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Women in Computer Sciences in Romania: Success and Sacrifice

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The purpose of this article is to more fully understand the professional lives of women academics in computer sciences in six Romanian universities. The work is exploratory and relies on a qualitative framework to more fully understand what it means to be a woman academic in high-tech disciplines in a second world economy. We conducted in-depth, face-to-face interviews and reviewed a number of documents to create a context for the major social and political changes in Eastern Europe that affected the professional journeys of women academics in Romania. Results convey the ways in which gender, technology, and higher education are bound together by a multiplicity of conscious and unconscious inclusionary and exclusionary practices at universities. Findings also suggest that further research is needed on the theoretical underpinnings and practice of gender equality in Romanian higher education institutions. Women academics in computing face a complex interplay of discouraging factors, including severe financial austerity and the masculine domination of the disciplines, necessitating the establishment of structures and mechanisms to foster honest debate around the dilemma regarding equality of opportunity or equality of outcome.
Keywords: Women in Computer Sciences; Women Academics; STEM; Romania

A growing body of literature on gender equality in science points to an imbalance in the number, seniority, and influence of women and men in the scientific professions. Some fields are heavily staffed by women, while others seem less female-friendly. In the government sector of the European Union (EU-27), equivalent numbers of women and men work in the humanities; yet only 27% of researchers are women in Engineering and Technology, while women account for 59% of graduates, they only account for 18% of full professors (She Figures, 2009). These figures highlight the need to identify the successes and sacrifices of female faculty in science, technology, engineering, and mathematical (STEM) disciplines.

Historically in Romania, as in other Eastern European countries, women's participation in the STEM professions has exceeded 30%, which is considered by some to be the mark of a critical mass (Trauth, 2007). However, the lack of studies with a focus on women, combined with the lack of a feminist movement in that country has left a gap in our understanding of how increased participation has shaped one's experience. Moreover, for more than two decades, the study of education has been removed from universities, necessitating studies

on academic life in 'general and gender relations' within higher education in particular.

The purpose of this study is to explore women's participation and understand the experiences in the fields of computer sciences in Romanian universities. The experience of women in these fields is of particular interest for three reasons. First, the world of computer science is traditionally dominated by male-centered perspectives and a masculine ethos, which contributes to the marginalization of women in these spheres (Harding, 1986, 1991; Longino, 1990; Keller, 2001; Hubbard, 2001; Hoonakker, Carayon, and Schoepke, 2006). The second is that information technologies and computer sciences are deeply connected with a nation's economic and democratic aspirations. Third, the critical mass of woman faculty in Romanian higher education in Computer Sciences makes for a fertile ground to study gender in a historically male field.

Theoretical background

Extant literature offers multiple perspectives on the causes of female under-representation in STEM fields. Some of the widely studied factors include bias against female science students (Moss-Racusin, Dovidio, Brescoll, Graham & Handelsman, 2012; Etzkowitz, Kemelgor and Uzzi, 2000); beliefs about innate intelligence (Dweck, 2006) and differences in how males and females think (Ceci & Williams, 2007); accumulated disadvantage (Zuckerman, 1989); adverse effects of tokenism (Kanter, 1977); gender role stereotypes and schemas (AAUW, 2010; Ceci &Williams, 2007; Valian, 2000); gendered universities and the normalization of male working styles including "ideal worker" norms (Currie, Thiele & Harris, 2002; Drago, 2007; Eisenhart & Finkel, 1998); implicit bias (AAUW, 2010); opinions that environments and cultures are unwelcoming to women (Fabio, Brandi & Frehill, 2008; Sonnert & Holton, 1995); choice/opting out (Diekman, Brown, Johnston, & Clark, 2010); and the challenges of balancing both work and family (Ward & Wolf-Wendel, 2012).

Research suggests that scientific excellence is a social construction that is open to several biases, including gender bias (Husu & Koskinen, 2010). Academic departments follow a number of organizational practices based on gender assumptions and beliefs that are culturally embedded (Williams, 1995). For example, technology and engineering are generally considered to be related to masculinity, due to perceptions about the stable image and culture of engineering, and because the male represents the stereotyped image of 'an engineer and a scientist' in the work force (e.g., Carter and Kirkup 1990; McIlwee & Robinson 1992; Mellström 1995; Faulkner 2000). Researchers argue that STEM fields are powerful institutions with reinforced levels of equity in the society (Fox, 1999). Therefore, women suffer proportional discrepancies, in turn reinforcing inequity in work experiences at all stages of training and career development (Nolan, Buckner, Marzabadi, & Kuck, 2008). Some experiences related to differential treatment may look meager at the start, but compound over time, creating large gaps between groups that lead to negative outcomes such as job dissatisfaction and higher turnover (Preston, 2006; Spector & Jex, 1998; Valian, 1999). Women may also find that their opportunities are limited when they are treated as if they are invisible, when their contributions are marginalized, or when they are detached from the informal social networks of their laboratories or departments (Becker, 1990; Committee on the Participation of Women, 2003; Etzkowitz et al., 1992, 2000; Sonnert & Holton, 1995; Stage & Maple, 1996).

The literature also offers culture-based perspectives for under-representation of women in STEM fields. For instance, past research shows that women and men experience academic structures and cultures differently. Women are generally less satisfied with their positions than their male colleagues, in terms of the quality of colleague interactions and support (Bilimoria, Perry, Liang, Stoller, Higgins & Taylor, 2006; Trower, 2008) as well as departmental climate (Callister, 2006), culture, and fit in their departments (Trower, 2008). Extant research also reveals a culture of bias against females by both genders. For example, Moss-Racusin (2012) identified that male and female science faculty at research-intensive universities perceive female students as less

competent and less worthy of being hired as laboratory managers than identical males. They also found that male and female faculty offer female employees a lower starting salary and less career mentoring. Ecklund, Lincoln, and Tansey (2012) showed that gender discrimination is a decisive factor of a woman either to not pursue careers in science at all or choose biology over physics. Regardless of their own gender, scientists "used gender reasoning that stressed innate differences between men and women as well as personal choices to explain the gender composition differences" (p. 710) in biology and physics.

Research also suggests that national cultures can affect the cultures of academic departments (e.g., Hofstede, 1991). Organizations function in a national context, and are guided by theories of the nation's scientists or dominant minds (Hofstede, 1994). Hence, in an academic setting, STEM departments are susceptible to the influence exerted by national culture because they operate in the same context. Hofstede found that the differences in national culture rest on four dimensions: power distance, uncertainty avoidance, individualism, and masculinity.

