

PROFESSIONAL WOMEN'S GENDER DISCRIMINATION EXPERIENCES IN
FEMALE-DOMINATED STEM FIELDS IN TURKEY FROM LIFE-COURSE
PERSPECTIVE

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COURSE PERSPECTIVE**

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ABSTRACT

PROFESSIONAL WOMEN'S GENDER DISCRIMINATION EXPERIENCES IN FEMALE-DOMINATED STEM FIELDS IN TURKEY FROM LIFE-COURSE PERSPECTIVE

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From a life-course perspective, the study aims to thoroughly examine the women's careers who have graduated from the fields of Science, Technology, Engineering, and Mathematics (STEM), where female participation is high in Turkey. In-depth interviews were conducted to analyze how women's gender discrimination experiences and their strategies during the socialization process in family, education, and professional life, covering childhood and young adulthood, shape their careers. The effects of gender stereotypes and discrimination in STEM fields on women's motivation and interest development in their career aspirations were analyzed during the early socialization period, considering the actors and mediators that affected the strategic decision to participate in female-dominated STEM fields. Subsequently, by maintaining and reproducing similar gender patterns in professional life, the barriers that prevent women's career development and their coping strategies have been revealed. These findings were analyzed from a feminist theoretical framework that criticizes the relationality of gender, science, and technology and the gendered structure of institutions. Beyond the women's underrepresentation in STEM, the study revealed gender-based structural barriers and discriminations that restrict women's

career aspirations and growth, even in the fields where they participate intensively. Thus, a comprehensive view of women's careers in science and technology fields from a life-course perspective is aimed at considering the inter-structural relationality of family, education, and work.

Keywords: STEM, Life-Course Perspective, Gender Discrimination, Career Aspirations and Growth

ÖZ

YAŞAM AKIŞI PERSPEKTİFİNDEN, TÜRKİYE’DE KADIN-YOĞUN FTMM ALANLARINDA ÇALIŞAN PROFESYONEL KADINLARIN TOPLUMSAL CİNSİYET AYRIMCILIĞI DENEYİMLERİ

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Bu çalışmada, Türkiye’de kadın katılımının yüksek olduğu Fen, Teknoloji, Mühendislik ve Matematik (FTMM) alanlarından mezun olmuş kadınların kariyerlerini yaşam-akışı perspektifinden derinlemesine incelemeyi hedeflemektedir. Çocukluk ve genç-yetişkinlik periyotlarını kapsayan sosyalizasyon sürecinde kadınların aile, eğitim ve profesyonel hayatta toplumsal cinsiyet ayrımcılıkları ve başa çıkma stratejilerinin kariyeri nasıl şekillendirdiğini analiz etmek amacıyla dair derinlemesine görüşmeler gerçekleştirilmiştir. Erken sosyalizasyon döneminde FTMM alanların toplumsal cinsiyet kalıplarının ve ayrımcılıklarının kadınların bu alana yönelik kariyer hedeflerindeki motivasyon ve ilgi geliştirme süreçlerine etkisi ve kadın-egemen FTMM alanlarına katılım göstermelerindeki stratejik kararı etkileyen aktör ve araçları gözetererek analiz edilmiştir. Sonrasında, profesyonel hayatta benzer toplumsal cinsiyet paternlerinin devam ettirilmesi ve yeniden üretilmesiyle kadınların kariyer gelişimini engelleyen bariyerleri ve başa çıkma stratejileri ortaya çıkarılmıştır. Bu bulgular toplumsal cinsiyet, bilim ve teknoloji ilişkiselliğini ve kurumların toplumsal cinsiyete dayalı yapılanmasını kritik eden feminist teorik çerçeveden analiz edilmiştir. Genel olarak kadınların bu alanlardaki

temsil ve katılım azlığının ötesinde, kadınların yoğun katılım gösterdikleri FTMM alanlarında dahi kariyer hedeflerini ve gelişimlerini kısıtlayan toplumsal cinsiyet temelli yapısal bariyerler ve ayrımcılıklar ortaya çıkarılmıştır. Böylelikle, ailenin, eğitimin ve işin yapılar-arası ilişkiselliği gözetilerek yaşam-akışı perspektifinden kadınların bilim ve teknoloji alanlarındaki kariyerine bütüncül bir bakış hedeflenmiştir.

Anahtar Kelimeler: FTMM, Yaşam-Akışı Perspektifi, Toplumsal Cinsiyet Ayrımcılığı, Kariyer Hedefi ve Gelişimi

To all women in STEM

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CHAPTER 1

INTRODUCTION

1.1 Purpose of the Study

This study endeavors to explore and explain gender discrimination that women professionals in the fields of female-dominated STEM¹ (Science, Technology, Engineering, and Mathematics) experience during the socialization process and career growth in Turkey. I focused on the experience of women who graduated from STEM fields: biology, chemistry, chemical engineering, food engineering, and environmental engineering, categorized as “female-dominated” in this study. It delves into how women’s careers are shaped by the strategies they develop to overcome discrimination. While the increasing representation and participation of women in some STEM fields in Turkey may suggest less gender discrimination and greater opportunities for women, it is critical to consider whether numerical dominance is enough to claim such expectations. Therefore, I aimed to understand women’s experiences within the STEM fields that do not appear to be exclusionary for women in Turkey. When examining the gender gap problem in STEM, I need to consider how gender discrimination in the socialization process affects women’s career aspirations and growth. Since the socialization process in this study is framed by focusing on women’s life course, including family, education, and professional life, it helps to examine how gender discrimination is reproduced from similar patterns by considering the intersectional relationship between structures. Thus, it aims to provide a holistic view of women's careers in the STEM fields.

The increasing importance of science and technology in many subjects, such as political, economic, and social fields at the global level, has become our area of interest, which is more talked about, researched, and studied. Besides, STEM professions, in which various and different sectors are clustered, have gradually become the most prestigious field for careers. These areas are at the forefront of significant progress with public and private sector investments. In Turkey, like many other countries, to meet the skills and capacity gap in this field and to compete socio-economically; primarily government policies, non-governmental

¹ STEM in this study is framed within the traditional narrow range of computer, mathematical, engineering, life, and physical science fields listed by the U.S. Bureau of Labor Statistics (BLS)

organizations, and private companies also make training programs and strategic plans for this purpose. For example, The UNESCO Science Report: The Race Against Time for Smarter Development (2021) report highlights the persistent gender gap in STEM fields and the need for more action to address this issue. The report also notes that while the gender gap in enrollment in STEM education has decreased in some regions, women are still underrepresented in STEM professions. However, beyond the reason why these policies and strategies are needed, the strategy and policies to increase women's participation in STEM fields should be analyzed within the framework of gender-based discrimination and inequality. I believe this framing is possible by examining the structural analysis through a gender lens rather than following a linear perspective of numerical participation rates. Thus, I focused on discrimination and inequality from the gender perspective, which participation rates could not give us based on statistics.

The fact that STEM fields have a masculine culture and are predominantly male reduces women's participation in STEM education and working life, thus creating a gender gap. Because the gender gap is not just about the imbalance of representation and participation, I aimed to investigate whether women experience discrimination in STEM fields where female participation is high. For this purpose, I aimed to point out the structural relationality of the barriers that limit women's career aspirations and growth in STEM from a life-course perspective. I focused on the gendered structure of organizations to analyze the operations in which gender roles are reproduced through the skills, stereotypes, prejudices, and expectations assigned to women in these fields. On the other hand, the part of the intertwined multi-layered realities that I focus on is to emphasize that gender-based discrimination has not decreased despite women's high participation in some STEM fields. I have framed my research to include a life-course perspective on women's experiences within the intersectionality of work, gender, and science-technology.

The main purpose of my thesis is the extent to analyze how the gender discrimination experienced during the socialization process and professional life of women who graduated from female-dominated STEM fields and their strategies affect their careers in Turkey. In addition, the structural interaction of these dimensions reveals how gender roles are constantly produced in women's careers before and after their orientation to STEM fields. One of the areas of discussion that I consider necessary is to analyze the impact of the co-construction of gender and science-technology on their career aspirations and gender-based discrimination experiences. While revealing the gender patterns of science and technology, my objective is to contribute to the existing literature on women's strategies against discrimination in the face of the barriers to participating in STEM fields that are maintained and reproduced in

professional life. This aim highlights the conditions beyond focusing on women included or excluded in STEM fields, which are limitedly focused on the literature, and what gender discrimination they experience in the process of participation. Thus, the experiences of women in the female-dominated STEM fields in Turkey shall be valuable insight points for questioning the conditions beyond focusing on participation in gender gap analysis in STEM.

1.2 Research Questions and Objectives

Women during the socialization process are oriented to gender roles in the family, education, and professional life, their gender roles in their life-course, which impacts the strategic decision of which skills they acquire, which university department they study in, and which job type they would like to work in. Gender roles have strengthened stereotypes that women are less competitive in many STEM professions where the masculine culture is dominant. In this context, feminists focus on the mutual shaping of science, technology, and gender to analyze how they co-construct each other. These critiques guide me to question gendered patterns of science, technology, and their fields in Turkey to understand women's experiences in the context of gender discrimination in their career pathways.

The study aims to understand the relationship between STEM and gender, recognizing the gender distribution in these fields so that I can reconcile why women tend to participate and be encouraged in some STEM fields. In line with this, I aim to find answers not to why so few or many women are in STEM fields but how this gender affects women's motivations, interests, skills, and strategies to participate in STEM fields in Turkey. The skills, behaviors, and attitudes that women acquire throughout their lives during the gender-based socialization process are essential for women working in STEM fields to be competitive candidates and to make strategic decisions to advance in their careers. I find my research question is essential to reveal that gender-based occupational segregation and (in)visible obstacles for women to get promoted in STEM fields are reproduced by the institutions by reinforcing gender roles and stereotypes in the process.

Since gender stereotypes encourage the idea that women are considered less competent than men to work, women's career aspirations in STEM fields, especially male-dominant, are affected when choosing the university departments or working in STEM fields. Women are underrepresented in STEM fields because they face structural gender-based barriers, including invisibility as engineers or scientists, uncertain work schedules, male-dominated work environments, and unequal competitive conditions for career advancement (Hewlett et al., 2008). Thus, non-male-dominated STEM fields have created the assumption that there is no

chilly climate² and hospitable working conditions for a woman's career. The reason I focus on STEM fields, where women's participation rates are high in Turkey, is to reveal the structural barriers in these fields in the context of gender discrimination beyond the discussion of women's lack of participation and representation. In addition, it does not only attribute women's career obstacles to work and organizational structure, but also sheds light on the construction of these obstacles from a life-course perspective. As a result, my main research question is how women's experiences of gender discrimination in the socialization process and their coping strategies affect their careers in STEM fields where women predominantly participate.

1.3 Background and Theoretical Context

Feminist critique of science-technology is essential to understanding its historical contributions and the basis of the struggle for gender equality in these fields. This study's meaningful discussions and framework take place within the framework of the criticisms and contributions of feminist literature to science and technology. I give brief literature on this relationality describing intersections of the gender and science-technology relationship. Since gender, science, and technology have intersectional relationality, which is one incomprehensible without the other. In this context, it is crucial to grasp the dynamic mechanisms that structurally co-construct each other. I endeavor to reveal the significance and contribution of my subject position by framing this relationality with current and basic concepts by including the feminist perspective to discuss relevant current discussions.

While researching the context of gender discrimination in STEM, the relationship between gender and science-technology is essential for the meta-analysis. The definition of science and technology should examine its meaning, values, ethical understanding, and methods to show the intersectionality with gender. Comprehending this relationship has led us to a structural phenomenon that includes the interplay of technology, society, and values. The feminist perspective, which can examine these structural phenomena from a historical perspective and an epistemological criticism, gives deconstructive and variable relationality, offering fundamental questions.

Keller (1983) has listed the mindsets that position science and women that have changed our perspective, language, and reality. With critiquing dualistic positioning, she has framed this comparison by attributing "emotional, subjective, harmonic, and soft" images of femininity

² It is an environment where there are both overt and covert forms of discrimination against women in a male-dominated environment (Simon et al., 2017)

while revealing how the "impersonal, analytical, non-emotional, rational, and tough-minded" of science converge to the masculine images. These images socially construct gendered science and technology understanding in a society, which is mutually shaped in reality as stakeholders in myths within the culture. For example, the weaning of concepts used for principles of science and technology, i.e., rationality and objectivity, opens the critique that emotionality and subjectivity are attributed to femininity, which remains outsiders and invisible in the science-technology relationship.

Keller (1983) and Harding (1986) aimed to analyze the 'gender in science perspective' by questioning what objectivity and impersonality are. This purpose allows us to grasp the perception of scientific thought because the emotion or affection that makes science personal or subjective is the source of power relations and dualisms in science. They believe dualisms in science are constructed within the networks between cultural values, gender stereotypical codes, and masculine science-technology understanding by interacting with each other. The objective and rational values of science, overlapping with masculine visions, strengthened the state of valuable professionalism; on the other hand, subjective, experiential, and affective ones were devalued to this extent. In the process, science's stereotypical gendered structure interacted with internal and external values and established a relationship that transforming and transformed social interactions. In this context, the values and roles of gender reveal different paradigms in the historical process of its structural formation. In order to bring a fundamental epistemological critique, it is necessary to agree on the truth of science and the politics within the dominant culture and to discuss the invisibility or devaluation of other values. The feminist paradigm offers that more women's questions and gender perspectives should be internalized for further examination to reduce hegemonic masculine culture and male domination in modern scientific thought.

Today's issues, the women as a minority group in STEM fields, from a historical perspective, social policies aimed at increasing the participation of girls and women in the fields of science and engineering have been implemented at different times and have been influenced by various factors such as societal attitudes, changing economic needs and the women's rights movement. According to Wajcman (2004), the movements toward the position and participation of women in the professions, which started in the early 1970s, struggled to make women visible by aiming to reveal their essential contributions and scientific endeavors in the field of science. This exclusion became more evident when the invisibility of women in the fields of science and technology and their contribution to the history of the industrial revolution began to be mentioned. Then, this salience began to examine the general patterns of women's participation, and scientific studies on this topic started. The first and second-wave feminist movements and

studies drew attention to the inequality of opportunities for women in education and employment by documenting the barriers to girls in science, engineering, construction, and technology (Phipps, 2008). Therefore, in the 1970s and 80s, the right to the opportunity for girls' education and the policies of encouragement in the field of science and technology and studies to overcome the problem were among the focal points of feminist stands.

On the other hand, rather than questioning technology and science itself, recommendations for equal opportunity to make women's participation high in the science-technology era do not change or not ask for a degendering understanding for men to the masculine image of science and technology. Sandra Harding (1986) has claimed that cultural aspects of science relate to masculinity values and behaviors, which makes the STEM professions seen as a male activity that has appropriate male skills and masculine attitudes in work. Values promoting a masculine culture in this area have created a gendered structure that excludes feminine characteristics, performance, and behaviors. This structural questioning has opened a discussion about science and technology. According to Faulkner (2001), the traditional conceptualization of technology is based on the idea of industrial machinery and military weapons as a tool for work and war. This identification of masculine images in technology contributes to male dominance of technical occupations by claiming skilled status. Feminist Science and Technology Studies have proven that cultural assumptions about gender are a critical analytical category for describing, understanding, and analyzing the causes of male domination in science and technology to change the social understanding of science and technology. To this end, Stanley (1983), for example, shows women inventing basic technological tools and methods based on the idea of being collectors and processors in early humanity. She is one of those who believe that contrary to women's role in advancing technology, women's gender roles associated with childcare, cooking, and shelter make them technically incompetent, unskilled, and invisible in technological fields in the context of masculine science and technology understanding. As a result, historically, studies for increasing women's participation in STEM fields and analyzing the relationship between women and science-technology from a gender perspective have influenced structural inquiries and policies.

The concept of gendered substructure, in which gendered assumptions and patterns associated with femininity and masculinity are embedded and reproduced, is the basis of organizational relations and operations (Acker, 2012, p.215). Because of the masculine perception of the technology itself, sub-branches of technology have also defined this division through gender characteristics. As Cockburn mentioned (1991), cultural and ideological discrimination significantly impact women's decisions in their educational and professional fields. As seen in

this study, the decision mechanism depends on the image and structure of STEM fields co-constructed by actors and institutions. In line with these intersectionalities, the concepts and discourse of science and technology in the professional and educational fields of the embedded masculine culture that excludes the relationship with women, feminine characterization, and their identity came to the fore in 19th-century studies (Wajcman, 2004). The structural relationship between masculinity and science-technology brings gender stereotypes, prejudices, and discrimination in STEM fields, which have an impact on women's career aspirations and professional lives. Unless the understanding is deconstructed during the socialization process, reasons and consequences of the continuation of women's underrepresentation in STEM fields are maintained by every interaction.

Since I aim to understand women's gender discrimination-based experiences in participating in female-dominated STEM fields with the structure of science and technology, I focus on their strategies and experiences in professional life. In this study, the fundamental dynamics that are effective in the strategic participation decision of women in specific STEM fields with the expectation that they could be in a more comfortable environment and be competitive in professional life are at the forefront. After this decision, according to women's experiences of discrimination, I discussed barriers created by gender patterns that do not meet their expectations and career advancement. Therefore, gender discrimination within the concepts of 'glass ceiling,' 'glass escalator,' and 'queen-bee syndrome' enable me to examine the discrimination women experience despite the high rate of STEM participation in some areas. I believe it should be based more on structural examination and analysis, not participation rates, revealing the invisible barriers for women in the organizations. The increasing participation of women in the STEM field does not indicate that women have the same status and equal opportunities as men. Although the standing points of women's struggle and solidarity in these fields have increased the visibility of structural barriers and conventional stereotypes, it is claimed that political and economic steps have not been taken to ensure gender equality in Turkey (Beşpınar & Pehlivanlı-Kadayıfçı, 2021). This structural process arising from the intersectionality of institutions that are family, education, and work during socialization has created structural barriers through stereotypes, devaluation, and role modeling by mainstreaming gender roles and values (Caprile, Meulders, et al., 2011).

Women's struggle to participate and continue female-dominated professions such as STEM should be in the struggle for structural transformation in the direction of technology that shapes our way of life. The assumption that science and technology are universal and neutral contradicts the existence of masculine images and male-dominated fields. Within this contradiction, the difficulty of women's participation and access to high-status positions in

STEM professions cannot be associated with professional life alone. For this reason, the feminist perspective focused on the analysis between structures of institutions in which the deep-rooted ideas in science and technology interacted with the socialization process of women. Caprile, Meulders, et al. (2011) claim that interplay with structural and life-course factors prioritizes focusing on the role of family, education, and working conditions. This perspective is meant to take the issue from a linear perspective to a layered discussion analysis rather than discussing whether women tend to choose the STEM field.

To conclude, extending the discussion of the relation of causality in my study by exclaiming directly about the difficulty of women's access to education, the inadequacy of education, and the obstacles to the acquisition of necessary skills, I aim to develop a life-course perspective by looking at the intersectionalities. This intersectionality may also reveal why women are dominated in some areas of STEM majors and the dynamics that implicitly or explicitly affect their decisions in the socialization process leading to this STEM major's preferences. Besides, beyond the definition of science and technology through dichotomies or whether STEM fields are inclusive or exclusionary for women, I aim to reveal the gender-based discrimination women experience before and after the process of participating in STEM professions. Contexts in which gender discrimination is experienced in these processes can also reveal how gender roles are reproduced through professions of STEM. As a result, I discuss all these discourses in which the relationship between science-technology and gender is reproduced and their mutual shaping based on the experiences of women working in female-dominated STEM fields.

1.4 Significance and Contribution

STEM fields are globally vital to every national economy, influencing major areas such as climate change, renewable energy, digitalization, and the development of artificial intelligence. Although increasing capacity and technical knowledge are essential for finding sustainable solutions to these topics, the need for innovation, adequate diversity, and equal workforce capacity cannot be provided enough. One of the Sustainable Development Goals (SDGs) emphasized by the 2030 Agenda for Sustainable Development is an equal educational opportunity that offers competent citizens who are transformative, innovative, creative, and acquiring skills in this direction (UNESCO, 2017). However, women are still underrepresented as a minority group of STEM professionals and educational opportunities worldwide in the 21st century. For example, although the rate is changing based on region, the UNESCO Science Report published in 2021 showed that the global average of women in STEM is around 28%.

The gender-based stereotypes, prejudices, and related social structures embedded reasons for the low women's participation in STEM also co-construct gender roles within the institutions (family, education, environment, peer groups, media, etc.) that women interact with during the process of socialization. In addition, this reproduction and construction process continues in gendered discrimination and gender-based division of labor at work. Despite the low female participation in STEM, their participation is 44% of the total number of students enrolled in bachelor's degree programs in natural sciences, which includes biology and chemistry worldwide (UIS, 2021). There are no comparative rates, specifically between all STEM fields. However, according to the UIS report mentioned earlier, women represent around 28% of the total number of students enrolled in agriculture, forestry, fisheries, and veterinary programs, which may include food engineering programs. Based on the 2020-2021 graduation rate in Turkey, the rate of women with bachelor's degrees is 74.93% in biology, 72.39% in chemistry, 72.79% in food processing, 65% in chemical engineering, and 54.77% in environmental engineering (YÖK, 2022). Based on the graduation data, I framed female-dominated STEM fields in Turkey, focusing on these departments in this study. While the feminist perspective claims structural relationality between the values of technology-science and masculine culture, I find it necessary to understand whether these values directly or indirectly match female-dominated STEM fields to contribute to an extended literature discussion. I questioned how I could frame this relationality behind the significantly varying gender participation rate in some STEM departments in Turkey. Besides, I analyzed what conditions of the socialization process encourage women's preference for STEM fields where women's participation is higher or dominant. Women's experiences in professional and educational life in STEM fields, beyond the participation rate, are ground data for the study to analyze their motivations and strategies from a gender perspective.

This study is important in terms of understanding the manifestations of which cultural codes and assumptions mutually construct this masculine or feminine image distinction of STEM fields through women's experiences. Therefore, matching the images and values of STEM fields with different gender roles gives this mutual construction that reveals how women's motivations, interests, and strategies affect their orientation to female-dominated STEM fields. While almost every report and study in the STEM field focuses on women as a minority group and analyzes the stereotypes, biases, and gender-based division of labor there, they claim that femininity values or women are excluded from these areas. On the other hand, in STEM fields where women's participation is high, inferences and reports need to be revised because it becomes difficult to understand how the same premises are related here. In addition to this literature, revealing gender discrimination in the female-dominated STEM fields can be seen as a contribution to the thesis in terms of expanding the discussion. Therefore, whether the

increase in the participation rate of women directly breaks these stereotypes, biases, and prejudices in STEM fields or whether it means that motivation and interest are created in the relationship of girls and women with science and technology needs to be questioned. I believe that research questions, by making such inquiries, contribute to my thesis discussion points and further research.

The life-course perspective significantly increased the contribution of this study to the literature because it enabled me to shed light on the multi-layered issue by revealing women's experiences in socialization to discussions about their careers in science and technology. In addition, I wanted not only to expand the discussion dimension but also to create a social benefit for women who are aiming for a career in the STEM field or who are already working in this field by paying attention to the barriers they may encounter and the strategies they could develop for them in Turkey.

1.5 The Methodology and Research Design

I aim to understand the place and meaning of science and technology from a gender perspective. This structural analysis gave the causality and the construction process of gender discrimination toward women in female-dominated STEM fields. Following the paths of feminist methodology, I endeavor to answer my research question by conducting qualitative research. The data was collected through semi-structured, in-depth interviews with the participants I interviewed. Since my research questions are about the socialization in family, education, and work experiences of women who have studied and worked in female-dominated STEM fields, I designed my research to conduct a life-course analysis. The unit of analysis level is based on the experiences and thoughts of the participants; this study also provides an overview of women's decisions and strategies that are affected by the socialization process in Turkey's society structure, education system, and working conditions toward university majors and employment. In addition, I used the 'female-dominated' categorization only for the STEM fields in this study, where the participation rate of women is higher than 50% in Turkey; it should not be framed as the opposite categorization of 'male-dominated.'

I used non-probability sampling methods such as snowball, purposive, and quota sampling to reach the participants who matched my research participant criteria. These criteria are that the participant must be between 25 and 35-year-old women participant who has at least two years of work experience in the field of STEM, graduated from female-dominated STEM (biology, chemistry, chemical engineering, food engineering, and environmental engineering) departments, and agree to be interviewed through face-to-face or online platforms (Zoom, Teams). I completed my research by reaching 15 participants who met these conditions.

Thematic analysis incorporating a life course perspective was used to examine women's experiences of gender discrimination via MAXQDA. Following the strategic decision to participate in female-dominated STEM fields based on women's gender discrimination experiences, I highlighted inter-institutional relationality to analyze repetitive or reproduced gender patterns in professional life. Since I question the gendered structure of science and technology from a feminist perspective, I analyzed women's experiences within the framework of intersectional relationality through the structure of family, education, and work institutions. The life-course perspective helps analyze how these institutions construct the understanding of science and technology in society through interactions during the socialization process and what kind of gender discrimination against women is reproduced in their professional fields. Therefore, by aiming to reveal the interactions that shape women's understanding of science and technology and mutual relationality in each institution, I analyze their career aspirations and progress in the STEM field within this framework.

1.5.1 Limitations

I frequently experienced constraints of time, space, planning, participants' accessibility, and limited existing literature in this study. While I believed that my thesis topic and research question made a difference and importance in the academic field, there were various constraints and limitations because I could find limited study examples or data in Turkey regarding the subject. I had to design a long line of questions that I would ask the participants to answer questions related to many topics, such as the gender gap in STEM, gender discrimination in the workplace, and the gendered socialization process, which could guide me on this subject. As a result, the lack of literature and data focusing on female-dominated STEM fields also caused me to compose many data myself and to take a long question form and time for the participant. It made it difficult for the participant to volunteer to devote a long time to this. Because I focused on intersectional structures, I searched for findings from different studies, which helped me limit the data I needed to obtain.

On the other hand, since I do not have many connections with women professionals in STEM, I could reach my participants through social media, professional associations, professors in the STEM department, and my friend's connections. While there are comprehensive women's solidarity networks in the software sector in Turkey, I could not find an active solidarity network or association in STEM fields in which women have highly participated, which made it difficult for me to reach them. It took a long time and effort to reach interviewees and make announcements through various platforms and networks.

Since I was planning to meet with working women, I added meetings via online platforms as an option. However, we could meet online more than I expected due to participants' working

hours, the high number of participants outside the province, or childcare responsibilities. Meeting with women who work long hours or have child-care responsibilities caused the conversation to last until late evening. These constraints also caused our interview process to be interrupted or divided. Besides, since my questions presented a retrospective in terms of question content, it took longer for the participant to remember or tell the plot, which caused me to lengthen the pace of the study many times. Thus, I could shorten my questionnaire as much as possible and reduce the time I spent with the interviewer.

1.6 Statement of Assumptions

My interest in the thesis was based on the networks and societies established for women's struggle in the STEM field, the academic studies I have read, and my personal experiences on this subject. Therefore, I had the opportunity to read about women's relationship with science and technology from a gender perspective, their working conditions, and experiences in STEM fields, and to listen to them from workshops, seminars, or talks events. However, all my experiences and knowledge were about departments and professions where women are a minority in STEM fields before deciding the research in female-dominated STEM. This basic paved the way for making assumptions that women would have fewer disadvantages in STEM fields and departments that have rates of women high participation. In terms of gender equality, reaching an equal number of participants in a particular field is a good indicator in terms of creating an equal competitive environment and ensuring its accessibility by everyone. Besides, this appears as a condition that must be met regarding democratic rights in the political arena, workplace, and education. Therefore, the prediction that numerical equality provides social, cultural, political, and economic equality is drawn linearly in many mechanisms. I assume that reaching a dominant number rather than an equal number creates conditions that can be advantageous for women to participate in STEM fields compared to those in STEM fields where they are a minority. However, although women are in the majority in many feminized professions, such as teaching and nursing, due to gender discrimination against women, the same majority in top positions is not the case. Therefore, it is assumed that this same case may also occur in different female-dominated fields.

The method I put forward in my thesis is to try to understand the women's socialization process, which includes their recent and past experiences. The fact that I, as a woman, have experienced gender-based discrimination within institutions such as family, education, and work during the socialization process in Turkey's social structure enabled me to pose a question appropriate for the political, social, and economic discourse I designed for a woman who had grown up in same society. These experiences have led me to understand that women who grew up in our society and have experience are the subject of shared experiences.

Therefore, questioning my assumptions that all these institutions shape women's interests, skills, strategies, and participation in the STEM fields is a guide to revealing the patterns of gender discrimination that affect women's professional experiences.

The fact that the participants have similar or different cultural, economic, and social capital affects the diverse experiences in the socialization processes. However, they are not the same in general. Therefore, with their agency, each woman subjectively filters and conveys certain reality to me. Based on the subjective representation of the participant, I aimed to reach the knowledge itself by questioning my assumptions from a gender perspective through similar and differentiating experiences. Here, the purpose of conducting an in-depth interview, especially by choosing the qualitative method, is to present a reality based on experience by not entirely putting aside my and the interviewees' identities, values, and ideologies.

1.7 Map of the Thesis

The purpose and findings of this thesis are integrated into five chapters. In the second chapter, I frame the relationality of gender, science, and technology co-constructing each other through the institutional structures. I aim to reveal how gender, science, and technology mutually produce each other and the construction of gender-based discrimination toward women in STEM arising from this relationality. Thus, I aimed to open the opportunity to analyze the whole process by giving feminist criticism to the values of the science-technology structure and the understanding given by the seemingly masculine image of the structure. Within this framework, I claim how this construction continues in particular periods of life to reveal gender patterns. I argue how the women's socialization process experienced in family, education, and professional life shapes professional experiences in STEM fields. Besides, the theoretical framework of the gender-based division of labor in STEM fields arising from this relationship does not only give us the causality of the gendered distribution in STEM fields. However, it also claims how the structure of organizations is shaped through this division of labor. I aimed to conceptualize gender discrimination in professional life in STEM fields with its historical perspective and gendered science-technology understanding. By intersecting the literature on family, education, and work as institutions with the gendered science-technology structure, I created a discussion ground that could reveal the relationship between the values of these fields and gender discrimination for my study.

In the third part of my research, I clarified my research design, my methodological limitations with how I solved them, the statement of assumption of this study, and the ethical issues I raised. In this chapter, I focus on my data collection method, data analysis methods, sampling methods, and the causality of using qualitative research to answer my research questions. I

have highlighted the importance of feminist critique and its standpoint, methodologically and as a guide to finding answers to questions in this research.

Starting from the fourth chapter, where I shared my analysis through findings, the following chapters focus on the relationship between the socialization process and women's career aspirations. I aimed to make inferences about STEM majors and professions from a gender perspective while giving place to discussions about how women's science and technology relations are constructed within institutions such as family, environment, education, and work within the socialization process. As a result, drawing on this process and women's recent experiences, I conducted discussions on the impact of gender discrimination on patterns that lead to concentration in female-dominated STEM fields. The discussion, which started with the socialization process in developing women's motivation, interests, and strategies in choosing female-dominated STEM fields, continued with the working environment and conditions they encountered in their professional lives. Beyond the dualistic ideas of exclusion or inclusion discussed for women's questions in STEM fields, I highlighted the conditions of inclusion that women's experiences point to beyond the concepts of a underrepresentation. By highlighting certain conditions, I aimed to understand and explain the experience of gender discrimination, even in STEM departments where women participate at a high rate, by turning to the intersectional discussion regarding both institutions and relationality.

In the concluding chapter, I aimed to do a general review of the study's purpose, scope, and summary. I have created suggestions that include both the study's limitations and how we can develop broader discussions on this area. In this way, I believe I have put forward practical applications for future studies and everyone working in STEM fields from a gender perspective.

CHAPTER 2

LITERATURE REVIEW

2.1 Literature Review

This chapter establishes the intersectionality between gender, work, and science-technology. To understand how gender discrimination shapes women's decision to participate in STEM fields and work life, to reveal their motivation for participation, and to underline structural barriers, it is necessary to reveal the intersection of the structure of professional life in STEM fields and the structure of science and technology understanding from a gender perspective. While the gender gap in STEM fields is still a global problem, specific structural analyses reveal the underrepresentation of women while simultaneously supporting and increasing women's participation in STEM fields. In addition, my valuable point is understanding under what socialization conditions women participate in STEM fields within the life-course perspective.

Unlike the underrepresentation of women in most STEM fields, women's participation is high in some STEM fields (such as biology, chemistry, chemical engineering, environmental engineering, and food engineering) in Turkey. I construct the relationality between these structures to understand that clustering and gender disparities in the STEM field are realized by intersection with science-technology values, cultural codes in society, and gender roles.

I aimed to understand the critique of structural analysis from a feminist perspective by focusing on dualistic values such as rational/ emotional and hard/soft in the field of science and technology. In the light of socially co-constructing understanding, the center of scientific values is based on rationality, neutrality, and objectivity, while its periphery values are connections, health, conservatism, and caring (Faulkner,2000). Masculine values code the core of technology and science work and devalue feminine values associated with the periphery. Therefore, I will discuss the STEM fields where women are concentrated and the prominent values not in the context of exclusion but in a hierarchical sense of devaluation. With this devaluation, I aimed to bring the women's experience in the STEM field to the analytical level by intersectionalizing the conditions of the socialization process with these institutions and structures through women's experiences of gender discrimination in the family, education, and professional life. During the socialization process, I focused on gender

roles and role modeling so that I could understand why women have high participation in some STEM fields and the gender discrimination they experience despite increased participation in Turkey.

First, this chapter starts with a feminist critique of the social construction of science and technology through hierarchical masculine culture and image based on gendered dualistic values. Secondly, the following focus aims to reveal the reflections and intersectionality of these hierarchical values and structures in the occupational structure in the STEM field based on gender perspective to discuss gender segregation and discrimination at the professional level. The following aims to take a holistic perspective on the relationality established with science and technology and the process of participation in professional life through gender discrimination in women's life-course experiences. Therefore, lastly, I emphasize the importance of making sense of this inter-structural relationship through women's experiences in their career journey during their socialization process.

