesso attualmente che lui è andato in pensione è comunque una donna in quel laboratorio, però effettivamente in ambito universitario sono poche le donne che sono arrivate ai vertici” R8

The gender awareness of both (mentor and mentee) increases in the mentoring relationship, thanks to the sharing of concrete experiences about life paths; this contribute to erase scepticism induced by abstract feminist discourses, often perceived as ideological and far from everyday experience.

“Il programma mi ha dato la possibilità di riflettere maggiormente sulla condizione delle donne nella scienza non solo “in generale”, ma soprattutto in concreto attraverso un rapporto costante con la mentee.” M17

“Io sono partita molto neutrale, nel senso che la mia esperienza limitata di studentessa e di ricercatrice non mi sembra di aver mai, sulla mia pelle direttamente, avvertito una sensazione di o discriminazione, in un senso o nell’altro, legata al genere. Lei mi sembrava quasi al mio livello, invece poi alla fine mi ha confermato che è veramente capillare questa cosa, che è una tematica... in realtà pregnante insomma... Sì, molto più diffusa di quanto non pensassi. Quindi mi ha fatto pensare che io sottovaluto il problema” R17

Moreover, sharing the experiences helps to highlight the structural nature of challenges faced by women researchers and to alleviate the burden of individual responsibilities and the feeling of personal inadequacy.

“There was a lot of awareness, not just of thinking strategically about their careers, and trying to step back from the urgency of the moment maybe and think about, “Where do I want to go?” But also this, [you can see?], dawning awareness for some people that what they thought was their own personal inadequacy at not being able to

juggle all the balls all the time, "Oh, there's other people are experiencing that and maybe it's not my fault or my responsibility alone." And I think that's fed into to this idea then of kind of them beginning to plan, maybe in a more kind of proactive, kind of [agented?] way about their own careers." C3

Sometimes the awareness of the role played by gender in science and academia may develop through small steps, more effective as they may reveal to be than the brisk harsh impact with ideological and already packaged placements. The grading of this process may be essential to the transformation of the model of “neutral scientist” into a model of gendered scientist. The recognition of one’s own status as “woman scientist” sometimes develops along the path of self-reflection that mentoring experience encourages in the mentors. Sometimes the process is triggered by a backward look to the mentors’ own biography and the recognition of the relevance of gender in their role models considered a-gendered until then.

“Ho avuto anch’io una mentore, un mentore donna, che per me è stata un’esperienza abbastanza formativa... [...] avere un esempio concreto sotto gli occhi aiuta... uno magari lo legge su internet che esistono delle donne con figli... ricercatrici di grido, ma lavorarci sette ore al giorno, [averne una] nella stanza affianco... sicuramente mi ha aiutato... [...] sicuramente [è stata] un esempio. Non mi sono mai spaventata anch’io di avere i figli presto. Ho avuto il mio primo figlio durante il dottorato, e probabilmente se non avessi avuto un esempio sotto gli occhi, magari c’avrei pensato di più... non so, è difficile da dire... però il fatto di non spaventarsi di fronte alla possibilità di avere dei figli e continuare comunque a fare una carriera di ricercatrice... anche sicuramente nella tenacia... come esempio di persona comunque che va avanti... dinanzi alle difficoltà... appunto, non tirarsi indietro... non recedere.”
M17

However, change is triggered by a pluralism of such models. This plurality is asked for, to cope with the uniqueness of the male model implicitly assumed as safest one by many women who cover apical positions. It appears to be essential to counteract the dominant discourse.

“Nella mia vita ho incontrato molte donne che sono arrivate da qualche parte [...] il modello di questa donna è sempre lo stesso. [...] è una donna che ha avuto successo sacrificando il proprio ruolo di donna, madre... che è stata sempre la più brava ... Un consiglio del tipo “ tu devi sacrificare tutto, ti devi laureare meglio di tutti quanti, devi dare sempre meglio di tutti” non lo trovo utile. Io vorrei incontrare qualcuno che sappia insegnare dov'è che a volte è il caso di mollare per non perdere altro da un'altra parte.” R18

“Mi è stata utile soprattutto perché io sono sempre stata con un unico capo, sempre, in 18 anni con un unico capo mi ha formato a 360° però è un relazionarsi sempre con la stessa persona.. con la mentore invece è stato diverso.” R7

7.2.3 Back to the future

One of the mechanisms that have been deconstructed by the mentoring program at UNINA is that of the “extended present”.