Among Hofstede's (1994) cultural dimensions, *masculinity* pertains to the values associated with the role of men in almost all societies. The values of masculinity include assertiveness, competitiveness, performance, and success. These values are more important than the values that society associates with the role of women. National cultures that score high on the cultural dimension of masculinity allow men to work on more complex tasks than women. Therefore, the role of women in such societies are typically associated with tender values such as quality of life, service, sustaining warm personal relationships, caring for the weak, and solidarity (Hofstede, 1994). A nation's degree of masculinity may have an effect on the status of women faculty in STEM disciplines. Romania scores lower on masculinity than that of the U.S. (Hofstede & Hofstede, 2005), which may partly explain the higher participation of women in STEM disciplines.

Feminist Critique of Science and Technology and the Glass Ceiling Theory

A feminist critique of science and technology breaks from Western philosophical traditions by including non-white and non-male voices. It posits that science and technology still constitute both a masculine kingdom and an instrument of domination and with such perspectives tend to exclude women (Keller, 1982). A comprehensive review of the literature on women in academia in computer sciences revealed two salient, interconnected themes: that women constitute a minority (under-representation), and that the disciplinary culture is masculine. The feminist critique of information technologies contends that one of the main reasons for women's low participation in computer sciences is that the field is imbued with cultural views, attitudes, and norms that do not appeal to girl's cognitive development (Miller, 2005; Rosser, 2005). When women enter such careers such as computer sciences they find themselves needing to make extra effort to acculturate themselves to its masculine ethos in order to succeed.

Underlying much of the work on the culture of computing is a theoretical point of view that women do not participate either because they reject the culture or because they feel rejected by it (Beyer & Haller, 2006; Major, Davis, Sanchez-Hucles, Downey, & Germano, 2007). Another thesis contends that women do not pursue careers in computer sciences due to early and ongoing social influences that maintain a gender-segregated society, steering women away from it and men towards it. As girls begin to develop their gender identities, they are influenced by cultural norms and begin to view a technological profession as non-feminine. Cultural definitions of femininity place information technologies outside the boundary of 'feminine' texture and can be exclusive of women (Trauth, 2007). The steering of people in and out of computing may occur through the combination and interplay of socialization, stereotypes, social networks, or discrimination. In this view, women's participation is a cultural product, and can be influenced through social structures (Barker & Aspray, 2006; Barker, Snow, Garvin-Doxas, & Weston, 2006).

The attrition of women in computer sciences is usually expressed in the literature through the 'leaking pipeline' metaphor. The pipeline analogy suggests that women enter the world of education and progress through its various stages towards a doctorate degree. The 'leaking pipeline' means women leave the discipline at various stages in their academic and career trajectory, including during graduate school and in the transition to careers (Blickenstaff, 2005). There is particular concern about women leaving academic computer sciences given departure out of the computer sciences pipeline at the doctoral stage and when entering academic positions, and, in particular, tenure track positions. In a book dedicated to the issues faced daily by women scientists and engineers in the academic workplace, Rosser (2004) found that more women than men leave science at every level of the pipeline and that balancing work with family responsibilities stands out as the major issue for women from all STEM fields; in particular, juggling an academic career with raising young children creates a constant struggle (Ward & Wolf-Wendel, 2012; Wolfinger, Mason & Goulden, 2008). Among the most significant issues facing women computer scientists is the decrease in the number of women entering the field, leading to feelings of isolation, lack of peer group support, lack of role models, and lack of mentoring. Rosser's (2004) study raises the dual-career issue, as most female scientists and engineers are married to male scientists and engineers, often in the same field. Also, the study provides caution about the call to serve on more committees and to advise more students as a result of being 'the only one.' The cumulative impact for women in computer sciences can lead to under-representation of women in STEM fields in general and computer sciences, in particular (Valian, 2000).

Most research on women academics in computer sciences places women in a rather homogenous category. To address this issue, Beyer and Haller (2006) looked at differences between women majoring in computer sciences, men majoring in computer sciences, and women majoring in other disciplines. Compared on a large number of variables, men and women computer sciences majors do not differ substantially, with the exception of hardware abilities. Their study acknowledges that women are not a homogenous mass, and that these differences may play an important role in how they move towards a career in computer sciences. Furthermore, the study found evidence for substantial gender differences on social psychological variables, such as values and computer self-efficacy. In many respects, female majors in computer sciences have been found to be more similar to male majors than to female non-majors. Also, research has found no gender differences in terms of quantitative ability, stereotypes and knowledge of computer sciences, and interest in computer sciences (Beyer, Rynes, Perrault, Hay, & Haller, 2003).

Despite a long history of exclusion, women have made great advances in participating in higher education. However, success is not proportional with participation, and women are still under-represented at the highest tiers of faculty and administrative positions (Bain & Cummings, 2000; Toren, 2000; Rosser, 2004; National Research Council, 2006). In a comprehensive study comprising ten higher education systems worldwide, Bain and Cummings (2000) found that women constitute one-third of all academics, but only one-tenth of full professors. The glass ceiling theory posits that a 'ceiling' of unstated norms and distorted expectations hinders women from reaching the top of academe. The greater the progression along the academic ladder, women have less representation. A large body of work deals with the various barriers faced by women in academia (e.g., Morley, 1994; Bagilhole, 2000; Rosser & O'Neil Lane, 2002; Gunter & Stambach, 2005; Niemeier & Smith, 2005; Fox & Mohapatra, 2007; Wachs & Nemiro, 2007; Eriksson-Zetterquist & Styhre, 2008; O'Connor, 2008). Similar studies from Eastern Europe exist but are extremely scarce. Although the same narrowing effect towards the top is reported in Eastern European universities, its amplitude is smaller than the world average (Gryaznova, 1992; Kudryavtseva, 1992; Siemienska, 1992).

The *She Figures* report (2006, 2009) defines a statistical indicator to measure the glass ceiling effect, the Glass Ceiling Index, which measures the relative chance women have of reaching a top position compared to men. For higher education, the Glass Ceiling Index is the ratio

between the proportion of women in Grade A positions to the proportion of women in all positions in academia (A+B+C). Grade A represents the single highest position at which research is normally conducted (equivalent to full professor in most countries), Grade B corresponds to the Associate/Assistant professor level, or to readers and lectors, and Grade C means the first position which a newly qualified PhD graduate would normally be recruited (She Figures, 2006). A Glass Ceiling Index of 1 indicates that there is no difference between women and men being promoted. A Glass Ceiling Index of less than 1 means that women are over-represented, and a Glass Ceiling Index of more than 1 indicates that women are under-represented; in other words, the higher the Glass Ceiling Index, the thicker the glass ceiling, and the more difficult for women to attain higher academic or research ranks. Among the 25 and later 27 European Union countries, Romania has the second lowest Glass Ceiling Index, surpassed only by Turkey, indicating that the glass ceiling effect is almost nil with -1.4 in 2004 and 1.3 in 2007 (She Figures, 2006, 2009).