2.2 Feminist Critiques of Science and Technology

Feminist scholars have discussed gender by conceptualizing it in philosophical, historical, and interdisciplinary scientific dimensions. In the late 1960s and early 1970s, they criticized science's ethical values, epistemology, and methodology from a gender perspective. This criticism and discussion developed by feminist because rational scientific thinking not only constructs modes of thought and public institutions' action but also affect our private lives (Harding, 1986, p.16). Since scientific knowledge has the power to be an engine of political, economic, and social control, feminists claim that our lives are gendered and produced through organizing social life based on dualistic values such as "*natural*," "*social*,"; "*rational*," "*emotional*"; "*subjective*," "*objective*" etc. Feminist critics of science do not argue that the dichotomy between reason and masculinity, rationality and emotion, or masculine and feminine has never changed in history. Instead, it reveals that while these dualities are rooted in the birth of science, the seventeenth century make us recognize a marked polarization of all critical terms that were also crucial to science and our understanding of gender (Keller, 1985). Since technological and scientific advancement and innovations have a long history centered on military and industrial purposes, gender-blind business, politics, and social reflection of technology and science make the image of man pioneering the world under control. For centuries, these deep-rooted dualities with the masculine narratives have opened new areas of struggle to understand science for feminist researchers who criticize unquestioned cultural assumptions within science's philosophical and historical structure.

Gender is an analytical category that can be observed in the organizational structure of social

actions, social life, and relationships and should not be seen as a variable as a consequence of sex differences in biology (Harding, 1986, p.17). Therefore, feminists criticize the separation of the category that we can see in its social structure from scientific theories that investigate phenomena. As an example of this critic, Keller (1985) wrote that the most significant critique of her book "Reflections of Gender and Science" aims to reconcile the relationality established by masculinity and objectivity prevalent in the culture. She claims that this established relationality should be understood as an interpersonal phenomenon because objectivity also develops its capacity through the articulation of gender by intersectionalizing it with different institutions and relations.

At the starting points of the epistemological inquiries of feminist standpoint theories, only the knowledge produced in the scientific field and the methodology of production should not be comprehended in the dimension of gender-blind or objectivity discussions because considering that the discussion has a broad historical women's struggle at the starting point, explains these discussions in the whole meaning. This struggle is for women to exist equally and maintain this existence in all areas, such as public or private, natural or social, work or education. Therefore, the point I want to grasp in this literature for my thesis is how science's gender-based image and culture reproduce gender roles and discrimination through social institutions and how gender shapes science and its values, ethics, etc. To do so, the intersectionality between science, technology, and gender can be conceptualized based on the experiences of women working in the STEM fields.

Looking at gender discrimination in employment and the socialization and educational structures women receive, many studies have revealed structural barriers that exclude them from studying engineering and science. These studies are similar to my position to show the structural barriers to women's participation and analyze under what conditions they can deal with these barriers with strategies. Besides that, rather than the fields where women are under-represented in STEM, my study focuses on STEM fields where women's participation is high and aims to explain the reasons for this density from a gender perspective. Thus, this study will enable us to question technology and science itself from a gender perspective and whether the increasing participation of women means that structural barriers have been overcome.

2.2.1 Unveiling the Masculinity of Science and Engineering

Technology itself cannot be fully understood without reference to gender.

(Cockburn, 1992, p. 32)

The birth of the philosophy of the modern science understanding in the Age of Enlightenment brought along the fundamental philosophical establishment. The birth of the modern

understanding of science created consciousness for scientific discovery and exploration of the outside world by categorizing it with the dualities taken for granted by early Western thought. Cartesian dualities (mind/body, nature/culture, women/men, reason/passion) are taken for granted on the basis of scientific understanding, methods, and thinking, that is, the purpose and process of producing knowledge. The understanding that what separates humans from animals (matter) is 'consciousness' is based on the fact that thinking and finding the truth is possible only with 'reason.' Therefore, the relationship between the state of being conscious (mind) and its object of knowledge (matter) is a structure that creates a binary and hierarchical opposition (Ramazanoğlu & Holland, 2002, pp. 27-28). Feminists have criticized that there is a power relationship between these dualistic categories in modern science and that by bringing the categories of mind, rationality, and reason to the superior position while putting categories such as emotion, irrationality, and subjectivity into a secondary position outside of reason.

Keller (1983) characterizes scientific mythology through the mindsets of values. Objectivity is a way of knowing in science based on impersonality, mindedness, and value-ladenness, matching masculine values centralized the men as knowing subjects, which decentralized the subjective values such as feeling, irrationality, and emotions, match with femininity (p.133). Thus, the authority of modern science also reproduces dualistic categories established through institutions and embeds hierarchical ways of thinking and social relations in power relationships. However, understanding this hierarchy and power relationship as deterministic science domination and its dualistic categories ignores the structure of gender and social relations in dialectical historical relationality. The point that the feminists challenge is to unveil from the perspective of gender that the structure of this scientific understanding that continues the masculine domination and political implications is socially constructed. For instance, determinist biological knowledge scientifically promotes the incapacities of women's nature to conduct a scientific study because of a lack of analytical thinking compared to men's based on sex differences (Wajcman, 1991, p.3). Accordingly, the feminist critique underlines that it does not have pure objectivity without eliminating it because the understanding of science highlights masculine values and produces gendered bias endowed with these values.

The feminist critique enables us to comprehend the intersectionality from the dialectical relationship of society and science in the patriarchal structure. According to the feminist critique, scientific and technological developments are a means of domination of women and nature; for example, nuclear weapons, arms manufacturers, and technical developments in the military can be explained in the context of this masculinity. Since "mastery of nature" is a powerful symbol of science and technology, modern scientific and technological advancement

is related to masculinity for the aim of domination and control in industrial capitalism (Easlea, 1981, cited in Faulkner, 2001). Therefore, forms of masculinity is related with such as physical toughness, destructive power, and control. These are constructed through machine-related skills and capacities and are directly related to science and technology's historical and cultural structure.

Gender-based segregation in STEM fields or among professionals can be explained by the intersection of patriarchal structure with whole social systems in a society. According to the values assigned to men and masculinity, significant roles and professionals in science and engineering also have masculine culture and image. The mutual construction between patriarchy, modern industrial capitalism, and science constructs overwhelming images of '*nuts and bolts*' (Faulkner, 2009) and 'nerd (emotional detachment)' for mechanical engineering, civil engineering, or computer engineering. However, within the image of engineering and science professionals have different images according to their closeness to mathematics and analytical formulations in the context of *hard/soft* dualisms (Edwards cited in Lerman et al., 2003). The STEM fields such as physics, mathematics, mining engineering, and civil engineering are related to *hardness* because of the high density of mathematical and physical ability. On the other hand, food engineering, biology, chemistry, and environmental engineering are the *soft* fields of STEM because of less density of mathematical, technical ability, and physical toughness, regarded as closeness to feminine (Pehlivanlı-Kadayıfçı, 2015; Zengin-Arslan, 2002). Accordingly, the symbolic connection of images with masculinity and femininity is related to both gender disparity among professions and hierarchical positioning in STEM fields.

In my thesis, I would like to note that I explain the coproduce circle of gender, science, technology, and work relationality through these dualistic ideas as continuous and dynamic examples during socialization. I have explained the dualistic concepts to claim the role of science and technology in social construction and to show how powerful and symbolic masculine values are. In particular, the rational/emotional and hard/soft duality that I focus on shows its relationship with gender values in the definition of *real* technology and science that has connected to rationality and hardness. For example, kitchen appliances and drugs are not the first examples that come to mind as technology products, and these technologies are soft because of their smaller scale and meeting our daily usage (Faulkner, 2001, p.85). This valuable perspective allows me to explain the social meaning of science and technology and hierarchies in this STEM field through these dualities. When I consider relationality from a gender perspective, it becomes clear that gender has a significant role in professional occupations in STEM.

2.2.2 Intersectionality between Gender, Science, and Technology among STEM

Professionals

Intersectionality enables analysis in the reproduction of gendered and gendering concepts with different forms of exclusion and inequalities, considering changing work organization, neo-liberal market ideology, and technologies (Acker, 2012). Engineering and science as a professional field where we can explore the intersectionality with gender issues, observe the practices in which binary values coexist, and experience the mutual construction process. Feminist Technology Studies (FTS) explore femininities and masculinities through practical skills, technology, and gendering performance at work. They use the term “co-production” to claim the dialectical relationship between gender and technology by feminist scholars. By avoiding essentialization, this concept emphasizes the performative and procedural state of both gender and technology (Lerman et al., 1997; Lohan, 2000; Wajcman, 2000; Bray, 2007; Faulkner, 2001; 2015).

Some dichotomous terms, such as soft/hard, objective/emotionally connected, or social/technical, conceptualize scientific and technological knowledge with their practices. Although some of the conceptualizing is not obviously seen in the context of hierarchy and gendered meanings, symbolic implying of images and discourses contradict each other mutually. Faulkner (2000) explores the coexisting dualism from the perspective of mismatching images and practice in engineering by examining mutually dependent interactive activities in the engineering professions. This mismatch is a socially constructed phenomenon because they have a masculine and hierarchical image; many values and symbols considered excluded in practice are embedded or visible. Faulkner contextualized the mutual production and shaping of gender, science, and technology through the *gendered division of labor*, *gendered symbols* in engineering practices, and professional *identity* in engineering. Since the hierarchy of dichotomic values in the context of gendered distinctions and hierarchies is manifested within engineering as a practical manner of technology, the dualisms in practice manner indicate the construction of gendered symbols in engineering and science in the industrial era.

'*Gendering of technology*' (Faulkner, 2001) means that based on different symbolic representations in technology are perceived with gendered associations. The gendered division of labor is based on symbols of masculine or feminine values and images. To illustrate, the sewing machine is feminine because of seeing women's stereotypical activity; on the other hand, the calculator is masculine because it is assumed to be commonly used by men and related to mathematics and analytic thinking. The consequence of the symbolic association and mutual social construction process related to the gendered division of labor (i.e., women

have skills in cooking, sewing, etc., men do not). Perceptions of gender roles are also the reference point for co-constructing the division of labor and the design of the artifacts.

For new technological designs and inventions, the formation of social/technical dualism in engineering and science understanding is not mutually exclusive but produces each other. Combining the two dualisms idea offers not only technical but also social intertwined in technology as called a 'seamless web' (Hughes, 1986; Faulkner & Lohan, 2004). Engineering and science must be constructed from a holistic perspective that combines heterogeneous social and technical knowledge to meet real needs and work organization. Therefore, feminine expressiveness, that is, 'social,' is not irrelevant knowledge that has opened space for heterogeneous roles in women's professional lives. However, these heterogeneous roles as senior positions in professional life, such as marketing, management, and coordination, grant men an advantage over specific gendered skills and role assumptions (McIlwee & Robinson, 1992; Woodfield, 2000; Faulkner, 2001). This caused women to experience gender-based inequalities and discrimination in the fields where they take a role for work during their professional lives. Therefore, these perspectives expanded my thesis study to examine the structural relationships, images, and symbols that intersect with women's career aspirations and development in STEM fields.

2.2.2.1 Devaluation of Femininity and Its Values

Although there is no general culture or femininity expression, some values are associated with femininity under patriarchy. "Emotions, body, nature, joy, connection, softness, sensitivity, and empathy" are some of the values assigned to femininity or women's qualities; on the contrary, "rationality, aggressiveness, logical and analytical thinking ability, practical, hardiness, and domination" associated with men and masculinity under patriarchy (Tong, 2014, p.53). The cultural construction of masculinity and femininity values that are also sets of gender identities are seen as "natural" and "normal" in patriarchal societies. In societies, this hierarchy of values, the balance of power, and domination placed men or those with masculine values in a superior position while they dominate the opposition of these values or the "other." As a result, social aspects of gender identities, institutions, systems of beliefs, and work organizations are mutually constructing each other based on the idea of dualistic gender values. In that sense, feminist critiques claim that scientific activity and scientific understanding are also organized by gendered perspectives and reproduce androcentrism under the patriarchal system, which would be seen as the relationality between scientific and masculinity values (Harding, 1986). On the other hand, values such as creativity, nurturing, empathy, and emotionality, assigned to women's unchanging nature or origin, are the traditional oppression conceptions of women's historical subordination (Wajcman, 1991).

Besides, these are clearly associated with motherhood, which is socially construed as women's gender identity within the male-dominated culture.

Values identified with femininity and womanliness in culture shape women's lives through the normality and naturalness of these values. Feminist standpoint theory criticizes these values as a conceptual aim of glorifying masculinity and devaluing women's life and 'femininity' values that shape the construction of their gender identity (Harding, 1992, p.448). The hierarchy between the glorified and the devalued values is constructed in favor of the loyalty of masculinity. In addition, rationality, objectivity, and reason are the values required in the process of producing scientific knowledge and in the characteristics and identities of a scientist, with the exclusion of emotions, feelings, and subjectivity. Although science claims to be 'value-free' by reflecting reality like a mirror, it cannot be a reality without considering this intersectionality of the structural configuration between traditional mindset, institutions, and gender.

The dualism between rationality and emotionality is one of the prominent tensions in professional engineering that has an association with science. Objectivity and rationality as masculine values in science are indispensable for problem-solving and analysis methods with emotional detachment, which is clearly gendered when emotional connectedness is considered subjective rationality as feminine values (Faulkner, 2000, p.773). As a result, while these prominent masculine images, symbols, and values are endowed with an unattractive and exclusionary culture against the fields of science and technology, the devaluation of the values associated with femininity in this field has guided their experiences in science and technology in social and professional life. The exclusion of culturally displaced values to the realm of femininity has allowed for the powerful "masculinization" of science, which is why the alliance between scientific values and the ideal of masculinity is matched by patriarchal culture (Keller, 1985, p.80). However, when we examine the professional values in the fields of engineering and science, despite seeming to be excluded, it is significant that we regard that they *co-construct* each other in a hierarchical manner and from values by devalued or underestimated rather than excluded completely.

The cultural expression and practices of technology and its symbolic representation have also been shaped by the different values and meanings attributed to women. We tend to think of science and technology in terms of traditional concepts and values. For example, when we think of technology or science, "powerful" and "solid" examples such as machines, cars, industrial products, military weapons, atomic bombs, or space rockets distract us from the technological understanding that we interact with in our daily life like kitchen staffs, horticulture, foods, or health products. The fact that this understanding creates a male bias in

the definition of technology emphasizes how much we identify technology and manliness with masculine values in society while excluding the context in which technology is actively used for large parts of society, such as childcare and cooking, which are attribute to women's technologies (Wajcman, 1991, p.137). I gave this example to emphasize how the concepts and values in science and technology, which women actively use, work, create, and assign, are culturally and historically constructed through the hierarchy between dualistic ideas.

Focusing on devaluing symbols, meanings, and values will not only deconstruct how we perceive technology and science but also enable us to comprehend historically and culturally through which institutions, ideologies, and structures this construction process has reproduced the relationality between science, technology, and gender. While feminist criticism uncovers the devaluation and invisibility of women's contributions in the field of science and technology, we can understand that many assumptions still lead to established gender patterns today with women's underrepresentation in the STEM professions.

2.3 Theoretical Framework of Gender Division of Labour

“Though home and private life may be romanticized, they are generally held to represent the ‘feminine’ world of the personal and the emotional, the concrete and the particular, of the domestic and the sexual. The public world of work sets itself up as the opposite of all these things: it is rational, abstract, ordered, concerned with general principles, and of course, masculine....”

(Pringle, 1989, pp. 214–215, as cited in Abbot et al., 2005)

The relationship between gender and work in the historical analysis claims complex relationality with the labor market and work organization. In pre-industrial times, the work divided by women and men varied from society to society; labor was not clearly divided by gender, ethnicity, age, or space. However, an attempt to divide and segregate was made to identify the socially constructed division of work and labor originating from biological differences during the industrialization process. Mainstreaming the assumption that the woman is ‘naturally’ good at gathering, caring, cooking, or doing housework has been attributed to stemming from biological differences. Conversely, men are identified as better at hunting, providing, and controlling. With the industrial revolution, the separation between work and home became a clear oppositional space (Abbott et al., 2005). Therefore, the male-dominated world of paid employment mostly excluded women from the workplace (public) by being imprisoned in domestic (private) life basically based on the nature of biological sex differences. In the private and public spheres, the fact that men are seen as ‘breadwinners’ and women are seen as ‘domestic carers’ claims the effect of the sexual division of labor in everyday life. Due to the gender roles assigned to women, the fact that women lack representation in paid employment claims that women have the leading role in childcaring and

reproducing domestic labor as a 'natural.' Accordingly, it is unsurprising that working women are seen as unnatural, immoral, or deviant against their families because paid employment is outside the home that 'women' belong to.

In the pre-industrial period, while the transition from the mode of production in the family to the capitalist system took place, capitalism industrialized family authority and relations to build an authoritarian structure. The gendered organization of work became much more visible by dividing the public and private arenas of life and demanding specific skills in the labor market. Two main consequences of industrialization had the separation of public from private space called *bifurcation of social spheres* and gender roles construct the *patterns of labor market segmentation* (Abbott et al., 2005, p.g.235). The fact that women, men, and children perform different tasks in the production model within the family, that the head of this production unit is a man, that is, the woman is an assistant next to the trader, had caused to be excluded from working life (Hartmann, 1976). In the 16th and 17th centuries, as industry demanded larger outputs, capitalism began organizing the large-scale production model. During this period, men's professions gained high hierarchical importance, and women's professions and skills were invisible. Besides, Hartmann (1976) explains that the new "scientific" skills had been perceived as being monopolized by men and that they were in a leading position in industrial professions with the help of the state, which limited women's participation in the labor market.

Gender division of labor made women concentrate on paid employment for low-status and low-paid (primarily seen in women's work) and created occupational segregation between genders because of associating men with the former and women with the latter. Feminist scholars have categorized occupational segregation into two terms. First, horizontal that explains women are concentrated in a limited range of occupations in the labor market. Secondly, vertical segregation explains the concentration of women in low-paid and low-status jobs. However, considering them as separate and non-interactive general segregation, as in Hakim's method (1979), makes it difficult to establish relationality and claim to the power dynamics in the local labor market (Walby & Bagguley, 1990). Accordingly, a complex formulation must include occupational segregation within the local labor market, hierarchy within occupations and work, and changing gender relations with the division of labor. Therefore, I considered these categories and relationalities as industrial segregation within the STEM fields and through the local labor market and gender relations in Turkey.

During the period of industrialization, the traditional gender roles, such as caring for the household, cooking, and cleaning in the domestic sphere, were seen as women's 'natural' roles and responsibilities, which resulted in patterns of the labor market. The pattern of gender

division of labor has limited women's opportunities for paid employment. Feminists have argued that traditional gender roles and the labor market reinforce women to a narrow range of occupations related to their roles in the domestic sphere. Thus, these patterns claim the reasons why professional and managerial occupations are gendering and hierarchically employing women in the lowest-level jobs. As Walby (1990) argues, rather than excluding women from paid employment, the changing labor market and industrialization process is the reproduction and transition of patriarchy from the 'private' sphere to the 'public' sphere within the mutual relationship between patriarchy and capitalism.

2.3.1 Occupational Segregation Based on Gender Roles

Technology significantly impacts the division of labor in work and organization. This effect is a process that continues to be reconstructed through technology and gender-based values and roles. Every new technological or scientific invention, development, and transformation affects the division of labor, employees, and professional understanding in work, which are mutually constructed by each other. Feminist sociology of work and organization understanding claims that the division of labor is characterized and shaped by sexual hierarchy with gender roles in society. The gendered segregation of occupations is not incidental but sustains and reproduces the gender roles in employment. The understanding mainly focuses on the impacts of patriarchal social structure and capitalist work and organization on women's labor and employment.

Professional occupations are heavily divided between female-intensive and male-intensive, including gender-balanced work. The concentration of women in jobs such as social, health, and education, where they are 'naturally' suitable, and the concentration of technical skills and physical abilities such as engineering, where men are 'naturally' suitable, are professional gendered distinctions. Particular gender discrimination and sex stereotyping are reproduced in specific ways within the pattern of occupational segregation (Acker, 1990; 2012). For example, Smith & Dengiz (2010) claim that men are concentrated in production and manufacturing departments, while women are preferred for jobs such as quality control that require careful monitoring and documentation in Turkey. However, even in professions where women are concentrated, manager or supervisor positions are carried out by men, while women are concentrated in low-level or mid-level positions as supporter roles.

2.3.2 Interest and Skill

Tracing the roots and continuously dynamic relationship between work and gender, I endeavor to understand women's experience in STEM by their interest and motivation to participate in specific fields. It is no coincidence that women working in STEM fields develop an interest in

particular departments and occupations. Gender interests are mobilized by common assumptions (Wajcman, 2000). Therefore, the fact that artifacts as technological objects, designed and symbolized in the technological field, appeal to the relevant social group based on gender has affected the division of labor in this field. For example, seeing the car as a man's toy and the masculinity of the set of interests also marginalizes women's interests and skills in this field. Wajcman (2000) analyses the division of labor and set of interests in this field as the industrialization of male interest as an actor.

Rather than seeing women as active actors in the designing and productive process of science and technology, they are considered end users of domestic and reproductive technology (Faulkner, 2001). The bias in science studies recognizes the men who work in prestigious heads of 'big science'; however, women are identified in routine scientific work, which is vital (Wajcman, 2000, p. 453). Unfortunately, women's jobs in STEM are considered 'semi-skilled,' and 'degraded' task leads to exclusion in visibility in the fields. Perceptibly, hegemonic masculinity is dominant in the fields, which shapes the division of labor and hierarchical power on the productive side.

The reason and result of the lack of participation of women in the fields producing side of science and technology, the politicization of women's and men's jobs with new technologies, the degradation of women's jobs, and their deskilled image being excluded from technology and science-related professions are discussed in feminist studies (Cockburn, 1981; Feldberg & Gleen, 1983; Faulkner & Arnold, 1985; cited in Lagasen, 2014). Despite the promising masculine values and image of science and technology that exclude femininity, women had to struggle to develop their skills and interests in these fields with receiving an education.

Although having a higher education is a great opportunity for women who work skilled jobs, the corresponding labor market has not opened an equal chance to use the skills and knowledge they receive. Because the labor market has occupational segregation, women mainly work in the service or public sector, particularly in roles associated with healthcare, childcare, and education. Therefore, there is a tendency for women to develop skills, interests, and capacities in areas with a high probability of finding a job and receiving a particular higher education. One of the reasons for the high women participation in biology, chemistry, chemical engineering, environmental engineering, and food engineering is the expectation that women are more likely to find employment in these fields than in other STEM fields. The fact that they want to receive education and acquire skills in these fields is that the labor market of STEM is segregated. In order to understand the occupations that women 'choose' in professional work, it is necessary to consider those gender-based social roles and expectations that restrict this choice and that the choice itself is socially constructed.

2.3.2.1 Women's Inherited Skills and Gendered Attributes

Manual dexterity is the assumption that women who have small hand features and the ability to work in detail are 'naturally' qualified by caring more. The orientation of women in manual dexterity compared to men is regarded as an inheritance. Not only having naturally '*nimble fingers*' but also being more docile and adaptive for difficult discipline make women more suitable for repetitive, detailed, and monotonous work. These skills and characteristics that are attributed to women are seen as natural or inherent features that are actually the results of training (Elson & Pearson, 1981, pp. 73-74). This training is given by their mother or other women's kin to women during childhood because of necessary for women's gender roles to be socially appropriated. Due to the skills training considered natural women's activities, it is not categorized as a 'skill' in jobs and the labor market. Therefore, especially in the industrialization process, the gender-based division of labor clearly predetermined women's employment in the market based on their activities in the family and household. From the self-efficiency perspective (Marra et al., 2009), people believe that they can also efficiently work in a way that matches their gender roles, attributed activities, and identity.

2.3.2.2 Working Place

The dualistic idea of the distinction between private and public spaces considers the private space as family and home, while the public space is work and outside. The division of labor in society, where the woman is seen as a household carer, has assigned the man with the outside as a breadwinner. Accordingly, the "proper" place for women in Turkey's traditional idea is in their homes for nurturing children, doing housework, and caring for husbands; therefore, the accepted place for women is at home. It is a social disapproval situation for women to leave the place they belong to and interact with men who are not their family, kin, or relatives. Therefore, working in an 'appropriate' field clamp in the industrial working area has imprisoned women in certain industrial jobs and activities. The '*appropriateness*' for women is explained in two levels based on her study in Turkey, which are not doing the men's jobs because of physical weakness or lack of knowledge and moral reasons for being appropriate women (Ecevit, 1991, p.59). Therefore, suitable or appropriate jobs are defined for women in such a way that they do not or less conflict with gender roles and identity in the social space. For example, Teaching occupations come first among the professions because it is one of the professions closest to being suitable for women in Turkey, with regular working hours and workplace, which is thought not to interfere too much with family responsibilities, and the work environment is more gender-balanced. However, occupations such as mechanical engineering that require field-based in a factory environment, long shift working hours with technical ability or thinking are seen as hostile workplaces for women due to

uncertainty of the workplace, environments, and hours.

2.4 Gendered Codes and Values of STEM Professions

Professions in STEM fields and the occupational labor market are segregated by the perspective of gender and socially constructed science and technology understanding. The fields are hierarchically segregated, starting from choosing departments to entering the work-life. The hierarchical division among engineering and science students at the universities is not only according to their university entrance score but also depending on their knowledge of mathematics or technical ability. Besides, the historical construction of science and engineering centered the core on establishing the origins fields like mechanical engineering or physics rather than new sub-branches like environmental engineering or biochemistry. Thus, the new fields were categorized hierarchically as peripheral branches near the center of the 'real' science and engineering fields (Zengin-Arslan, 2002). Accordingly, the fields in which men's domination and masculine values related to mathematics, practical and psychical ability, and abstract thinking are the center of science and technology, which makes the definition of 'real' engineering (Faulkner, 2001). The division of the fields is also observed in the fields of industrial occupations, such as preferring men in civil, mining, mechanical, or computer engineering; conversely, women are welcomed for environmental, food, or chemical engineering positions.

Although production, design, quality, research and development, management, organization, or sales are some of the tasks that every science and engineering employee could do, the hierarchical relations reproduced over the task. For instance, tasks in a sales or organizational department are not considered what 'real' engineers do as much as being in a position of design or production department because they require 'soft' and 'less technical' skills in STEM fields. Therefore, prestige and status are gained through using 'hard' and 'more technical' skills such as computer programming, project management, machine operation, and design in STEM fields.

The hierarchical relations start from departmental division with the continuing industrial division of labor in STEM fields reproducing the gender discrimination against women with a gendered understanding of science and technology. Because real engineering and science must use hard and technical skills and employ more men in the departments that can do the task, women in other departments are not seen in the center of the work. The structural barrier, especially in STEM fields that have a gender gap, could not be overcome by employing women engineers or scientists more without avoiding the concentration of women solely in the organizational and sales departments.

2.4.1 Gender Discrimination at Work

Equality opportunity recommendations in the fields of science and technology include the same roles and expectations from women and men without foreseeing a '*degendering*' process (Wajcman, 1991). In fact, the recommendations want women to replace their gender identities with a more manly and masculine version in order to achieve equal opportunity. To illustrate, the usual successful career for a professional scientist or engineer necessitates long, inflexible work periods that do not allow for care, social life, and domestic responsibilities. A prerequisite for success for a woman is to model men who have traditionally avoided such responsibilities. Even if women's domestic roles and responsibilities are at a level that does not affect their careers, for example, gender-based assumptions made against women about their abilities, capacities, and skills do not prevent them from facing vertical and horizontal discrimination in their careers.

Although today's professional life gives a chance to balance family and career with certain rights and social benefits, the structural barriers that women experience in the workplace are still obstacles to employment. The contemporary career path model is designed to match men's life course, which is disadvantageous for women because women's careers are often 'interrupted' or 'broken' by childcare responsibilities (Edwards & Wajcman, 2005). In the linear organizational career, women are seen as inferior to men's careers, so it does not mean being different; it also means deficiency for rapid career advancement. Therefore, hardly seeing women in senior or management positions is explained by one of the factors of the career break.

A career is constructed by masculine values within the organizational culture (Edwards & Wajcman, 2005). The historical formation of the division of labour, career pathways, and promotion prospects operated by gendered segregation in professional life. For example, women, rather than men, have a decisional career dilemma of being motherhood or marriage for seeking advancement in professional life. Being a father versus being a mother in a family comes with different meanings and responsibilities for organizational culture; women make their decisions strategically more than men. The conscious decision-making needs of women and the need to develop career strategies are also the results of gender discrimination in the organizations they work for.

2.4.1.1 Glass-Ceiling Effect

Glass-ceiling (Davidson & Cooper, 1992) refers to the condition that women can see; however, invisible barriers and imperceptible obstacles occur, which cause them not easy to reach a higher position because of their gender. Within the scope of against gender inequality, various

organizations provide some positive opportunities for women to advance in their careers. Still, there remain few in the number of such organizations. In many organizations where women work, they are still exposed to gender discrimination, preventing them from progressing in their careers. Because women are considered to have family responsibility and childcare, occupations that require long hours culture in a management position are seen as disadvantaged for women who especially are married or have children (Abbot et al., 2005).

Gender is taken into consideration for the suitability criteria in management according to whether the person can organize others and is acceptable by other workers or customers. The leadership, senior, or management positions within the command-control style are associated with men because of requiring aggressiveness, directiveness, control ability, and rationality (Edwards & Wajcman, 2005). The gendering career pathway is obvious discrimination against women, although it is invisible and cannot be recognized easily in the organizations. To illustrate, the strong association between men with rationality, technical ability, and practicality incorporates the hegemonic masculine culture of STEM organizations that concern 'professional' values. Being professional is defined as having no sexuality, emotions, and procreations in organizational logic (Acker, 1990, p.151). The logic of organizations both conceals and promote the reproduction of gender relation at work, which creates less opportunity for women's career. It is no coincidence that most men dominate management positions in many sectors where women's employment participation is high. Therefore, the logic of the sectors and organizations determines whether there is an equal and fair competition environment in the career pathways in STEM fields or other professional fields where women participate highly.

2.4.1.2 Queen Bees Syndrome Threatens the Networking and Mentoring

Personal networks are a critical factor in finding employment in many organizations. However, there is a difference between network ties within hierarchical structures and interpersonal connections in firms that have inter-organizational networks (Smith-Doerr, 2004). The 'old-boy network' operates discreetly under the guise of formal rules by the chain of command that is supposed to ensure fairness, while the informal network is less pronounced (p.101). Besides, the small, interconnected informal network between colleagues is much more difficult to be included in an organization because hierarchical work and social relations are more amenable to exclusion. A woman aiming employment or leadership in organizations like men-dominated STEM fields must have an agenda to be trusted by organizations and their colleagues. For example, Smith-Doer's (2004)' study indicates that although women life scientists are more than men, the possibility of running laboratories around 40% in science-based organizations such as pharmaceutical corporations or universities (p.107).

The queen bee phenomenon is that women in male-dominated environments break the glass ceiling in their professional and social lives as having the privilege of being in a higher position, then they see these obstacles as unimportant and exhibit discriminatory behavior against other women (Ellemers et al., 2004). Therefore, the leader position in which women hierarchically distance themselves from other younger women, alienating them from the discrimination women experience while legitimizing the gender hierarchy (Derks et al., 2016, p. 457). Accordingly, Derks et al. (2016) argue that this phenomenon must be discussed in the context of gender discrimination consequences in the work setting since women pursuing their succession careers are triggered by negative group-based stereotypes in organizations. However, I want to emphasize that collective action and solidarity are critical for young women's careers, especially in organizations such as STEM, where work environments are male-dominated and have a gendered culture. Therefore, one of the strategies that can be a solution to women not being able to access managerial positions on equal conditions despite their high participation rates is to have a mentor and network. Considering the fact that Queen-Bees threaten solidarity and possible mentorship, it is also significant to expand the scope of gender discrimination.

2.4.1.3 Glass-Escalator

While sometimes group-based stereotypes for women slow down or prevent upward mobility in professional advancement, this situation can be advantageous for men. The invisible conditions that strengthen men's professional careers and enable them to advance rapidly are conceptualized as the 'glass escalator' effect (Williams, 2003). In this effect, there are situations where it becomes easier for men to gain an advantageous position in professions where women are the majority, and this is a type of gender discrimination. In particular, a man who not only facilitates the recruitment process but also has conditions that enable him to stand out among women has a higher chance of being promoted in women's occupations due to his gender privileges.

Beyond just covering the fact that STEM fields dominated by women have become advantageous for men as a gender privilege, it is critical to cover how gender patterns where work and organizational logic intersect become discriminatory for women. Therefore, this privilege is a reality that can reveal the intersection of science and technology, as well as organizational and professional fields, glorifying masculine values, principles, and being a man.

2.5 Doing Gender During the Socialization

"Doing gender" is a significant concept that will enable people to reanalyze to understand

every institution and daily life experiences to which they interact and relate (West & Zimmerman, 1987, p. 125). It allows for reformulating the research findings by understanding how people in the society interact and examining the relationality of the actions in the doing process of the individual who is oriented to the gender roles and norms. When we discuss the "doing gender" conceptualization through interactive mechanisms aimed at reconciling the discourse of action supported by gender traditionalism and gendered roles in society, we talk about attributing our choices and actions as conforming or nonconforming. In this way, we can establish gender roles and stereotypes in society from their relationality over actions. I believe it is critical to broaden its theoretical meaning to include "doing gender" not only by actors who are culturally oriented with their actions but also by multiple forms of macro and micro social institutionalization because it allows us to understand the relevance of the whole pattern in which we interact. In other words, not only do individuals do gender as a performative act with their interactions in their daily lives, but also the structure of the institutions in this action territory. Incorporating this perspective, I aim to create a women's work-life trajectory by analyzing and discussing the structure of family, education, and work in the context of their experiences and strategies within the socialization process from a gender perspective.