Mentoring may counteract this mechanism in a multiplicity of ways. The first is to encourage early career researchers to take a break as far as it asks them to be more self-conscious in regarding their own attitudes toward the present, as well as toward the future it is opening up or closing down. Our interviews revealed effective impact of this opportunity, as experienced by the mentees, in: encouraging mentees towards a more strategic management of their own time-plan; supporting them in the pursuit of

greater autonomy and of an independent scientific identity, thus capable of breaking the binds of scientific subjection re.

“The mentoring program and with the professional development program that we did, for a lot of women was the first time that were able to stop and think ahead, to think about the future, in terms of their career and their life [...] So the mentoring scheme I think helped with that or it certainly gave kind of attention to that. It gave women time to stop and think about their careers, and their future, and to plan. And to be more strategic.” C2

“[Grazie al mentoring] ho cercato di capire effettivamente dove volevo andare...e dove voglio andare. [...] [La mia mentore] mi ha aiutato a capire su cosa avrei dovuto concentrarmi... e detto da un professore di una certa esperienza che ti autorizza, “guarda se stai facendo dieci cose ma otto di queste non ti portano da nessuna parte, abbi il coraggio di farle passare in secondo piano perché non puoi fare tutto, impara a non disperdere le tue energie” che è una cosa che io sapevo, però ovviamente non essendo né ricercatrice essendo insomma... praticamente stipendiata dal gruppo per cui lavoro è ovvio che io mi sento tra virgolette dipendente ed è ovvio che quindi faccio quello che mi viene detto di fare. Quindi, da questo punto di vista, una persona di esperienza, che ha raggiunto i suoi obiettivi, può sicuramente insegnarti, insomma sono stata fortunata.” R10

“La relazione di mentoring mi è servita tantissimo... Mi ha aiutato tantissimo, mi ha veramente.. ci pensavo oggi, stavo parlando con una mia collega e le ho detto a me questa cosa mi ha veramente cambiato la vita perché io già dal primo incontro sono cambiata totalmente ho incominciato ad indirizzare tutte le mie energie nella direzione giusta. [...] Credo che già dopo il primo incontro io abbia avuto un cambiamento...” R8

“In ogni incontro ci siamo date degli obiettivi, dei compiti, “la prossima volta quando ci vediamo ci vediamo devi aver sottomesso questo, applicato per questo.” R7

The greedy institution mechanism was also de-constructed: in some cases, mentees found support by their mentors to devote time to (re-gain) personal life.

“[La mentore] ha cercato di aiutarmi in un momento in cui la mia vita privata non esisteva...” R10

“La relazione ha preso subito una determinata direzione che è stata aiutarmi a focalizzare quello che effettivamente volevo perché, anche a causa delle cose che ho da fare e di come si svolge proprio la mia giornata in laboratorio, avevo delle idee un po’ disperse... ero concentrata sul lavoro, non su di me. Trascorrevi molto più del tempo che avrei dovuto a lavoro e quindi disperdevo....concentravo le mie energie sul lavoro e molto meno su di me o su quello che volevo. [...] Ho acquisito una consapevolezza molto forte di quanto fosse prezioso il mio tempo e di quanto effettivamente fosse necessario dedicare a quello che facevo, al mio lavoro per ottenere quello che volevo. Cioè riequilibrare questa cosa che era effettivamente molto molto squilibrata, cioè molto portata sul lavoro e poco sulla mia vita privata.” R8

Actually, one of the issues dealt with in the mentoring relationship was that of the work-family balance:

“Mi sono sempre creata dei paletti, ho sempre avuto paura che a un certo punto che fare delle scelte in termini importanti, definitive, in termini di vita privata mi avesse in qualche modo tolto qualcosa in termini lavorativi. [...]Essendo ancora n una situazione di precarietà, rimandi, rimandi sempre, rimandi sempre, perché dici “no mo se faccio un figlio è la fine, ho fatto tanti sacrifici fino ad ora” [...] Sono paure e quindi lei mi ha molto tranquillizzato ... mi ha dato anche l’opportunità di superarle [...] mi ha dato molta serenità il fatto di parlare con lei, mi ha rasserenato molto.” R4

“E’ come se stessi un po’ ampliando la prospettiva, che a volte sento molto angusta, la possibilità di conciliare l’essere madre con la ricerca. [...] La maternità un nido, è come se la considerassimo un lusso, come una cosa strana, non credo che debba necessariamente essere considerata così.” R15

7.3 Arianna’s Mentoring

According to the theoretical framework and analysis described, the processes through which gender is done in institutions are extremely dynamic, mutable and modifiable. This means that setting new equilibriums within the institutional, organizational and cultural structure of social institutions, requires a continuous work through which gender practices are negotiated and re-negotiated. Activating a networking able to negotiate gender in the scientific and academic contexts is the aim of the mentoring model proposed.

Figure 7.4 lists some mentoring features that have a potential role in deconstruction of gendering processes acting in science and academia. The combination of these (some of these) elements defines a new mentoring composite scheme for the gender equity in science and academia, the Arianna model. Figure 7.5 resumes this scheme and its elements, described below.

Doing gender equality in mentoring	Undoing gender inequality mechanisms
Only women scheme	Gender asymmetry
Traditional mentoring (experienced mentor)	Cohort segregation/ no experience cumulation through cohorts
Transdisciplinary matching	Disciplinary field as micro-power arena
Mobilizing femininity as a positive action	Mobilizing masculinity and old boy networks
Pluralism of academic, relational and personal competences	Unidimensional concept of academic achievement/career
Pluralism of role models	Male role model as dominant/Stereotyping about women scientists
Peer mentoring	Disciplinary segregation /no experience cumulation across disciplines

Figure 7.4. Mentoring features as potential deconstructors of gendering processes

Features	
Scheme	Women only / women –andmen
Kind of mentoring	Traditional/networking/ peer mentoring combined: <ul style="list-style-type: none"> ▪ One to one mentoring – transdisciplinary matching, ▪ Networking mentoring – transdisciplinary matching ▪ Peer circle mentoring
Matching	Transdisciplinary <ul style="list-style-type: none"> ▪
Target	One to one and networking mentoring: Mentee: PhD student, Post-doc researcher fellow, RTD Mentor: Associate and Full Professor Peer circle mentoring: PhD student, Post-doc rese di archer fellow, RTD; Associate and Full Professor
Duration	2 - 3 years
Gender equity agenda	Training on gendering processes in academia and gender dimension in science Participatory events and tools toincrease debate on gender equity in academia

Figure 7.5.Arianna mentoring scheme

7.3.1 *Only women vs women and men*

Women only mentoring programs have long been considered as one of the most effective ways to counteract gender asymmetries that characterize academic and research structures.

However, in recent years, the consideration of men's inclusion in institutional intervention programs has been developed within research groups dealing with gender equality in the academic field. The need for transversal participation of genres as a key element in institutional transformation processes has been recognised. Two main reasons have structured this debate.

Firstly, the emergence of the theme of “intersectionality” that proposes gender as one of the dimensions on which social dynamics put into practice the processes of discrimination. Intersectionality cannot be really understood unless it is related to other exclusion agents, such as ethnic, social, cultural, generational differences (McCall, 2005; Shields 2008; Hancock 2007; Bacchi and Eveline 2010).

Secondly, the analysis of programs for a gender change of organizations reported by feminist literature has highlighted the phenomenon known as *losing gender* and related implications (Ely and Meyerson, 2000; Coleman and Rippin, 2000; Benschop and Verloo, 2006; Charlesworth and Baird, 2007; Eveline and Bacchi, 2009; Rao, Stuart and Kelleher, 1999; De Vries, 2010).

One of the ways in which *losing gender* can be manifested is to identify gender issues with issues affecting women, and of which women are concerned. The previous chapter highlighted how frequently in the narratives of women scientists *gender* is the equivalent of *women*, and how gender-type discourses were frequently circumscribed exclusively in their female dimension.