Another valuable perspective on women's academic role in Romania is informed by past research, which suggests that academic women's experiences are influenced by the socio-cultural and political conditions most persistent in that country (Cooper and Strachan, 2006). During the industrialization of Romania, the communist rule forced its women to prioritize working outside the home, then taking an active part in economic and societal activities, and lastly practicing the family role (Vese, 2004). In Romania, communism preached and practiced the equality of both sexes, and the enduring and entrenched peasant culture fostered the definition of gender (Cooper & Strachan, 2006; Harsanyi, 1993). Although the communist regime in Romania gave women the opportunity to hold leadership positions through a quota system, Romanian society still continues to be patriarchal (Cooper & Strachan, 2006).

Research Design and Data Analysis

Research suggests that the theory of inter-subjectivity and narrative strategies explains the shared experiences of women faculty in research (Cooper & Strachan, 2006). Weiler (1988) defines the theory of inter-subjectivity as "lived experiences and the significance of everyday life" (p. 60). Narratives or stories of individuals are explanations that openly express people's experiences, which can teach, validate, and embody a collective wisdom that can enable women faculty in making their academic lives more meaningful (Lieblich & Josselson, 1994; Personal Narratives Group, 1989).

The study explores the professional lives of women academics teaching and conducting research in computer engineering, software engineering, and information technologies in six Romanian universities. The primary research question that guides the study is: What does it mean to be a female academic in these disciplines in Romanian higher education? Secondary questions that guide the study are: How gendered are the computer sciences disciplines? Are there large gender disparities? What difficulties do women experience in their professional lives? How do they balance professional and personal life? How does gender play a role in upward academic mobility?

Site and Participant Selection

The study looks at two types of institutions: comprehensive and technical universities. Among these, six of the eight largest and most prestigious institutions were selected; these are equivalent to Research Extensive Universities in the Carnegie Classification system used in the United States. Institutions were selected from each of the four oldest universities in Romania. Participants were selected based on their specialty and on the courses they teach, including software engineering (informatics) and computer engineering/electronics. The sample includes an in-depth of analysis of the experiences of seven women faculty and was built to include different career stages (lectors, readers, and professors). We use English pseudonyms in reporting to ensure anonymity.

Methods of Inquiry

The study utilizes qualitative approaches and relies on formal, face-to-face interviews. Participants were identified through their departmental websites and were invited to the study through email. The researchers had no

previous connection with any of the respondents and participation in the study was voluntary. While a qualitative study does not try to build a statistically significant sample, the selection is representative of Romanian women academics in the fields of computer sciences and the study employs elements of trustworthiness to insure rigor of the findings.

Harding (1988) claims that a study is feminist insofar as it is informed by feminist theories. According to Reinharz (1992), feminist research focuses on analyzing and understanding gender within the context of lived experiences, and is committed to social change as well as to challenging researchers' subjectivity. The study aims to capture and interpret the communicable experience, or what Benjamin (2006) calls *Ehrfarung*, of women academics who are also computer scientists. The result is both the work of the storyteller and that of the listener. Interviews included open-ended questions to guide the discussions along major dimensions of interest, yet respondents had the latitude to engage in other topics. Guiding questions are helpful to create openness to get a complete picture of professional lives and issues associated with gender. Guiding questions can also help with the process of self-reflection in which one "begins to know that and how the personal is political, that and how the subject is specifically and materially en-gendered in its social conditions and possibilities of existence" (De Laurentis, 1986, p. 9).

Interviews were transcribed, then analyzed and interpreted using narrative and conversation analysis (Reisman, 1993). Conversation analysis is a method for "investigating the structure and process of social interaction between humans. As their empirical materials, conversation analysis studies use video and/or audio recordings made from naturally occurring interactions" (Peräkylä, 2005, p. 875). This method of analysis allows the voices of the participants to illuminate the research question.

Although there were some initial guiding questions, the patterns, themes, and categories of data analysis emerged from the data. After the first coding, we identified whether the emerging categories were internally homogenous and externally heterogeneous. Internal homogeneity means that everything in one category holds together in a meaningful way, while external heterogeneity means that the differences between categories are clear (Patton, 2002). For the narrative analysis, we employed a bottom-up approach, in which the researcher derives context-dependent cognitive units to produce an infrastructure that generates and explains a story (Manning & Cullum-Swan, 1998).

Data validation relied on several sources to triangulate the data: previous research in sociology, official documents from the Romanian Ministry of Education and Research (MER), official documents related to the Bologna process, reports, and statistical data. Important sources of data were the UNESCO European Center for Higher Education (CEPES), the Organization for Economic Cooperation and Development (OECD), the European Commission, the Romanian National Institute for Statistics (NIS), the Romanian National Authority for Scientific Research (NASR), and the Eurostat. Reports that proved especially useful were the Enlarge Women In Science to East (ENWISE) report (2003), the reports of the Helsinki Group on Women and Science (especially the *She Figures* Report 2006), and the European Technology Assessment Network (ETAN) Report (2000).

Low-inference descriptors were employed to attain reliability which, in qualitative research is understood in terms of "dependability", "credibility", or "trustworthiness", terms that are often used instead of reliability (Golafshani, 2003, p. 600). Low-inference descriptors involve "recording observations in terms that are as concrete as possible, including verbatim accounts of what people say, […] rather than researcher's reconstructions of the general sense of what a person said" (Seale, 1999, p. 148). According to Seale (1999) and Silverman (2005), detailed data presentations that make minimal inferences are always preferable to researcher's presentations of their own, high-inference summaries of their data.

Results

Is Gender Relevant?

Data analysis produced five major themes and multiple sub-themes. We profiled each respondent with biographical points of reference

(see Table 1) and outline each major research theme: representation, masculine image of computer sciences, gender and the academic career, balancing 'personal and professional life,' and working in financial hardship.