While the socialization process standardizes the life courses of individuals in society, it also opens a space for the reproduction of gender roles carried out by this standardization through inter-institutional structuring. Family life, school life, and work life are associated with the life courses of its members in society; I believe that the action and orientation cannot be understood without looking at the gender patterns of this process. It is necessary to have a complex and dynamic perspective in order to be able to make an institutional analysis of lifestyles and genders in society. The critical stance of this point of view for my thesis is what the professional orientation, which is seen as a choice, is integrated with and the patterns to which this decision is related. One of the institutions that this decision is related to is the structure of social institutions and the socialization process where gender roles and stereotypes are oriented and learned. Since I aimed to reveal the relationship between the socialization process in the family-education-work life trajectory, I consider gender roles, actions, opportunities, constraints, and discourses. I am trying to reveal the structural relevance of these actions, discourses, and patterns beyond the understanding of an individual choice so that I can explain the gendered patterns of women's participation in the field of STEM.

2.6 Early Socialization in Family

The feminist perspective reconstructs the theorizing family discussion in the context of women's social life by emphasizing that all genders have equal importance in social action

and that structures and processes in society have an impact on relationships in private (Fox & Murry, 2000). Thus, highlighting the discussion that the personal is political has brought a feminist perspective to the unattended theories and debates on women's experiences. Unlikely traditional stratification theories that concern gender as an analytical or control variable status like education or age (Krüger & Levy, 2001), feminists concern gender as a structure to avoid any missing evaluation. When I focus on the relationships in the family, which is a part of socialization, I find it essential to look at it from a gender perspective because the experience process that women learn by being influenced by the roles in the family and parental attitudes is different from the male individual. We also see the interaction of this difference at work regarding participation in the labor market and the positions in which they are employed.

Children's characteristics and identities are influenced by parents who transmit their values and behaviors, including gender messages. The gendered characteristics and messages shape an individual's later attitudes and decisions. For example, parents encourage behaviors that appropriate gender roles during the socialization process, such as being a girl is stereotypically associated with being gentle, kind, and docile, while being a boy is associated with strongness, toughness, and alertness (Lindsey, 2015, pp. 85-86). Besides the identification, the gender roles of parents, including the gendered division of labor in a family and lifestyle, seem meaningful models for the children about their interests and abilities. *'Tinkering rituals'* (Faulkner, 2000) are part of a homosocial resuscitation process in which the father deals with technical work at home and transfers technical knowledge and skills to his son rather than his daughter. Cockburn (1983) claims that domestic responsibilities, gendered occupational segregation, and adopting role models during the socialization process historically contributed to the construction of men having the capacity for manual and technical labor while women as technically incompetent. Girls' understanding of science and technology is affected by the lack of role models, lack of encouragement, lack of information about STEM careers, and the masculine image of these fields due to gendered childhood experiences (Phipps, 2007). I highlight the concepts such as gender stereotyping and gender role socialization during the process. Accordingly, many studies assert that women face structural barriers in their decision-making processes regarding participation in science and technology, starting with their socialization and education life.

Life course analysis is essential to understand these experiences, choices, and strategies because it is necessary to uncover the intersection of structures. Women's professional preferences and individual orientation are intersected by the socialization process and the structures of society. While intersectionality enables us to better analyze the layers of inequalities between genders in society, it also provides an opportunity for change or

transformation. In this context, feminist approaches endeavor to understand the intersectionality between women's life experiences from a gender perspective concerning practices and social actions. Actors make or reject decisions for their actions based on their cultural values, political stances, and personal intentions as a reflection of self-agency, which has meaning by considering the social conditions and discourse that make this a meaningful decision. In other words, my position must make sense of women's experiences by finding the transmission and interdependency between structures and actors through specific themes instead of analyzing work, family, and education as separate domains.

One of the critical discussions in family relations in the context of gendering life courses is questioning whether we are passively exposed to it or actively interacting. Krüger & Levy (2001) claim that not only individuals but also institutions are 'doing gender' while interacting because every relationality structure is dynamic. They attempt to 'institution-oriented' linking with the dynamic life courses to understand family, work, education, and gender relationality. It is a necessary framework to analyze relationality in terms of dimensions as individuals establish relationships among themselves and within sectors, social groups, and systems. Framing social actions with the institutional arrangements with which they are associated will enable us to include the actors of the practices and the institutions in which they act while reading the theories. Women's gendered life course can be shaped or influenced by education, family, and economic policies that promise traditional domestic arrangements. Therefore, the strategies and decisions that women develop regarding their experiences of gender discrimination in this process also bring new opportunities and constraints in the context of gender role reproduction. For example, the development of science and technology and the educational system have created different employment opportunities for women. Still, they face various constraints and discrimination in work organizations regarding working conditions and gender roles. Therefore, while analyzing the complexity of intertwined relationships, I believe that to research, for example, the socialization process, we need to establish a whole relationality formed by fragmented patterns.

2.6.1 Toys and Games

Toys and games cannot be explained only by the gender roles that parents encourage for their children but also by the intersection of the toy and game industry with gender issues and inequalities. Williams (2006) examines this intersectionality as gender differences in toy preference are marketing for the toy industry, and this market plays a role in perpetuating and creating traditional gender roles. Marketed toys and games reinforcing traditional gender roles and promoting certain types of toys according to gender foster children's orientation to gender roles. The roles of men and women in gender socialization are reinforced directly or indirectly

by the different expectations of parents, peers, and teachers regarding certain behaviors and attitudes. Girls may be teased or even ostracized for preferring to play with toy guns or cars rather than dolls, while their parents and peers may praise them for helping with domestic roles in a family. In addition to the sweet, cute, and pink-colored appearance of standardized toys for girls, the functions and features of the toys are oriented toward gender roles. For example, while 'Barbie' carries symbols for social standards about beauty and fashion, it is also a gendered message carrier about her professions and talents. It is also a role model construction for girls' preferences or life options. We cannot see Barbie wearing professional clothes, such as a soldier, driver, or engineer, while wearing professional attire, such as a ballerina, a cook, or a flight attendant. Gender identity develops when people portray gender roles according to the perception associated with reinforcements for their behavior appropriate to the label of girl or boy and their interest in artifacts such as toys suitable for that label (Lindsey, 2015, pp.79-81).

Toys for girls encourage domestication, social intimacy, caretaking roles, and housework, e.g., ironing, cooking, and cleaning. On the contrary, for boys, more toys encourage self-confidence, problem-solving, and mechanical control, such as driving cars and trains and building construction with trucks and blocks. Toys and games for boys are regarded as familiarity and confidence in technological aspects and scientific learning, while girls' toys foster the skills of domestic responsibilities, social interaction, and caring (Wajcman, 1991). The transmission of masculine and feminine ideals of embodiment and skill is conveyed to both boys and girls through these toys and games. Gender role transmission in the socialization process manifests itself in the differences between girls and boys in cognitive and social development in childhood and the differences in gender roles, as in adults, through toys and games. Children and young people undergo a socialization process with many artifacts, behaviors, and expectations placed in predetermined gender roles throughout their education and social lives. Thus, exposure to gender-specific patterns of skills and interests is claimed to make it difficult for girls to develop an interest in or participate in science and technology fields (Phipps, 2007).

2.6.2 Mass Media and Narratives

Mass media, family, school life, and culture stimulate the identification of masculinity with machines and technological competency by transmitting the socially structured meanings and values of science and technology (Wajcman, 2004). The structural obstacles to women's participation in employment and occupational segregation are channeled through the education and socialization process, discouraging girls from pursuing careers in STEM. The intersection of images, identities, and roles transmitted in the socialization process has become

mutually reinforcing, limiting certain options and preferences of girls. It strengthens the pairing of men in the fields of technology and science, which dominates their representation through media such as cartoons, television series, fairy tales, and stories. Colatrella (2011) points out that an individual's avoiding or leaving decisions in the STEM field could be influenced more by the impact of socialization, including media representation and peer stereotypes.

Gendered portrayals in cartoons and stories give the ideal roles and values in a way that girls or boys could understand the behaviors and attitudes in society. Disney princesses or female characters in movies, cartoons, or fairy tales are represented as emotional, beautiful, kind, passive, and dependent, while male heroes are strong, aggressive, brave, and intelligent (Ahmed& Wahab, 2014). Besides unbalanced gender representation, female characters are seen in stereotypical roles (e.g., nurses, teachers, mothers, and girlfriends) in media worldwide. On the other hand, although there is limited powerful women characterization in cartoons or movies, the girl heroes are portrayed as not following the gender norms and rules. For example, women scientists are characterized as opposing domesticity, nurturing, and having romantic love, such as the stepmother in *Snow White* (1937), who uses supernatural power and knowledge to kill her stepdaughter because of jealousy (Colatrella, 2011, p.5). Representing femininity through jealousy, competition, domesticity values as opposing rational thinking, pursuing knowledge-accessing, and lack of objective thinking mutually shapes the readers' and audiences' gendered perception of science and technology. Gendered stereotypes in mass media portray science and technology as hostile areas where women may find it hard to belong and feel a lack of skills and capacity through the characterization of role models.

2.7 Socialization in Education Life

In the context of the main parts of continuous socialization, education is a process that bridges both social relations and work life. The formal education process has been operationalized to prepare the individual for society and work life with a rational, reasonable, and objective point of view. Gender roles are at the forefront of the relationships children establish with and within the educational institution at an early age, especially in their relationships with peer groups and teachers. Reinforcing positive peer relationships within the coeducational system is essential, but controlling mischief, aggression, and stereotypical masculine behaviors is not always possible. Therefore, girls and boys are in an environment suitable for segregation into different peer groups by exhibiting stereotypical behaviors. For example, the masculine activities of girls within drawn cultural boundaries are often rewarded; however, girls with gendered atypical behavior could be nicknamed 'tomboy' or excluded from the peer group

(Lindsey, 2015). Therefore, there is a social environment where children are encouraged to exhibit typical gendered behaviors.

Education is not a structure taught in a simple formal education course covering gender differences. Nevertheless, school culture is more deeply involved in the construction of gender and sexuality through the 'hidden curriculum' and implicitly taught meanings and behaviors associated with femininity and masculinity (Wajcman, 1991, pp. 152-153). Studies of schooling and classroom culture claim that teachers exhibit different behaviors, speech, and guidance to girls and boys. As well as being role models, teachers have a vital role in constructing gender identity and self-perception regarding capabilities and decision-making abilities. Besides, studies that explain the underrepresentation of women in science education, technology-based jobs, and scientific publications have highlighted the construction and character of femininity promoted by our culture. Promoting the cultural codes that match the relationship between masculinity and science reinforces that the qualities of femininity are incompatible with the requirements of the 'mathematical mind' in educational life (p.153). The cultural codes and stereotypes surrounding science and masculinity could lead girls to be educated in an environment where they can internalize the belief that they lack 'innate' or more 'natural' abilities that boys possess. Feminist gender differences theorists consider teachers as role models, and they suggest that teachers and the education system encourage young women to engage in science, deconstruct gendered patterns, and promote women as role models and achievement in science and technology (Thompson, 2003). Women are exposed to technology and science through masculine norms and values, the prevalence of male role models in these areas, and gender discrimination in the labor market during the socialization process led to men being constructed as strong and technologically equipped; on the other hand, women seem physically and technically inadequate in these fields. Therefore, it comes in sight the decision to participate in STEM fields suggests that feminine identities require sacrifice in certain fields (Wajcman, 2009, p.145).

2.7.1 The Mathematization of Education and Profession in STEM

As a recurring main feature of engineering and science education, students are expected to perceive the mechanical and machine world as embodying only mathematical and physical principles. The mathematical understanding of scientific and technical practices with a reductionist approach excludes the social and holistic view in one way (Faulkner, 2000). Engineering and science education is defined by endless and repetitive mathematically based, analytical problem-solving exercises. The cognitive content of pure mathematics is the way of speaking in science and engineering language that has no social characteristics (Harding, 1986, p.48). Since mathematics represents the rational and value-neutral mindset of the nature of

modern science, it is the criterion of success, that is, for all examination and school degrees - particularly in STEM education-. Therefore, as in the education system, the primary success criteria and requirements for professionals in the STEM field are mathematical-based rational modes of thinking. Mathematics not only stratifies the criteria of success and intelligence among students throughout their entire education life but also stratifies the hierarchy between professions. Mathematical skills and ability have a decisive role in the status and payment of the 'subprofessionals' and professionals in STEM. Among the categorized and degraded professions in engineering and science, most women are concentrated in new branches of engineering and degree programs where calculus and theory courses are less intensive (Hacker, 1983, p.39). For example, data from the United Nations Educational, Scientific and Cultural Organization (UNESCO) shows that some of the most male-dominated engineering programs that are computer and mathematical-based are in the world's leading industrial democracies such as Japan, Switzerland, Germany, and the United States (Charles, 2017, p.1). As is the case in Turkey, the participation rate of women in these fields is relatively low.

The 'math filter' is an important component of occupational segregation in STEM and the decision to participate in those fields. Hacker's (1983) discussion highlights the difficulty of overcoming women's experience of 'math anxiety' in education as one of the reasons for their low representation and barrier to women's participation in engineering and science-based industry. Since mathematics, science, and technology have male-dominated cultures and images, it affects the gendered career aspirations that have a vital role in reproducing and producing gendered segregation in occupations (Correll, 2004). In this context, 'doing gender' (Wajcman, 2000) is a relational process that emerged in daily interaction in our life course; doing engineering has relationality with their masculine culture, symbols, and images. On the other hand, Hacker (1983) claims that everyday interests and social factors mutually affect science and engineering, which should be promoted and encompassed in education and industry due to having equal importance of social and mathematical skills in STEM. Hence, perceiving the importance of social skills in those fields and no correlation between the succession of mathematics and engineering is one of the possible intermediates to change the tendency of women's participation.

2.8 Socialization in the Framework of Women's Life Course

From a life course perspective, today's choices and actions are associated with individuals' past experiences and expectations with conditions of the situation they face because the choices are not solely situational, but they have a logical mindset. The interplay of family, education, and work trajectories over the life course analysis considers parental behaviors toward their children, role modeling, and direct or indirect influences on children during

socialization. Rather than giving direct influence or attitudes, parents are role models, and their behaviors provide guidelines for their children in the socialization process (Bernardi, 2016, cited in Vidal et al., 2020). Desirable choices, gender roles, attitudes, and values are given purposively by transmitting social, cultural, and economic behaviors in a family, education, and work as a reflector of society. Therefore, role modeling and doing gender are the critical concepts for the study to analyze women's choices, motivations, and interests in participating in female-dominated STEM fields during the long-term and continuous socialization process.

Changing educational, societal, and employment opportunities with their circumstances that every generation experiences differently make our life course varied among other generations. However, this is not a disconnection between periods and generations; there is transmission by actors and actions for each generation. An intersectional understanding between structures from a gender perspective should study the transmission process during women's socialization in society. This study aims to understand women's socialization process from childhood to adulthood by questioning the construction of women's relationship with science and technology. Therefore, it seeks to reveal the conditions of the process to analyze women's career choices and pathways through their current and past experiences within family, education, and work life.

2.8.1 Relationality between Professions in STEM and Life Course Trajectory

Analyzing the significance of women's participation in STEM and how the socialization process affects women's career aspirations in STEM is crucial to reducing the 'gender gap' in this framework. Combining different socialization processes and equal opportunity policies is regarded as a potential solution to this issue, and the effectiveness and constraints of equal employment opportunity policies have been extensively discussed in recent decades. On the other hand, feminist studies pointed out whether technoscience and its institutions can be reshaped to accommodate women rather than just because of women's socialization process, aspirations, and values. (Wajcman, 2009, p.145). In addition, we need to address broader questions, such as how and in what ways the STEM jobs employ women, because of the fact that opportunity for women's employment does not directly indicate that this problem has been resolved or reduced. I believe it is one of the methods that show us the conditions and ways to investigate the departments where women are intensely encouraged to work in the STEM field in some departments. Hence, I aim to understand the relationship between women and science-technology in the socialization process and how this relationship is mutually constructed through different intermediary role models and institutions in order to analyze the impact of gender discrimination experiences during and before women's employment in STEM.

The common social association of technology is related to the stereotypical gendered

definition of technology as a masculine activity, which explains women's hesitancy to participate because, similarly, in science, the language and symbolism of technology are masculine. Acquisition and training skills are not just a matter of sole factor. These skills and capacities are intertwined with the culture of masculinity, which is associated mainly with the culture of the technology industry (Wajcman, 1991). For example, due to the strong association of domestic skills such as cooking with femininity, their technical skills are undervalued, which causes different gendered discriminations at work, particularly in predominantly male-dominant fields (Wajcman, 2000, p.455). While education and work have become essential mediator mechanisms in increasing tools of self-realization and mobility in industrial societies, cultural gender beliefs on educational and professional aspirations may have a more substantial impact on expectations of personal fulfillment (Charles, 2017, p.2). Hence, the fact that culture is incompatible with femininity in science and technology, both in education and in the workplace during the socialization process, is an obstacle for women who pursue self-realization through their profession. Even if women could be scientists or engineers, forsaking femininity seems necessary to participate in the STEM world, learn its language, and do the jobs successfully. Therefore, it is critical to look at the relationality of both subjects and institutions from the perspective of doing gender in the socialization process because, in this whole process, women have to struggle under unequal conditions in order to exist, achieve, and participate in the fields of STEM and orient to its culture.

Despite the belief that women can be more successful in jobs requiring women's 'natural' skills associated with domesticity and compatible with gender roles, the same respect, value, and prestige are not seen for their jobs and occupations. According to Thompson (2003), if the workplace, school, and society culture continue to be organized along gendered stereotypes, any achievements attributed to women may not be given the same value as those of men. Besides, women socialized into embedded or visibly exposed to stereotypical gender roles may aspire in education and occupation for gender-conforming jobs to maintain masculinity/femininity to the social approval of their family, peers, and colleagues (Armstrong & Hamilton, 2013; West & Zimmerman 1987, cited in Charles, 2017, p.2). Culture in STEM fields and the extent of association of these fields with masculine stereotypes differ according to gender perception from culture to culture (Leslie et al., 2015; Matskewich & Cheryan, 2016; cited in Cheryan et.al, 2017, p.2). Therefore, I focus on what kind of dynamics the stereotypes and gender patterns with which this extension is associated are co-constructed, which intermediations are conveyed in the socialization process, and the process of women's concentration on STEM fields less associated with masculinity. In order to analyze the conditions, symbols, and language of female-dominated STEM fields in Turkey that cause women to be more inclined, it is necessary to consider what they have experienced throughout

the socialization process from a gender perspective.

2.9 Conceptualizing Gender Discrimination in STEM Fields in Turkey

To strengthen the country economically and politically, the participation of individuals who choose and pursue careers in STEM fields has been needed at the national and international levels. Educational support and political action plans are provided at the national level to raise interest, develop relevant skills, and inspire a career in STEM fields in Turkey. However, there is no targeted STEM policy/strategy at the level of national action plans, and since the STEM issue in our country is projected from the perspective of education and employment, it may be insufficient for the development of the fields because of the limited emphasis and strategies on gender inequality in these fields (Beşpınar & Pehlivanlı-Kadayıfçı, 2021; Taş & Bozkurt, 2020). According to global data from UN Women (2022), women's participation rate is 19.9% in STEM and in the case of Turkey, this rate is 34.7% (UNESCO,2020). The number of students who choose STEM fields and graduate from these fields varies between genders and is far below expectations. Most of the findings of these studies and reports have highlighted gender inequalities because sustainable solutions to this issue have not been developed within social, political, and economic plans. However, studies have emphasized that inequality deepens in labor force participation and career advancement after completing education (Özdemir & Tanyıldız, 2011). I believe that it is essential to contextualize gender inequalities and discrimination in the cultural and social context of Turkey rather than solely through equal rights and political plans. Therefore, based on the focal perspectives and findings of studies in this context in Turkey, I focused on the life-course trajectory between women and their careers in STEM fields.

Turkey differentiated from many countries that have dominant Muslim populations, low education levels, and high employment rates by leading the way in women's social, political, and educational rights and encouraging women in technical and engineering professions has been seen as a part of the modernization process (Küskü et. al., 2007, p.113). However, the engineering culture coded from the early republican reforms to the contemporary Turkish society has a gendered structure with masculine norms and values, which cause structural obstacles and disadvantages for women to participate and pursue a career in STEM fields (Pehlivanlı-Kadayıfçı, 2015a; 2015b; 2019). For example, Mutlu & Owen (2017a; 2017b) and Smith & Dengiz (2010) analyze that society's gender-based occupational perception, lack of role models, and gendered stereotypes negatively affect women's career development in STEM fields. Gender stereotypes and the biases that women are suitable for certain professions have caused gender-based distribution in STEM fields because gender roles and the 'masculine' / 'feminine' definitions of the departments have seriously affected the

tendencies of students in Turkey (Zengin-Arslan, 2002; Özkurt & Yakın, 2020). These studies have shown that male students are overrepresented in STEM fields, especially in some departments matched with mathematics-intensity, computer-based, and physical strength. Despite women's dominant representation in natural and life sciences, 'feminine' engineering departments (such as food, chemical, environmental), medicine, and health, they overall continue to be underrepresented in STEM fields. On the other hand, Ecevit et. Al. (2003) and Bozkurt & Akpınar (2017) revealed that women are subjected to horizontal/vertical segregation in STEM fields (i.e., the IT sector) and the barriers to women's professional advancement to upper positions. Therefore, women's issues in STEM fields are focused not only on terms of underrepresentation but also on studies related to structural barriers in career development in Turkey.

This literature provide me to contextualize women's career aspirations and development in female-dominated STEM fields by examining their gender discrimination experiences in Turkey. Therefore, I have developed a theoretical framework to make sense of women's experiences throughout the socialization process within the inter-structural relationality. The framework is designed to understand the structure mutually produced through gendered patterns in family, education, and professional life through intersectional relations with science-technology and gender understanding. By focusing mainly on science and engineering fields where women's participation is high, my research question would contribute to deepening the gender gap in STEM discussion in Turkey beyond the issue of underrepresentation. Because of my focus on feminist critiques of science and technology and gender discrimination, women's agency is at the forefront of their strategies and relationships with the structures.

CHAPTER 3

METHODOLOGY

3.1 Methodology

This study endeavors to explore and explain how the experiences of gender discrimination and coping strategies of women working in Turkey's STEM (Science, Technology, Engineering, and Mathematics) fields shape their career pathways from the life-course perspective. The perspective considers women's socialization process in family, education, and professional life to construct the relationality of gender, work, science, and technology. To develop a life-course perspective, I adopted the feminist methodology to analyze the institutions and agency relationship from a gender lens. My theoretical framework and thematic analysis using a life-course perspective I designed research on professional women's experiences of gender discrimination during the socialization process and their coping strategies.. To understand women's career aspirations and development in STEM, we will examine the intersections of three institutions from a life-course perspective: family, education, and work.

By focusing on women-dominated STEM fields, which are biology, chemistry, chemical engineering, food engineering, and environmental engineering, I aimed to reveal the ways in which gender inequality is still reproduced in the fields where women are dominant as participation rate and gender discrimination experienced by women in the process leading up to the professional life and after. Therefore, I created a research question covering gender discrimination experienced by women in their careers from a standpoint based on life-course experience. Questioning the strategies or ways to challenge gender discrimination while working is a part of my research question because the challenges are about structural problems between gender, work, and science-technology. My empirical findings, which include women's experience, focus on the intersection of science, technology, work, and gender. Starting with the socialization process of women, I designed my research to find the relationship between the patterns of gender discrimination in their families, education, and professional lives. Therefore, I analyzed the relationality of all experiences in the process with the structure of institutions from a gender perspective.

I describe the research design, how I approached the topic I was working on when posing my question, and how I followed a methodology in my research design to answer my questions.

In this chapter of my thesis, I present the epistemological perspective I use for my research by explaining the methodology, feminist methodology, which I have guided and applied, and evaluating the critics in this field. In addition to guiding me to establish my research methodology, feminist standpoint theories made me realize that scientific thought is a process of generating knowledge in a gendered structure. I developed my research design, the literature, and my arguments by questioning the epistemological discussion from the standpoint of this context. Thus, feminist methodology allowed me not only to describe the structure of my research design but also to understand the intersection of science and technology with gender.

The methodology chapter is framed by giving how I generally approach the findings, my interpretations, and my knowledge of social realities. The concept of feminist objectivity emphasizes the importance of acknowledging the limited location and *situated knowledge* rather than trying to separate oneself from the subject and object. (Haraway, 1988). By doing so, we take responsibility for our biases and gain a deeper understanding of what we observe. In the light of the feminist standpoint theories, I situated my knowledge according to what I make sense of the participants' experiences through the lens of gender perspective. In my study, I aimed to position my perspectives and interpretation reflexively as a feminist in social science so that I could produce trustworthy scientific knowledge.

3.2 Research Design

In the scope of my study, I pursue the guidance of feminist epistemology that clarifies the thesis arguments and problem statements. While researching gender discrimination experiences of women in socialization, including the working process of participation in the female-dominant STEM fields, I designed my main themes with research questions focused on “feeling and experience.” This focal point, which I will elaborate on later in thematic analysis, is the guide perspective of feminist research. The life-course perspective, in which “*not only individuals but also institutions are doing gender*” (Krüger & Levy, 2001, p.145) within these relationalities, shaped the structure of my research design. In line with the life course, I aimed to make sense of women's experiences during socialization within inter-institutional relationships through gender patterns.

First, I have adopted feminist methodology in order to understand that the process that includes the relationality of institutions is gender-based, unlike the methods of positivist scientific paradigms, and to reveal the patterns in this relationship. Feminist epistemology is suitable for my research design not only because it aims to reveal the difference in experience between genders but also because it is based on the knowledge that the structure of society and

institutions is patriarchal. My methodology, which includes the intersectional relationship of structures such as science-technology, family, education, and work, aims to grasp reality from a gender-based perspective while analyzing the relationship between these structures and the agency. The intersectional perspective is significant in understanding the gender basis in this inter-structural relationship. For example, we could not find how institutions are structured by patriarchy without the gender perspective that makes the reality of representation conceptualized. One of my thesis's essential aspects is finding the common pattern of experiences within the gender-based construction of this intersectionality. As a result, I aimed to find a layered reality by including multiple institutions rather than the relationship of a single institution and analysis unit. For this reason, I designed the life course of the analysis unit to complete this pattern and reveal the dynamic relationship between them.

Based on my interviews, early studies, content analysis, and reports, I demonstrate the combination of theory and practice, avoiding the possible abstraction accompanying this theoretical context with empirical studies. While designing the research, reading the theories, developing the arguments, and examining the case studies, the point that I pay attention to is to find out what kind of experiences the concepts can emerge from rather than focusing on abstract thinking. Hesse-Biber (2007) points out that recognizing women's life stories as knowledge is essential for feminists to disseminate the embedded knowledge. Hence, combining theory and practice and making the voice heard is part of my research.

I designed questions based on experience to discuss the socialization process that started before the participation of women in professional life in the fields of science and technology and the relationality of gender discrimination that continues in their professional lives. First, STEM is an occupational field where women's participation and women's representation are low all around the world. Some of these fields have participation rates where women's participation is much more dominant, like in Turkey. Therefore, the female-dominant STEM fields mentioned in my research are parallel to the professional fields in Turkey or other countries that have this rate, and it is not coincidental that the participation is high here. I also explain the reason for the high participation rate in some STEM fields based on my data analysis. Secondly, I focused on intersectional relationships where I could establish the causality of high women's participation and visibility and reveal the gender discrimination experienced despite this dominance. Therefore, regarding its causality and intersectionality, I aimed to understand the mutually gender-based reproduction process of the dynamic relationship between institutions through the gender discrimination experienced by women. Certain limitations in my research design, in which I prioritize women's agency in the intersectionality of institutions, are that I do not investigate this issue in its political and

economic dimensions. In my research, while it was perceived that the economic and political dimensions in Turkey significantly affected women's participation in this field, the lack of data and my research framework remained limited. On the other hand, although I adopted the life-course perspective to examine how women's experiences during the socialization period shaped their careers, I designed my research with certain constraints because I could not include all the institutions and actors they interacted with.

3.3 Feminist Standpoint Epistemology and Methodology

In the 1960s and 1970s, feminist thought emerged against social movements and political issues (Browning Cole, 1993). This political emergence has always construed a stance that evokes change, questions existing knowledge, and criticizes reality in feminist philosophy and feminist understanding of science. Feminist philosophy is defined as aiming at a specific object whose purpose is to liberate people from oppression associated with gender, race, and social class. As it can be understood from its philosophy and starting point, while trying to reveal the social relations between the subject and the structure, it takes a political action here by emphasizing that this structure is patriarchal. Harding (1986) insists that the natural sciences try to explain their social phenomena in the same causal terms and methodologies (p.84). Because of methodological domination and control based on value-free, objectivity, and rationality; social values and social inquiry are eliminated. Therefore, applying the positivist methodology of natural sciences claims that by focusing on physical, visible, public, official, and written social life and its relations, sociology is missing the knowledge and reality that are invisible, embodied, private, and "marginal." Certain realities of the modern philosophy of science and grand theories are based on a single-society structure and binary gender understanding, which makes sociology face conceptual problems (Harding, 1986).

Feminist epistemology questions the knowledge-production process. Feminists have criticized who produces knowledge for whom in the knowledge-production process. In this standpoint, objectivity means for the feminist methodology that the subject of knowledge needs to be in a mechanism that can establish the same causality with the objects of knowledge to maximize the strong objectivity or validity of truth. However, feminists believe there are never enduring truths about social reality that are universal and general. The process of knowledge production and the subject of knowledge claimed by modernism are strongly criticized by feminists as male-centered and patriarchal knowledge. Harding (1992) emphasized the 'strong objectivity' questioning while explaining the feminist methodology's critique of the modern positivist male-centered methodology. The methodology explains that strong objectivity needs "strong reflexivity" (Harding, 1993, as cited in Ramazanoğlu & Holland, 2002, p.51). Besides, the methodology claims that the researcher and the subject of knowledge should be visible and

reflexive rather than embodied and invisible.

Modern science understanding does not question the subject in the sense of gendered structure and takes the individual as a central without recognizing the diversity of subjects. Therefore, the “other” subjects, who have different experiences and features, have been lost in this understanding. Feminist understanding brings the question of subjects and their experiences into modern science by criticizing its methods and ways of knowledge production (Ramazanoğlu & Holand, 2002). In addition, feminists emphasize concepts of knowledge by claiming the impossibility of absolute knowledge and by questioning whose knowledge and how it is produced because they believe that men do not have the women’s life experience knowledge. Knowledge includes socio-political power dynamics; research has political foundations. If there is a power relation between gender, knowledge belonging to women subject is problematic because the knowledge is produced in the context of power relations in society, and the relation is found meaningful in the structure. As a result, knowledge itself and knowledge production are based on the power relation, which shows us it is a political process. For instance, if the woman was subjected to violence, the positivist paradigm methodology explains the situation in the context of socially structured narratives by generalizing all women’s experiences because the method has the form of knowledge based on the general theory hypotheses (Hesse-Biber, 2007, p.7). However, feminist empiricists reach the knowledge of the truth through the experiences when the woman is subjected to violence. Reaching the truth is possible by using a non-hierarchical and interactive method. After that, feminists explain that this is the issue’s essence because, unlike modernist scientific understandings, they reach the knowledge of violent experience without generalization or assuming *universal truth*.

Harding (1986) pointed out that the androcentric bias in science has many assumptions, which leads to gender stereotyping in identities, roles, and interpretations in science being very problematic. These assumptions in social inquiry tend to impose specific conceptual schemes on human behaviors and actions as ethnocentric or male-centered interpretations. Therefore, we need to engender social sciences and philosophies of science to protect objective understanding and explanations. In this sense, feminist criticism of all scientific fields is relevant to understanding the gender-biased analysis of the research.

My study emphasizes embedded and invisible women’s identity, focusing on emotions, gender relations, women’s oppression, and women's experiences in the sense of feminist methodology in the theoretical paradigm. Through the interpretive method, I deal with the details of the situations, reasons behind the relations, and subjective meanings of social phenomena. Using a feminist methodology, this thesis has a perspective that aims to collect

invisible or less comprehending experience-based data. In general, we can easily access the knowledge that gender gap analyses are conducted when looking at the invisibility of women in the STEM fields, in which women have a low participation rate. However, I analyzed women's participation conditions, the participation process, the reasons behind women's high participation rate in some STEM fields, and the fact that the knowledge about gender-based discrimination in this process remained invisible. Therefore, while comprehending the underrepresentation of women's participation in STEM, I believe that focusing on areas with women's high participation fields will contribute to the literature by revealing embedded social realities. These realities have been interpreted depending on the local culture, social structure, institutional life, and gender perspective to which the subjects and study belong.

3.3.1 Ethics of Feminist Research

Different from rationalism based on objective, observable data, feelings, emotions, and experiences are a valid source of knowledge in my study based on the interviews. In my thesis, I want to show women's voices who desire equal attention and more space in the STEM field. Feminist philosophy and thinking, which Browning (1993) emphasizes, is produced in an orientated way for political purposes. One of my aims is to reveal gender discrimination in work experience, just as the subject in this work is oppressed in different forms because of their gender and gendered science-technology relationship. Therefore, I found it appropriate to evaluate my thesis on these epistemological dimensions within the framework of feminist methodology.

In feminist ethical concerns, it is unlikely that modern understanding of science is mainstream, and traditional social science understanding is gender-blind and value-free. Sandra Harding (1986) discussed the ethics of neutrality for the strong objectivity in positivist methodology because she believes it is a way of *depoliticizing* the research. Since there is still power exercising while conducting research using the dominant institutional structures, priorities, practices, and languages of science, the neutrality ideal provides no resistance to producing systematically distorted research results. Feminist ethics offers an interpretative social science understanding concerning feminist stance, reflexivity, politics, and interpretative research understanding.

While conducting my interviews, I focus on women's experiences and draw the concepts from feminist theories. I examine their experiences within the patriarchal construction of social relationships, which is an essential point for the ontological structure of the study. Unlike the traditional relationship between agency and structure as a positive scientific methodology dominated by the androcentric scientific method and understanding, my analysis considers the

relationship between them. Since the social structure is patriarchal, feminist standpoint theories claim that gender in the relationship between the subject and structure must be regarded to find the truth.