This ontological misunderstanding, as well as determining the process of auto-segregation of women in science, undermines the ability to develop the attention that would be required on the paths and action of men, on masculinity, and on how these dimensions contribute to determining the gender structure of institutions. As a result, the activation of the feminine point of view is the cause of the low incisiveness of the transformative projects that maintain men and all other gender representations on the margins of the design and implementation process. According to De Vries, the focus on women inevitably maintained by *women only* programs constitutes Achille's heel of transformative interventions. In these programs men are asked to be "allied", they are asked for support, but in practice, men and other gender representations are excluded from the process of transformation that, in fact, so designed, only involves women already sensitive to gender issues and not the whole institution (De Vries, 2010).

The intervention model proposed here therefore assumes the necessity that all the identities that make up the academic world become co-travelers in the process of transformation and renegotiation through careful reflection on the gender structures of the scientific institution.

The opening to cross-gender participation requires, on the other hand, a careful thematizing of the risks of reproducing the gendering processes that we intend to deconstruct. This risk is present especially in mentoring programs aimed to the professional growth of women and, at the same time, to the transformation of *gendering processes* that structure research institutions, where the gender dimension of role models and relations in academic and research environments are fundamental in building mentoring relationships for gender equality. To overcome this risk, it is necessary to identify the mechanisms of *doing gender* in science, then identify how masculinity and femininity, and what is identified as male and female, are structured in academic and

scientific organizations and in relationships established within these institutions, then identify the practices to activate processes to “undo the gender”. The literature on the theme of *doing and undoing gender* in organizations is rich in theoretical analyses and case studies (West & Zimmerman, 1987; Padavic 1991; Deaux and Steward, 2001; Goffman 1977; Ridgeway and Correll, 2000; Butler, 2004; Ely and Meyerson, 2010). In particular, these studies report an analysis of some gender-structuring processes in science (Benschop and Brouns, 2003; Harding, 1986; Knights and Richards, 2003; Krefting, 2003; Prichard, 1996; Stobbe et al., 2004; Valian, 1998; Wolffensperger, 1991), recently focused on gender-related practices in recruitment and selection, resulting in a sub-representation of women in the academic world (Van den Brink and Benschop, 2012; Knights and Richards, 2003; Krefting, 2003; Van den Brink et al., 2010).

Nevertheless, more in-depth research is needed to identify how gender is structured and destructured into the processes of building scientific knowledge and organization of research work, also in light of the recent and rapid transformations that the academic and research system is going through in these last years.

7.3.2 A (not schematic) scheme for new programs

In order to disable some of the main mechanisms that support the *gendering processes*, observed in the previous chapter, the proposed mentoring model combines elements of traditional instrumental mentoring, such as the *one-to-one* mentor-mentee with more innovative elements such as *networking mentoring* and *peer mentoring*. The indicated network is therefore the result of a variety of networks.

One to one mentoring

One to one mentoring proposes the support of a person with more experience (professor, associate professor or full professor, from university, or first researcher or research director from institutes and research centres) and a not structured researcher (post-doc research, fixed-term researcher).

In this context, the role of the mentor is to support the researcher in a process of raising awareness of gender structures in science and science pathways, in the (re) definition of a conscious career path of professional and scientific growth, or in the (re) definition of career goals of mentee and in the development of strategies for reaching them. This role implies a critical reflection of the mentor's career path in academia and research, developed both in relation to the mentee and in relationships established in *peer circle mentoring*.

The traditional formula of *one to one mentoring*, as well as lay the foundations for consolidating a relationship aimed at the professional growth of young people, aims to create communication between generations and cohorts who have developed their career paths in normative and cultural contexts very different and that hardly in the academic context and in the research environments have the opportunity to compare these experiences. *One to one* mentoring allows mentors and mentees to build a communicative bridge with a different cohort generation, allowing knowledge to cumulate about *gendering processes* in academia and research,.