Table 1: Profile of Participants

Pseudo-nym	Type of Institution	Faculty	Depart-ment	Specialty	Academ-ic Rank	Lead er Ship - Posit ion	Age	Marital Status	Chil-dren
Agnes	Comprehen -sive University	Inform -atics	Optimizat ion and Artificial Intelligen ce	Numerical Analysis Systems Theory	Lecturer (Asst. Prof)	-	43	Single	0
Dorothy	Comprehen -sive University	Math -ematics and Inform atics	Informati cs	Parallel and Distributed Calculus Grid and Cluster Architectures Numerical Models Mathematical Software Computer Graphics	Professor	Chair of the Depa rt - ment	43	Divorce d	1
Edith	Technical University (Polytech-nic)	Auto matics and Comp -uters	Computer s	Signal Processing Discrete Mathematics Computer Programming	Reader (Assoc. Prof.)	-	45	Single	0
Faye	Comp-rehensive University	Math -ematics and Inform atics	Informati cs	Artificial Intelligence Computer Programming Computational linguistics	Reader (Assoc. Prof.)	-	41	Married	0
Ingrid	Technical University (Polytech-nic)	Auto matics and Comp -uter Science	Computer Science	Computer Programming Computer Graphics Graphical Processing Systems	Lecturer (Asst. Prof.)	-	37	Married	2
Linda	Technical University (Poly-technic)	Automat ics and Comp uters	Automati cs and Applied Informati cs	Computer Programming Informatics Applications in Medicine	Professor	-	45	Married	0
Pamela	Technical University (Poly-technic)	Auto -mation and Comp uter Science	Computer Sciences	Image Processing High Performance Computing Parallel Systems Computerized Graphics	Reader (Assoc. Prof,)	-	53	Married	1

Representation

The three most important attractors to a career in computer sciences were an inclination for mathematics, passion for the fields of mathematics, physics and/or computing, and family tradition. All accounts share several commonalities: a) secondary and high-school years were decisive for developing a passion for science; b) they had role models, most often in their family; c) computer sciences enjoyed much prestige; and, d) they have had extra training in math above the school curriculum. During their secondary and tertiary school cycles, almost all respondents won local or national Mathematics Olympiads.

Four of the respondents were drawn to the academic profession by the prospect of teaching, and three respondents were attracted by the prospect of conducting research. Feelings vis-à-vis teaching varied from being passionate about it to not enjoying it much. Dorothy confesses that she likes teaching graduate students and conducting research better than the undergraduate teaching load. As the head of her department and of a research institute, she now has the opportunity to focus on the type of work she enjoys the most.

Linda, Pamela, and Edith started their careers in research. Edith worked for many years in a research institute for seismic engineering and she moved into teaching after her research institute closed. This change of a career in research to a career in teaching recalls history that after 1990, many research institutes in Romania simply dismantled and numerous researchers moved into universities.

All participants believed that during their student years, which collectively covered two decades from 1970 to 1990, women academics in computer sciences were greatly outnumbered by men. It is highly unlikely that the statistical data between 1966 and 1990 is segregated on gender, as the 'woman's problem' was thought to be resolved in socialism.

According to research participants, 1990 represents a transition point in computer sciences in Romania. This is when computer sciences started to take shape as a distinct discipline in earnest, as well as when student numbers increased. The study reveals that the number of women academics in computer sciences increased, especially in software engineering and informatics. Despite the increase, men outnumber women by approximately 7 to 3 (see Table 2). As a rule of thumb, in technical universities, offering computer engineering programs, the proportion of women academics is smaller than in comprehensive universities which offer software engineering programs. In technical universities, there are roughly 3 to 4 times more men academics than women. Comprehensive universities present a more diverse picture: there are departments with slightly more women than men, and departments where women represent less than 20% from the total (see Table 2). In terms of students, there is visible gender segregation, as women tend to prefer software engineering, while men tend to embrace computer engineering.

Table 2: Number of Academics in Computer Science Departments in Selected Romanian Universities, on Gender, 2007

University	University of Bucharest		Technical University Cluj		Alexandru Ioan Cuza University Iasi		Timisoara Technical University		Gheo-rghe Asachi Univer-sity Iasi		West Univer-sity Timiso ara		Total (includin g Lab Assistants and Doctoral Students)	
Academic Rank	Faculty of Math and Informatics, Informatics Department		Faculty of Automation and CS, CS Department		Faculty of Informatics		Faculty of Automation and CS, Automation and Applied Informatics		Faculty of Automa tion and CS, CS Depart ment		Faculty of Math and Inform-atics Inform-atics Depart ment			
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Professor	4	2	9	1	9	0	12	1	4	2	4	1	42	7
Reader (Associate Professor)	1	1	6	3	3	1	0	0	2	1	2	5	14	11
Lecturer (Assistant Professor)	1	2	15	9	8	3	5	3	6	0	6	2	41	19
Assistant	1	4	11	6	1	1	14	3	0	0	2	3	29	17
Total Academics	7	9	41	19	21	5	31	7	12	3	14	11	126	54
Lab/ Teaching Assistant /Doctoral student	1	1	31	9	11	11	5	1	10	2	6	2	64	26
Percentage (without Lab assist/ PhD students)	43.75	56.25	68.33	31.66	80.76	19. 24	79.48	20.51	80	20	56	44	190 70	80 30

Linda and Edith are computer engineers with different recollections about the gender ratio in their departments. Linda recalls that "there were always fewer girls in this area [computer engineering]. Even when I undertook the admission exams there were two groups of girls and three groups of boys. And the ratio has rested somehow the same". Edith recalls that, during her undergraduate studies in the mid-1980s, women were preponderant: "Before 1989 I studied Automatics and Computers, and we were 80 students, and 20 were boys. Now the percentage is reversed". Linda and Edith agree on the fact that now there are lesser women than men in computer engineering. In software engineering, the numbers of women and men tend to be equal.

Figures from NIS and NASR show that in 2003 and 2004, women constituted approximately 45% of the total number of employees and in 2005 approximately 47% in research and development (R&D) in science and technology. Overall in the professional computer science realm, women represent around 40% of

the workforce (see Table 3). However, the number of women and men in STEM professions requiring a university degree tends to be equal. According to the Romanian Statistical Yearbook 2008, 51.84% of specialists with intellectual and scientific careers were women. Thus, in computer sciences in Romania, women are under-represented, although not as severely as in Western Europe or North America. The representation of women provides a ripe opportunity to explore gender in computer sciences and related fields.

Table 3: Percentages of women in selected fields in Science and Technology in Romania, 2007

Occupation	% of Women
Physicists, Mathematicians, and Engineers (including Scientific Research)	32.91
Researchers in Physics and Chemistry	54.25
Specialists in Informatics	38.89
Researchers and Assistant Researchers in Informatics	41.17
University Professors, Readers, Lectors, Assistant Professors	44.61
Researchers and Assistant Researchers in Technical Sciences	38.43

Source: Compiled by Authors from the Romanian Statistical Yearbook 2008

Respondents attribute the difference in women numbers in these sciences and engineering disciplines to three causes. The first is an economic context that is unfavorable to engineering, due to the collapse of entire industries after 1990. The second is that people are now presented with professional options in social sciences and humanities that were nonexistent before. The third is that women do not feel as responsible to contribute financially to the family unit as in the past. Respondent Pamela believes that these changes will reverse after economic recovery. Faye posits that there are fewer women in information technologies due to the nature of the field, and not with traits of Romanian society. In fact, Faye believes that throughout the world, the nature of the field of information technologies is homogeneous which is the reason for the under- representation of women in this field.