3.3.2 Data Analysis and Methods: Feminist Qualitative Research Methods

The challenges of feminist methodology within the traditional positivist paradigm have questioned whether it has a distinctive and own method understanding after the epistemological and methodological discussions. Feminists discuss the “*knower*” and whether traditional epistemologies exclude the “*knowers*” (women) by claiming “*the masculine voice of science*” (Harding, 1986, p.3). Feminist researchers attempt to add women’s life experiences and gender actions, including emotions and embodiment, unlike traditional androcentric analysis. Therefore, it is an ongoing process that criticizes the knowledge, the knower, and the process of producing knowledge. It is difficult to discuss a clear-cut and satisfactory method technique in feminist methodology. However, even putting myself in the position of 'seeking reality' rather than being a 'knower' by questioning this process changed my study's epistemological and methodological structure.

Since the feminist standpoint theory emphasizes that there should not be a hierarchy between the researcher and the participants, I avoided hierarchical positions that could arise in my data analysis and the interview process. Rather than claiming to be able to achieve equality or create this illusion methodologically, I would like to point out that, as a feminist researcher, I have been constantly challenged by this hierarchy. Although having the same gender identity in the same society makes it easier for me to have and understand similar experiences, I looked at any experience commonality or difference with an eye that does understand, not with a knowing eye because gender experiences can be understood not with an understanding of components and not eliminating other differences but with a perspective of multiple and dialectical experiences.

It is essential to know that while interviewing or analyzing the data, the social realities are not basically “there”; feminist research methodology attempts to analyze and understand with continual reflection within the dynamic relations between institutions and individual experiences (DeVault & Gross, 2007, p.176). The construction of knowledge about the findings based on people’s experiences and actions is a process that is socially and politically constructed. As a result, analyzing, collecting data, and designing the research is a process continually mutually constructed, so reflecting the social context of the researcher’s findings, arguments, participants’ situation, and their profiles also must be integrated into the construction of knowledge. Self-reflection is one of the essential cores of the feminist research

process to analyze the social context of findings and discussions and advance political approaches. The standpoint of who produces what knowledge for whom in feminist epistemology is a critical one that can be possible with self-reflection.

Thus, in-depth interviewing as a qualitative method based on experience creates a space where the agent of the subject and researcher can reflect on their agency by interacting with participants and readers. My in-depth interviews with women in the STEM field are closely related to this reflection standpoint. I believe reflecting on participatory subjects and my subjectivity methodologically reveal the context of my knowledge-production process and the extent of the discussion points.

My questions about women's experiences during family, education, and professional life. In family life, my questions focus on whether women have any family support to participate in STEM education, understanding how the relationship between science, technology, and gender is constructed through the parents' behavior, encouraging particular interests and skills through the family responsibilities at home, toys, and cartoons in the context of role modeling. In education, whether women have access to develop their skills, interests, and motivations toward STEM fields is significantly related to participation decisions and choice of STEM majors. In professional life, although they strategically chose female-dominated STEM fields, I questioned gender-based discrimination in university and professional life in terms of work conditions, disadvantages of being women in STEM, and inequality conditions for getting promoted. Consequently, from a life course perspective, I question whether they face gender discrimination at work and their whole life process and how to challenge these during their lifetime in the context of participating in STEM fields and education. My theoretical concern is researching the different factors such as gender discrimination towards women, the impact of gender roles, gender bias, occupational segregation, gender stereotypes, vertical/horizontal segregation at work, and gender inequality in the STEM field. The qualitative research study aimed to investigate women's female-dominated STEM experiences to understand better the obstacles that prevent them from enjoying successful careers. Based on women's experiences in professions, the research might represent to analyze the reasons behind high participation, the effects of embedded social relations in all parts of life, and what conditions women work in.

3.4 Transforming Qualitative Information: Thematic Analysis

Boyatzis (1998) explains the use of thematic analysis in three stages: deciding on sampling and design, developing themes, and validating and using the code (p.29). These stages recognize a form of theory-driven and data-driven perspectives. I use the thematic analysis by

theory-driven to analyze the raw data through codes in the context of proceeding with the themes of feminist theories or research. In the process of rereading the data from the interviews I have transcribed, I have reviewed the recurring themes, similarities, commonalities, or divergences with the practices of the theories in the relevant literature.

In the thematic analysis model, I aim to analyze the data by labeling, defining the theme concerns, describing the themes I recognize, and describing the similarities and differences in the data examples based on my themes. I used MAXQDA to make themes and sub-thematic coding. Based on my research question, I aimed to gather the answers given in specific contexts and find the patterns of gender discrimination in the process of participating in STEM fields and professional life.

Framing and conceptualizing the socialization process needs the ability to derive from the finding pattern in theoretical meaning in the experiences. From the perspective of the work-life trajectory, career life, motivations to be involved in or continue in that field are not only intersectional with current experiences but also with the socialization process and relations with social institutions in this process. Therefore, I tried to analyze the experiences of women working in the STEM field in this process through specific themes of gender discrimination. In particular, the scopes I focused on were how the relationship with science and technology started, their strategies to participate and pursue a career in STEM, and the roles of family, school, and organizations in this process. Gender roles orientation, gendered role modeling, development of skills and motivation towards STEM fields, gender stereotypes, and gendered occupational segregation are themes in repetitive discourses. Focusing on these themes from a structural gender perspective in society, I sought the meaning of women's experiences in the socialization process centered around these themes.

While analyzing the interviews in the field, I chose some themes to focus on, and I touched on the patterns of gender discrimination through these themes. I believe that these patterns can reveal the relationality between gender, technology, and science in the process of participating in the STEM field with a methodology based on women's experience holistically. On the other hand, I argue that beyond being a choice, women's low or high participation in STEM fields has implications for structural barriers and gender discrimination in society. Comprehending the relationship between science, technology, and gender is also critical to be able to observe the mutual shaping between these structural relationships in practice. I aimed to make sense of the causality of women's high participation in some STEM fields with the themes that I started from the theoretical framing of this relationality. From the feminist methodology, examining the agency relationship between these structures through the gender lens allowed me to see intersectionality. I believe my work provides valuable insight into the gender

discrimination faced by many women in STEM fields as a whole.

3.5 Process of Sampling Design

For my thesis, I conducted in-depth interviews as a qualitative method with 15 participants who had my selection criteria. These criteria and recruiting became a part of my thesis research design. Before I clarified these criteria, I conducted a pilot interview with the criteria I had more or less determined, which was an essential step for both the methodology and the pathway I would construct for the knowledge production process.

First, I aimed to find a participant with whom I could discuss the ongoing gender discrimination in STEM professional life, starting from the socialization process. I had 50 semi-structured interview questions that I directed to the participant. Under these questions, I also created my options to ask alternative questions in case the question was not understood. Therefore, I measured which questions were understood and which themes I could interview about gender discrimination. As a result of this meeting, I rearranged my questions and eliminated some repetitive and incomprehensible questions according to the crucial answers I could interview about. I understood that comprehending my questions and not needing additional questions would parallel the participant's awareness of gender issues. Therefore, in my interviews with women, I noticed the difference between those with and without gender awareness. I noted this difference not only in my pilot study but also by following the workshops and meetings held against gender discrimination in the STEM fields and observing the participant profiles there. I find it essential that the sample of representatives and trustworthiness of data I will make is qualified regarding women's experiences in these fields.

Based on the criteria I clarified in my study, I tried to reach the participants by using purposive sampling and snowball sampling methods. I try to reach women educated in female-dominant STEM fields and work professionally. Therefore, I made announcements from networks where I could establish many connections, such as professional associations access networks, graduates' associations, job search sites, and closed solidarity groups of universities. In addition, I was able to reach the people I interviewed with the snowball method. I tried to reach women educated at different universities and work in different positions in the STEM field as much as possible so that restricting university departments in the STEM field would not make it difficult for me to access. I could listen to the same jobs from different and similar experiences and perspectives.

For my research design, in which I included the socialization process, I drew age limits so that I could represent the sample because of the educational process, access to scientific and technological equipment, and having similar childhood and adolescence periods in times of

similar political and social discourse. For this reason, I interviewed young women who graduated from female-dominant STEM fields between the ages of 25-35 in terms of the possibility of understanding my experiences in my life process and establishing experience similarities and differences between the interviewees. Besides, having at least two years of experience within this age limit was a criterion because part of my research questions required me to learn about life decisions, experiences, and strategies.

Table 1: Participants Profile

	Participant	Age	Marital Status	Children (if any)	University Major	Job	Years of working experience	Mother's Job	Father's Job
Pilot	Vildan	26	Unmarried	0	Food Engineering	Purchasing Officer	6 months	Nurse	Technician
1	Olivia	25	Unmarried	0	Biology	Biologist	2 years	Health Technician	Health Technician
2	Sude	26	Married	0	Chemistry	Patent Specialist	2,5 years	Textile Worker	Site Manager
3	Cansu	35	Married	0	Food Engineering	R&D chief	12 years	Housewife	Self-employment
4	Ayşe	25	Unmarried	0	Genetics and Bioengineering	Clinical research specialist	2 years	Housewife	Lawyer
5	Ekin	33	Married	2	Environmental Engineering	Environment and Sustainability Chief	7 years	Housewife	Civil servant
6	Deniz	30	Unmarried	0	Environmental Engineering	Environmental Engineer	6 years	Business administration	Soldier
7	Elif	34	Unmarried	0	Chemical Engineering	Process Engineer	8 years	Customs officer	Customs officer
8	Ela	32	Unmarried	0	Biology	Executive Assistant	3 years	Manager at clothing store ^a	Civil Servant
9	Yıldız	27	Unmarried	0	Chemical Engineering	Process Engineer	5 years	Salesperson	Jeweller
10	Ceren	30	Married	1	Chemical Engineering	Process quality engineer	7 years	Housewife	Worker
11	İrem	27	Unmarried	0	Chemical Engineering	Carbon Consultant	2 years	Teacher	Logistics Manager
12	Eylül	30	Married	0	Food Engineering	Quality Assurance Specialist	4,5 years	Teacher	Teacher
13	Esin	35	Married	1	Food Engineering	Quality manager	8 years	Secretary	Police
14	Gözde	26	Unmarried	0	Chemical Engineering	Plant Engineer	3 years	Faculty Member	Driver
15	Zeliha	29	Unmarried	0	Food Engineering	Product development engineer	2 years	Production Worker	Electrical Worker

3.6 Interview Techniques and Strategies

Due to the epistemology of the feminist standpoint in field studies, it is significant to convey to the interviewees the importance of their role in the research at the beginning of each interview. On the other hand, at the beginning of the interviews, I introduce myself and my research in detail in order to establish safe relationships with mutual trust and encourage

conversation. These conversations at the entrance allow me as the researcher to re-establish my position in front of the interviewers in each interview by recognizing and pursuing researcher roles. In this interaction, I stated that the interviewees were free to ask questions about me when they were curious; I applied the participatory model by sharing my identity, life, and experiences. This interactive participant model breaks the hierarchy between the interviewer and the researcher (Hesse-Biber, 2007).

To not disturb the natural flow of the interviews and not create a hierarchical knower impression on the interviewers, I conducted semi-structured interviews as an interactive conversation to lead them to answer the questions comfortably. Instead of directing them directly to the questions, I tried to continue with the flow by positioning my questions among the answers. Based on my own experience, I steered myself away from this path when I felt the desire of the interviewers to give a politically correct answer or to answer the purpose of my questions rather than their direct experiences. Thus, each interview allowed me to strategize for the next ones. I could develop these strategies because of the importance I give to the conversations I made and the feedback I received in order to leave an agency for the participants at the beginning and end of the interview.

3.6.1 Limitations

Since I conduct interviews through purposive and snowball sampling, the aim of this sample and the representation of the participants it reached could represent a partial pattern rather than a holistic one. Different limitations and constraints emerged in the online platforms or face-to-face interviews with 15 women participants.

First, because my interviews included retrospective questions about the socialization process, it required time to be remembered, a process of remembering and transferring. This time could take place in a much longer time compared to my questions based on daily or recent experience. For a working woman, it was not easy to devote time to my research and to plan that time. Therefore, business meetings, sudden job calls during the day, or caring responsibilities for women with children made it difficult to take a long time, and sometimes our interviews were interrupted or postponed. Because of their workload and home responsibilities, arranging a meeting time was as complex and flexible as I did not expect. I even had to complete the interview by meeting with some of my interviewers twice or more. I needed extra time and effort to plan the timing and re-set the research flow.

Another limitation is spatial. I was able to carry out most of my interviews online, which I planned to do face-to-face due to living in a different city or remote working conditions.

Through online platforms such as Zoom, Microsoft Teams, and Google Meets, I did an interview. Compared to face-to-face meetings, time and space made my planning difficult and limited while conducting research, and it became more open to being interrupted by electricity, the speed of the internet, or someone.

3.7 Self-Reflexivity

What makes a social science study feminist? When I think about this question, the answer I found in my study is that it is reflexive. I thought that as much as I can reveal the self-reflexivity of the research, the researcher, and the researched subjects, this research can have a feminist methodology and epistemological perspective. A feminist researcher should exercise power reflexively in the research process (Ramazanoğlu & Holland, 2002). Therefore, I need to be able to clearly reflect research's epistemological accountability and moral stance on the ethical point of the research. Doing feminist research does not mean being politically correct and methodologically pure for me; it means showing that social beings are gendered. It is not to make the invention a structured, taken-for-granted male power but to open this investigation to discussion and criticize these experiences and existences.

It is not possible to separate and understand gender and its relations in a particular context; it is necessary to look at its intersectionality. As a woman dealing with social science, I became an individual who could make sense of many of my experiences when I realized the intersection of science and my gender identity. First, since I studied sociology, my discourses or the issues I discussed based on what I read caused me to question the relationship with science by others and sometimes even myself. Nevertheless, the answer to seven times seven was never discussible or far from science and rationality. The meaning of science, traditionally based on objectivity, rationality, and value-free, far from irrationality, emotions, and self-experiences, made my relationship with science difficult in the first years of my undergraduate degree. It was from this feeling that I made sense of this understanding, which makes me feel woman as a subject, different thoughts and feelings as the 'other,' as an exercise of power. Undoubtedly, it was feminist theories and discussions that made this buried reality aware. I know from my observations that I am not alone in this awareness.

With the insights of my experiences, thoughts, and feelings, I aimed to draw a new route by accompanying the journey of women participating in the field of science and technology. I wanted to explore how gender-based discriminations make sense of these insights in the processes of women's participation in science and technology and their work and production. My hope of empowering and encouraging both myself and women working in these fields where this patriarchy reproduces gender roles motivated me to do research on this subject by

challenging the power.

I am aware that, like all researchers, I have my thoughts, feelings, inexperience, and sociopolitical baggage. I aim for the research to add a social imagination, provide intellectual accumulation, and mirror what I do not know and what I have investigated. This will be an academic baggage I wish to carry to my next journey.

CHAPTER 4

CAREER ASPIRATION DURING EARLY SOCIALIZATION

4.1 Early Effects on Child's Career Aspiration

In this chapter, I focused on the early socialization process from the gender perspective and analyzed the data I gathered by following the process from the child-parent interaction, the games, toys, fairy tales, and cartoons in which participants socialized during childhood. In gendered socialization, the dynamic interactions of girls within the family and education with role models in mediums when the child socializes are essential for their career aspirations. By aiming to understand the women's experiences in the STEM fields through the patterns of gender discrimination, I focused on their role models' transmissive attitudes with behaviors and experiences that could guide their career aspirations through skills, interests, and motivation development in the early socialization period. I noticed that research, policies, and projects aimed at increasing women's participation in the STEM fields emphasize that girls have fewer opportunities than boys to develop their interest in science and technology at an early age (Phipps, 2007). The high representation of women in some STEM fields in Turkey and women's experiences in socialization give ideas about how this participation is operated during the socialization process in that they are exposed to stereotypical ways. As a holistic result of this process, following their experiences and comprehending the relationality of repetitive gender patterns through women's strategies to participate in those fields is valuable to discuss. In addition, for my analysis in the chapter, I aim to claim the early socialization process in order to follow how women's strategies affect their participation in female-dominated STEM fields. The early socialization process is a beginning that reveals the patterns through which gender discrimination in continuing education and professional life is reproduced.

4.1.1 Socialization in Family Life

The family is the institution that transmits the lifestyle in society as a social heritage and provides guidelines for appropriate behaviors in accordance with the culture. The cultural structure of the family includes interactions that we experience through social institutions that ensure that the basic needs of a society are met in established, standard ways. The family, in

which gender roles are practiced and standards are constructed, in the process from early childhood to adulthood, is also shaped by common cultural values and norms regarding gender. Within the family structure, interactions between parent and child vary according to the child's gender, which is how this interaction takes place in a cultural context where being a woman has lower power and prestige (Lindsey, 2015, p.65). The strong gender hierarchical relationship based on male superiority that considers women as inferior in terms of value, prestige, and power operates the relations, attitudes, behaviors, and roles of the actors in the family, which has also been observed in the family structure in Turkey (Sunar & Fişek, 2005; Kandiyoti, 1988). 'Doing gender' is conveyed and practiced through this family structure itself and gender roles that have sets of attitudes and behaviors within the structure. Micro-structuring of power and discrimination within the gender perspective structure is a repetitive socialization process by 'doing' the gender roles in all ongoing social interactions (Fox & Murry, 2000). Thus, the behaviors and attitudes that parents convey directly or indirectly, as well as different discourses against girls, are influential in shaping social interactions and forming the gender identity of girls at an early age.

4.1.1.1 Transmitting of Gendered Lifestyle, Behaviors, and Attitudes

Gender is influential in shaping the fundamental social life of the individual, which affects their identities, actions, and decisions from an early age, especially with strong interactions and transmission within the family. In Turkey, family, relatives, and the close environment have an active role in the socialization process of how the girl behaves, dresses, speaks, and attitudes in accordance with the traditional women's gendered identity and roles. These roles and the acquired transmission are expected to be repeated continuously and unconditionally in every environment. For example, İrem talked about how her family tries to control traditional attitudes and behaviors and interferes in her life at an early age, although she believes that she grew up in a modern family structure. Starting from an early age, women are taught to dress and behave according to the environment. For example, İrem said she felt like she had to always appear happy under any condition or she had to behave according to the environment she was in. I should point out that I will emphasize these transmitting attitudes and behaviors becomes obligations for women in education and professional life according to participant's experience.

Although we are a very modern and gender-neutral family, they disappointed me a little in this regard. You know, I heard a lot about sitting and getting up, for example, "Be a little ladylike." I have heard such words a lot, like "What you are wearing is too short, you cannot go out like that" or "What you are wearing is not appropriate where you are going" or something. So maybe it was protectionism, but they were just preventing me from wearing anything. I do not think it should be that way. Yes, I have

encountered such an attitude. "Be smiling, do not be so sulky; you are a girl, be a little cheerful" or something. (Irem, Chemical Engineering) ³

While girls' behavior, lifestyle, choice of clothes, and attitudes are constantly questioned and restricted according to social rules, this dynamic is different in the parent-son relationship. Parents allow their sons to be more independent and aggressive while they expect their daughters to be more dependent and docile; the oppression of girls becomes more evident as the child's age increases in Turkey (Fişek, 1993). During socialization, the girl may infer this difference from the attitudes towards the boys in their peer groups, among siblings, or around them. Gender discriminatory attitudes and behaviors according to gender roles and identity cause girls and boys to experience different socialization processes. For example, within the same family, İrem and Ayşe stated that their parents behaved and attituded differently towards their brothers by giving them more freedom of movement. However, the same rules that did not apply to their brothers restricted girls' freedom, expecting them to be more subservient.

In this case, I was exposed to all the pressure both because he was a boy (her brother) and because I was the first child. My brother is much more comfortable getting in and out of the house than me. They put less pressure on him to choose the department at the university. I mean, I do not want to say oppression; I could not find any other word either; in my opinion, they care about him much less. (Irem, Chemical Engineering) ⁴

I remember when I was a kid; actually, it was the same way when I was younger, in high school, etc. My parents would care for me a lot, I would not be cold, and I would not hit anything while running. But they were more flexible with my brother. It was as if it was more normal, more acceptable for him to be active. I was thinking about this, for example, in high school, middle school, and elementary school. For example, my brother is 16 years old now, and he does not make much noise, but when he goes out, he can come quite late; he can hang around until 1 a.m. or something. But when I was his age, I was constantly being called at 10:30 p.m.; I was being harassed on the phone. There is such a difference, the difference in behavior towards the two of us. (Ayşe, Genetics and Bioengineering) ⁵

³ Son derece modern ve toplumsal cinsiyet rollerinden uzak bir aile olmamıza rağmen bu konuda hayal kırıklığına uğrattılar beni. Oturmam kalkmam olsun, çok duydum mesela "Biraz hanım hanımcık davran" . Buna benzer kelimeleri çok duyduğum oldu ya da işte "giydiğin şey çok kısa, bu şekilde dışarı çıkamazsın" gibi ya da "gittiğin yere giydiğin şey uygun değil" gibi. Korumacılıktı belki ama sadece benim bir şey giymemi engelliyorlardı. Bu şekilde olmamalı bence korumacılık. Evet, böyle bir tavırla karşılaştım. "Güler yüzlü ol, somurtma kız çocuğusun sen, biraz neşeli ol". (İrem, Kimya Mühendisliği)

⁴ Hem erkek çocuğu olduğu için hem de ben ilk çocuk olduğum için yani bütün baskıya ben maruz kalıyordum bu durumda. Erkek kardeşim benden çok daha rahat eve girip çıkarken. Hani üniversitedeki bölüm seçimi konusunda da ona daha az baskı kurdular. Yani baskı demek de istemiyorum da başka bir kelime de bulamadım ya onun üzerine çok daha az düştüler bana göre. (Irem, Kimya Mühendisliği)

⁵ Çocukken şeyi hatırlıyorum, aslında benim gençlik zamanlarımda da öyle, lisede vs. Benim üstüme çok düşerdi annem babam, üşümeyim, koşarken bir yerimi vurmuyım. Ama kardeşime daha esnek davrandılar. Sanki onun hareketli olması daha normal ve kabul edilebilir gibiydi., lisede, ortaokulda ve ilkokulda. Mesela kardeşim şu an 16 yaşında ve çok sesi çıkmıyor ama dışarı çıktığı zaman geç gelebiliyor bayağı, 11ere kadar filan oturabiliyor. Ama ben onun yaşındayken, 10da 10:30da sürekli aranıyordum, taciz ediliyordum telefonla. İkimize karşı farklı davranıyorlar. (Ayşe, Genetik ve Biyomühendislik)

Gender discrimination against girls in the family grows with the direct message that being a woman and a man in society means different from each other, both in determining their identities and roles and observing different attitudes and behaviors towards boys. The gender role patterns are transmitted by parents with rules, restrictions, and boundaries of freedom that vary based on the gender of children.

4.1.1.1 Gendered Division of Labor at Home

The finding I aim to make sense of through the experiences of women participants in this chapter is how family and social environment shape occupational aspirations in the socialization process. According to role-modeling theories, children comprehend gender roles and norms at an early age from parent relationships, domestic labor distribution, and labor-market participation (Polavieja & Platt, 2014). Parental stereotypical behavior is one of the essential factors in forming sets of knowledge that formulate children's opinions about which work divisions are appropriate according to gender. Gender socialization is a critical transmission mechanism that operates the gendered division of labor, occupational aspirations, and career choices at an early age. The agencies that manage the interactions during socialization have a role in the accumulation of motivation and interest in certain professions based on the gender of children who do not have labor-market experience yet.

In a standard Turkish family, my mother takes care of the housework, cleaning, cooking, etc. My father takes care of technical issues as a standard. Apart from that, my father goes into the kitchen from time to time and cooks good meals, but for him, he needs a little pleasure. Or he cooks when my mother works extremely hard; other than that, all the responsibility is on my mother (Sude, Chemistry)⁶

Gender roles occur both in their domestic work divisions and in the transmission of household work with expectations to be done and learned by their children. The skills and interests transferred in the domestic work division provide direct information about the capacities and abilities of the children. During the socialization process, a girl is traditionally oriented toward domestic work such as housekeeping, caring, cleaning, and cooking in order to acquire specific necessary skills and roles. The strong association with femininity and domestic roles and jobs in society results from this widespread transmission (Wajcman, 2000, p.456). However, it is also the reproduction of a structural match with a gendered perspective on the identity and nature of femininity. Sude stated that as a girl, her mother transmitted the traditional division of labor as a role model and tried to teach these duties. In addition, she said that relatives

⁶ Standart bir Türk ailesi zaten ev işleriyle annem ilgileniyor; temizlik, yemek vs. Teknik konulara babam bakıyor standart olarak. Onun dışında babam ara sıra mutfağa girip güzel güzel yemekler de yapıyor ama onun için birazcık keyfinin gelmesi gerekiyor. Ya da annemin çok yoğun çalıştığı dönemlerde yapıyor, onu onun dışında bütün sorumluluk annemde. (Sude, Kimya)

questioned her about whether she was brought up as a girl suitable for these roles. She explained that this experience forced her to be oriented toward the skills and gender roles she should have as a girl:

My mother was always in this standard way: the girl knows how to iron; the girl knows how to wash dishes. In fact, even from outside relatives, for example, when I am not very old as a secondary school student, there is a direct conversation like “Doesn't the girl know how to iron? Come on, teach her how to iron” things like that happen. There is that thing in our family, and in our family structure, namely patriarchy, roles like women do these things. (Sude, Chemistry) ⁷

The transmission of duties and roles in the home is considered necessary not only to standardize the division of labor in the family but also to maintain it in adult life as a woman and to maintain the abilities and skills that match femininity. Besides, women's abilities and interests, such as baking, knitting, and taking care of children, are tried to be orientated by other women seen as role models, who may be their mother, grandmother, or aunt, in the early socialization period. Based on Zeliha', Cansu,' and İrem's experiences, I infer they directly impact their fields of interest through encouragement or pressure.

Apart from trying to teach these roles, we (as girls) also felt pressure to learn. Since I lived close to my grandmother, both my mother and my grandmother, there should not be anything in the kitchen that we did not know about. In other words, you must learn this, or what will you do in the future? We were included, especially in the kitchen, much with the pressure. Such a thing is a family that has a tradition of making its own bread; for example, you should have learned how to make bread. They said, “I used to do it at that age; I was doing this task when I was half your age,” so we had to learn everything about the housework, and we learned very quickly. (Zeliha, Food Engineering) ⁸

I cannot say it is a household responsibility, but for example, it affects sibling responsibility because you always must think about it when doing something like this. Again, I blame my mother because my mother gave me much responsibility. You know, when you go somewhere, take Aysel (her younger sister) with you, do not forget Aysel, take care of her, do something like this, and then you can do what you want to do within a particular framework. Your mind always stays in one person. For example, when we were little, we went to our hometown and went out to play. I could not play

⁷ Annem hep bu standart şekildeydi: kız çocuğu ütü yapmayı bilir, kız çocuğu bulaşık yıkamayı bilir. Hatta yani dışarıdan akrabalarından da mesela ortaokul öğrencisiyken, çok yaşım da büyük değilken, direkt muhabbet geliyor; kız çocuğu ütü yapmayı bilmiyor mu? Hadi ütü yapmayı öğret ona gibi şeylerde oluyordu. O bizim ailemizde sülale yapılanmamızda da o şey var yani ataerkillik, kadın bunları yapar gibi roller. (Sude, Kimya)

⁸ Bunları öğretmeye çalışmak bir yana bayağı böyle öğrenelim diye baskı da hissettik. Ben hem annemden hem de sonrasında anneannelere de yakın yaşadığımız için özellikle mutfakta bizim bilmediğimiz bir şey kalmamalıydı. Yani bunu öğrenmen lazım yoksa sonra ne yapacaksın gibi bir baskıyla biz özellikle mutfaka çok fazla dahil edildik. Böyle şey ekmeğini de kendisi yapma geleneği olan da bir aile mesela hani o kadar hani ekmeği yapmayı da öğrenmeliydin. Ben o yaşlarda yapardım, işte senin yarın kadarken bu işi yapıyordum gibi telkinlerle beraber hepsine biz hem eve dair ne varsa öğrenmek zorundaydık ve çok hızlı öğrendik yani. (Zeliha, Gıda Mühendisliği)

comfortably because I wondered if Aysel had fallen or where she had gone; there was always such anxiety. I can honestly say it had a negative impact. (Cansu, Food Engineering)⁹

My mother taught me to knit. There were a few times when I got bored and left. She did not force me at all, but she encouraged me to learn something in the field of basic needs, namely cooking and cleaning. She tried to teach them a lot. It is such a nice hobby, and it is nice to produce something. I do not know, but I could be knitting a beret now. (Irem, Chemical Engineering)¹⁰

While housework is mainly seen as the mother's responsibility, the father's role is to help the mother or take care of other responsibilities except cleaning, cooking, and caring. In the domestic division of labor, the father's role is primarily technical/repair work, billing, or going to market/shopping. While the father always transmits the ability and skills for technical roles, the majority of the participants stated that they were not interested or never taught at all. She emphasized that there is a clear gendered distinction in domestic roles in Ceren's family, that her brother is only responsible for helping her father with technical matters, and that she does not strive to be included in these responsibilities.

Ceren: My mother and I usually took care of the cleaning chores. My father, the repair would not be too much at home anyway, but he is already very talented in those matters; it was like work for him. My brother was just going to school. Apart from that, my brother used to help my father from time to time—a standard Turkish family.

Me: Do you think your parents behaved differently towards your brother?

Ceren: Not for my father. In my opinion, my father remained very modern compared to where he lived and where he came from. Nevertheless, there was also my mother. As I said before, I would help with cleaning, but for example, I would say that my brother would also remove the dust. My mom said do not be silly! Do men clean? These kinds of things happen. My mother was acting more like he is a boy, and you are a girl. (Ceren, Chemical Engineering)¹¹

⁹ Ev sorumluluğu diyemeyeceğim ama mesela kardeş sorumluluğu etkiledi çünkü hep böyle bir şey yaparken onu düşünmen gerekiyor. Biraz da gene burada annemi de suçlayacağım çünkü hani annem de bana çok sorumluluk verdi. Hani bir yere gideceğin zaman işte Aysel'i de götür, Ayseli unutma onunla ilgilen, şöyle yap falan filan derken o zaman sen kendi yapmak istediğin şeyi belli çerçevede yapabiliyorsun. Aklın hep bir yerde kalıyor. Mesela işte küçükken memlekete giderdik, dışarı çıkardık oynamaya. Ben rahat rahat oynamazdım çünkü işte Aysel düştü mü acaba, nerede, hep öyle bir kaygı oluştu. Açıkçası olumsuz etkiledi diyebilirim. (Cansu, Gıda Mühendisliği)

¹⁰ Annem bana örgü öğretmişti. Çok sıkılıp bıraktığım oldu bir kaç defa. O da hiç zorlamadı ama hani daha çok temel gereksinimler alanında beni bir şeyler öğrenmeye teşvik etti işte yemek, temizlik. Onları çok öğretmeye çalıştı. Öyle hani güzel bir hobi ve bir şey üretmek güzel. Ne bileyim yani bere örebiliyor olabilirdim şu anda. (Irem, Kimya Mühendisliği)

¹¹ Annemle ben genelde temizlik işlerine bakardık. Babam, tamir çok fazla olmazdı evde zaten ama babam zaten o konularda çok yetenekli, ona çalışma işi gibi oluyordu. Abim de işte okula gidiyordu geliyordu. Onun dışında arada babama yardım ederdi abim. Standart bir türk ailesi.

Ben: Abine sence velilerin farklı davranıyorlar mıydı?

The interests, hobbies, and experiences of girls and boys differ in many ways during socialization. With these hobbies and toys, girls' interest is socially centered, while boys are more interested in tinkering activities than girls (Giligan, 1982 cited in Kelly, 1985, p.136). *'Tinkering rituals'* (Faulkner, 2000) are a part of the homosocial resuscitation process by men taking care of technical deals in the domestic division of labor and transmitting this interest, knowledge, and skill to their son. While, like Ceren's experience, girls' interests and skills concentrate on domestic responsibilities at an early age, the fact that the father is responsible for technical or tinkering responsibilities and transfers them primarily to his son is one of the essential manifests in the establishment of occupational segregation based on gender in the socialization process. On the other hand, compared to their male colleagues, most women engineers had dramatically fewer tinkering experiences with technological materials in childhood socialization based on the study (Faulkner, 2000, p.775). As a result, boys have more opportunities to develop their skills and abilities in traditional science-based jobs due to the early orientation of mechanical and technical orientation.

Gender theorists contribute to the explanation of the gendered division of labor according to stereotypical abilities and skills attributed to women. Anker (2001) argues that not only the division of responsibilities but also common gendered stereotypes, such as women's caring nature, segregate occupations based on gender. The gendered division of labor at home reinforces the gendered social structure in society about roles, abilities, and skills assigned to femininity and masculinity. To illustrate, doing domestic work such as caring, cleaning, and cooking is seen as the nature of being a woman as a 'domestic carer.' The social belief is that women are 'naturally' skilled in manual dexterity and household-related tasks because of matching femininity values such as caring, emotional, niggling, etc. (Anker, 2001, p.324). In the context of the invisible social character of works (Harding, 1992), the relationality of femininity with domestic roles and masculinity with technical ability is socially structured, although the idea of matching is seen as 'natural.' During the socialization process, parents, also being role models for their children, tend to orient their daughter or son by transmitting the values and norms of society by reinforcing or encouraging the 'appropriate' behaviors based on gender roles. Therefore, in this process, the orientation of girls or boys towards stereotyped roles and values in the family leads to developing interests and abilities in different fields. The fact that the state, family, education system, and other social institutions prioritize

Babamın açısından değil. Babam, bence yaşadığı, geldiği yere göre çok modern bir insan olarak kalıyordu. Ama, annem de vardı mesela. Biraz önce dediğim gibi, ben temizliğe yardım ederdim ama mesela derdim ki tozları da abim alsın. Annem ise saçmalama erkek temizlik mi yapar derdi. Bunlar oluyor, bu tarz şeyler oluyordu. Annem biraz daha işte o erkek sen kızsın şeklinde davranıyordu. (Ceren, Kimya Mühendisliği)

the gender-based roles and activities attained for women and assign emotional tasks to a certain group has economic consequences (Harding, 1992, p.444).