The deconstruction of segregation by generation and cohort is a necessary step to counteract the glass ceiling of the perception of the gender issue. In Chapter 5, we have seen how the research on *gendering processes* has revealed the diachronic dimension of *gender blindness*: while the analysis of the discourses of younger researchers reveals that they attribute little relevance to gender issues, mentors affirm that they have matured a

gender consciousness at an advanced stage of their scientific career, showing how the *glass ceiling* is constructed and maintained by the discursive and relational practices of men and women it becomes a reality only with the effect of a series of obstacles that women find in their career.

Reducing the segregation of experience for generations is therefore indispensable to break this glass ceiling and promote the spread of greater awareness of gender issues in science even among younger women researchers.

Peer circle mentoring

This type of mentoring involves the creation of research groups sharing the same career stage (*peer circle*) with the aim of sharing the experience needed to recognise the gendered practices and gendering mechanisms in academia and research and strategies that can be taken to overcome these obstacles.

The mentoring model proposes the formation of *peer circle of mentors* consisting of precarious women researchers and *peer circle of mentors* made up of more experienced women researchers.

Networking mentoring

The mentoring model proposes the activation of a third level of relationships: *the networking mentoring*. This proposal arises from the need to provide the women mentees involved in the program the opportunity to take advantage of the various resources made available by the network of women mentors activated. The hope is that, thanks to mentors and *peer circle* activation, mentees can identify the resources they need to overcome the obstacles identified and necessary to implement career development strategies. Unlike the *one-to-one matching* relationship that, as described, is set by the institutional team

working on the project's implementation, *networking mentoring* relationships will be activated by the mentees, so it will be an *elective matching*. The woman mentee may then decide to activate more relationships in this network depending on the needs found, the training and professional goals set, and the resources (professional, emotional, etc.) that she finds useful to achieve for her purposes. Again, transdisciplinary matching is highly suggested.

The path designed may be supported by the activities carried out in all types of mentorships activated: *one to one*, *peer mentoring* and *networking mentoring*. In particular, while *circle peer mentoring* is designed to create an exchange of experiences and information among peer researchers, *networking mentoring* will help to identify resources available in the pool of mentors involved that best fits the specific needs of a single path.

Transdisciplinary matching

One of the crucial elements in determining the functioning of a mentoring program is the *matching* of the mentor-mentee. In the proposed model mentor-mentee matching is established by the institutional team in an attempt to match the needs of the young researcher with the skills and resources that mentors can potentially offer in the mentoring relationship. In order to avoid confusion with tutoring and overlapping with the role of the mentee's tutor, in accordance with the guidance given in the literature and the results of the pilot study evaluation, a *transdisciplinary matching* is proposed. It means that the match will be between a mentor and a mentee who do not belong to the same disciplinary sector, but to contiguous scientific areas.

This type of association places the necessary conditions to encourage dialogue as much as possible without any interference linked to the group sharing and work

environments. Choosing to match women from different disciplines, and above all that do not belong to the same department, reduces the risk of possible conflicts of interest that may arise in the mentoring relationship, and promotes mentoring as a "room on one's own" that is a space devoted to professional comparison and, at the same time, to confidentiality.

The transdisciplinary nature of the matching also allows to counteract the asymmetries of position that, as we have seen, characterize the hierarchical structure of the academia and the research centres, and that take place in the tutorial relations in disciplinary fields of belonging. As seen in the second chapter, there is also a black literature on mentoring that also mentions the risk of abuse forms of power that a mentor can act on his mentee due to his hierarchically higher position. Membership in different departments and/or disciplines allows to avoid the negative effects of positional asymmetry and to enhance the positive ones giving the most fragile part of the relationship the knowledge and experience of the more stable part.

The duration

The proposed mentoring program lasts for a period of time ranging from 2 to 3 years. Two years are in fact the minimum time interval for achieving quantifiable results both in terms of professional development and in terms of impact on the institution. Three years are the recommended duration.

The target

According to the purposes set out in the first paragraph of this chapter, the proposed mentoring model is aimed at the entire Italian academic institution which benefits from the construction of a network that promotes the diffusion of a culture of support, solidarity and

enhancing diversity. The program preferred target are the unstructured researchers (post-doc researchers, fixed-term researchers). These women of academia and research, as seen in Chapter 4, go through the most delicate phase of their research career for being an underrepresented gender, this phase, after the completion of the high-level education, marks the passage as a staff of the academia or research institutes.