The Masculine Image of Computer Sciences

Faye's remark opens up another theme emergent from analysis: the 'aura' of masculinity surrounding computer sciences. There is no consensus among research participants about the issue of masculinity. A majority agree that the 'technical sphere in general and computer sciences in particular,' are domains that are considered by society to be more appropriate for men than for women. Edith agrees, but also remarks that gender segregation in the world of work led also to the 'feminisation' of entire industries, such as textile engineering and food processing. Agnes is convinced that computer sciences are perceived by society as a masculine domain, but she also believes that Romanian women made durable inroads into the field.

Faye does not agree that technology in general has an aura of masculinity in the Romanian society at large. Instead, she states that global information technology is still a masculine domain, and that Artificial Intelligence is clearly dominated by men worldwide. She states:

> *I believe it is an eminently masculine domain. I believe it is so precisely because the majority of academics and of researchers are men. And then, automatically, a majority gives the tone in everything.*

Faye believes that the perception of masculinity is detrimental to women entering the

field and is difficult to overcome; as long as women constitute a minority, this view will persist. All participants are of the opinion that it is up to women to change the masculine image surrounding information technologies by participating in larger numbers. However, they shy away from recommending that other women follow in their footsteps. Faye responded:

> *Now, I do not encourage anyone to embrace my life style and do what I have done and to renounce what I have renounced, because not everyone obtains satisfaction from the same thing, or equal satisfaction. Hence, I abstain from advice.*

One of the key reasons for not recommending her field to women is because it is a man's world, it may be misogynist. Perhaps nothing illustrates better the interplay of masculinity and under-representation in academia as Dorothy's recollection:

> *And at one of the conferences – it was in Poland – it happened some time ago, at a conference on parallelism, which is a domain I am interested in and in which there aren't many women...I was in a room with some 40 persons, and the speaker said: "Dear Lady and Gentlemen" [laugh], and I didn't realise, then, I saw that in fact I was the single woman. And all heads turned to me, I started to feel not at ease…. .*

Dorothy is of the opinion that there should be a distinction between software and hardware, the latter being perceived as masculine and the former not masculine any longer, due to women's presence in large numbers. Linda is the single participant who did not link women's numerical participation with the perceived masculinity of the field. Although she acknowledged that men traditionally outnumber women in computer engineering, she did not draw a relation of causality between numbers and people's perceptions about the field.

When speaking of gender stereotyping and social conditioning, Edith considers that centuries-old mentalities place all domestic responsibilities with women. Yet, she considers that occupational engendering is a process that occurs at the level of individual consciousness rather that at a collective, societal level. Agnes agrees with the view that traditional values preceding communism place the woman 'naturally' in the private domain; these values are embraced by some men and by some women, therefore they do not depend on gender. She calls them mentalities and preconceptions and she even speaks, like Faye, of certain misogyny of Romanian society. Edith also points out that women often create limitations for themselves. She calls them "self-imposed walls," and considers these to be the most difficult barriers to overcome.

Speaking about the fact that software engineering attracts more women than computer engineering, Ingrid believes the more hands-on, practical side of computers is more attractive to men. She does not think these inclinations are innate, but rather believes they are acquired. She attributes them to the way boys and girls are socialized from early childhood. Faye expresses the view that the characteristics that would make one a good candidate for the work in information technologies – to be cerebral, anchored in reality, to love exact sciences – depend on one's individual nature. However, she does not eliminate the possibility that women are innately less inclined towards hard sciences. She insists that individuality is the most important factor, which overpowers gender. She also believes that it is in the feminine nature to develop more facets of personality and cultivate more interests. Women tend to be less unidirectional, and as a result, less successful in the world of computing. Faye expanded on this, stating:

> *I rather believe that boys spend more hours in the night [working], they don't have interests related to fashion, etc.…inherent feminine interests. Hence boys have more time, they are readier to spend it in totality for work and this, combined with a certain intelligence and power – which girls poses too, but I believe girls cultivate it less. A woman, after all, has a larger area of interests. Regardless if it is good or not, ultimately it is normal to have a larger area of interests, not all related to the profession. Boys that do only this, and eventually*

> *soccer, and of course that… [are more successful]. Girls also implicate themselves more in family relations. I think this is part of the feminine nature in general. Not only in Romanian society. I believe that this is the case in the majority of societies. And automatically a woman is busier.*

Gender influenced Dorothy's decision to return from a German university. While working there, she had the opportunity to communicate with German women in Informatics. At first, Dorothy was shocked by meeting so few women. In time, she realized that the general mentality in society regarding women has to do with the fact that there are so few women. She agrees with Faye that women tend to have a larger range of interests, which is at odds with the European trend to ultra-specialization within higher education. Dorothy assigns certain masculinity to ultra-specialization. There is some research in the US context that posits that women work more in interdisciplinary fields than specialization which supports Dorothy's assertion about specialization (Rhoten & Pfirman, 2007).

From her experience as a teacher, Dorothy notices differences in favor of men in practical abilities, such as who scores higher on practical tests, as do Agnes and Pamela. Like Faye, Pamela does not totally reject the thesis that technical domains may appeal more to boys than to girls. While career choice depends on gender, performance does not. Pamela points out that while male students tend to score better in practical assignments, female students tend to outperform them in tasks that require one to be patient and meticulous, so that overall male students do not perform better or worse than female students. This study finds that, in general, women professors are more inclined to reject biological determinist views than to embrace them; however, they exclude no possibility.

Collaboration practices can draw substance from gender stereotypes. One such practice is to assign more clerical tasks to women based on the view that innately women are equipped with more patience than men; therefore, women will suffer less in doing tedious and boring tasks. Men tend to avoid clerical tasks in the hope that their women colleagues will accept them, and they usually do. Dorothy, for example, agrees to perform these tasks, although she is the head of her department, because she also believes that girls display more patience than boys.

Influence of Gender on the Academic Career

All research participants share the belief that there is no systemic gender bias in Romanian universities, and no gender-based discriminatory mechanisms embedded in their institution or in the Romanian system of higher education. Therefore, if cases of gender bias occur, they are isolated and attributable to individuals and not systems. However, all participants encountered more or less overt forms of gender bias during their careers, which were considered by them to be isolated incidents that were uncharacteristic of the system. Gender bias embraces more visible forms at higher hierarchical levels. Although the participants see nothing in the system that raises supplementary barriers to women, they are also of the opinion that, through their nature, women are usually less able to meet the requirements for advancement, which are equal for all. The main reason is that women tend to have more extra-professional responsibilities. The fact that requirements are equal for all is supported by participants and considered to be fair.