According to Cockburn (1983), men were historically socialized to have skills and capability for manual and technical labor; in contrast, women were seen as belonging to domesticity and socialized the stereotypical role models in their peer groups and social environment. These conditions and seeing women as technically incompetent lead to gendered occupational segregation in many fields and positions. Domestic division of labor in the family reproduces its social/technical dualism in the socialization process by intersecting with the gender ideology in society. During socialization, the fact that girls are not given responsibility in the roles they define as technical and technological in the domestic work division, that their attention is not directed, and that the tasks sometimes called 'men' work' maintain the reproduction. In addition, the common assumption is that girls lack technical ability and interest. However, the assumption that boys are naturally predisposed to physical and technical work is a model suitable for this gendered division. Since the socialization process in the society structure influences women's preferences and orientations, having no or lack of role models who take responsibility for other than domestic roles shapes girls' gendered identity construction and later decisions.

The historical structuring in society, where the woman is the home carer and the man the breadwinner, reproduces itself in the changing economic and political structure. Despite the changing work and organization with the Industrial Revolution, women's professions in the fields of health, communication, and education are concentrated. In contrast, men concentrate on professions where they use their technical and physical abilities. The gendered division of labor is relational to this reproduction, which intersects with the socialization process of individuals.

4.1.1.2 Toys and Games During the Socialization Period

In this process, games and toys have a reproducing effect that maintains gender roles and characterization. Toys and games have gendered distinctions, from their color to their purpose of function, for girls and boys. The color of the baby dolls' clothes and other toys as by-products, such as kitchen utensils, new clothes, and care products, are produced interactively by how the child plays with them. The idea that girls play, both the artifact and the relationship of the actor playing with it, are essential and mutually shape each other. These toys reinforce girls for the gender roles of women in the house. For example, Öztürk (1969) claims that in the house game played with Baby Dolls, there is a framing similarity of domestic roles assigned to the women's gender roles, such as feeding, caring, bathing, caring for hair,

dressing, sewing, etc. On the other hand, popular images of hegemonic masculinity, such as mastery of domination, militarism, and power construction through artifacts, are established stereotypical assumptions when boys play with toys such as cars, trucks, weapons, or action heroes in war films during early socialization process (Wajcman, 1991, p.146). From an early age, these are ensured that boys are encouraged with objects defined as mechanical and technological and 'male work.' Besides, the toys for boys are the opposite of the domestic and friendly with their adventurous and heroic figures that are not pinky or sparky (Colatrella, 2011). Therefore, in socialization, games and toys influence children's interests and skills. Games and toys enable both genders to interact, which enables them to develop their interests and skills in stereotypical roles in social and professional life. This situation aims to orient them to the gendered structure, assuming or directing that they are not related to girls or boys. However, what is seen as technological at this point should be questioned to conceptualize the direct impact; instead, I aim to analyze the impact on the orientation of interests and skills based on the participants' experiences in this chapter. In addition to this impact, matching games and masculinity with technology-related toys, such as cars or guns, prevented girls from being orientated to technological artifacts and areas.

My toys are very standard girl toys like dolls and plush toys. My mother was also a self-taught person who knew a small quantity of tailoring. That is why there was such a thing as sewing clothes for babies; it was a game we played a lot. Thank you for giving us needles and scissors, even at a young age! I mean, how she trusted, I would not give them if it were me. These are the games that I remember the most, such as dressing up dolls, sewing clothes, etc. (Zeliha, Food Engineering)¹²

I had a black baby, a pretty actual baby size, and I loved it like that back then; I guess I saw someone. I do not remember exactly how it happened, but I was looking at her, buying her a diaper, diapering, then feeding her by making food. I was literally looking after a child at that time. There were also kitchen utensils that I played with. (Sude, Chemistry)¹³

During socialization, the children convey the masculine and feminine ideas of embodiment through the toys and games. Toys produced in accordance with gender roles and identities are manifested through the purposes for which abilities and cognitive skills should be developed by children playing with them (Polavieja & Platt, 2014). For example, the toys played by Sude

¹² Oyuncaklarım, çok standart kız oyuncakları aslında. Bebekler, pelüş oyuncaklar. Benim annem de biraz böyle terzilik yapan, kendi kendine öğrenmiş biriydi. O yüzden çok böyle bebeklere kıyafet falan dikme şeyi vardı, çok oynadığımız bir oyundu o yani. Küçük yaşta bile bize iğne makas vermiş sağ olsun. Yani nasıl güvendiyse, ben olsam vermem ama. Hep böyle bebeklere kıyafet giydirmek, kıyafet dikmek falan gibi en çok hatırladığım oyunlar onlar. (Zeliha, Gıda Mühendisliği)

¹³ Bir tane siyah bir bebeğim vardı bayağı gerçek bebek boyutlarında ve o zamanlar böyle seviyordum birinde gördüm herhalde. Onu tam hatırlamıyorum nasıl olduğunu ona bakıyordum ona bez alıyordum, bezliyordum, sonra yemek yediriyordum, mama yapıyordum, kendi kendime mama yediriyordum. Çocuk bakıyordum yani o zamanlar. Bir de şey vardı işte böyle bir mutfak gereçleri. (Sude, Kimya)

and Zeliha and their interaction during the games encourage the domesticity assigned to the traditional gender roles of women. In this case, girls' toys foster social interaction, domestic responsibilities, and caring during the game. According to Damour (2009), boys could advance their reasoning and cognitive skills more than girls because of being encouraged to play games and toys that involve taking things apart and understanding their mechanics, while girls are often encouraged to play with toys that involve accomplishing tasks. My study emphasizes that since most of the participants have similar experiences and are exposed to gender-specific patterns of skills and interests from the socialization process, they had less opportunity to develop their interests in the field of science and technology at an early age.

Perceiving technology and science with their gender-based associations endowed with symbols of masculine or feminine values has a masculine nature because of mathematics and analytical thinking associated with stereotypical action and actors in STEM, which are widely dominated by men co-construct the masculine image of science and technology (Faulkner, 2001). Therefore, at this point, I established the context of the relationship between gender and science-technology by investigating the girl's socialization process from an early age as a whole with games, toys, and gender roles. Schreuders et al. (2009) claim that men have more comfort with computers, machines, or tools; on the other hand, women have a lower level of interest and are less comfortable designing, building, and analyzing activities. Girls' lack of experience in exploring, investigating, or developing interests other than stereotypical gender roles at an early age could cause them to approach science and technology in which they had less opportunity to interact with feelings such as inadequacy and disconformity towards them.

4.1.1.3 Media and Stories in Popular Culture

Since cartoons, fairytales, and TV programs or series are part of the means of spreading popular cultural transmission, stereotypical gender roles and messages are portrayed through these channels, too. Images, characters, roles, and identities of cartoons and main characters of books stimulate the identification of masculinity and femininity by strengthening the stereotypical female or male role models. The most famous worldwide stories and cartoons strengthen the association between masculinity and science-technology, which in the socialization process reinforces the transmission of gender roles and concentrates girls' interest in certain things. Colatrella (2011) claims that portraying female characters and peer groups' stereotypical attitudes in the media undermines the relationship between women and scientific inquiry with interests by not representing enough female characters in science and technology contexts. As a result, I gathered these answers to understand the portraits of female characters that women were influenced, socialized, and seen during their early socialization process.

Since dinner will be served when my father comes home in the evening, I am always out during that time. That's why, compared to this time, I had a perfect childhood in terms of games, Heidi from cartoons, Sweet Girl Candy, Power Rangers, Tom and Jerry, and Donald Duck; let me tell you that I watched them all. Also, I remembered the fairy tale Little Red Riding Hood; my father used to tell it to me. (Ela, Biology)¹⁴

While the traditional stories and fairytales that the participants mostly remember from their childhood are Little Red Riding Hood, Snow White, and Cinderella, the most watched cartoons are Winx Club, Heidi, Tom and Jerry, Bugs Bunny, and Candy Candy. Since mass media portray characters with identification of stereotypical masculinity and femininity, female characters in those cartoons and narrative roles are emotional, beautiful, docile, and cute; in contrast, male characters are portrayed as aggressive, brave, intelligent, and heroic superpowers (Perea, 2018). Brownlow & Durham (1997) claim that male action figures are typically aggressive while using the products of science and technology for the action or battle; on the other hand, female figures are portrayed as both socially competent and capable. In the portrayal of dualistic thought, the widespread use of technology and science with 'heroic behavior' presents the fact that masculinity is more compatible with matching. Children are exposed to stereotypical characters in cartoon shows, which could impact children's perspectives on science and technology and their interest in the characteristics of figures who are role models for them.

The inter-structural relationality of stereotypical gender roles and science-technology with masculinity, which girls are exposed to during the development process that they adopt as role models during the socialization period and acquire about career aspiration, reproduces mutually. Although this situation in popular culture does not directly affect the relationship established with science and technology during the period, it indirectly maintains stereotypical perceptions of women's gender roles and identity. In addition, it portrays characters and representations of science and technology for the set of values identified with masculinity. While there is a lack of representation of women in the fields of science and technology in the mediums of popular culture, portraying these fields in terms of masculine values and stereotypical attitudes co-constructs dualities.

4.2 Socialization in Education Life

Historically, the image of STEM fields as male-specific and associated with masculinity in many societies has reduced the participation of women in education and professional life in

¹⁴ Akşam babamın eve gelişiyle akşam yemeği yeneceği için o süre zarfında ben sürekli dışarıdayım. O yüzden şu zamanla karşılaştırsak mükemmel bir çocukluk yaşadım ben oyun anlamında. Çizgi filmlerden Heidi, Şeker Kız Candy, Power Rangers, Tom ve Jerry, Donald Duck; hepsini izledim öyle söyleyeyim. Hatırladığım masal şey, kırmızı başlıklı kız, babam onu anlatırdı. (Ela, Biyoloji)

these fields. Male dominance in this field, with gender discrimination and inequalities in education and career life, has been examined by many studies. These studies aim to understand the causality behind the identification of STEM fields with masculinity and to analyze gender inequalities in these fields by focusing on institutional and social structures. To contribute to these studies, I investigated the causality of women's strategy, interest, or orientation in STEM fields, where women have high participation in Turkey. In addition, this chapter is about understanding how women's interest in educational life and female-dominated science and technology fields develops and is constructed during socialization. I focused on the factors that affect life-course career aspiration by examining the relationship of family, social environment, peer groups, and teachers from a gender perspective during the participants' educational life from primary school to university. My examination of the field of education and employment from a gender perspective is not superficial - it is a linear view toward increasing women's participation - I aim to critique gendered awareness and explore structural gender discrimination and gendered understanding of science and technology that solely women's high participation cannot intercept.

4.2.1 Socialization with Peer Groups and Teachers

“Gender differences in educational experience are not simply the result of what is taught in courses of formal instruction in a more profound way the culture of the school is involved in constructing gender and sexuality through the 'hidden curriculum' - teaching in an implicit way meanings and behaviours associated with femaleness and maleness, with femininity and masculinity.” (Wajcman, 1991, p.152)

The education process has an operational role in society to raise individuals who comply with the ethical understanding of work life, the understanding of professionalism, and business values. The socialization process in educational life is critically important for the subject examined by this thesis. This is because, rather than being an institution that only provides formal education, education is a structure in which students establish dynamic relationships with teachers, peer groups, and school culture. The gender role and identity learned and transmitted during the socialization process that begins within the family at an early age is performed in a different structure and reproduces itself under different conditions. The educational environment and culture is a process of orientation to social and professional relationships for the individual, in which new role models are encountered who can affect gender identity. Also, behavioral changes are made with reactions that are supported or inappropriate, based on gender stereotypes in a culture, from the social relations established with their peer groups. This process is analyzed within the framework of social role theory, developed by Eagly and Wood (2012); gender roles are visible in all actions and contexts in daily life within the culture. This framework suggests that occupational choices emerge in

response to men and women in different social roles and social role-related activities based on gender stereotypes. Since there is an association between men and science-technology, the relationality of gender-science stereotypes and women's enrollment in education and the workforce in STEM fields are considered in the context of typical role-linked activities (Miller et al., 2015).

According to gender role model theorists, teachers' attitudes, behaviors, and approaches to students during the socialization process vary depending on gender. In the context of the studies, teachers treat girls and boys differently, and they expect them to behave and respond differently according to their gender in the classroom, which affects their self-perception (Wajcman, 1991). For example, similar to the experiences of the participants of this study, the tolerance of male students being naughty and making louder noises in the classroom is different from the expectations towards the attitudes and behaviors of female students. Female students are expected to be more docile and quiet and exhibit 'feminine' behavior, while males are allowed to be louder (Fox & Murry, 2000, p.1164). In addition to this expectation, there is a disciplining and controlling system regarding girls' behavior and appearance, as in the family. Considering the participants' experiences in this educational process, it manifested itself that they intervened more in female students' attire. Their desire to wear a different hairstyle, colorful clothes, or masculine 'tomboy' behavior at school is deemed to be inappropriate and marginalized. Therefore, during the socialization process of girls' educational life, the orientation of femininity sets of behavior toward expression in the institution is supported within certain limits, and the attitudes assigned to these values are expected to be oriented.

My purpose in analyzing this process in depth is to make sense of the women's experiences in the orientation process to femininity values and sets of behaviors with life-course career aspirations. In an educational environment where individuals are given the opportunity to develop interest, talent, and motivation in STEM fields, the formal education infrastructure they receive in order to gain knowledge that will increase their competence in this field affects their future careers. In this structure, a 'hidden curriculum' is included in the formation process of gender identity and is associated with gender roles within the school. Within this hidden curriculum, girls feel they must adopt attitudes consistent with feminine behaviors. Wajcman (1991) reveals that girls may internalize the belief that they are deficient or inferior in educational life because their feminine qualities are incompatible with the qualities required for the 'mathematical mind.' Therefore, I examine the process behind the women in this study feeling compatible in the female-dominated STEM fields and their strategies in three intersected themes: interest, gendered stereotypes, and strategical motivation.

4.2.2 Interest in STEM Fields

The theme of interest emerged because it was one of the foremost common reasons women participants turned to the female-dominated field. I gave meaning to form an area of interest within the framework of the existing conditions and obstacles to develop motivation for this area. Rather than interest appearing as a motivation alone, in-depth analysis is required to understand the conditions and actors that create this interest. Since STEM fields have mathematical-based images, the success criterion within the education system has also been based on mathematics, reinforcing interest. I believe it is necessary to consider the educational structure and actors by taking into account their interactions within this framework.

4.2.2.1 The Mathematization of Succession Criteria

Mathematics is a topic where I can exemplify and concretize relationality, which is seen as the foundation of science and technology. Mathematics is the basis and value of the objectivist, rationality, and reason-based structure of scientific teaching, which is the primary determining criterion in the education system. Besides, in science-based industries historically, mathematics knowledge and ability have become measurement tools for the professional level, too. Since mathematics has an essential role in the professions in the branches of technology and the reliability of scientific data, it covers a large part of formal education. So much so that this size has become the one-dimensional essential success criterion in engineering and scientific fields. The most important standard that should be met by everyone who aims to acquire professional fields in STEM has created a field of exclusionary reason and struggle for women. Hacker (1979) claims that mathematics represents rationality and, since it seems to be an indisputable criterion for engineering, its professional fields make the intertwining of social and everyday interests invisible. This one-dimensional criterion has revealed that since it creates "math anxiety" for women, it devalues their success in fields and even reduces orientation. She believes that, instead, STEM branches' education and evaluation criteria promote everyday life interests, which positively transform our perspective on these fields and the structure of the particular work organization.

Basing scientific thinking and the sub-branches of science-technology only on mathematics draws the image that science and engineering are disconnected from daily life and social relations, which shapes a person's interest and motivation through STEM fields. In this context, mathematics, the primary criterion of the education system and university entrance exam, requires success and interest that directly affects women's participation in STEM fields. The traits such as softness, dreaminess, and social, associated with the gender of the woman in the early socialization period are different than the attributes associated with mathematics

and physics, such as hard, serious, robust, and strict. In addition, the fact that mathematics and physics-intensive fields in STEM fields are male domains causes the spread of stereotypical gender images. Male supremacy in math-intensive and technical fields affects young people's career aspirations and reinforces mutually gendered patterns in interests and choices of career fields (Nosek et al., 2009).

The gender disparities in education and occupational fields reproduce the gender stereotypes that women are better in expressive and human-centered career fields while men are better in technical and mathematics-intensive career fields. This persistent segregation based on gender stereotypes is a decisive factor in spreading these beliefs (Charles & Bradley, 2009). In addition, the mathematization of science and technology concepts and gender stereotypes in STEM is critical for this study to understand the high women participation in less mathematics-intensive departments.

As I said, it is my preference; since I could not get into medicine and I do not like chemistry as much as biology, I am left with biology. I mean, my parents did not say that I should study biology or anything like that. If I had gotten into medicine, I would have studied medicine. Engineering is coded as physics for me because if I hate physics and I cannot succeed, why should I choose it? I could not do physics; I could not perceive it. Am I stupid about this? Yes, I am talking about the university exam and high school years, so I thought I would not be an engineer at that time. That is why I never thought about becoming an engineer. (Ela, Biology)¹⁵

A recurring feature of engineering education is the focus on mathematically based problem solving, which emphasizes that the student must learn to perceive the mechanical and machine world as a world in which only mathematical and physical principles are embodied (Faulkner, 2000, p.763). However, adopting a reductionist approach in this respect hinders the realistic view of the scope of engineering. Therefore, the solely mathematics-based image of engineering and the intensity of mathematics-physics courses are barriers to participation in this field for other female participants like Ela when choosing a department.

4.2.2.2 Interest in Successful Courses: Less-Intensity Mathematics

Various institutions such as schools, mass media, families, and youth cultures transmit the values and beliefs associated with masculinity machines and technical proficiency. Encouraging girls and boys towards different subjects during secondary education has exposed

¹⁵ Benim tercihim dediğim gibi tıplı kazanamadığım için kimyayı da biyoloji kadar çok sevmediğim için geriye bir biyoloji kalıyor. Yani annemle babam biyoloji oku falan demediler tıplı kazansaydım tıplı okuyacaktım. Mühendislik, bende fizik olarak kodlu çünkü e ben fizikten nefret ediyorsam ve başaramıyorsam neden seçeyim? Fiziği yapamıyorum, algılayamıyordum. Bu konuda salak mıyım? Evet, üniversite sınavı, lise zamanından bahsediyorum demek ki o zaman benden mühendis olmaz diye düşündüm. Hiç düşünmedim o yüzden mühendis olmayı. (Ela, Biyoloji)

them to gender stereotyping, ultimately leading to gender segregation in the labor market. The term 'math filter' is used as one of the reasons for the low representation of women in STEM fields. Mathematics success is the only criterion for a woman's participation in the mathematics-science (MS) major during high school. Since it is not a rational decision to choose MS as a major in high school, especially if you are unsuccessful in mathematics, families and teachers generally direct you to the high school major with higher grades. In this condition, they can direct their preferences to Turkish-Mathematics (TM), Turkish-Social (TS), or Foreign Language majors, which have mostly high women's participation in Turkey. Many studies identifying structural barriers to women's participation have examined gender discrimination in the employment and education process that girls receive, highlighting their exclusion from mathematics and science (Wajcman, 2009). Since mathematics success is the fundamental success and intelligence criterion from primary school to high school, the family and the student are encouraged to succeed in this field by receiving private lessons or private teaching support, if necessary. Participants emphasized that mathematics is a must criterion for success, mentioning the pressure for success at this point and the increasingly competitive environment, especially when the university exam approaches. Mathematization is a criterion that operates educational life, and there is a perception that the closer you get to this criterion, the more prestigious professions you can have. Especially for a student who has chosen or been directed to the MS major during high school, mathematics success parallels medicine and engineering with high scores in the university exam.

It felt good to be an MS student. It will be a bit like an attack; it always seemed like that, but actually, it is not like that. It is not easy if I fail, but it seemed like the TM students chose the easier option at that time. If I could, I would choose them too, but everyone also constructs that perception. There were things like MS students are more brilliant, MS students find better professions, and MS students are much better at finding a job. (Sude, Chemistry)¹⁶

On the other hand, all of the women participants were or were directed to the MS major because they were always successful in mathematics. They generally stated that their favorite subjects were science in primary school and chemistry, biology, and mathematics in high school. The overwhelming majority are participants who hate physics, say they do not understand it, and do not like it. Therefore, many male-dominated STEM fields in Turkey, primarily mechanical, computer, electrical electronics, and civil engineering are mathematics-physics intensive departments. The fact that these departments differ in content from the

¹⁶ Sayısalcı (MFci) olmak iyi hissettiriyordu bana. Biraz saldırı gibi olacak , hep şey gibi geliyordu ama aslında öyle de değil başarısızsam kolay değildir hani ama, Eşit ağırlıkçılar (TMciler) biraz daha kolay seçmiş gibi geliyordu o dönemlerde. Becerebiliyor olsaydım zaten ben de seçerdim onları yani ama öyle bir algı da yaratıyorlar. Sayısalcılar daha zekidir, Sayısalcılar daha iyi meslekler bulurlar, Sayısalcılar iş bulma konusunda çok daha iyilerdir gibi şeyler vardı bunların içinde. (Sude, Kimya)

courses in which they were successful reduced the belief that they could succeed. In addition, these mathematics-intensive departments strengthen the mathematics and male gender association and reduce the tendency of women towards these fields (Nosek et al., 2002). The fact that women strategically prefer less-intensive math departments shows that they prioritize courses where they see themselves as successful during high school. The fact that life-sciences (biology, chemistry) and soft engineering (chemical, food, biomedical, environmental engineering) departments include courses the participants are interested in outside of mathematics-physics courses has increased their belief in 'self-efficiency' compared to other departments. In other words, one of the factors of gendered distribution among STEM departments is the density of mathematics courses and its connection with the male gender.

English, German, mathematics, and geometry, I was pretty good at these subjects. I think that is why I chose MS. I do not know if this has anything to do with genetics, but yes, my mother was always in my mind. My mother is a very practical woman. Just say something and let her figure it out. Now, I am like that in my life and that way in my professional life. Mathematics and geometry seem like solving puzzles to me. You know, I loved that, making connections like that, etc. I am the same way in my own life. I like to make connections like this and keep things in my mind. They were obvious: mathematics, geometry, and language.

Me: Would you feel successful?

I felt successful in every course until high school. I felt successful in mathematics and geometry classes in high school, too. That is why I became an engineer. So, there was no physics. Knowing physics would seem like a manifestation of success to me because I cannot do it; that is why I think. (Gözde, Chemical Engineering)¹⁷

Gözde's experience, which is parallel to other participants' relationality with math-intensive, including understanding physical principles fields, and her inability to establish an association in terms of efficiency among herself is one of the factors that cause diversification in STEM fields. The strong connection between mathematics and males from a gender perspective reinforced the negative relationship between mathematics, physics, and women based on the study by Makarova et al. (2019). This study revealed that mathematics and physics are perceived as close to masculine traits and male gender; in contrast, chemistry is perceived as

¹⁷ İngilizce, Almanca, matematik, geometri bu konularda baya iyiydim. O da şeyden dolayı MF seçtim bence ya. Bilmiyorum bunun genetikle falan bir alakası var mı diye ama evet gözümün önüne hep annem vardı. Annem çok pratik bir kadındır. Hemen yani bir şey söyle ve o çözsün. Şu an artık ben de öyleyim hayatımda, iş hayatımda da bu şekilde anılıyorum. Matematik, geometri de bana böyle bulmaca çözmek gibi gelir. Hani o onu severdim, böyle bağlantı kurmayı falan filan. Yine kendi hayatımda da öyleyim. Böyle bağlantılar kurup bir şeyler öyle aklımda tutmayı severim. Bariz onlardı; matematik, geometri ve dil.

Ben: Başarılı hisseder miydin?

Liseye kadar her derste başarılı hissediyordum. Lisede de başarılı hissediyordum matematik geometri derslerinde. O yüzden mühendis oldum. Yani fizik falan yoktu. Fizik bilmek bana böyle bir sanki başarı belirtisiymiş gibi gelirdi çünkü kendim yapamıyorum o yüzden bence. (Gözde, Kimya Mühendisliği)

less masculine or at least gender stereotyped. Even if this is not the criterion measured in this study, the fact that Gözde and the other participants believe in success and intelligence through a mathematical mind and exclude the subjects from which they draw their success proves that they have changed their career choice aspirations.

4.2.2.3 Opportunities to Access Materials for Supporting the Interest

In order for women to develop their interest and skills in the field of STEM, supporting them in social environments such as family and education and increasing their interest by accessing or visualizing various materials is an essential factor. Therefore, with this point in mind, I questioned the access possibilities in this regard because specific support and guidance in this area within the family was not a common situation in preschool. Increasing the basic knowledge level of their interest can direct and influence capacity and skills during the education years. Constituting a basic background in the field of university education and work related to a chosen university department helps create a career aspiration that you want to see yourself in or think you are able to. According to Turja et al. (2009), women's motivation and self-efficiency toward STEM fields are based on encouraging them early by providing cognitive skills and tools for aspirations in occupational decisions. Since self-efficiency is essential for aspiring careers in non-traditional fields, women need to have the belief of having capacity in STEM that has seen male-dominated images and gendered culture from the beginning of early socialization.

There was nothing I could develop my interest in; I wish there were. If my family had known how this could be developed, they would have taken the initiative, but my family had no knowledge about it either. If I had discovered something, they would probably have supported me when I wanted to pursue it, but since I lived in a small place, the things I could discover or hear from those around me were very limited, so it never happened. I remember reading a science-technical magazine, so I was trying to follow the innovations, but other than that, there was nothing that interested me extra. (Elif, Chemical Engineering)¹⁸

The limitation of access to materials that increase interest and skills has caused STEM fields to be reduced to mathematical success, professional prestige, and job opportunities, and they have not been able to access the opportunities to develop themselves sufficiently in this field. Therefore, participants deprived of family repair work, mechanical toys, and computer use

¹⁸ İlğimi geliştirebileceğim hiçbir şey yoktu, keşke olsaydı. Ailem bunun nasıl geliştirilebileceğini bilseydi ön ayak olurdu ama ailemin de bu konuda bilgisi yoktu ben bir şey keşfetseydim hani onun peşine gitmek istediğimde destek olurlardı büyük ihtimalle ama küçük bir yerde yaşadığım için benim de keşfedebileceğim etraftan duyabileceğim şeyler çok kısıtlıydı o yüzden hiç olmadı. Bilim-teknik dergisi okuduğumu hatırlıyorum yani yenilikleri takip etmeye çalışıyordum ama onun dışında ekstra ilgimi çeken bir şey yoktu. (Elif, Kimya Mühendisliği)

associated with technology and technical skills tended to draw their interest and skills in STEM, based on their mathematics-science success and exam scores. Since teachers and families measure their interest and skill in MS through course scores, they support them by providing access to private lessons, private teaching institutions, and test books. On the other hand, participants also stated that they were impressed by the limited opportunities they encountered and that they were able to interact with science. Opportunities such as museum trips, scientific magazines for children, experimental laboratories at school, and computer laboratories were mentioned as examples of materials that increased the participants' interest in the educational process. However, while some have very limited access to these opportunities, the majority of them do not have access at all. Women's lack of access to opportunities to gain sufficient knowledge in the science-technology fields and inability to construct the relationality between themselves and the fields has led them to make decisions based on stereotypical judgments for career aspirations.

4.2.3 Teachers as a Role Model: Teachers' Attitudes that Increase Interest

Your role models are your mother and father, so you see them first, and you get the same behaviors they do. My parents were always organized in their work. I already learned this behavior from them. Then, when you go to school, you start to imitate the teachers' behavior. And as women teachers, you try to do the same as they are meticulous, detail-oriented, and organized. Just as she wanted. This time, it is reinforced from that side as well, but did I get this from male teachers? It is actually rare, so women are generally transmissive at this point. (Eylül, Food Engineering)¹⁹

During socialization in the education process, teachers are role models and establish effective communication and relationships in guiding and mentoring students. There is an expected correlation between love and respect for teachers, interest in lessons, and success rate. Participants like Eylül must state that they saw their favorite teachers as role models and were interested in their lessons. On the other hand, female students' interest in the lessons of teachers who behaved perversely towards or discriminated against them based on their achievements negatively affected and decreased their participation rates. It should be underlined that male teachers have more sarcastic behavior, jokes, and behavior according to the student's gender. These situations contradict the institutionally rational and objective attitude, and these relationships manifest themselves in gendered structures and cause discrimination.

¹⁹ Rol model anneniz ve babanız, yani ilk önce onları görürsünüz, onları yaptığı davranışların aynısını alırsınız. Benim annem de babam da hep işlerinde tertiplilerdi. O taraftan bir kazandım zaten bu davranışı. Sonra okula gidince, öğretmenlerin davranışlarını örnek almaya başlıyorsunuz. Ve kadın öğretmenler onlar nasıl titiz davranıyorsa, nasıl detaycı davranıyorsa, nasıl düzenli gidiyorsa siz de onun gibi yapmaya çalışıyorsunuz. Onun istediği gibi. Bu sefer o taraftan da pekişmiş oluyor ama erkek öğretmenlerden bu şeyi aldım mı? nadirdir aslında yani genelde kadınlar kazandırıyor bu noktada. (Eylül, Gıda Mühendisliği)

There was a male geometry teacher. I did not like asking him questions; he also had this sarcastic attitude, evaluating you based on the question you asked. He was a nerd man, and his communication with women was terrible. I would not feel comfortable around him; I would not bring him anything. He got along better with men. He said something to me in class. It is like, are you picking your nose? Usually, you do not care about such a thing, but in high school, you are being bad in front of everyone. The woman who was our mathematics teacher was good, but I mean, she was a straight woman: a decent woman who would not think badly of anyone with a good heart. Male teachers were strange. There was a chemistry teacher; the man had extremely strange movements. They had very characteristic patterns, and so on, we would have fits of laughter. I did not like asking questions to him either. (Vildan, Food Engineering)²⁰

Because it is a fact that the success of students who take their favorite subjects and teachers as role models can increase their interest and shape their future career aspirations. Although this reality does not directly manifest itself in every case, we can see that it directly affects exam success in the mathematized education system. Therefore, teachers' behavior and attitudes according to the student's success and gender affected the interest and success. Teachers' success criteria make interest and skills in STEM fields one of the reproductive actors of mathematical categorization because the success criterion itself is structured within the mathematical mind. From Eylül and Vildan's experiences, I inferred that success criteria and teachers' attitudes towards students are important factors in determining their areas of interest. I analyze this situation from a gender perspective as case examples of gender and orientation within the institution constituting each other.

4.3 Gendered Stereotypes: Science and Technology Understanding

Experiencing the socialization process within the gendered understanding of science and technology is another factor for its strategic orientation and women's tendency to female-dominated STEM fields. At an early age, school culture, mass media, family, and the environment's stereotypical assumptions about professions and the fields of science and technology encourage girls to aspire towards 'appropriate' fields to their gender roles and identity. In this process, feminine sets of behaviors and values are oriented by the family and education institutions by doing gender within every interaction. Feminist perspectives of science and technology studies that I detailed in the literature framework (Harding, 1986;

²⁰ Bir geometri hocası vardı erkek. Ona soru götürmeyi sevmezdim onun da böyle sarkastik tavrı vardı götürdüğün soruya göre seni değerlendirme durumu. Nerd bir adamdı, kadınlarla iletişimi de kötüydü. Onun yanında kendimi rahat hissetmezdim ona bir şey götürmezdim. Erkeklerle daha iyi anlaşıyordum. Derste bana bir laf etti. Sen burnunu mu karıştırıyorsun gibi, normalde böyle bir şeyi takmazsın ama lisede herkesin içinde kötü oluyorsun. Matematik hocamız olan kadın iyiydi ama yani dümdüz bir kadındı: iyi kalpli kimse hakkında kötü düşünmeyecek düzgün bir kadındı, erkek hocalar garipti. Bir kimya hocası vardı, erkek aşırı garip hareketleri vardı. Çok karakteristik kalıpları falan vardı, gülme krizine girerdik. Ona da soru götürmeyi sevmezdim. (Vildan, Gıda Mühendisliği)

Wajcman, 1991; Oldenziel, 1999; Faulkner, 2000; 2001) examined the structure of science and technology that embodies masculinity and its values to question the exclusion of women and femininity values. Therefore, traditional women's gender roles are incompatible with the STEM fields in general since engineering and fields of science are constructed and maintained as masculine images and values. However, gender disparities in STEM fields are also analyzed in the values of femininity and masculinity variation assigned to some STEM fields. For example, some STEM fields, such as machine engineering or physics, have more masculine images, while biology or food engineering is less masculine or feminine. Within the hard/soft dualism. In my case study, I questioned why women are interested in or encouraged to female-dominated STEM fields in Turkey to understand their strategic preferences based on their experiences.

4.3.1 Gendered Symbols and Identities of Artifacts: “A machine is a man.”

The belief that technology and science are male-dominated because they basically require masculine characteristics is insufficient to understand their structure. In addition, according to studies (Cockburn, 1985; Wajcman, 2000; Faulkner, 2001), the relationality in which the masculine understanding of power and binary thinking is dominant in the structure of science and technology has been analyzed from a gender perspective. Although there is a mismatching image between technology and masculinity in the context of practicing, masculine images and identities of technology are co-constructed by male dominance of technological and science occupations and their gendered structure (Faulkner, 2000, 2001). This framework reveals the relationship between science-technology-gender and the mutual production of both structural and gendered symbols.

For this study, inferences were made through the image and symbol differences between the STEM departments of the framework that girls match with their own identities and capacities. Because the relationship between modern technology and hegemonic masculinity has become intersectional through "power," the image of technology and its products are perceived based on control and domination themes. The concept of "mastery of nature" is a powerful symbol of science and technology, which is associated with masculinity for the goal of domination and control in industrial capitalism (Faulkner, 2001; 2009). This construct of masculinity is mutually shaped by machine-related skills and capacities within the historical and cultural structure of science and technology. As a result, masculine traits such as physical toughness, destructive power, and control are co-constructed through this process.