The elements described can be combined with the aim of initiating a multi-stage gender equity process based on the cyclical renegotiation of the gendered practices of science.

The first step is to develop a critical reflection within the network activated to identify *gendering processes* in science through the mapping of gendering processes in science. During this stage, network members design their own path within the drawn map. The route design implies a critical reflection of the already-going path, a redefinition of their career goals (long, medium, and short term), and the development of personal and collective strategies to counter *gendering processes* in order to continue on one's own path.

The second step is to develop and implement gender equity strategies in scientific institutions. Actions and strategies for the transformation of scientific institutions are designed through the active participation of the scientific network (mentors, mentees, stakeholders, representatives of the collegiate bodies of the institute). In particular, the network of mentors and mentees is invited to submit proposals for intervention in their institutions, elaborated starting from considering and sharing their experiences and paths, and which will be submitted to the collegiate bodies and management of the institutions involved.

At the end of this phase a new cycle begins, on the one hand, to extend the network of people involved in the transformation process of the institution, on the other hand, to draw

the map according to the renegotiation work completed in the previous cycle. Then, new reconfigurations of power and gender relations, defined within the institution as an answer to induced action, will be identified. In the transition from one cycle to the next, a review of gender balances in scientific institute will be made to evaluate the effects of the policies adopted to counteract the observed gender asymmetries.

Chapter 8

Conclusions

Arianna's thread through the glass labyrinth

This research provides an analysis of the phenomenology of processes that contribute to define and redefine the gender order in academic and scientific contexts. The study is based on the analysis of interviews provided by 44 women scientists involved with different experience in gender programs and different opinions about gender equity in research and academia.

Through the analysis of their biographic narratives the research has identified some of the gender practices and some of the major mechanisms involved in supporting gendering processes.

The results of this research do not provide a complete picture of all the gendering processes women have to deal with in scientific careers. Moreover, the experiences and considerations mentioned do not belong to the experience and to the elaboration of all the women interviewed. These women, on the contrary, are sensitive to very different gender issues, have different career paths, belong to highly-characterized disciplines, and eventually, they bring together experiences from separate cohorts. As a consequence, the processes, practices and mechanisms involved in this research are neither an objective photography nor an unquestionable description of what is happening daily in academic institutions and research institutes; rather the detected gendering processes should be interpreted as a reading of the experiences reported by the population of the women who constitute the interviewed collective. These data, though their interpretative nature, allow to draw a first map of the mechanisms of production and reproduction of gender differences existing in the academic and scientific research field.

The design of this map introduces some important innovations in the discussion about gender equity in academia.

In the first place, the map of practices and mechanisms that contribute to increase gendering processes allows to break down some limits of the major models currently used to describe the scientific careers of women. Narratives on women's career paths in the field of scientific research are generally dominated by two metaphors, the glass ceiling and the leaky pipeline, but both of these images do not represent the complexity of women's experience in science, as it emerges in this research.

The glass ceiling metaphor entered the public debate thanks to an article from the *Wall Street Journal* of 1986 by journalists Carol Hymowitz and Timothy Schellhardt; since then, it has become one of the most frequent expressions in describing the obstacles that women find in rising to high positions. In fact, the image gives the idea of the frustrating feeling experienced by many women who come close to an apical position and cannot reach it, as if an invisible and impenetrable barrier prevented them from proceeding in their career. Gherardi and Poggio show how the *glass ceiling* is actually an interactive process which reflects and expresses the symbolic order of gender and the discursive practices by which gender is "done" in organizations.

However, the results of this research show that gendering practices act as invisible barriers all along the way while women proceed in their scientific careers. The map of the *gendering processes* as reconstructed in chapters 5 and 6 rather than envisaging a barrier at the top of the ladder, looks like resembling a transposition into the academic and scientific field of the labyrinth metaphor introduced by Alice Eagly and Linda Carly. In their analysis of the difficulties of delegated administrators of US companies, they describe a path of

obstacles, deviations, blind alleys (Eagly & Carly, 2007). The *glass labyrinth of science* would be a more representative metaphor of the concatenations of mechanisms and practices entrenched in the doing and undoing of the gendering processes at work in science and academia.