One of the themes that emerged from interviews is that, in general, women have to make extra efforts to prove themselves. All respondents agree that the academic environment is a competitive world, which places high demands on everyone. However, there is a common feeling that a woman encounters a greater degree of reticence about professional performance when she starts her academic career. Another commonality is the idea that it is the woman's individual academic responsibility to dispel the feelings of reticence she encounters. There is a general consensus that women, if they want to be successful academics, should make extra efforts to fit in, to gain a good opinion, and dispel mistrust. Feelings of reticence come more often from colleagues than from students. As the woman teacher earns respect from her peers and from students, her gender starts to pass un-noticed, much as a diminished imperfection. Yet no woman

considers this attitude as a form of gender bias. Faye explains the initial attitude she encountered in the following terms:

> *It is a problem of respect in the end. If you know to earn respect for yourself in the profession, until the end they will forget that you are a woman. No, I cannot say that I ever felt wronged because I am a woman. It is clear that in the beginning they give you less credit because of it. This is clear. And that they make your psychological situation more difficult.*

Faye's experience is shared by all participants. None of them feel that gender influences one's opinions about how work is appreciated, and none questions how standards of good work are established. Edith believes that in universities, "there aren't any politics to reject or to place supplementary barriers to women". Like Edith, Agnes considers that the system is not conducive to gender bias and the atmosphere of respect depends solely on the individuals comprising the collective. She describes the atmosphere in her faculty in the following terms:

> *Relationships with male colleagues and with women colleagues are different. You cannot say that a woman is like a man. But I never felt, here at least, any discrimination, neither from male nor from female colleagues. No. The atmosphere is very good. I would even say encouraging. But encouraged are all the others, as well.*

Regarding barriers to advancement, Ingrid concludes that gender only indirectly plays a role when coupled with family responsibilities. She does not consider the lack of women in top administrative positions and the fact that only one woman is a professor in her department (with nine male professors) as reasons to conclude that women face supplementary barriers. Rather, she believes the main cause is the imbalance in the number of women academics in the past. Faye also rejects the idea that gender influences career advancement in her department. In her opinion, it is natural for a woman to encounter more difficulties in corresponding to the high professional standards in information technologies, because a woman cultivates more interests:

> *I never suffered from the fact that I am a woman when the problem of advancement was put forth. Now, I cannot generalize, because I don't know how it is in general in the academic environment. But to us, maybe also because we are an exact science faculty [laugh], I don't know, to us the atmosphere is pretty sober. There is a standard for advancement, which is extremely hard, but which applies equally to everyone. Through the nature of things, as a woman is more difficult to correspond to the standard, because you have all these additional interests we spoke about. As a woman is more difficult to correspond, but if you do, if you meet the conditions set by the faculty, and which apply to everyone, and then you won't have any problem. Thus, not the fact that I am a woman may be a handicap. Rather the different life of a woman, the nature of things, in certain moments may drag her down.*

Asked if it is more difficult for a woman than for a man to advance in the university's hierarchy, Linda argues:

> *Only if she, internally, sets to herself different priorities; let's say, if the family has priority in front of academic career, and this is an option that you can respect. But the environment, I do not believe that … [it makes it more difficult for a woman].*

According to research participants the clarity of requirements for advancement to the next academic rank makes the process less prone to foster forms of gender bias than the process of securing a leadership position. The findings from the study indicate that in the latter case, indirect exclusionary practices, such as hidden workloads or stereotyping, may hamper women's upward mobility and that sometimes there are even cases that may be labelled discrimination. The individual acts of gender bias accumulate to create systems that can stifle career progression. Edith clearly makes this

distinction between professoriate and academic leadership when she speaks about advancement:

> *I think there are two issues here. Once, for a leadership position, here indeed I think discrimination takes place, almost openly I would say. Thus, in what's concerning leadership positions; when we talk about being chairperson, dean, rector. There is a certain holding back, I would say, vis-à-vis women. Thus, if a woman and a man candidate, regardless how good the woman is, in let's say 90% of cases, because there are exceptions too, the man wins. About the professoriate, there are some criteria that must be met and this depends again on each person and on how tenacious you are to solve your problems.*

Agnes considers that women who are seeking leadership nominations have to fight harder to prove their worth, although fighting is not necessarily in a woman's nature. She goes on to share examples of former women leaders who encountered an inhospitable climate. She thinks this is because they were too 'inflexible' and did not conform to men's views. Yet Agnes does not conclude that this is a form of gender bias; rather, she feels it is the perpetuation of a state of affairs borne of convenience, because it is simpler for men leaders to be among themselves (which itself is a form of gender bias).

Dorothy is of the opinion that any barriers to advancement are self-imposed. In general respondents are not in favor of positive discriminatory practices, although the idea is not totally rejected. Agnes's view on how gender equity should be sought is a sentiment shared by all:

> *There are certain mentalities that must be changed and I don't know if an attitude towards conflict, towards self-aggrandisement can help. I don't know. Here I am the adept of a rather peaceful, non-warrior-like attitude, let's say. To change mentalities takes a long time; it cannot be done overnight. It is an aim that will take some time and I think it depends a great deal on women to change people's turn of mind. No, no, I don't see it as a fight, as a matter of legislation, or as a program. These always produce adversities and I don't know how well this is. Maybe in a first stage and after a step forward…I don't know for sure. But here I think what works best is: you have to do your job, woman or man, but if you are woman you have to do it as well as possible, to demonstrate that it is possible, that you are competent in your field. And the more numerous we will be, maybe the more we'll be appreciated and accepted. Therefore I believe more in a silent version [of seeking gender equity] than in a vocal one.*

Balancing the Professional and the Personal

Although each woman has her own story, these women share common experiences: the act of balancing is one of the most significant challenges that they face. The study reveals that balancing professional and personal life can be summed up by one word: *sacrifice*. A successful academic career requires extensive dedication to the profession, thus sacrifices from all aspects of extra-professional life including family. Likewise, motherhood is perceived as sacrificing a career. The difficulties of combining raising children with a successful academic career increased in time, as the complexity and dynamic of the computer sciences profession increased. All participants agree that being childless constitutes an important competitive advantage, and many women academics choose to sacrifice motherhood. Asked whether an aspirant to an academic career in her field today would need to make sacrifices, Faye is categorical:

> *Enormous. In her personal life, as a woman. But if she is ready to make them, if she knows to make them and not to be marked by this and to find satisfactions in her career and in what is related to her career, if she is a person that can find satisfaction in it, then she has sufficient chances, I would say almost equal to the chances of young men. […] I do not have children precisely because this is a very difficult career, very demanding, at very high standards, and this is the cause I married later, after I took my*