I was not interested in mechanical, civil, or electrical engineering, but that is a separate issue. But mainly, you act cognitively when choosing a major. At these points, its

influence is more significant, even when choosing a profession. Because you believe that you have a certain power and you think that you cannot use this power anymore, you say that I should choose those departments for whatever that power is enough for. (Eylül, Food Engineering)²¹

Archer et al. (2010) argued that during the socialization process that begins at an early age, children's lack of sufficient knowledge about science causes them to attribute masculine characteristics to science. Eylül explained why she did not focus on mechanical, civil, and electrical-electronics engineering through the definition of 'power' that she felt was lacking. The definition of power here refers to the symbolized power connection between hegemonic masculinity and the technology-science relationship. Gendered images and symbols of male-dominated STEM fields mutually construct the association of both fields of work and their produced artifacts with masculinity. Zeliha also made a similar association by saying, "The machine is a man," and created a direct conflict with the fact that she is a woman. In addition, stereotypical skills and images such as physical toughness, enduringness, and hardness that are considered necessary for mechanical, civil, mining, and electrical electronics engineering have reduced women's participation since they have mismatched the traditional values of femininity and women's gender roles.

By the way, I am very sad that mechanical engineering never came to my mind because when I saw it a little more like this at university, I thought it was very nice; I would actually enjoy it very much. However, it had never even occurred to me as a possibility because the machine is obviously man, so you know, I have never matched it with myself. I did not even consider it. Let alone feeling incompatible, I never even thought about it. I also did not consider petroleum and natural gas engineering or mining engineering. These were the departments that I immediately eliminated because I was worried about how I would work there. Here are chemical engineering, food engineering, and computer engineering are the ones where we can work in our protected areas and physically. (Zeliha, Food Engineering)²²

On the other hand, the symbols and images of female-dominated STEM departments in Turkey, such as non-technical, less-intensive mathematical ability, and non-physical strength, are the exact opposite of male-dominated ones, which makes women's participation high. Due

²¹ Makine, inşaat, elektrik mühendisliğine ilgim yoktu da o ayrı bir mesele tabi. Ama daha çok bölüm seçerken bilişsel davranıyorsunuz. Bu noktalarda onun etkisi daha fazla oluyor, meslek seçerken bile. Çünkü sizde belli bir güç olduğuna inanıyorsunuz ve bu gücü daha fazla kullanamayacağını düşünüp o güç neye yetiyorsa ben o bölümleri seçmeliyim deyip ona yöneliyorsunuz. (Eylül, Gıda Mühendisliği)

²² Aklıma hiç makine mühendisliği gelmemesine çok üzülüyorum bu arada çünkü biraz daha böyle üniversitede görünce çok güzelmiş, aslında ben çok keyif almışım dedim. Ama hiç en ufak bir ihtimal olarak bile aklıma gelmemiştii benim çünkü makine direkt erkektir yani hani o hiç kendimle eşleştirmedim. Ben onu hiçbir değerlendirmeye bile almadım. Bırak hani yetersiz hissetmeyi hiç değerlendirmedim bile. Petrol ve doğalgaz mühendisliğini ya da maden mühendisliğini değerlendirmedim. İkisi de yok olmaz nasıl çalışacağım ben oralarda gibi endişelerle hemen ellediğim bölümlerdi onlar. İşte kimya mühendisliği, gıda mühendisliği, bilgisayar mühendisliği. Bunlar daha hani kendi korunaklı alanlarımızda çalışabileceğimiz hem de fiziksel olarak da öyle. O yüzden oralardaydı tercihlerim. (Zeliha, Gıda Mühendisliği)

to the density of laboratory courses, their work fields in these departments, and their female-dominated nature, the image has been structured as 'protected areas' for women, as Zeliha said. The critical reason why Esin feels close to herself is that she establishes a relationship between herself, the artifact produced, and her job field. Therefore, Esin's lack of knowledge about cars, but the fact that she considered herself skilled in producing food, was the most essential factor that inspired her to this field. Female-dominated STEM fields and symbolic images of women are matched with roles assigned to women's gender, such as caring, nurturing, and domestic care.

I had no knowledge of the machine, nor was there any guidance. You can more or less guess what it is. Okay, you know, there is something I am dealing with with machines now because, after all, it is engineering. However, you know, food production. What is food production? Tomato paste is produced in the factory, and you can also produce tomato paste at home. So there is something about it: it makes you feel closer. You know, machinery, cars; I do not know the car's features, so I cannot produce it, so it is far from me. (Esin, Food Engineering)²³

Images in STEM fields have caused the male dominance of some departments and the female dominance of others, or vice versa. On the other hand, dominance can also be explained by the relationality between gender roles matched with images and symbols. Zengin-Arslan (2002) emphasized that in the gendered distribution in STEM fields in Turkey, women are encouraged into more 'social' fields with the cultural image that femininity is incompatible with technological competencies. Therefore, although food production requires technical knowledge and skills, the belief that parts that match the symbols of artifacts such as cars, machines, and engines require more technical knowledge and skills has revealed a contradictory reality. Gender roles and femininity qualities in physical competence, interest, and skills are essential criteria in the process where women decide departments through their symbolic connection.

4.3.2 Lack of Women Role Models in Science and Technology: Marie Curie's Impact

Digging into what we know, how we know, and the way of knowing, and oversights deep within the knowledge are the epistemological questions that lead feminists to comprehend the gendered structure of science. Women in the history of science and technology and the contributions of women's products to their developments is this study's fundamental theoretical questioning to explain the relationship between science and gender. While defining

²³ Makinede bilgim yoktu, yönlendirme de yoktu işte şeyden. Aşağı yukarı tahmin ediyorsun ama ne olduğunu yani. Tamam, hani yine makinelerle uğraştığım bir şey var. Sonuçta mühendislik ama hani gıda üretimi. Gıda üretimi nedir? salça işte fabrikada üretmek ve salçayı evde de üretebiliyorsun. Yani demek ki hani bunun bir şeyleri var, hani daha yakın hissettiriyor. Hani makine, araba, arabanın ben özelliğini bilmiyorum ki şeyini yapayım, o uzak yani bana. (Esin, Gıda Mühendisliği)

science and technology with regard to their history, the basic assumptions imprison us in the history of gender-blind technology and science. Within the gender-blind perspective, women's productions and contributions are destined to remain invisible. Stanley (1983) emphasizes that women who contributed to the development of technology and science in the historical process are never discussed, assuming that these fields are male-dominated. Therefore, being visible should be addressed in this regard, considering the effect of being a role model and science-technology understanding for generations in the historical process.

Since there is no gender-sensitive system in the education curriculum, the inspiring, encouraging, and inclusive effect of women role models in science fields for girls has been ignored. However, in the years when we heard a lot of male explorers, Marie Curie was the scientist that all women said they were first inspired by. They stated that being a woman in a male-dominated field was surprising and inspiring during their childhood. Therefore, one of the points where the male-dominated visibility debate needs to be framed is in the context of role modeling and the image of STEM fields towards women. It would not be surprising to hear of women inventors during the early socialization period if we could know many. Women's invisibility in science and technology during the socialization period in family and school life strengthened the image of women in these fields as incompatible.

When I think of science and technology, man comes to mind. It was clearly a man. Maybe that is why I am a little more like that in attitude. That is the reason why I chose a more masculine attitude. So, for me, it is always something that also matches competence. Man, you are more competent, which is a very similar situation. There was definitely a similar match for me in both primary, secondary school, and high school. So, something was surprising about women engineers. Can women become engineers? There was always such an environment like, "Can women be successful in engineering?" In other words, it starts with the attitude that you chose this field even though you are a woman. Naturally, it continues with the tendency to close the gap or catch up with something constantly. (Zeliha, Food Engineering)²⁴

Numerous pioneering male inventors and contributors have been constructing gendered science-technology throughout history, which makes women question whether they belong to male-dominated fields. Women participants with career aspirations in the STEM field can strategically adopt masculine behaviors and traits to compete and succeed in these fields, as in Zeliha's experience. Because we are taught the historical knowledge that limited women role

²⁴ Bilim teknoloji deyince aklıma gelen erkekti. Net olarak erkekti. Belki de tavır olarak biraz daha öyle olmamın sebebi de odur. Daha maskülen bir tavır seçmemin sebebi de odur. Yani benim için her zaman o şeyle yetkinlikle de eşleşen bir şey. Erkek, sen daha yetkinsin gibi hani o da çok eşleşen bir durum. Kesinlikle hem ilkokul ortaokul sonrasında lisede de benzer bir eşleşme vardı benim için. Yani şeye kadın mühendislere şaşırılan bir durum vardı. A olabiliyor mu Kadınlar mühendis? başarılı olabiliyor mu falan gibi sürekli öyle bir şey vardı, ortam vardı yani. Yani kadın olmana rağmen bu alanı seçmişsin tavırla başlanıyor. O sürekli açığı kapatmak ya da bir şeylere yetişmek eğilimiyle de devam ediyor haliyle. (Zeliha, Gıda Mühendisliği)

models could be visible because they made many sacrifices and worked excessively to be successful in science, male-dominated workplaces give us the intuition that women should struggle more. Powell et al. (2009) claim that women adopt coping behavior within the hyper-masculine structure of engineering by adopting an anti-women approach by focusing on gaining a reputation as an engineer and the advantages of engineering studies.

During the early socialization period of girls, women's role modeling context affects their motivation, interest, and positive self-efficiency capacities in science and technology. Besides, women role models are a gatekeeper for young female engineers and scientists, mentoring and fighting against stereotypical images and dominant gendered ideology. Therefore, girls have the misfortune of having fewer role models and mentors in the STEM field and have not had the experience to deconstruct the gendered distribution of these fields. We can infer this from the gender difference in career aspirations of peer groups.

For men, the standard would be computer engineering, mechanical engineering, and, very rarely, pilot training. But, for example, I have never heard of any girl dreaming of pilot training. I mean, none of my girlfriends had these dreams. For example, in contrast to the male population who wanted to be doctors or surgeons, some girls wanted to be dentists. I mean, they were making comments like, "I cannot be a doctor, but I should be a dentist." (Zeliha, Food Engineering)²⁵

Since the gendered images of departments construct the image of professions based on gender identity and roles, assigned feminine qualities such as health, cooking, and care attract women to the decision process. While these symbolic connections are one of the reasons women choose female-dominant departments in STEM fields, the preferences of other women tend to have a role model impact on them.

4.4 Strategical Motivation Development Toward STEM Fields

They have to choose a department by taking a university entrance exam as the last stage before the university education process, where they develop interest, motivation, and skills in STEM fields. I consider the essential criteria that the participants, who have direct and indirect guidance, transmitting, and orientation processes until this decision stage, develop strategic motivation for in the final stage: compatibility, social encouragement, and the advantages of being in a female-dominant field. These criteria reveal how the strategy was developed and constructed, in which the orientation of the socialization process up to this stage was intense.

²⁵ Erkekler fix bilgisayar mühendisliği, makine mühendisliği çok nadir de olsa pilot çıkardı. Ama mesela hiç kızlardan pilotaj eğitimi hayali falan hiç duymadım. Yani hiçbir kız arkadaşımda yoktu bu hayaller. Mesela doktor ya da cerrah olmak isteyen erkek nüfusunun karşısında diş hekimi olmak isteyen kızlar oluyordu. Hani doktor da olamam da ama diş hekimi olayım falan gibi yorumları oluyordu yani. (Zeliha, Gıda Mühendisliği)

I also reveal the patterns of gender discrimination in women's career aspirations in the context of their strategies.

4.4.1 Motivations Beyond the Prestigious

STEM departments are preferred in Turkey because they are prestigious, have a high probability of finding a job, and have compatible salaries. Since employed in these fields has the potential to earn more income, engineering is appreciated and praised by society in Turkey, which is regarded as a prestigious middle-class occupation (Pehlivanlı-Kadayıfçı, 2015; 2019). Therefore, students who succeed in mathematics and natural science are encouraged to specialize in MS during high school. Therefore, STEM majors are imaged to students as a strategic decision for jobs, prestige on the social level, and higher income. Additionally, there are hierarchical differences in prestige and respect across STEM departments and professionals such as mechanical, computer, electrical engineering, and medicine in Turkey, which has provided goals that generate interest and motivation in shaping career aspirations. For example, many participants reported being motivated by pursuing medicine when choosing MS.

MS has many work areas. So, we can say that they put us on that path with the guidance of private teaching institutions, that is, with the guidance of our teachers. We actually went in together. I went to private teaching institutions for seven years, from the sixth grade to the fourth year of high school. So, I always had teachers. In fact, there is a prediction of this in primary school as well: 'focus on mathematics and science.' However, the reason why private teaching institutions and everyone around us are motivated to specialize in mathematics and science is partly due to prestige and partly because of the financial situation. Things like having a variety of job opportunities and high salaries are guiding factors. (Eylül, Food Engineering)²⁶

However, in addition to these, gender has been prioritized for women in the decision-making process, so they have driven the department choice period by intersectionalizing with gender roles and identity. In other words, while encouragement and support for the mathematics-science field was much higher due to the image of STEM fields in Turkey, the prominent point in the selection process among these fields was, before all these, gender identity and roles for women. While women feel more motivated towards the images and symbols associated with female-dominated departments, they also stated that they strive to be in a field where they can compete and be preferable employees in the labor market. Therefore, they foresee the risk of

²⁶ Sayısalın alanı çok fazlaydı. Yani dershanelerin yönlendirmeleriyle, hani öğretmenlerimizin yönlendirmeleriyle ve hani o yola soktular diyebiliriz. Birlikte girdik aslında. Altıdan lise dörde kadar yani 7 yıl dershaneye gittim. Yani hep hocalarım vardı. Zaten şeyde ilkokulda da bunun şeyi oluyor. Bir öngörüsü işte matematikle fen bölümüne ağırlık verin. Ama dershaneenin ve işte çevremizdeki herkesin matematik fene gitmesi biraz prestij, biraz işte geçim maddi durumdan dolayı işte iş alanlarının fazla olması, aldığı maaşların yüksek olması gibi şeyler yol gösterici oluyor. (Eylül, Gıda Mühendisliği)

low chances of finding a job in a male-dominated field.

When I think about it, for example, if I were a civil engineer, I would go into construction. I do not know if I were to become a material engineer again; maybe I would work in a place where there were such types of equipment or a higher male population. But, as I mentioned before, food engineers have to look at food production facilities from a 'female eye.' In fact, this is something that also happens in our sector. Women auditors are generally preferred because they are viewed with that sensitivity. That is why the place where they are more workable is in our sector (Cansu, Food Engineering)²⁷

Gender-specific career goals change girls' career choices more than prestige. Therefore, as Cansu stated, the 'female eye' assigned to women as feminine qualities and the ability to work in detail is an ability that can put her in an advantageous position in the sector. The thought that this ability could be sought-after and preferred by food engineers in production facilities influenced her career choice. Therefore, the idea that a female-dominated area would offer an inclusive environment seemed advantageous for women, rather than pursuing a career in male-dominated areas and would be seen as more incompatible as a woman. While the prestige of STEM professions motivates women during high school, professions that are appropriate to gender roles take precedence over professions that may be more prestigious in the decision-making process.

4.4.2 Gender Stereotypes in STEM Professionals: “Professions Suitable for Women”

The direct connection between gendered distribution in STEM fields, working conditions, and professional images was analyzed. Zengin-Arslan (2002) stated that the cultural masculine and feminine image of STEM departments in Turkey is based on stereotypical perceptions: 'feminine' image is considered 'cleanliness,' 'comfort,' 'lightness,' and 'softness.' On the other hand, masculine STEM departments symbolically associated 'dirtiness,' 'heaviness,' 'outside work,' and 'hardness.' According to Acker (2006), place refers to the situation of work organizations and social practices. Therefore, the workplace is essential to who belongs to the place and who is excluded in the context of gendered social relations and practices. Therefore, professional life, working conditions, and the image of professions have become the most critical criteria when women make decisions considering their gender. The social environment, teachers, and family members have actively interacted by directing the gendered occupational perception to 'appropriate roles and conditions for women.' Since role modeling, inspiring, and

²⁷ Düşününce mesela ben inşaat mühendisi olsam inşaata gideceğim. İşte ne bileyim yine malzeme mühendisi olsam belki işte gene böyle ekipmanların ya da işte daha böyle erkek yoğunluğunun olduğu bir yerde çalışacaksın. Ama hani gıda mühendisleri gıda üretim tesisleri yine daha önce de bahsettiğim gibi işte daha böyle kadın gözüyle bakmak şeyliği vardır ya aslında bizim sektörde de olan bir şey hani o hassasiyette bakıldığı için genelde kadın denetçiler tercih edilir o yüzden hani daha çalışılabilirliği olan yer bizim de sektörde (Cansu, Gıda Mühendisliği)

informal mentoring (Ericson et al., 2009) are essential for life-course career aspirations during early socialization, I asked women whether gender, professional stereotypes, and the guidance of the close environment affected their professional aspirations. Based on women's experiences, I analyzed the criteria that may be effective in making strategical choices that are advantageous for them through their masculine and feminine dualistic images and practices in STEM fields.

4.4.2.1 Working Hours: Flexible vs. Long

As I said, I had more than one option like this. For example, there was a lot of architecture and pharmacy, but by the way, they were both professions suitable for women. You know, the professions where I can dress stylishly and go to work. These are not professions that will take up all your time between 8-6, where you can work a little less or have flexible working hours. You know, there should be things that can give you flexibility when you have a child or something like that. Even our teachers in high school had such guidance. In fact, I remember very clearly that during our meeting with my guidance counselor, she gave a warning like, 'Well, after all, you need to think a little further ahead.' I am like this, how come? I asked. There was already obvious guidance such as 'You know, years will pass, and eventually, you will have a family, then all of these will be advantages for you.' That is why I chose architecture, pharmacy, and such kinds of departments. (Zeliha, Food Engineering)²⁸

Zeliha has constructed the idea that appropriate women's professions are based on working conditions where a woman can dress as she wishes (her idea of 'stylish clothing' can be heels, dresses, skirts) and where she can have enough time when she has a child. Both their social environment and teachers conveyed the message that women should consider their future family and domestic responsibilities in working conditions. Therefore, they are oriented that women's professional aspirations should take into account family life and women's traditional gender roles. The fact that flexible working hours are more appropriate to the gender roles assigned to women is considered an advantage for them. Therefore, the gendered assumption is that long and overtime working conditions are not suitable or challenging in the discourse of professions suitable for women. Working hours are a criterion for not job satisfaction or performance but for gender roles when you are a woman. Therefore, it is common to assume that the working hours, conditions, and climate of female-dominated professions should be

²⁸ Ben böyle bir birden fazla seçenek tuttum elimde demiştim ya. Mesela çok fazla mimarlık vardı, eczacılık da vardı ama yani ikisi de kadına yakışan mesleklerdi bu arada. Hani şık şık giyinip gidebileceğim meslekler. Biraz daha ya da işte freelance çalışabileceğin hani esnek çalışma saatleri olabilecek seni böyle işte 8-6 arası tamamen bütün zamanını alacak meslekler değil. Hani biraz daha böyle çocuk yaptığında falan sana esneklik sağlayabilecek şeyler olsun gibi. Lisedeki dershanedeki öğretmenlerimizin bile öyle bir yönlendirme vardı. Hatta ben çok net hatırlıyorum rehber öğretmenimle görüşmemizde yani 'hani biraz daha ileriye de düşünmen gerekir sonuçta' gibi bir uyarısı olmuştu. Ben böyle işte nasıl yani? Diye sordum. 'Hani yıllar geçecek sonuçta sen de bir aile kuracaksın o zaman bunların hepsi senin için avantaj' gibi çok açık bir yönlendirme vardı zaten. O yüzden ben işte şey mimarlık ve eczacılık bu şekilde bölümler vardı. (Zeliha, Gıda Mühendisliği)

compatible with women's gender roles.

4.4.2.2 Working Conditions: Clean vs. Dirty

Those departments were not called men's work, but a warning was given under the scope of "Okay, go, but pay attention to this." When you get a job, there were conversations like, 'If you were to work in a factory on a construction site, there would be workers, and there would be a lot of male workers around you, and this could give you trouble.' I think most families guide their children in this way based on this. There are also those who think that that job is a man's job; what is a woman doing in the dust and dirt? I know that there are university professors who think so. (İrem, Chemical Engineering)²⁹

The warning given to İrem reminded me of the common idiom used in Turkey when women are involved in 'men's' work that they do not understand, do not know, and cannot do: '*Interfering in men's work with your doughy hands.*' Doughy hands represent women busy with kitchen work and understand it but cannot do or understand work outside the kitchen; such expressions also carry the culturally gendered division of labor. Male-dominated STEM professions and their workplace are imaged with dirtiness, heaviness, physical toughness, and masculine-environment more contrary to female-dominated STEM fields in Turkey (Zengin-Arslan, 2002; Küskü et al., 2007; Pehlivanlı-Kadayıfçı, 2015). Since female-dominated professions are identified as clean, light, and soft, their workplace is close to office or laboratory work rather than sites or factory work. The high male representation in jobs with dust, pollution, and a factory environment co-produce each other to the idea that these job areas pose a threat and difficulty for women, with the stereotypical belief that women are vulnerable and incapable of protecting themselves. İrem states that most families warn their daughters during the decision-making process to aspire to a career that will make them 'comfortable' rather than working in work environments where they will experience difficulties or pose a threat. The constructed idea that women do not belong in dirty, dusty, and dangerous workplaces is that male-dominated STEM fields, where masculine symbols and images are high, are not presented as an easy option for women.

4.4.2.3 Work Environment: Female-Dominated vs. Male-Dominated

Lower male dominance affected me because, as I said, I was very insecure at that time (before university), and I am wondering, if this is the case here now, what will happen when I choose a male-dominated profession in my professional life? I always thought

²⁹ O bölüm erkek işi denmedi ama şöyle bir uyarı da yapıldı, yani tamam git ama şuna da dikkat et başlığı altında. İşe girdiğin zaman işte bir şantiyede fabrikada çalışacak olursan, hani işçiler olacak etrafında bir sürü erkek işçi olacak ve bu başını ağrıtabilir şekilde konuşmalar yaşandı. Bence çoğu aile buradan yola çıkarak çocuklarını bu şekilde yönlendiriyor. Şu da var. O iş erkek işi tozun toprağın içinde kadının ne işi var diye düşünenler de var ki, böyle düşünen üniversite hocalarının da var olduğunu biliyorum. (İrem, Kimya Mühendisliği)

that men would oppress me, but of course, I did not think why. Even though I chose this department, I experienced similar things. If I had not chosen this department, for example, if I had become a mechanical engineer, who knows what would have happened? It still scares me, namely the fact that the bosses would be men because they will not understand you. He does not know anything about empathy; he cannot empathize; that person has never had a woman in his life. How could he develop empathy? That is why I am still looking for a job where my boss will be a woman so that she can understand me. I wanted a department where I could get promoted (at work), a female-dominated department, which means there are not many men. (Olivia, Biology)³⁰

Since many women participants, like Olivia, experience gender discrimination and disadvantages during socialization, gender-based disadvantage structures make women's position inferior under different conditions in family and education. Women felt and experienced masculine domination over them in every dimension of life, which required them to develop strategies and make decisions against this oppression. Therefore, rather than primarily concerning the women's participation rate in the context of inclusion in the STEM fields, challenging cultural masculinity in education and professions of STEM and its intertwined hegemonic masculinity should not remain secondary (Lohan & Faulkner, 2004; Phipps, 2007). Since there is no awareness-raising or deconstructing policy perspective either in parents or education in the context of the gendered culture in STEM in Turkey (Beşpınar & Pehlivanlı-Kadayıfçı, 2021), women have a lack of coping strategy or have felt insecure in male-dominated environments. In this context, women have suspicions that there shall be no equal competition in their education and professional life and that they shall experience oppression due to their gender, especially in the lower representation of women's fields. Since male-dominated fields seem more hostile work environments, female-dominant professional and education life seem advantageous and inclusive for women.

4.5 Women's Strategic Decision: Female-Dominated STEM Fields

All families give importance to their daughters' education and encourage them in this direction. On the other hand, I found that while the parents of the participants provided limited opportunities to develop curiosity, knowledge, and inspiration in the field of science and technology, they experienced a socialization process in an interaction environment that guided the behaviors, abilities, and interests assigned to their gender because they are women.

³⁰ Erkek yoğunluğunun az olması etkiledi çünkü o zaman dediğim gibi çok özgüvensizdim (üniversite öncesi) ve diyordum ki ya şimdi burada böyleyse e ben iş hayatında erkek egemen bir meslek seçtiğimde ne olacak? Ben ezileceğim hep erkekler tarafından diye düşündüm, niye düşünmedim tabi ki. Bu bölümü seçmeme rağmen de öyle şeyler yaşadım oradaki seçmesem bir mesela makine mühendisi olsam kim bilir ne olacaktı ki hala korkutur yani patronların erkek olması çünkü seni anlamayacak. Empatiyle de bilgisi yok empati kuramaz o insan hayatında hiç kadın olmamış ki. Nasıl kursun empatiyi? o yüzden ben hala patronumun kadın olacağı bir iş arıyorum ki anlasın beni. Bu bölüm yükselbileceğim kadın egemen yani çok erkeğin olmadığı bir bölüm. (Olivia, Biyoloji)

Children get their STEM education and acquire the required skills for these fields mostly at school; they also continue the learning process that enables them to construct relationality with science and technology in family lives. In order for women to participate in STEM fields or to aspire to these fields as a career goal, an orientation process that includes family as well as education is required (Arslan, 2020). For this reason, the structural barriers that maintain and reproduce traditional gender stereotypes, roles, and identity construction through institutions must be restructured, and the interactions of intuitions involving all actors must be changed in order to improve women's participation and career advancement in the STEM field.

As is the case globally, policies to create equal educational opportunities for women's participation in STEM fields are common in Turkey, too. However, it is an inference emphasized in this study that the gender dimension of projects carried out to provide equal educational opportunities or increase women's participation in STEM fields should be considered. Women have experience in interactions where gendered science-technology understanding is operated in family and educational institutions during their early socialization periods. They constructed the interest between women and science-technology with stereotypical images, identities, and connections in this process where they did not have gender awareness and sufficient knowledge. In this process, some departments of STEM fields were provided with an environment where they could develop motivation towards fields that most closely matched female images and identities or were less masculine and male-dominated in Turkey. They strategically prioritize areas where their interests and abilities can provide self-efficiency in STEM fields, where they can be competitive as women in professional life, and where work conditions do not conflict with gender roles. Female-dominated STEM fields have the stereotypical image of a 'clean, non-male-dominated environment, desk job, and shorter working hours' than male-dominated fields. These stereotypical images motivate them because they are appropriate for women or closer to the working conditions encouraged by their teachers, family, and environment. Therefore, the lack of female role models for women to deconstruct these stereotypes, the inability to access knowledge-enhancing materials in science and technology, and the prominence of inter-institutional gender patterns during the socialization period are the essential dynamics of the motivations of the strategic decision.

CHAPTER 5

GENDER DISCRIMINATION DURING ORGANIZATIONAL SOCIALIZATION IN UNIVERSITY AND PROFESSIONAL LIFE

I provide a review of my analysis of gender organizational social relations, division of labor, and their applications in STEM professional life. This literature and my research provide a framework for understanding gender discrimination and structural barriers within the organization for women in STEM jobs in Turkey. I framed the discrimination experienced by women graduating from the female-dominated STEM field and the strategies developed for this through themes that frame the gendered structure of the work and organization. Family, education, and work within the inter-structural relationship offer us an essential lens into how gender and science-technology relations continue their mutual production by institutional doing gender. Therefore, gender patterns reproduced through the lens of the socialization process associated with all these structures enable us to understand the structural barriers that shape women's professional careers. From these experiences, I analyzed how gender discrimination is reproduced in the intersectionality of the gendered structuring of science and technology in professional life and gendered structures of work and organizations. Therefore, based on feminist critiques of the relationality of science and technology with gender, I intersect the perspective with the gendered organizational socialization at work.

5.1 Devaluation of Female-Dominated STEM Fields

One of the primary motivations for women not choosing male-dominated fields is that these departments do not have a women-inclusive environment image in university and professional life. Strategically, their motivations explained in the last chapter are competing in professional and education life more equally, and they expect to experience less gender discrimination. The inclusive image has increased their participation in female-dominated STEM fields. However, since the university contains dynamics intertwined with professional life, experiences during this socialization period have reproduced gender discrimination through similar patterns. Women who were oriented to femininity qualities and sets of behavior in the pre-university period and experienced encouragement towards female-dominated STEM fields stated that they encountered gender discrimination in these fields that they and their informal mentors could not have foreseen.

I didn't hear anything discriminatory from the students, but I heard it from the teacher. It was very strange and funny, especially as a person studying engineering. This man, a professor in a department with more than 70% female density, later became the Head of the Department. He once said: "It's already very difficult for you to do engineering. In Germany, they do not want to make women engineers, they do not want you to become chemical engineers." He made an unbelievable comment such as "because you have things going on, you are a bit emotional, you have special times at certain periods". I have one female friend, Feyza, who is a very close friend of mine and she is a very nice woman. She is, a tall, and has beautiful body with beautiful-faced woman. He said to her, why are you doing engineering, why don't you become a model? Very ridiculous. (Gözde, Chemical Engineering)³¹

Although most participants stated they did not experience sexist attitudes or behavior from professors and friends in their university life, the number of women who experienced this is not insignificant. As the scientific education principle of university education, gender-neutral language is chosen based on objectivity, which requires not considering anyone's gender and not adopting a subjective attitude. According to Thompson (2003), the principle of this language does not include gender sensitivity, and it creates a blind attitude toward gender-based problems that women may experience in their professional lives. Therefore, this language style and behavior, ignoring gender inequalities, is not functional in preparing women for professional life. Underlying the organizational logic lies a gendered subculture created with gender assumptions and practices; the existence of this culture manifests itself in the gender-neutral bureaucratic organizational structure as embedded in the contemporary work organization within daily interactions, sex segregation of occupations, and hierarchical positions (Acker, 1990; 2012). There are many barriers and challenges to women's careers, especially in STEM fields, where male-dominated work environments are typical (Wajcman, 1991; Faulkner, 2001). Therefore, they need more mentoring, solidarity, and networking. On the other hand, like Gözde's experience, other participants also stated that they were exposed to sexist attitudes because they are women. In Gözde's experience, the professor's statement that menstruation, being emotional, and being very beautiful are not suitable for professional life and that it is challenging to be an engineer as a woman, which he refers to as 'certain periods,' is sexist rather than not an objective language. These discourses have been disseminated by positioning the relationship between being a woman and being an engineer/scientist in a mutually 'exclusive' context in classrooms and workplaces due to the

³¹ Öğrencilerden ayrımcı bir şey duymadım ama hocadan duydum. Özellikle mühendislikte okuyan bir insan olarak da bu arada çok garip ve komikti yani. %70ten fazla kadın yoğunluğu olan bir bölümde profesör bu adam sonradan Bölüm Başkanı falan oldu. şey demişti zaten mühendislik yapmanız çok zor. Almanya'da kadınları mühendis yapmak istemiyorlar. Kimya mühendisi olmalarını istemiyorlar, işte sizin çünkü şeyleriniz oluyor böyle siz biraz duygusal oluyorsunuz belli dönemlerde özel zamanlarımız oluyor gibi bir yorumda bulunmuştu. İnanılmaz, bir tane kadın arkadaşım da Feyza çok çok yakın arkadaşım. Çok hoş bir kadındır. Yani böyle işte uzun boylu, güzel, fizikli, güzel yüzlü bir hatun. Ona da şey demişti. Sen manken olsana ya sen ne yapacaksın ki mühendis olup falan gibi şeyler demişti. Çok çok saçma. (Gözde, Kimya Mühendisliği)

masculine structure and image of science and technology (Lohan & Faulkner, 2004). It is an example of widespread gender discrimination that reproduces the fact that women are not only considered unsuitable for this field due to assumptions based on biological and physical features but also that their assumed skills and abilities are technically incompetent.

You know, it's not what the professors directly say, but my friends at the university say that they are food engineers, they make tomato paste, they make wine, they make pickles, etc. Even the way they make fun of it, you know, there's actually a little thing, a sexism thing, at that point. I think their subconscious is dragging them into saying that all the time, even if it's meant as a joke. For example, They said: "Why do food engineers need drawings? Well, you don't need to draw, drawing lessons are unnecessary for you.". However, we take the same courses as with other engineering departments. Sometimes we may need to use Autocad or Sketch-up. Like I said, in college, they were doing those insulting things. (Eylül, Food Engineering)³²

Participants who had similar experiences to Eylül stated they faced underestimating, mocking, and excluding attitudes, especially in the joint courses they took with male-dominated STEM departments. These widespread attitudes towards the departments in which women participate are highly explained within the concept of 'real engineering/scientist,' which has a hierarchical understanding of the fields of engineering and science. It creates the hard/soft dualism within images of real engineering complexity, abstract thinking, and psychical toughness. Faulkner (2000) claims a mutually shaping relationship between the social construction of gender and technology, manifesting itself in dualistic symbols and practices in engineering (p. 761). In addition, based on Eylül's experience, saying that food engineers should not be considered engineers and should be exempt from the fundamental common courses of engineering by implying that they cook shows that these fields are devalued in the gendered understanding of science and technology. Similar devaluation and belittling are seen in Ela's experience: "*Why is biology in MS? Why are you taking physics?*" she stated that in the fundamental courses of science and engineering, students in biology departments are commonly referred to as "*verbalists within science.*" The intertwining of science and technology with hegemonic masculinity (Henwood, 1996; Faulkner, 2000; Wajcman, 2000) devalues and positions the values and images of femininity on the periphery.