In the same way, the metaphor of the *leaky pipeline* spread over recent years to represent the decline of women from initial to advanced stages in career progression. It has many limitations in its exemplification of the phenomenon. This is because the *leaky pipeline* allows to visualize the quantitative aspect of the women and science issue, but it is very reductive, if not entirely ineffective, in the reconstruction of the real paths of women and in identifying the causes that determine the phenomenon represented. In addition, the model of the pipeline, assuming the existence of a unique and linear career path, humiliates women who do not proceed along this predetermined trajectory, as female scientists who migrate from academia to new occupations at the intersection between business and science (Etskowitz, Ranga, 2011). Finally, the one-dimensional representation of the segregation phenomenon (the vertical one) eliminates all other segregation dimensions, such as the horizontal one found in the gender division between disciplinary areas and within disciplinary areas.

Metaphors build the *storytelling* of a phenomenon, determine the elements to study it, and, finally, influence the policies and measures taken to counter it. Proof of this is the fact that the *glass ceiling index* is one of the most common indicators in surveys on the gender inequality in the workplace and that the *leaky pipeline* is the most common metaphor in the framework defined by European policy in the representation of the women and science issue. However, as Eagly and Carly argue, providing a wrong diagnosis to a problem means not being on the right path to find an effective therapy (Eagly & Carly, 2007).

To stress the plurality of invisible walls that women researchers face in their career

paths through science and academia, this dissertation introduces a new quantitative indicator, the *Glass Door Index*, measuring the gendered differential rate of access to academic careers. Defined by analogy with the Glass Ceiling Index, given women's relative presence in all temporary research positions, it measures the relative probability for women of filling the position that marks the entrance in academia (type B research), with respect to their male counterparts. Introducing this indicator in statistical analysis on recent national data, the gender differential in the initial stages of the career becomes clearly apparent, The *Glass Door Index* figures show the existence of a gender filter in academic recruitment spanning overall the disciplines, also where women are the majority at previous stages, to restore and consolidate the established gender order.

This evidence contributes to falsify current narratives nurturing the “pump priming” expectation that women's rise to academic positions proportionately to men scientists would naturally occur among the incoming cohorts.

Making visible and recognizable the *glass door*, together with the other barriers which make up the *glass labyrinth* are not only key steps in the development of greater gender awareness within scientific institutions. They are possibility conditions to think about possible actions to be taken to renegotiate gendering processes and mechanisms eventually discard them. According to this perspective, the labyrinth becomes a cognitive tool for women in science but also a transformative lever, orienting practices in modifying and deconstructing the processes of exclusion and discrimination of academic structures and scientific culture.

The comparative study with the Irish academia has confirmed the main findings of this research revealing that, even if in different national contexts the procedures in which the gendered practices are developed (Research Quality Exercise, recruitment processes,

promotion processes) may be different, gendered practices follow similar patterns in academic and scientific structures, in the organisation of academic and research work, and in academic and scientific culture.

The analysis shows that gender mechanisms and gendering processes in science and academia are rooted in more deep layers of interpretation. These mechanisms can be correctly understood only by investigating the constitutive and normative elements on which science and academia have been structured and continue to be structured, depending on the social, economic, and political transformation of society.

The metaphor of the labyrinth is also suggested with a dynamic and contextualized sense: the labyrinth is not intended as an immutable or monolithic structure. The study carried out in this thesis shows how gender mechanisms are closely related to the founding and normative elements of science and academia. However, the practices through which these mechanisms appear may show very marked differences in the academic and scientific institutions of different countries (see, for example, the procedure for recruitment and career progression (Le Feuvre, 2009; Adam, 2016). The paths and walls inside this labyrinth, as well as the kind of practices they represent, change over time and change in different normative and cultural contexts. In addition, changes within the academia and research structures, even those aimed at inducing greater gender equity, start up the activation of reaction processes aimed at reconstructing the gender order.