> *doctorate, and I decided not to have children. Thus, not because I did not want to, or because I would not like children, or I couldn't have them, I felt that I cannot do them both well. Thus, not for a moment I thought that I could beneficiate from some form of institutional help for a woman […]. It is a competition in which I engaged elbow at elbow with my colleagues, who are male in their majority, and if you want to resist, you must be competitive, regardless who you are.*

At the time of the research, only one participant, Ingrid, had young children. Two participants have one grown-up child each, and four participants do not have children. All participants stated that family takes priority over career. All respondents agree that it is mostly women who will set aside time for children, regardless of the impact this has on their professions. Dorothy believes that it is normal for a woman to "put family first" and therefore to have less time for her work at the university. She also considers that her male colleagues are less likely than her female colleagues to "put family first". Ingrid, who chose to combine career and motherhood, often works to her limits. Speaking about the influence her two young children have on her career, Ingrid makes the point that being a mother constitutes a competitive disadvantage:

> *There are ladies my age who up to now did not make a family and who work hard and of course that they will have conditions to advance. For sure faster than me, this is clear. Thus, not necessarily gender is a barrier; if you do not have the personal side developed…*

Faye explains in clear terms why she considers a career in information technologies incompatible with raising children, with or without institutional support:

> *But in the university environment, two years break may be deadly. And in a domain like informatics it may be fatal, because here in every month there are new things, and if you do not master them, you must at least be up to date. After a two years break, you can retire. Thus, even if the state offers me this facility, I choose not to take advantage of it. I do not want to take advantage of it, because it can be fatal for me in my profession, in my career.*

Ingrid also reports that institutional support, while nevertheless welcome, cannot constitute an easy solution to the career-motherhood conflict. All participants made the point that motherhood is difficult to 'outsource', especially when children are young. Questioned about how she manages the personal side, Linda replies: "I…we…do not have children…this is a relief…well, it is sad on one hand; from the professional point of view, of course, we do not have the load…". Asked the same question, Edith replies in a similar manner, stating that she is not married and does not have children; as a result, she is free to dedicate as much time as she wants to work at the university. The study suggests that it is almost impossible to be both a good mother and to excel professionally. As a result, more and more women who embrace an academic career in these fields choose not to have children. These findings are consistent with research in other cultural and national settings that position work and family as at odds with one another (e.g., Ward & Wolf-Wendel, 2012). Progress for women academic in computer science related fields (and but STEM fields in general), call for perspectives that can see more compatibility between work and family.

Whether it is about help with domestic responsibilities or about showing understanding for the demands of the profession, all respondents mention the support of their family members as essential for their careers. Participants have no expectations of institutional help, on the grounds that institutions cannot afford supplementary expenses.

Working in Financial Hardship

Higher education in Romania takes place in a context of financial adversity. According to respondents, lack of proper funding is the major problem affecting the work of academics. Due to the nature of computer sciences, education and research necessarily require certain resources, without which activity cannot take place. Faye

explains that she cannot buy the programming language that is absolutely necessary to her course. She understands clearly the scarcity that the whole country experiences. Faye has been asked by her department to be patient and wait for another semester with her request for software. Because she understands the situation, she was patient for two semesters, but she cannot ignore the fact that "another year has passed". In software engineering, to be one year behind is extremely detrimental. Both Edith and Faye point out that, in information technologies, not having timely access to information is particularly detrimental to one's career, undermining all efforts and hard work.

Research in Romania is seen as luxury and takes place intermittently. The Romanian Ministry of Education and Research (MER) attempts to finance as many projects as possible, yet the total budget for research is meagre and projects funded by MER rarely allow for paid employment for graduate students. More serious financing comes from European sources where the competition is extremely fierce.

Except for professors, all other academic ranks are severely underpaid. One mechanism employed to cope with the low wages is to take more 'teaching loads' than normally expected, either in the same university or in another institution of higher education. Multiple employments in teaching drastically reduces the time dedicated to research, which leads to less publishing productivity and delays in meeting the requirements to advance on the academic ladder. There is consensus that, due to financial hardship, a career in higher education becomes unattractive. Offering low wages, universities have difficulty in maintaining the younger generation of scientists. Some participants also speak about difficulties in hiring. Dorothy calls the salary for a young person 'offensive', which leads to a high turnover of teaching assistants, research assistants, and faculty:

> *Many of our lab assistants or teaching assistants have a second job because otherwise they would not be able to survive. In other words, who embraces this career makes a financial sacrifice. The satisfaction is intellectual, not material. Because, at least in our domain: computers, software industry, information technologies [all of which have very high salaries, way higher, than in university] no matter what you would work in industry, the salary is much higher than the salary of an assistant in the first stage [of his or her career]. And to reach a somehow decent salary in Romania you have to become professor. Thus, until then, [the academic life] is a material sacrifice (Edith).*

At the PhD level, many students leave Romania, often for good. There are mixed and even contradictory feelings about this "brain drain." It is generally perceived in academia as a negative phenomenon, and yet it is a source of professional pride for many teachers. To be able to secure positions with prestigious companies or to study in internationally renowned scholarly centers is considered proof of good mentorship. Faye states that:

> *I have enormous satisfaction when I see many ex-students that are very well to do abroad and very satisfied, and I noticed, and I like this at the young generation, at least at our students I noticed, everywhere they say they are Romanians, that they graduated in Romania. My ex-students are in their vast majority in US, they had PhDs in Artificial Intelligence, and they went there with doctoral bursaries. And all of them say that they graduated in Romania, and not only they do not feel embarrassed, but I think they are even proud of it, precisely because of the Romanian reputation in information technologies. And for me this is a great satisfaction (Faye).*

Dorothy speaks extensively about how she derives satisfaction from working with students that plan to finish their PhDs abroad. On the other hand she also tells about her department's effort to attract them back after graduation:

> *The greatest satisfaction is to see students embracing research. Unfortunately, they cannot do it in Romania. The majority leave abroad with bursaries. Some come back, which is something that makes me very glad. Thus we have now several colleagues who*

came back from USA and from Austria after they completed their dissertations and we hope to create here a nurturing environment for their return. And this is something we do right now here, some projects for postdoctoral studies, through which we invite, we welcome people back. Recently we hired a boy who came back from France after [his] PhD and we hope to have another four openings for PhD graduates.

The study suggests that, even in conditions of severe under-funding, people in academia struggle to keep the common passion alive. Too often though, a tension arises between the desire to help people develop successful careers and work in research and the desire to retain them to work in computer sciences and related fields.

Discussion and Conclusion

Equality or Equity? Opportunity or Outcome?