For example, My aunt used to humiliate me by saying that Ceren would be a chemical engineer and would make bleach soap at home and sell it. She once said in public,

³² Hani hocaların direkt söylediği değil de üniversitedeki arkadaşlarım işte gıda mühendisi salça yapıyorlar, işte şarap yapıyorlar, turşu yapıyorlar vesaire. Hani bu şekilde dalgasını bile geçmeleri, hani aslında bir ufak şey var, bir cinsiyetçilik şeyi var yani o noktada. Hani bilinçaltım yine onu sürekli onu söylemeye sürüklediğini düşünüyorum, şaka niyetli olsa bile. Mesela gıda mühendislerinin çizime niye ihtiyacı var yani hani çizim yapmanıza gerek yok. Çizim dersi çok gereksiz sizin için falan diyorlardı. Ama oysaki biz bir mühendis hangi dersleri alıyorsa aynısını biz de alıyoruz. Yani yeri geliyor Autocad veya Sketch-up kullanmanız gerekebiliyor. Üniversitede dediğim gibi o küçümseme tarzı şeyleri yapıyorlardı. (Eylül, Gıda Mühendisliği)

“Ceren is going to study to make bleach at home”. Throughout my education and work life, I have never done anything related to detergent, nor have I even encountered it in the laboratory. You know, there were friends who made soap in the laboratory, but even that didn't appeal to me and I had nothing to do with detergent. We can think of these materials, mechanical and chemical engineering fields as a trio, because the place of these three does not change much, because all three are needed in factories. But software, electrical and electronics and communication engineering are much more popular, especially now, they may even seem like the real engineers and we are more like intermediate staff. (Ceren, Chemical Engineering)³³

This devaluation is both the hierarchical position of the artifacts within the masculine understanding of technology and science in daily life and the framework in which professional prestige is constructed through this understanding. While STEM departments, which are placed at the center of gendered science and technology and refer to highly prestigious professions, become the creators of high-tech products in industrial production, the departments around the center are given less prestige and value as 'intermediate elements,' as Ceren stated, in the social and work environment. It would be incomplete to understand the center's location from the old/new department distinction because while machinery, electrical-electronics, mathematics, and chemistry can be placed in the center, computer engineering, although new, is in the definition of 'real' engineering. This is because they produce products in demand in the industrial market. Although chemistry is old, the engineering profession, which was devalued with the assumption that Ceren would produce bleach, was underestimated. She felt that she was working as an 'intermediate employee.' Faulkner (2000; 2001) describes the hard/soft, technical/social dualisms in technology and claims that these are associated with gender hierarchies by co-constructing through these diatomic categories. Gender dynamics that operate through symbolic masculine performing mechanisms within hard and technical categorization as 'real engineers' make women's membership more fragile than men's. Therefore, within the hard/soft dualism within the masculine understanding of science and technology, the professions of female-dominated STEM fields in the industrial market and the hierarchical positioning of their production have reproduced similar patterns related to gender, causing them to be devalued and not given the same level of prestige as masculine professions (Halford & Leonard, 2006; Bryant & Jaworski, 2011). Accordingly, this study has an approach that analyze experiences from a mutually constitutive perspective, rather than from a mutually exclusive perspective of this dualism.

³³ Teyzem mesela Ceren kimya mühendisi olup evinde çamaşır suyu sabun yapıp satacakmış.. Eğitim ve iş hayatı boyunca bir kere bile deterjanla ilgili hiçbir şey yapmadım, laboratuvarıda bile denk düşmedim. Hani sabun yapan arkadaşlar oldu laboratuvarıda, o bile düşmedi bana. Deterjana hiç dokunmadım. Bu malzeme, makina, kimya üçlü alabiliriz çünkü üçünün yeri çok fazla değişmiyor, çünkü fabrikalarda bu üçüne de ihtiyaç oluyor. Ama yazılım, elektrik elektronik, haberleşme özellikle şu an çok çok daha ilerde, onlar şu an asıl mühendis biz biraz daha ara eleman gibi bile görünüyor olabiliriz. (Ceren, Kimya Mühendisliği)

5.1.1 Internalizing Devaluation: “We do not split the atom.”³⁴

While working on my thesis in my master's degree, I was sometimes thinking that what we do is unimportant. What are we doing now? In my thesis work, there was a recipe including tomatoes, carrots, red peppers, and with this, you increase the fiber and make it crunchy by combining it with corn. It was actually a product like chitos but it does not increase the glycemic index after consuming. Therefore, it is a healthier snack, but I often thought of it as if it is not splitting the atom. When you look at other engineering fields, men make useful things, like robot vacuum cleaners. (Esin, Food Engineering)³⁵

So, I look at it and say, all these incredible inventions were actually made by men. When you really think about it, Marie Curie's x-ray thing is amazing, great, but on the other hand, the phone was invented by men, electricity was invented by men, and gravity was explored by men. Women have found very good things too, but they seem like things that would be okay even if they weren't invented. Actually, when you dig a little deeper, for example, those who do CRISPR studies are always women. For example, Canan (Prof. Dr. Canan Dağdeviren) invented a heart battery, but as you say, it is not a phone. Women did very important things, but they were not heard of. People thought because everything was already found. If there was a flying car, for example, if a woman built it, it would be heard. (Olivya, Biology)³⁶

Esin and Olivya are women who not only work in their fields but also have doctorates and master's degrees, but they stated that despite this, they do not feel that they are producing valuable products. The internalization of this devaluation feeling of doing engineering/science is directly linked to the formation and transmission of the history of science and technology. The relationship of technology and science with 'power' reveals the gendered connection in the inventions and discoveries highlighted in STEM fields. Perceiving technology as disconnected from daily needs and social context reduces the importance of Esin's healthy chips study and suggests that unless women invent a 'flying car' or split the atom, as Olivya says, it will cause their valuable work and names to remain invisible in the history.

³⁴ Splitting the atom: A common saying. It is used to belittle and humiliate the work done, to imply that one did not split the atom/did not do anything difficult.

³⁵ Master da işte tez için çalışırken de şeyi düşünüyordum. Birazcık yaptığımız şeyin önemsiz olduğu şeyi de bana da geçti yani. Şimdi ne yapıyoruz? Benim tez çalışmamda, işte domates katıyorsun işte havuç katıyorsun, kırmızı biber katıyorsun. Bununla lifi arttırıp gevrek yapıyorsun mısırla birleştirip. Bunu çitos gibi bir ürün yapıyorsun ama glisemik indeksi çok yükseltmiyor. Dolayısıyla daha sağlıklı bir atıştırmalık oluyor ama hep böyle çalışırken de bir atomu da parçalamıyoruz yani hani. adamlar işte robot süpürge yapıyorlar yani hani sonucunda bir şeye yarayacak bir şey var. (Esin, Gıda Mühendisliği)

³⁶ Yani ben bakıyorum hani bu bombastik buluşların hepsini harbiden erkekler yapmış ha diyorum. Hani gerçekten bir ben düşününce Marie Curie'nin o röntgen muhabbeti o muhteşem süper ama yani diğer bakıyorsun hah telefonu erkek bulmuş işte ne bileyim, elektrik erkek bulmuş, başka hani yer çekimi erkek bulmuş. E kadınlar tamam onlar da çok iyi şeyler bulmuş ama hep böyle daha hani olmasa da olur şeyler gibi görünüyor. Aslında ama hani biraz derine inince mesela CRISPR çalışmaları yapanlar kadın. Mesela, Canan Hoca (Prof.Dr. Canan Dağdeviren) kalp pili yapmış ama hani diyorsun ya bir telefon değil mesela. Çok önemli olan şeyleri kadınlar yaptı ama duyulmadı, çünkü zaten her şey bulundu diye düşündü millet. Uçan araba olsa mesela bir kadın yapsa bak duyulur ama işte. (Olivya, Biyoloji)

Cockburn (1985) highlights how men have historically held prominent technological and scientific roles since particular technologies appeared and supported more during the feudal and industrial times. Modern science and technology are constructed historically by supporting and directing through the powerful market and its interests (Wajcman, 1991). The relationship between men and science-technology has historically been represented through male inventors, which has caused the understanding of science and technology to have a gendered culture and female role models to be invisible (Cockburn, 1985; Wajcman, 1991; Faulkner, 2009). As a result, feminists' initial uncovering of women's contribution to scientific and technological developments and revealing hidden women's roles in history has aimed to change the hegemonic science-technology understanding. This devaluation has been constructed within the framework of gendered science-technology understanding, and this framework has positioned the association of feminine images and symbols in the periphery by not excluding nor including them.

It is possible to intersect similar patterns and discourses of devaluation with gender discrimination. Gendered diversity exists within different professional groups and STEM in Turkey. In these distinctions, if there is a relation that a job is 'women's work' or feminine, it is not given the same prestige and respect as jobs that are seen as masculine or called 'men's work' (Halford & Leonard, 2006). In the context of feminization, when a field or profession is attributed to women or is feminized, it reduces the respect and prestige of that profession, which causes less desirable, lower wages, and poor working conditions as cumulative disadvantages (Smith-Doer, 2004; Acker, 2012). Women participants' common discrimination experiences reflect the fact that female-dominated STEM fields are referred to as lower prestigious and devaluated within the framework of feminized professions and gendered science-technology understanding. In line with this, the feeling of devaluation and discriminatory experiences by professors, friends, and the social environment at the university occurred during the early organizational socialization period, causing women who graduated from female-dominated STEM fields to internalize their education and professional life.

5.2 Internship: Early Organizational Socialization

Internships are critical for future career orientation in terms of outcomes, satisfaction, performance, and retention during the early career socialization period. Early organizational socialization guides a person to develop the skills, attitudes, and knowledge required for a job position (Chao et al., 1994), during which the person can continue or leave their career in this field. This experience varies for different groups or professions. I examined the women's organizational socialization experience in STEM fields from a gender perspective. Women's gender discrimination experiences at university and internships at work affect their future

career decisions in the context of work environments, conditions, and specialization in their professions.

There really isn't a place where I haven't been verbally harassed, including my internships and professional life. There are very few people around me who haven't experienced this. So, the internships I did were generally in the production field, both of them were in the factory. By the way, all the interns were women, but I remember the workers in production ridiculous jokes among themselves. I mean, I remember catching inappropriate looks from some of them at work, I remember that they were workers who were openly trying to get close, or I remember the foreman doing such things. You know, we are interns there, we are there for a month anyway. We didn't take any action, thinking "I'm going to have to deal with this anyway, I'll be gone in 2 weeks or a week", and they could easily disturb us by relying on this. I mean, I remember a man was asking me personal questions like 'Are you married, single, how old are you, are you studying?' They were saying things like, "I'm married too, but my wife went somewhere for three weeks." So if I complain, nothing will happen and that means if nothing happens, he trusts this. The place I worked later was in an office environment, and this was the first reason why I wanted to work in an office environment. You know, I decided that I don't want to work in a production facility, I don't want to be in a factory environment. If I go and tell these to the managers there, they won't take it seriously either. They would probably tell you that "What is wrong dear? He just asked a question and wanted to chat with you. Do not exaggerate it" and they made you feel like it. (İrem, Chemical Engineering)³⁷

Organizational socialization is an interactional process; in this process, the focus should be on both the newcomer and the insider adjustment process within the culture and structure of the organization (Bauner & Erdoğan, 2012). Participants stated that they could easily find internship opportunities in the factory. Still, most participants did not prefer to work in a manufacturing factory environment because they experienced a lot of harassment, discrimination, and underestimation. In addition, the fact that there is no mechanism to prevent these problems in the work environment they work in and that they do not take them seriously because of their gender and age, just as İrem stated, has alienated them from this work environment. Experiencing an environment where it did not seem possible for a woman to

³⁷ Stajlarım ve iş hayatım dahil sözlü tacize uğramadığım bir yer yok gerçekten, hani bunu yaşamayan insanlar da çok az çevremde de.—Yani yaptığım stajlar genelde üretim alanındaydı, ikisi de fabrikadaydı. Bütün stajyerler kadındı bu arada ama üretimde işçiler arasında saçma sapan bize şakalar yaptıklarını hatırlıyorum işçilerin. yani işte uygunsuz bakışlarını yakaladığımı hatırlıyorum bazılarının, yani açık açık yakınlaşmaya çalışan işçiler olduğunu hatırlıyorum ya da işçilerin işte başındaki operatörün böyle şeyler yaptıklarını hatırlıyorum. Nasıl desem hani orada stajyeriz zaten bir aylığına oradayız. Ay bununla mı uğraşacağım zaten 2 hafta sonra bir hafta sonra yokum diye düşünerek hiçbir aksiyon almıyorduk ve onlar da buna güvenerek bizi çok rahat bir şekilde rahatsız edebiliyorlardı. Yani hatırlıyorum adamın bana şey dediğini 'evli misin, bekar mısın, kaç yaşındasın, okuyor musun?' böyle kişisel sorular. 'Ben de evliyim ama işte karım şuraya gitti üç hafta yok' gibi şeyler söylüyorlardı. Yani şikâyet etsem, bir şey olmayacak yani. Demek ki bir şey olmayacaksa buna güveniyor. Sonradan çalıştığım yer de ofis ortamıydı ve ofis ortamına yönelmek istememin birinci sebebi buydu. Hani ben üretim tesisinde çalışmak istemiyordum. Ben fabrika ortamında bulunmak istemiyordum dedim. Gidip oradaki yöneticilere bunları söylesem, onlar da ciddiye almayacak. Ne var canım? Sadece soru sormuş, muhabbet etmek istemiş senle sen de abartma diyecekler, bunu hissettiriyorlardı yani. (İrem, Kimya Mühendisliği)

easily communicate with workers, establish authority over them, and organize them caused them to strategically want to work in corporate companies have office environment and desk jobs when they graduated. In addition, women participants who wanted to work or worked in a manufacturing site stated that they experienced similar discrimination and difficulties. My inference from these experiences is that early organizational socialization shapes a woman's career decision according to working environments, the position they work in, and gender-based discrimination experiences. On the other hand, while female-dominated STEM fields are strategically encouraged with the assumption that there is high participation of women in their professional fields, it has been inferred that this mismatching is common. However, this is not true for all job positions and fields.

5.3 Gendered Occupational Segregation in Female-Dominated STEM Profession

Throughout history, STEM fields have been referred to as male-dominated and men's work. At the same time, male-dominated culture and understanding prevailed both in the education process and in professional life (Cockburn, 1985; Wajcman, 1991; Faulkner, 2001; Harding, 1986). However, although women are underrepresented in many fields, they have been able to employ women in STEM fields and are still in the ongoing struggle with their success and contributions. It should be known that the fact that women dominate some of the STEM fields in numbers does not often indicate the same dominance and representation in the workplace. Because there is a gender distribution in work environments where different professionals work together in the fields, positions of professional women at work are necessary to consider what criteria and understanding this distribution is based on. When we focus on the professionals where women have high participation, occupational segregation occurs through the gendered pattern. To understand the occupational segregation in STEM fields through the participants' experiences, I asked which fields women tend to and are directed to. The qualifications and abilities required for the job match the 'natural' images assigned to gender roles. Therefore, the concentration of women in certain positions indicates that institutions are doing gender through the pattern of gender norms and assigned gender roles. In my analysis, this gendered pattern in occupational segregation is a recurring cycle in the division of labor within the family and the guidance criteria based on the gendered occupational perception of the actors and institutional structuring in the education process. Continuing this cycle inevitably creates gender discrimination in professional life, too.

5.3.1 Fields Where Women Are Preferred

The prominent characteristics of the job departments where women are preferred are meticulousness, detail-orientedness, patience, steady/repetitive, and precise manual dexterity

requirements. These abilities are equivalent to the characteristics assumed to be 'natural' in women rather than the quality of education they receive and the skills they acquire. The gender roles assigned to women, which require women to be skilled in domestic work at home, require similar skills, and concentrating on fields where they can perform the same skills in professional life indicates the process in which the labor market and gender perception are operated within the occupational segregation by sex (Anker, 1998; Acker, 1990). The orientation of gender roles, starting with early socialization, and the associated skills assigned limit the fields and options in which women can find employment in their careers.

Chemistry and food departments generally prefer women in the laboratory. By the way, according to male employees, it is probably a very static job, partly related to the structure. It requires some follow-up and patience. These are generally jobs that require patience. (Cansu, Food Engineering)³⁸

This matches the woman's being more meticulous and organized. We should be like that, we need to be more organized, orderly and careful. Work in the laboratory is often very sensitive and requires a lot of work, especially records that need to be kept. I think too many male staff are not trusted there. The laboratory is a protected work area. Regarding general gender concepts, because she must keep regular records of every analysis she makes. When it comes to quality, you have to be very detailed and go after the job. She should save them in folders at work, but men do not pursue that much while they are doing it. Men do not follow much, men do not do it in detail, men do not do it meticulously, men are not clean, for example, that is why men do not want it and that is why women especially prefer it. She probably thinks that she will be more successful because of those general comparisons. (Zeliha, Food Engineering)³⁹

All participants stated that women like Cansu and Zeliha are preferred in laboratories and departments that require detailed job tracking and reporting. They stated that while women are competitive candidates for jobs that require soft skills such as writing, communication, and detailed application in many STEM fields, men are not preferred because they think that they cannot meet the task requirements of these fields, as well as women. While directing women to people-oriented departments in STEM fields is a common situation in male-dominant fields, this alone is not sufficient to understand the division of labor. Only the people-

³⁸ Kimya ve gıda bölümü genelde laboratuvarda da kadınları tercih ediyorlar. Bu arada erkek çalışanlara göre herhalde çok durağan bir iş biraz yapıyla alakalı tabii. Biraz takip ve sabır gerektiriyor. Sabır gerektiren işler genelde. (Cansu, Gıda Mühendisliği)

³⁹ Bu da kadının daha titiz ve düzenli olmasıyla eşleştiriyor. Öyle olmalıyız ya böyle daha tertipli, düzenli ve dikkatli olmamız gerekiyor. Laboratuvardaki işler de genellikle çok hassas ve çok, özellikle de kaydı tutulması gereken şeyler oluyor. Orada da bence çok fazla erkek personele güvenilmiyor. Laboratuvar çünkü korunaklı bir çalışma alanı. Genel cinsiyet kavramlarıyla alakalı olarak, çünkü her yaptığı analizin düzenli olarak kaydını tutmalı. Kalitede çok böyle detaycı ve bir işte işin peşine düşmek gerekir. Onları işte klasörlere kaydetmeli ama erkek yani yaparken yani çok da onun peşine düşmez. Çok takip etmez, detaylı yapmaz, titiz yapmaz, temiz değildir mesela hani o yüzden onu istemiyor ya da kadınlar özellikle o yüzden tercih ediyor. O genel yakıştırmalar dolayısıyla daha başarılı olacağını düşünüyor muhtemelen. (Zeliha, Gıda Mühendisliği)

oriented/technology-oriented dualisms do not analyze this segregation because technically defined occupations such as laboratory and reporting require detail, meticulousness, and manual dexterity, which are technical skills but also parallel the feminine qualities assigned to women. Even if they have received the same education, occupational segregation is organized with this discrimination based on gender roles and stereotypes, and they are guided starting from the recruitment process.

5.3.2 Fields Where Women Are Not Preferred

Cultural restrictions on women's working conditions define acceptable and appropriate workplaces for women from a gender perspective (Anker, 1998, p. 29). Despite having similar education and skills, the occupational segregation in which men are primarily recruited differed from women's. Gender norms and stereotypes in the division of labor prevent women from being the preferred candidate for working conditions with long hours or shifts, assuming them to have domestic responsibilities and child or elderly care responsibilities within the family. Gendered stereotypes that women are not competitive candidates for male-dominated blue-collar environments, requiring technical knowledge and physical strength in working conditions, are preventing women's participation in occupational fields. In Turkey, it is prioritized that women's working conditions are 'appropriate,' that they do not conflict with gender roles, and that the work environment is not male-dominated due to moral reasons such as the possible risk of experiencing harassment and rude behavior (Ecevit, 1991).

They want to employ men more in production because of working in shifts is common in factories. The factory I am currently worked has three shifts and the Blue Collar female employees only work in the day shift, they do not work in the evening and night shift. They leave the work at eight o'clock at the latest. And it leads to that a male worker is more accepted. For example, when you look at it on a worker basis, because you can make male workers do heavy work picking up corners at work, and you can also take care of overtime more easily, but it is a little more limited for women. (Ceren, Chemical Engineering)⁴⁰

I really don't know if it was because men with stronger backgrounds came, but even though there were more women in the department, men were more dominant. The same goes for finding a job afterwards. In other words, there is a high percentage of women, but companies looking for employees are looking for men. Why are they looking for men? Because he will be able to work shifts according to job postings. So yeah, when you're a woman, you don't want the shift so much. Let me say by being

⁴⁰ Erkeklerin daha çok üretimde değerlendirmek istiyorlar çünkü hani o dediğim olay işte vardiya olayları mesela şu an çalıştığım yerde bizim kadın çalışanlar aşağıdaki mavi yaka kadın çalışanlar biz burada 3 vardiya çalışıyoruz tek sabah vardiyasına geliyor yani akşam vardiyasına gelmiyorlar akşam ve gece vardiyasına gelmiyorlar gibi yani en geç saat sekizde buradan çıkmış oluyorlar e böyle olunca daha böyle olunca da bir erkek işçi daha çok kabul ediliyor mesela işçi bazında bakınca da çünkü hem işçilere işte kenar köşe toplatma ağır iş de yaptırabiliyorsun hem işte mesaiye de daha kolay bakabiliyorsun ama kadınlarda biraz daha kısıtlı (Ceren, Kimya Mühendisliği)

married. There are some things that come with this, there are things that life imposes that you have to do, like taking care of your child. Since working at night is not very beneficial for women, men are preferred. In a field such as production, men are more suitable as machines are involved. Women are more suitable for quality departments. (Esin, Food Engineering)⁴¹

Working conditions and the gendered structure of the organization ensure that occupations are segregated by taking into account the gender norms attributed to women for jobs that require long hours. Gender roles and norms need women to prioritize domestic roles in the family, which may prevent them from advancing in their careers and encourage them to focus on work that does not conflict with these roles. However, this prioritization is not expected of men, and it is assumed that they do not have family and domestic responsibilities to interrupt their professional lives (Acker, 1990; 2012). As observed by Ceren and Esin, although it is the STEM field where they dominate the labor force in numbers, the prioritization of men in job recruitment made them feel that they do not compete equally. Besides, the fact that men are a minority in professions where women are the majority has become an advantage in their careers and created the opportunity to find a job more quickly in specific fields. For example, participants stated that if a chemical, environmental, or food engineer is to be recruited in the manufacturing site (a working condition that requires overtime and shifts) or field-based work, job notices are opened for male candidates. While the gendered structure of the business organization does not create career barriers for men, it contains many visible and invisible barriers for women.

5.3.3 Women's Invisible Division of Labor

Invisible labor and hidden work highlight gender inequalities in the workplace because the form of labor is unpaid and expected from employees depending on their gender. Gendered subtexts and logic of organizations in work have been structured according to the essential differences between men and women in capitalist societies (Acker, 2012, p.218). Gender roles attributed to women have become unwritten duties such as caring, nurturing, and domestic responsibilities as unpaid labor, which is attributed to feminine sets of behavior. For example, the fact that women are expected to communicate better, be more organized, and be more

⁴¹ Gerçekten bir şeyi alt yapısı daha güçlü erkekler mi geldiği için bilmiyorum ama. Bölümde de kadınlar olarak daha çok olmamıza rağmen erkekler daha baskındı, yani bölümde de bence. Sonrasında da iş bulma konusunda da öyle. Yani o kadar yüzdelik olarak yüksek bir kadın oranı var ama arayan şirketler işte erkek arıyor. Niye erkek arıyor? Çünkü işte iş ilanlarından şey vardiyalı çalışabilecek. Yani evet, kadın olunca vardiyayı çok istemiyorsun Evli olmakla diyeyim. Bunun getirdiği bazı şeylerin var. Hayatın dayattığı yapman gereken şeyler var işte çocuğunla ilgilenmek gibi şey, gece çalışmak çok da işine gelmediği için erkek tercih ediliyor ya da işte üretim gibi bir alanda hani kaliteye falan kadına makul bakıyorlar ama işte üretim gibi bir alanda yine makinelerde işin içine girdiği için. Erkekleri almaya daha meylliler, işte yine mesaiyi ve cinsiyetten ötürü. (Esin, Gıda Mühendisliği)

docile than male employees in their work is due to gender norms and stereotypes. Still, it is not a visible division of labor. However, by reinforcing the representation of masculine and feminine qualities in every social and professional interaction, such as appearances, style of language use, and expression of emotions, it further widens the gender divide within the organization and perpetuates gendered socialization (Lester, 2008).

I heard a general manager say: Let's hire a woman in production, women will be more organized and tidy up the place. I mean, that's the only positive thing I've heard about women if you can see it as a good thing. When women is around, the expectation is getting higher. For example, When a male employee is hired, it is enough to report properly, but when a female employee is hired, there is also the opinion that she should organize and tidy up and I do not take this as a positive thing for women. (Esin, Food Engineering)⁴²

They expected us to communicate better and so on, as they expect everyone else, but I think they expect us to be more docile. In other words, they expected us, as women employees, to be more dignified and say okay to everything they were told. I can say that I was made to feel that. (İrem, Chemical Engineering)⁴³

The disorder in the laboratory also leads to such things as, for example: "what kind of woman are you?". For example, it seems like I need to follow up more regularly there too and I definitely need to be cuter and happier all the time. You feel something like that in the office, so you can't be bored, you can't be depressed, you can't be sulky. If you make a face, you are called sulky. But if an engineer sulks like a man, they say he's a serious man or he's authoritarian or something. That's why we are expected to be someone who is always cheerful, makes such jokes, and mediates between people who are fighting. My manager even says something: I expect you to act as a mediator. You know, why does he expect it from me and not from Mr. Hasan? So, I feel like I have to be like way. It really becomes a duty after a while. (Zeliha, Food Engineering)⁴⁴

Participants confirmed an invisible division of labor in their workplaces, including emotional labor, even though they do not have formal job responsibilities. Expecting women to be cheerful and smiling is a gendered attitude and behavior that emphasizes the need for 'girls to

⁴² Bir genel müdürünün üretime bir kadın alalım dediğini duymuştum. Kadınlar daha derli toplu olur, buraya toplar. Yani tek duyduğum kadınlara yönelik pozitif şey de buydu ya o da ne kadar iyiden sayarsan, yani bir beklenti artıyor hani. Erkek aldığımda düzgün raporluyor olması yeterli ama kadın alıyorsa ekstradan düzenlesin, toparlamasın. Bana pozitif gelmiyor yani. (Esin, Gıda Mühendisliği)

⁴³ Yani bence daha iyi iletişim kurmamızı vesaire, bunları herkesten bekliyorlardı ama bence bizden daha uysal olmamızı bekliyorlar. Yani bizden daha ağır başlı, daha her denilene tamam dememizi bekliyorlardı kadın çalışan olarak. Bunun hissettirildiğini söyleyebilirim. (İrem, Kimya Mühendisliği)

⁴⁴ Laboratuvaradaki düzensizlik de mesela bir de kadın olacaksınız gibi bir yere de varıyor. Mesela orada da daha düzenli takipte olmam gerekiyormuş gibi. Kesinlikle daha sevimli ve sürekli mutlu olmalıyım mesela. Ofiste öyle bir şey hissediyorsun; senin canın sıkın ve moralim bozuk olamaz, surat asamazsın. Surat assan direkt bu da suratsız denir. Ama erkek mühendis surat asarsa abi ciddi bir adam ya otoriter falan derler. O yüzden sürekli şen şakrak, şakalar yapan işte kavga eden insanların arasını bulan arabuluculuk yapmamız bekleniyor. Hani müdürümün söylemi bile var: ben sizden arabuluculuk yapmanızı bekliyorum. Hani neden benden bekliyor, Hasan beyden beklemiyor? Demek ki benim öyle olmam gerekiyor hissediyorum. Görev oluyor gerçekten bir yerden sonra. (Zeliha, Gıda Mühendisliği)

be cheerful,' docile, meticulous, and organized, as experienced in the early socialization period. Relational tasks expected from women participants, such as caring, nurturing, and conflict resolution, are emotional labor. Besides being invisible, they are not included in salary calculations because they are not included in job performance and requirements (Guy & Newman, 2004, p. 289). Hochschild (1983) explains that the more natural women's emotional labor appears, the better it is invisible that this labor is a quality; although the labor is expected as required performance, yet it is invisible. They emphasized that the female profile oriented towards feminine sets of behavior is felt as a necessity in the workplace and that they feel obliged to perform this performance. However, it is not labor that is rewarded other than being appreciated when they commit these assigned responsibilities and attitudes in the organizations. In today's world, the uncertainty of what is paid and unpaid work is ambiguous for many sectors, so there is no prize for labor that is devalued by the market or remains symbolically 'invisible' resulting from the social label of 'not-work' (Crain & Cherry, 2016). Therefore, the job performance expected because they are women is symbolically invisible, but it is a criterion that, when not met, they received the reaction that organizational disrupted. I believe that the invisible division of labor is gender discrimination since women's contributions and leadership potential are underestimated, and this awareness should be generated among all employees to overcome bias.

5.4 Glass-Ceiling

Women graduating from female-dominated STEM fields have faced many invisible and visible barriers in the workplace. Gender-based discrimination while being recruited and throughout the employment process has affected their career advancement and their workplaces. I questioned whether gender-based discrimination has decreased in STEM fields where women are more numerous and whether they have an advantage in their professional lives. To analyze this, I asked about their experiences of gender discrimination that they have faced or might face in the workplace: whether there is an equal competitive environment in their organizations when they are going to get a promotion, working conditions that would hinder being a woman, and their opinions of advantage to being a man in a female-dominated field. First of all, STEM fields where women dominate in numbers during university education do not have a dominant equivalency in professional life except laboratories and some departments in the workplace. Therefore, the work environments in which this analysis takes place sometimes include male-dominated workplaces, women-dominated, and occasionally mixed organizations. However, the different group dominations do not change the women's answers since they believe being a man is advantageous for advancing in a career.

The glass ceiling is a metaphorical term that conceptualizes the invisible barriers that a

particular group, in this case women, faces to getting promoted in organizations (Davidson & Cooper, 1992). Conceptualizing these barriers around specific patterns of gender discrimination and inequalities is necessary to understand what discrimination women face in STEM fields and what strategies they develop. Based on my data analysis and the participants' experiences, the most significant obstacles and discrimination in the transition of women working in STEM fields to higher positions are conceptualized by questioning women's technical and managerial skills, women's life-work balance, glass escalator, and queen bee.

5.4.1 Questioning the Ability and Authority

Gender-based stereotypes in both professional and educational life continue and reproduce the gendered culture and organization within institutions. As seen in my analysis of stereotypes and prejudices against women, it causes horizontal discrimination. It organizes occupational segregation according to gender while also causing vertical discrimination in women's promotion to higher positions. Promoting equality of opportunity in the fields of science and technology recommends that men and women should have the same roles and expectations without considering their gender to eliminate gender stereotypes in organizations (Wajcman, 1991). In practice, these recommendations often require women to conform to masculine norms rather than embracing and valuing their gender identities to achieve equal treatment since masculine values construct linear career advancement within the organizational culture (Edwards & Wajcman, 2005). For example, Vildan believes that women and men are never equally treated in the context of getting promoted because it is widely believed that women do not have sufficient capacity and ability for operational tasks such as going to the fields, coordinating workers, and traveling whenever necessary.

I think managerial positions are easier for men to reach because to be involved in more field work in non-corporate companies, where there are more operational tasks. There is a woman at a high level in our workplace, wouldn't apply for the general coordinator position or she wouldn't stay long because there are too many operational jobs. Sometimes, you need to go to the station where the goods arrive, go to the field, interact with other men, etc. When such situations occur, you don't want to be in this position as a woman, and the manager doesn't consider that when hiring as well. He does not believe that a woman will rush and deal with. He says she doesn't know the jargon. He may think that a woman with politeness is not taken seriously. (Vildan, Food Engineering, Pilot interview)⁴⁵

⁴⁵ Yönetici pozisyonlarına erkeklerin daha kolay ulaşabileceğini düşünüyorum çünkü kurumsal olmayan firmalarda operasyonel yerlerde, sahadaki şeylere müdahil olabilmek erkek için daha kolay. İş yerinde kadın var yüksek kademe de, bu kadın genel koordinatörlüğe başvurmazdı. Ya da başvurursa çok uzun kalmazdı çünkü çok fazla operasyonel iş var. Yeri geldiğinde malın geleceği otogara da gitmen, sahaya gitmen, diğer erkeklerle muhatap olman gerekiyor vs. Böyle durumlar olunca bir kadın olarak bu pozisyonda olmak istemezsin, yönetici de işe alırken oraya düşünmez. Bir kadın koşturacak, onunlarla muhatap olacak, jargonu bilmez der. Kibarlıkla kadın ciddiye alınmaz diye düşünebilir. (Vildan, Gıda Mühendisliği, Pilot görüşme)

A male will most likely be chosen for the top position, but such a cover is created for this that no one can object. However, the reason is that he is actually a man. In general, they take men more seriously. In every business field, especially in engineering. In a way, it is thought that the work done by men is more reliable. (İrem, Chemical Engineering)⁴⁶

Leadership, senior, or management positions are often associated with masculine values due to the perceived requirements for aggressiveness, directiveness, control, and rationality in the command-control organizational logic (Edwards & Wajcman, 2005). According to Acker (1990; 2012), the gendered subtext of organizational logic defines professionalism as having no sexuality, emotionality, and procreation. This organizational logic intervened in the hegemonic masculine culture in STEM fields associated with engineers and scientists as rational, technically able, and abstract thinking capacities based on mathematical principles (Cockburn, 1981; Harding, 1986; Faulkner, 2001). Alpha-male behaviors in management, such as physical toughness, aggressiveness, and competitiveness, are a form of hegemonic masculinity values and norms (Wajcman, 1998; Miller, 2004) that correspond to gendered organizational logic. Therefore, women who assimilated into male-dominant culture with those values of the norm and oriented to femininity during socialization are seen as technically incompetent, emotionally, and physically vulnerable at work. 'Unquestionable men's authority' and 'formers do not get an order from women' reflect the gendered substructure in organizations, which is a common glass-ceiling problem for women not to get promoted in Turkey (Ecevit, 1991; Pehlivanlı-Kadayıfçı, 2015) This kind of organizational logic does not provide equal opportunity to women for career advancement, yet gender discrimination is embedded within structures of institutions.