The suggested model, then, does not refer to a single labyrinth, but to a plurality of labyrinths, whose walls change over time and space, through individuals who in their interaction within this field are doing and undoing gender, while enacting structural, organizational and cultural practices.

The de-structuring of these labyrinths and the redefinition of spaces and paths within them, can then be seen as the iterative transformation program for a gender equity agenda within the academic and scientific field.

Drawing gender labyrinths in academia and in the scientific research field, even more in its dynamism, is therefore a determining ability to act with cognition within these structures. Making these maps visible means helping to raise the level of awareness on gender issues in science in the institutions, providing those who cross the labyrinth of the ability to equip themselves with the tools to cross it and, at the same time, create the opportunity to prompt the structures transformation process in the direction of greater *gender equality*.

Therefore, the thesis suggests an intervention for the transformation of academic and research institutions towards gender equity, based on the implementation of transformative processes through which change may be. Triggered. The change of the academia labyrinthine maps will be activated through the participation in a transformative mentoring program: **Arianna's mentoring**.

The suggested intervention strengthens the mentoring model through the construction and valorisation of a network in the academia and in the scientific research sphere. This network aims to counter the practices that generate gender asymmetries in science.

This path refers to the bifocal model proposed by de Vries but makes clear the need for a third pillar based on the awareness of the gender dimension in science. According to the review of the bifocal model recently proposed by De Vries and van den Brink (de Vries, van den Brink 2016), through the development of a reflection of the paths through the glass labyrinths, Arianna's mentoring aims to suggest a possible concrete path. This path involves subjects that form part of the university and aims to the reconsideration of academic structures and research in a gender perspective.

In an effort to bridge the gap between theory and practice of gender-based transformations of the institutions, the activation of a network transversal to academic cohorts, disciplinary fields, institutional roles is suggested. The mentioned gap is also the one between gender research and local knowledge and it is considered by literature as one of the causes of resistance that oppose the implementation of transformative processes (Coleman and Rippin, 2000; Benschop and Verloo, 2006; Eriksson-Zetterquist and Renemark, 2016; de Vries and van den Brink 2016). The activation of the network will enable the activation of knowledge sharing practices about gendering mechanisms at different levels and depth in the social structure of scientific institutions. Mapping labyrinths can be experimented as a practice for undoing gender inequities in science and recognizing and renegotiating their impact, while respecting the diversity of the experienced trajectories through them, by knowledgeable subjects. The Arianna mentoring scheme is designed as a paradigmatic proposal of an action research program supporting this transformative agenda.

Developing a gender perspective in structures, organization of work and academic and research culture also means to review the process of scientific and technological production. This review must be carried out not only in the relationships and roles in which this process is produced and structured, but also in the dynamics that determine the definition of research questions, the methodology supported by research, research results and technological innovations suggested. The renegotiation of gender labyrinths therefore offers the opportunity to go beyond *gendered innovation*, which is at present the dominant paradigm of the projects proposed so far in the *Fixing the Knowledge* field.

According to the theoretical framework and analysis described, that point out the processes that structure the gender in institutions as extremely dynamic, mutable and modifiable, gender equality should not be interpreted as the final outcome of a path, rather than the path itself. This path cannot be defined a priori but, on the contrary, it is to be

rediscovered and renegotiated constantly. In fact, the intervention on gender processes means the activation, through participatory practices and institutional involvement, of the mechanisms of reconfiguration of the gender processes themselves. It also means setting new equilibriums within the institutional, organizational and cultural structure of social institutions, which will in turn require renegotiating gender structures. Gender equity in science cannot be pursued if not as social practice. The intervention strategy implicated in this conception of gender equity is one that continuously identifies and disrupts the structural, interactive, and interpretive practices producing gender inequity (Meyerson & Fletcher, 2000). There is no identifiable endpoint of this approach; rather, as Ely and Meyerson (2000) put it, “the process of change it advocates is both means and ends”(ibid, 113): as a process of transformation, it implies resistance and learning, continuing indefinitely and itself constituting “the gender equity goal” (ibid, 132).

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