Research participants draw a strict demarcation line between their identity as women and their identity as academics. Family life was initially considered to lie outside the realm of the study, since the study was interested in their professional life, but the findings suggest that personal life shapes career decisions. For Ingrid, the single mother of young children, in particular she talks about the complications of juggling career and family life. Although the study participants were interested in gender equity, and this is why they accepted to participate in a study focused solely on women, the participants lack a feminist view of gender and of gender relations. In part, this can be attributed to a national culture that is persistent in Romania, a culture that generally posits equality of both sexes (Cooper & Strachan, 2006; Harsanyi, 1994). However, in male-dominated environments, even when there is an overall cultural commitment to gender equality and the micro level the findings reveal that women continue to face gender bias and exclusion based on being women (Evetts, 1994). Hence, in STEM male-dominated environments, women are likely to face disconnection between their professional and personal identity.

The study finds that, in Romania, women constitute lesser in percentage than that of men in computer engineering, while in software engineering, women tend to equal men in percentage of participation. Software engineering is considered a profession 'appropriate' for a woman. Thus, an engendering process is at play within the computer sciences in Romania. The study also suggests that the existing constructs of gender act upon one's career decisions; this finding supports the feminist critique of science and technology. Therefore, in Romania, the social construction of gender places software engineering within the sphere of femininity.

The social construction of gender during the long socialist period (1947–1989) led to the large number of women in STEM. Science and technology were deemed as the main force for building communism; thus natural sciences and engineering disciplines were favored. In addition, communist ideology stressed that one's most important identity is constituted by being a productive member of the society. Therefore, social status and privilege followed from participating in what was considered most important for the economy. As the study suggests, the school system, which never claimed to be politically innocent, was an important conduit that steered girls towards science and engineering. The findings from the study support the feminist thesis that early and ongoing social influences may be decisive for one's career choice, and that participation in STEM is a cultural product (Barker & Aspray, 2006; Barker et al., 2006). Further, experiences of gender bias throughout different stages of schooling and the academic career can accumulate to make careers in certain disciplines and subfields to be unattractive (Valian, 1999).

Like Miller (2005) and Rosser (2005), we conclude that, despite their presence in larger numbers than in the West, women who enter computer sciences careers in Romania must make extra efforts to fit into the academic milieu and face additional barriers related to their gender. Unlike previous work on the culture of computing (Beyer & Haller, 2006; Major et al., 2007), our findings do not suggest that women feel permanently rejected by the culture of computing. Also, unlike Rosser (2004), we find

that women do not tend to leave the profession; they tend to leave is academia for the industry, for financial reasons.

In the context in which the departments of computer sciences, computer engineering, and software engineering are relatively new, it is hard to conclude whether the glass ceiling effect is present or not based on numbers alone, because the vast majority of women academics are too young. All requirements for advancing to a superior academic rank being equal and spelled out in legislation, this study finds that it is more difficult for women to meet these standards. The main deterrent is the fact that women suffer more from time poverty. If we also take into account the previous finding that women need a larger dose of assurance and convincing of the value of their work, it becomes clear that equal requirements disadvantage women. While women academics are aware to various degrees that it is somehow harder not only for them, this is considered to be the inherent nature of things for women in general. The solution they seek is to conform to the standards by working harder and by suppressing other interests. While the findings show some progress in terms of numbers and fewer leaks in the pipeline in terms of women leaving computer sciences, there continues to be challenges associated with structural discrimination and participants' experiences with gender bias and sexism.

The findings from the study also suggest there is still progress to be made in the formulation of discrimination policies. All participants confessed that they know little about the ethical reasoning behind affirmative action; however, they also expressed mistrust in the idea of creating advantages based on gender. The study suggests that women feel the need to advance their cause, but they also reject the confrontational mode. They consider, moreover, that positive discrimination undermines collegiality and respect among peers. Women prefer to adopt a masculine standard rather than be seen as trouble-makers. The women in the study seek individual change rather than structural change. While the individual approach is admirable and also understandable given some of the challenges people have encountered, structural change is necessary to not only improve parity, but to also address equity as well. Too often conversations about women in STEM fields gravitate to representation (parity) and not enough focus on recalibrating cultures to be more reflective of men and women (equity). The ongoing advance of women in STEM fields needs to include both perspectives.

When it comes to leadership positions where real power is attached, exclusionary practices are clearly at work, although most often, they take on subtle forms. Indirect exclusionary practices grounded in power relations still hamper women's upward mobility. At the top, Romanian higher education is strongly dominated by men. Contributing to this 'holding-back' of women's promotion is a model of leadership that is masculine in nature. As a result, women have fewer chances to meet this model of a good leader simply by being a woman. Consequently, many women choose not to apply for leadership positions. The glass ceiling perspective is at play (Bain & Cummings, 2000; Toren, 2000; Rosser, 2004; Gunter & Stambach, 2005; Niemeier & Smith, 2005; Fox and Mohapatra, 2007; Wachs and Nemiro, 2007; Eriksson-Zetterquist & Styhre, 2008; O'Connor, 2008). The women in the study talk about leadership and can see it, but don't feel it is attainable based solely on gender. The study findings suggest that, when we account for discipline, we obtain a more diverse picture than the one offered by the Glass Ceiling Index being close to the number one. Therefore, it is the best interest of an institution to assist faculty to be successful at all levels of the academic progression ladder and not just in early career. Higher education leaders such as provosts have the responsibility to put policies in lace that, that provide a climate favorable for women faculty to balance work and family and to simply be women (Ward & Wolf-Wendel, 2012). More importantly, deans and department chairs should know policies and utilize them in ways that can help women navigate career advancement.

Research based in Romanian environments sheds particularly interesting light on the frequent discussions about the lack of women in STEM related fields. The findings from the study point to how the critical mass of women in the work environment positively affects experience of women faculty (Etzkowitz,

Kemelgor, Neuschatz, Uzzi, & Alonzo, 1994). Such critical mass can be attained only when more women faculty are recruited and a stable mass of women academics is maintained in academic departments, despite the attrition of women faculty. Yet, critical mass alone is not enough to not just include women numerically but to include them as women. At this point, there is no feminist project of institutional change at work in higher education in Romania. Although there is much discussion and debate about policy in education been drafted as a new Law of Education, there is no public discussion about what universities can do to facilitate women's success and lessen their sacrifices. Romanian higher education does have a long list of laws, policies, and guidelines which ban gender bias and gender discrimination and are based on the idea of gender equality of opportunity. In light of our findings, we suggest that serious public discussion and much further research should be dedicated to the following question: *In what measure does equality of opportunity lead to equality of outcome, and which will be sought by the Romanian higher education system?* We suggest that, in the current cultural and socio-economic environment in which resources are extremely scarce, organizing based on gender may create a space in higher education for honest debate and lead to a reduction and eventual elimination of lingering gender inequities.

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