Of course, there is no equal competitive environment. There is also an ego there; for some reason, even a male person may hesitate to give a promotion to a woman, and may prefer a man for the promotion. For example, there is an argument, people say "I think you are in an emotional moment" and some unpleasant approaches such as these occur. It's as if only women are emotional, or every woman acts with 100% emotion. Unfortunately, there are such permanent references. When you stand strong there, you get over it, but if you get teary-eyed when a few people come at you, if you switch to a more passive mode, at that point you are already eliminated because they are always ahead in this regard. Unfortunately, this is a fact. Factory managers are generally always men, and there are very few women factory managers in our industry. For example, it can be a quality manager, an R&D manager, but they always prefer men as factory managers. Probably because there are so many staff and it requires a bit of a strict stance or something. Factory managers are a bit more dominant types like the type that could yell to the staff. How should I tell it, they want him to have a profile

⁴⁶ Üst pozisyon için büyük ihtimalle yine erkek olan seçilir ama bunun için de öyle bir hani kılıf uydurulur ki hiç kimse itiraz edemez ama yine de sebebi aslında erkek olmasıdır. Yani, çünkü dediğim gibi hani? Genel olarak erkekleri daha çok ciddiye alıyorlar. Her iş alanında ya özellikle mühendisliklerde. Erkeklerin yaptığı iş daha güvenilir diye düşünülüyor bir nevi. (İrem, Kimya Mühendisliği)

that is a little more like the headman, like the angry father at home. Because it is a little more difficult to establish communication and control with blue-collar workers, it is as if they would not listen to the woman's words if there was a woman there. Even if she says so, they won't do it anyway, I think they need a more physically intimidating profile. (Cansu, Food Engineering)⁴⁷

For example, Cansu also believes that because women are not considered aggressive, physically tough, and able to control their emotions, they are not in an equally competitive environment when given promotions, even if they have the same experience as their male colleagues. In addition to the common stereotypical belief of men's reliable technical ability, the essential obstacle is that assuming women cannot establish authority and control over workers prevents them from reaching management positions. However, as she and other participants highlight, women have more chances to advance their careers in Quality Departments or Research and Development Departments because being more empathetic with employers, being organized, doing detail-oriented tasks, doing desk-jobs, and less communicating with former seems much more suitable for women.

Changing post-bureaucratic organizational structure and management modes require the person in the manager position to have a more empathetic, less hierarchical, more supportive, and cooperative working style (Edwards & Wajcman, 2005; Acker, 2012). In contemporary work structures, the 'transformational' management style associated with nurturing and empowering challenges the male manager model based on leading with command and control (Abbott, 2005; Acker, 2012). However, there is a tendency for women working in engineering to be trapped in lower-level manager positions (e.g., project manager, team manager, charge of IT systems) as supported roles for high-level positions (control of organizations). This prevents them from advancing to hierarchically powerful and more remunerative positions in management (Faulkner, 2015, p.36). Therefore, while working in the large corporate sector increases the opportunity for women engineers and scientists to rise to a certain level, it is also

⁴⁷ Eşit rekabet ortamı yok tabii ki. Tabii ki yok. Orada şöyle de bir ego var. Erkek bir kişi bile nedense kadına terfi vermekte eli titreyebiliyor, erkek tercih edebiliyor. Bir tartışma oluyor atıyorum, sen duygusal bir zamanındasın galiba falan gibi hoş olmayan yaklaşımlar gerçekleşiyor. Sanki sadece duygusal olan kadınlardır ya da her kadın mutlaka %100 duygusuyla hareket eder. Böyle yapılandırılmış kalıplar var maalesef. İşte oralarda güçlü durunca onu aşırıyorsun ama öyle birkaç kişi üstüne geldiğinde gözün doluyorsa, daha pasif moda geçiyorsan falan o noktada zaten eleniyorsun çünkü onlar hep bir sıfır önde bu konuda, bu bir gerçek yani maalesef. Fabrika müdürleri olarak genelde hep erkek oluyor bizim sektörde. Kadın fabrika müdürü çok azdır. Mesela kalite müdürü olabilir, arge müdürü olabilir okey ama fabrika müdürünü hep erkek tercih ediyorlar. Çok fazla personel ve biraz katı duruş falan gerektirdiği için muhtemelen. Fabrika müdürleri biraz daha böyle tabiri caizse höt höt tipler oluyor. Personele daha böyle bağırabilen. Nasıl diyeyim, biraz daha şey gibi muhtar gibi. Böyle evdeki sinirli baba gibi, öyle bir profil o olsun istiyorlar. Çünkü mavi yakayla iletişimi sağlamak ve kontrolü sağlamak biraz daha zor olduğu için sanki orada kadın olsa kadının sözünü dinlemezler. O dese de sallamazlar zaten ne yapacak falan gibi. Biraz daha sanki fiziksel olarak korkutucu bir profile ihtiyaç duyuyorlar bence. (Cansu, Gıda Mühendisliği)

necessary to consider the possibility of being stuck in these lower management positions. Being stuck in these intermediate positions is an ambivalent situation because while it seems possible for women to meet certain 'conditions' in their lives and develop strategies; structural barriers are maintained for top positions.

5.4.2 Questioning Women's Commitment to Work

I think women's marriage life is a disadvantage, or if they have children, it becomes a disadvantage. Men are given a little more freedom, or this can be a positive thing for them. Maybe it's bad for them too, I don't know. You know, the men who were my managers at work really didn't leave on time. They can spare it for the weekend, and that is not a problem, but they are more flexible in this regard. This can also be a disadvantage for women. (Esin, Food Engineering)⁴⁸

These conditions, as stated by Esin, create a conflict between family and work for women since domestic responsibilities are attributed to women's roles in the family. While all the participants emphasized that housework and domestic responsibilities were not assigned to them, except for single women who do not live with their families, they stated that they are constantly discriminated against based on these assumptions while hiring or getting promoted. While being married to a woman for men is a positive criterion since it represents stability, motivation, and compatibility, women's marriage status means short-term investment and low commitment to work (Edwards & Paul, 2005, p.78). The discrimination is based on gender roles that women have to prioritize domestic responsibilities and childcare (Abbot et al., 2005). As a result, domestic commitment is disadvantageous to women's careers due to idealized work commitment that requires long hours, continuous, full-time work, travel, etc.

5.5 Glass-Escalator

The gendered organizational structures have an unequal competition workplace with their criteria and assumptions that underlie the questioning of the technical abilities, authority, and work commitment of women graduates in female-dominated STEM fields in their promotions and career advancement are not valid for their male competitors. In addition, they emphasized that men who graduated from their fields and are working are in an advantageous position. It is possible for men who graduate from female-dominated STEM fields to exemplify the advantages of easily distinguishing themselves from women's disadvantaged situations and advancing in their careers.

⁴⁸ Kadınların direkt evlilik yaşantısı bence önlerine konuluyor ya da çocuğu varsa bir önüne konuluyor da. Erkek biraz daha özgür bırakılıyor ya da pozitif şey olabiliyor bu durum. Belki onların açısından da şey kötüdür bilmiyorum. Hani erkekler de gerçekten vaktinde çıkmıyordu işyerimde müdürüm olanlar. Hafta sonuna ayırabiliyor, o da dert değil ama daha esnekler yani bu konuda daha esnek davranıyorlar. Bu da önümüze çıkabiliyor dezavantaj olarak. (Esin, Gıda Mühendisliği)

As a woman, being a food engineer does not have much of a disadvantage, because eighty percent of the people in the industry are women anyway. Men experience the advantage of this, they are first in line where they apply Especially if they are going to work in production, they want male engineers, and since there are very few male food engineers, they find jobs very quickly and find a place for themselves very quickly. Women generally have a more standard approach like this: during the job interview, people are asked: Do you have a boyfriend, fiancée or something else? Do you have plans to get married soon? Because they will hire you accordingly. They will invest in me, but they want to learn if I may get married in 2 years and I quit? Human resources wants to know this. You know, they directly come in with this question about my private life. So, let's deal with it first and then we'll deal with the school you graduated from and what you did for a living. So your marital status is being questioned first. (Zeliha, Food Engineering)⁴⁹

When I was working in the factory, one week of nights has to be worked every month. For example, they did not employ women at night. They say, "how will she return, do not let her be alone". The problem with this is that one day, when you want to become a factory manager, you will never have seen a night shift. You know, you rise to a certain level, but you get blocked somewhere. The HR manager is a woman, the quality manager is a woman, but the factory manager is not. The same thing is here as well. For example, we had to go to the field, the whole team was women, by the way the team was 11 people, there was only 1 man. For example, they did not send it to Bitlis, for security reasons. They are even looking for a male OHS specialist who can go to the field. Or, for example, there are many men in the engineering team that will go to the field in Bursa. They can take the company's vehicle and leave. There must be at least 2 people, for job security reasons, but male engineers can go. But for example, our manager did not allow us to go without a (male) driver. For example, let's hire a man so that we can go to the fields, or for example, if you are going to be something like a coordinator, then men are recruited so that he can go to every field. You can get promoted a little bit, but after a while, I think these things might become obstacles for you. (Deniz, Enviromental Engineering)⁵⁰

⁴⁹ Kadın olarak gıda mühendisi olmanın dezavantajı fazla olmuyor, çünkü zaten yüzde sekseni kadın. ama mezun olan erkek arkadaşlarım bunun bir avantajı da yaşıyorlar. Başvuru yaptıkları yerde ilk sıraya geçiyorlar .Özellikle üretimde çalışacaksa direkt erkek mühendisi istiyor ve çok az erkek gıda mühendisi olduğu için de onlar çok çabuk iş buluyorlar ve çok çabuk kendilerine yer buluyorlar. Onların bir avantajı var. Bizde de böyle genelde daha standart bir yaklaşım var. İş görüşmesinde de şey soruluyor, sevgilin nişanlın bir şeyin var mı? Yakın zamanda evlenme planın var mı? Ona göre işe alacak çünkü seni yani. Bana yatırım yapacak ama ben 2 sene sonra evlendim, ben taşınıyorum diyecek miyim? Bunu bilmek istiyor insan kaynakları. Hani direkt ilk özel hayatımla ilgili bu soruyla giriyor. yani önce halledelim de sonra mezun olduğun okul, ne iş yaptın, onlarla sonra ilgileniriz diye. medeni durumun bir sorgulanıyor yani. (Zeliha, Gıda Mühendisliği)

⁵⁰ Fabrikada çalışırken mesaiye kılacağım. Her ay bir hafta gece çalışıyordu. Kadınları çalıştırmıyorlardı mesela gecede. Nasıl dönecek, yalnız kalmasın deniyor. Bunu da şöyle sıkıntı oluyor, yarın bir gün fabrika müdürü olmak istediğinde hiç gece vardiyası görmemiş olacaksın. Hani belirli bir aşamaya kadar yükseliyorsun ama bir yerde önün tıkanıyor. İK müdürü kadın oluyor, kalite müdürü kadın oluyor ama fabrika müdürü olmuyor. Aynı şey burada da var. Sahaya gidilmesi gerekiyordu, bütün ekip kadınız bu arada ekip 11 kişi, 1 erkek var sadece. Mesela Bitlis'e göndermediler, güvenlik gerekçesiyle. Hatta bir erkek İSG uzmanı aranıyor mesela. Sahaya gidebilen. Ya da mesela. Bursa'ya sahaya gidilecek mühendislik ekibinde çok erkek var. Onlar firmanın aracını alıp gidebiliyorlar. En az 2 kişi olma zorunluluğu var, iş güvenliği sebebiyle ama 2 mühendisler gidebiliyorlar. Ama mesela bizim müdürümüz şoförsüz (erkek) gitmemize izin vermedi. Mesela erkek alalım da sahalara gidebilelim ya da mesela diyelim ki koordinatör gibi bir şey olacaksın o zaman her sahaya gidebilsin diye erkek alınıyor. Ya birazcık bir yere kadar yükelebilirsin ama bir yerden sonra bence bu şeyler önünü tıkayabilir (Deniz, Çevre Mühendisliği)

"Glass escalator" refers to the fact that, in many workplaces, men tend to get promoted than women and are shielded from the effects of gender bias and stereotypes in female-dominated professions (Williams, 1992). Unfortunately, this situation causes unequal conditions of competition and imbalance in career progression and contributes to the wage gap between genders. Therefore, the common belief that their female counterparts cannot work overtime, that it would not be appropriate for them to go to the field, and that marriage and family interrupt long-term stability gives men the advantage of advancing their careers quickly. This is an advantageous position for men's careers, especially when most competitors graduating from female-dominated STEM fields are women. Therefore, Zeliha and Deniz's experiences reveal how the life-course career process is mutually shaped by gender since career orientations differ in the context of gender discrimination and structural barriers.

5.6 Queen-Bee Syndrome

Equal-right legislation for women's access to education and the labor market creates fundamental institutional changes and increases social awareness compared to last decades. Optimistically, the modern woman's identity is portrayed in a way that does not limit herself to traditional gender roles, being a mother, and having a career, thanks to different socialization, education, and career access legitimized by fundamental equal rights considering gender, racial, ethnicity, and religion diversity. Although some women have these accesses for their careers in the professional fields, the glass-ceiling barrier in upward mobility at work has shown that gender discrimination continues because women are still underrepresented as managers (Baumgartner & Schneider, 2010). However, for young women who do not have these conditions, have limited access, or are at the beginning of their careers, discrimination by women in senior positions negatively affects the struggle against gender discrimination. It has been discussed in this study that this syndrome may pose a threat when women who have reached higher positions use their position and hierarchy for their own purposes and strategies. As young women are in the early years of their careers, this experience creates vulnerabilities rather than solidarity.

They prefer more desk jobs since the burden of children is more on women, especially women who are considering getting married and having children, the first thing they do is to leave production department because it's hard to manage with a child. In what case would it not be difficult? It wouldn't be difficult if your partner puts as much effort into the child as you do as a woman. So we don't think about these things when hiring. I was working in one of the toughest sectors, I attended a lot of job interviews, and I did not come across what was said about marriage to the candidates. Being married is no longer a criterion because there are many examples that break this prejudice. I did not encounter any resistance to hiring more female employees. But once women are hired, they don't want to stay there. I think the majority of women leave because of the circumstances. The examples I heard from those who left their

jobs are as follows: Some say they are getting ready to get married, some do not want to work on duty on the weekend. (Elif, Chemical Engineering)⁵¹

I can say that I saw women discriminate more. There were many efforts to criticize people's social life rather than to question their competence. For example, when I first went there, the woman said, "Are you married? Do you have children? Who will look after the child?". I said, my in-laws are here, they are already waiting for us to take care of the child. At least the conversation should be stopped after that question. What she told me is, they say that, but they say send her to daycare at the age of 4. But then she said, for example, it was a far place, how will you get back to the city? There is no public transport here. There was a human resources employee with us. "Don't take this the wrong way," she said, "but if I were you, I would continue with the academy." But the woman I was talking about was a production manager. You know, she was also a woman, she was also in production, and she also had a child. In fact, she questioned them even though she had experienced the same conditions herself. (Esin, Food Engineering)⁵²

In the interviews, as exemplified by Esin's and Elif's opinions, I analyzed the this syndrome by the participants who both experienced this discrimination by other women, who thought that this discrimination experienced by women was a result of their own decisions, and who stated that working in places where women were dominated is more of a disadvantage with preferring men employees. The phenomenon of the queen bee is that in male-dominated environments, women break the glass ceiling in their professional and social lives and become senior managers, and after their privileged position, they see these obstacles as unimportant and display discriminatory behavior towards other women (Staines et al., 1974 cited in Ellemers et al., 2004). Queen-bee is a discussible conceptualization of the phenomenon because women's social response also outcomes of gender discrimination in structures of work and organizations, which is analyzed in the context of women's strategy to overcome negative

⁵¹ Daha masa başı olacak işleri tercih ediyorlar biraz daha çocuğun yükü kadında olduğu için özellikle evlenmeyi düşünen çocuk yapmayı düşünen kadınlar mesela ilk yapacağı şey üretimden ayrılmak oluyor çünkü bir çocukla birlikte yürütmek zor hani. Hangi durumda zor olmaz partnerinin de çocuğa senin kadar bir kadın kadar emek verse olmaz. İşe alırken bunları düşünmüyoruz yani ben böyle bayağı en ağır sektörlerden birinde çalışıyordum iş görüşmesine çok girdim yeni işe alımlarda söylendiğine denk gelmedim ya kadının evli olması bir kriter değil artık çünkü bu önyargıyı kıran da çok örnekler var. Kadın çalışan daha fazla alınmasında bir dirençle de karşılaşmadım. Ama kadınlar girdikten sonra kalmak istemiyor. Kadınların çoğunluğu koşullardan dolayı gidiyordur herhalde diye düşünüyorum duyduğum örnekler evlenme hazırlığına girdiğinde falan mesela giden oluyor hafta sonu nöbet tutmak istemiyor. (Elif, Kimya Mühendisliği)

⁵² Ayrımcılığı daha çok kadınlardan gördüm diyebilirim. Yetkinlik sorgulamak değil de sosyal hayattan vurma çabaları çok oldu. Mesela ilk gittiğimde kadın dedi ki, şey evli misin evliyim, çocuğun var mı? Var çocuğa kim bakacak? Dedim ki, kayınvalidemler burada hani onlar zaten çocuğa biz bakalım diye bekliyor. Git de biz bakalım diye bekliyor. Bence burada en kötü ihtimal burada muhabbetin durması lazımdı. Bana söylediği şey şu. Öyle derler ama 4 yaşında kreşe ver derler. O zaman iş görüşmesinden çıktı bence. Ama sonra mesela şey uzak bir yerdı orası şehre işte nasıl döneceksin?, otobüs yok da dedi. Yanımızda bir İKcı vardı. Böyle yanlış anlama ama dedi yerinde olsam akademiye devam ederdim dedi. Bilemedim ama bahsettiğim kadın bir üretim müdürüydü. Hani kendi de kadındı ve kendi de üretimdeydi aslında, kendinin de çocuğu vardı. Aslında aynı şeyleri koşulları kendi de yaşamış olmasına ragmen bunları sorguladı. (Esin, Gıda Mühendisliği)

stereotypes and professional success (Derks et al., 2016, p.458). On the other hand, it is crucial for women to struggle together against discrimination in fields where hegemonic masculine culture is prevalent, such as the STEM field, where women feel the lack of role models, mentoring, and networking. Therefore, Queen Bee Syndrome complicates the elimination of gender discrimination and weakens solidarity, especially among young women engineers and scientists who want to advance their careers.

5.7 Women's Strategies against Gender Discrimination at Work

The strategies developed by women in STEM fields to advance their careers also expose fundamental evidence of gender discrimination in professional life. The women's strategies and experiences I have analyzed significantly differ between genders in analyzing organizational orientations within the socialization process. Gender discrimination is structuralized through gendered patterns that is operated in the inter-institutional relationships of professional women in STEM fields.

5.7.1 Partner Choice and Postponing Children

Regardless of the socialization process in women's family structure, those who participated in the study stated that marriage is not an obstacle to their careers because they believe that the 'wrong' partner choice is the factor that could hinder them. Therefore, women are in relationships with their partners where they can share domestic responsibilities and mutually support their careers, or single women consider marrying the 'right' partners who can meet these criteria. However, they stated that having a child negatively affects a woman's career because the lack of rights, such as nurseries, breastfeeding rooms, and social assistance for childcare in workplaces, prolongs the period of a woman's stay away from work after giving birth. The babysitter or a nursery is not affordable for people of all classes, considering economic conditions, so for a woman to return to working life after having a child, either her mother or her partner's mother must undertake the childcare, or women must stay away from work until their child is old enough to send the kindergarten. In studies examining the factors that increase women's labor force participation rate in Turkey, the findings indicate that women's marriage-age divorce rates are increasing, and the fertility rate is decreasing (Akgeyik, 2017; Omay, 2021).

After maternity leave, a man working with the same seniority was getting paid more than me. It's partly because I took a break in the meantime, and I missed the improvements etc. that were made while I was on maternity leave. During that period, male employees were more likely to have their own work accepted, etc., and then my own projects were not given back to me. For example, it was such a model of gradual deskilling, and then when I went and talked to them, I was told that I don't think you

are qualified for this position, you are an insufficient engineer, etc. Having a child set my career back by about 2 years. As I said, since I can't stay for long hours, something happens and the perspective changes. Since my mother takes care of the child, my mother does most of the work at the moment, but other than that, the housework is usually on me, my husband is the one who takes care of the child, and he is a great help. My top priority is usually my child. (Ceren, Chemical Engineering)⁵³

Lindsey (2015) argues that marriage and having children pose a meaningful career versus job dilemma for women within the context of prioritizing breadwinners as men because career orientation is associated with personal sacrifice, high commitment, and the goal of planned development (p.325). It is possible to understand from the gender discriminations I have discussed that the developmental trajectory of a career is still designed to match men's life trajectories. When women have children and have to care for them, it causes careers that are 'broken' or 'interrupted' (Edward & Wajcman, 2005). This career break “mommy track”⁵⁴ is critical to explaining the underrepresentation of women in senior management positions. As in Ceren's experience, being away from work for a long time due to having a child has a penalty of retreating in women's career advancement, which organizations legitimized the situation by arguing that they lost their investments. Therefore, although young couples prioritize ideal career satisfaction when one partner has to stay at home after having a child, the fact that that partner is a woman causes her career to be suspended or change directions (Lindsey, 2015). Therefore, in the strategy of balancing family obligations and career development, women who want to have children need to either postpone having children or have fewer children and get support from their mothers for childcare.

5.7.2 Muting Femininity: Strategy of “Distance”

Gender organizational culture manifests itself in daily interactions, occupational segregation, and invisible barriers to women's career advancement. Participants pointed out that the definition of a professional engineer and scientist is a person who can produce practical solutions at work, does not involve their emotions in it, can make objective decisions, and acts based on evidence. Women engineers and scientists stated that the definition of

⁵³ Doğum izninden sonra aynı kıdemde çalışan bir erkek benden daha fazla maaş alıyordu. Biraz benim ara vermiş olmam o arada ki işte ben doğum iznindeyken yapılan o ara işte iyileştirmeleri vesaire kaçırmış olmam biraz işte o süreçte erkek çalışanın daha çok kendi işlerini kabul ettirmesi vesaire benim sonra kendi projelerimin bana geri verilmemesi oldu mesela giderek böyle bir vasıfsızlaştırma modeliydi sonrasında da işte ben bir gidip konuştuğumda bu pozisyon için yeterli olduğumu düşünmüyorum işte yetersiz bir mühendissin vesaire dendi. Çocuk sahibi olmak benim kariyerimi yaklaşık 2 yıl kadar geriye attı. Dediğim mesailere çok kalamadığım için biraz da hani şey oluyor bakış değişiyor yani. Annem çocuğa baktığı için şu an çoğu işi annem yapıyor ama hani onun dışında genelde ev işleri benden, çocukla ilgilenen eşim oluyor o da büyük bir yardım oluyor yani bir yerde. En önceliğim genelde çocuk oluyor (Ceren, Kimya Mühendisliği)

⁵⁴ The ‘mommy track’ describes a variety of organizational arrangements that allow women in management the opportunity to spend more time at home with their young children (Schwartz, 1992).

professionalization has drawn in an idealistic framework because they thought that emotions and subjectivity are involved in every aspect of the work. However, they stated that they preferred to act neutral, not to behave, and not to dress 'feminine' with adopt male attitudes in order to look professional. For this reason, they prefer to act socially 'distant' and only focus on doing their job very well as an important strategy to show that they are professional/successful engineer or scientist. I analyzed that the two definitions intersect within the organizational logic; what is a 'real' engineer/ scientist and what professionalism is. Acker (1990) argues that the absence of sexuality and emotionality is embodied in organizational logic and theory, which reproduce gender relations by prioritizing masculine values and behavior within professionalization. Faulkner (2000; 2009) claims that 'real' engineering and scientists are associated with masculinity through a 'nuts and bold' or 'asocial' identity. Therefore, for a woman, being a successful professional engineer-scientist is equivalent to gender-inauthentic performativity (Faulkner; 2009), distant from and muting their visibility as feminine by preferring 'appropriate' clothes, language use, behavior, and work, etc., are the strategies to advance a career. Based on İrem's experience, definition is changed; since meaning of being professional is different according to your gender.

When I think about myself, I try to be extremely honest and neutral in work environment and I don't socialize, I try to be professional, but a man might go for a beer with that person socially, for example. He makes a social friendship with him. Brother conversations can be happened very easily. And I think men can gain favor with managers more easily. In this scenario, I realized that I actually directly accepted that the person at the top was a man. If it were a woman, such a thing would not happen anyway, because I think if it were a woman, a more neutral environment would be created. But when a woman does the same thing, the perspective is very different. In other words, it is thought that she flattered the managers and who knows what she did to the managers, and gained their favor. But if it is a man, it will be thought that the person doing this is just trying to be friends. (İrem, Chemical Engineering)⁵⁵

On the other hand, keeping a distance and muting their feminine visibility appears as a strategy not only to appear 'professional' but also to avoid unwanted flirtation and sexual harassment. At the beginning of their careers, young women desexualize themselves as a coping strategy in response to the lack of a company mechanism to overcome harassment they were exposed to by male colleagues, bosses, or blue-collar employees during organizational socialization.

⁵⁵ Ben kendimi düşündüğüm zaman iş ortamında ben son derece dürüst ve nötr olmaya çalışırım ve sosyal açıdan yaklaşmam, profesyonel yaklaşıma çalışırım ama erkek olan sosyal olarak mesela o kişiyle bira içmeye gidebilir. Sosyal anlamda onunla bir arkadaşlık kurar. Kardeşim, abim benim falan iletişimi çok daha kolay kurar. Ve üst tarafların gözüne daha kolay girer diye düşünüyorum. Bu senaryo da aslında şunu da yaptığımı fark ettim, en üstteki kişinin erkek olduğunu direkt kabul ettim. Kadın olsa zaten böyle bir şey yaşanmaz çünkü bence kadın olsa daha nötr bir ortam oluşur diye düşünüyorum. Ama aynı şeyi bir kadın yaptığı zaman buna bakış çok farklı olur. Yani karşı tarafa yalalaklık yaptı, karşı tarafa işte kim bilir neler yaptı da onun gözüne girdi diye düşünülür. Ama erkek olursa bunu yapan sadece arkadaş olmaya çalışıyor diye düşünülür. (İrem, Kimya Mühendisliği)

However, as İrem's experience, manager positions are predominantly held by men, and women's keeping their distance in the workplace or adapting to masculine behavior does not allow them to be included in the homosocial relationship between male employees and male managers, which explains how gender is an element of organizational relations. Women state that their male colleagues establish a more unfiltered relationship with a male person who is in higher positions, such as joking, swearing, informal dialogues, etc., which is an invisible advantage for male employees. This kind of working relationship in engineering makes men's potential career progress easier by providing social networks who are organizationally powerful (Faulkner, 2009).

5.7.3 Women's Ways of Management

As I explained above, 'glass-ceiling' is obstacle for the careers of women graduating from female-dominant STEM fields, regardless of whether the work environments they work in are male/female dominated. However, women still have advantages in female-dominated departments where women are preferred than male-dominated departments. Women have developed strategies to advance their careers by postponing children, adopting masculine behavior, muting femininity, and preferring departments and sectors where they could be more competitive. These strategies may not be sufficient for women to get promoted because there is a widespread gendered organizational logic, especially in the managerial positions in manufacturing with blue-collar employees, such as authority, high control-ability, and masculine attitudes as requirements for performance. On the other hand, as I have discussed above, in post-bureaucratic organizations (which participants identify as corporate firms, not small or manufacturing businesses), a more 'transformational' style of management has been adopted, requiring nurturing, empowering, and supportive (Edwards & Wajcman, 2005, p.263). Among the participants, there are a few expert women in senior positions. While some prefer masculine behavior when communicating strategically according to the person they are dealing with, others adopt a more empathetic, non-authoritarian management style that is intertwined with non-hierarchical communication and social relations.

Since there are workers under you and managers above you, you provide that direct connection between them. So you actually have to choose 2 languages. The language I have used when speaking to blue-collar people since I started working, the language of love. You can't make them do something like "do it". They do it when you're there, they do what they know when your back is turned. Of course, the man is more knowledgeable than me and he is not eager to pass on that knowledge to you, because on the one hand, you are telling him to "put on your bonnet" and you are disturbing the man. Therefore, we need to approach them with more love. I mean, you know that his child is sick, and you can say, "What happened, brother Ahmet, is your son healed?", "is there anything I can do?", etc. While this doesn't mean anything when you say it to your top manager, it means a lot when you ask the blue collar. That's why

you can gain their appreciation this way, but you have to use more technical language for the above too.... Therefore, you actually determine your own place and importance in our industry. If they love you, employees will do their jobs anyway. They even clean up after you to prevent any inconvenience at work. Body language and love language are very important in blue collar jobs. (Cansu, Food Engineering)⁵⁶

In the department I work in, it is necessary to be in the field and there is a field for which I am responsible. There is a team of 45 people in this field, all men, and I am their chief... I am sincere, but I am like that in my normal life too. So, I am dominant, but I cannot communicate in an authoritarian or masculine manner. The more I called, the more I said, "Hello, what are you doing, are you okay? I'm Gözde." I joke a few times, and according to the man, there is definitely a joke between me and all of them. First I joke with him and then I say, "Well, I want to ask you for something again, you can do this tomorrow, right, you'll do me a favor, etc." I always joke like this with my team. In short, there is no need for me to adopt a masculine attitude when communicating. But maybe this is a separate discrimination. But there is this, I can explain this with an example. There are chiefs here who are more senior than me, 2 men, people I like very much... We were joking around with those 2 male chiefs and one of them, who was on duty at that job. "Tell me," he said, "how do you manage to keep people on their word?" But he said it jokingly, but I thought it was very interesting. Something along the lines of, "Are you cheating on them with your beauty or your red hair?" The knowledge of a woman whom they find beautiful and polite is not very important, and since she has these, she seems to get her job done with her femininity. However, I have worked hard, I mean, I work with my knowledge. I don't know, at some point, I lost sleep over this task. These were always things outside of my gender, and that surprised me. (Gözde, Chemical Engineering)⁵⁷

⁵⁶ ... Çünkü hem işçiler var hem de yukarıda bağlı olduğun yöneticiler var ,sen arada direkt o bağlantıyı sağlıyorsun. Dolayısıyla aslında 2 dil seçmen lazım. İşe başladığımdan beri mavi yakayla kullandığım dil, sevgi dili. Onlara hani "do it" şeklinde bir şey yaptırılmazsın. Sen oradayken yapar, sen arkanı döndüğünde gene bildiğini yapar. Adam tabii ki de benden bilgili ve sana da o bilgilerini aktarmak için can atmıyor çünkü bir taraftan sen ona "boneni tak" diyorsun, adamı rahatsız ediyorsun. Dolayısıyla onlara daha sevgiyle yaklaşmak lazım. Atıyorum çocuğunun hasta olduğunu biliyorsundur ve dersin ki "ya nasıl oldu Ahmet abi iyileşti mi oğlun", "yapabileceğim bir şey var mı" gibi hatırlar sorman gerekiyor. Bu üst yöneticine söylediğinde bir şey ifade etmezken, mavi yakaya sorduğunda çok şey ifade eder. O yüzden onları böyle kazanabilirsin ama yukarıdakilere de daha teknik dil kullanmak zorundasın.... Dolayısıyla, aslında kendi yerini ve önemini de kendin belirliyorsun bizim sektörde biraz. Seni severlerse zaten çalışanlar yaparlar. Hatta işte bir uygunsuzluk olmasın diye senin arkanı bile toparlarlar. Mavi yakada beden dili ve sevgi dili çok önemli. (Cansu, Gıda Mühendisliği)

⁵⁷ Benim çalıştığım departmanda sahada olmak gerekiyor ve benim sorumlu olduğum bir saha var. Bu sahada 45 kişilik bir ekip var, hepsi erkeklerden oluşan ve ben onların şef pozisyonundayım... Ben samimiyet kuruyorum ama normal hayatımda da öyleyim. Yani ben baskınım ama otoriter veya maskülen iletişim kuramam. Ben daha çok arayıp hemen işte selam ne yapıyorsunuz, iyi misiniz? Gözde ben. Bir iki şakalaşırım, adamına göre hepsiyle muhakkak aramda bir şaka vardır. Onu şakasını yaparım önce sonra derim ki işte senden yine bir şey isteyeceğim, yarın bunu yaparsınız dimi bana? bir kıyak geçeceksiniz falan filan. Hep böyle şakalaşarak yaparım kendi ekibimle. Yani kısacası iletişim kurarken maskülen bir tavıra girmeme gerek kalmaz. Ama belki bu da ayrı bir ayrımcılıktır. Ama şu var bunu mesela bir örnekle açıklayabilirim. Benden daha kıdemli şefler var burada 2 erkek, çok sevdiğim insanlar... O 2 erkek şefle bunlardan bir tanesi, o işte nöbetçi olanla böyle şakalaşıyorduk falan.. Anlatsana dedim. nasıl sözünden çıkıyor insanlar gördün mü? Fakat o da şakayla söyledi ama çok ilginçti bence. Ne yaptığın adamlara dedi. hani böyle kaşına gözüne kızıl saçına mı aldandılar tarzında bir şey. Kendince güzel buldukları ve kibar olan bir kadının bilgisi çok da önemli değil ve bunlara sahip olduğu için dişiliği ile işini yaptırıyor gibi. Halbuki ben çok emek verdim yani. Oraya işte bilgimi kattım. Ne bileyim işte yeri geldi uykusuz kaldım. Bunlar hep cinsiyetimin dışında şeyler. O beni çok şaşırtmıştı. (Gözde, Kimya Mühendisliği)

Gender stereotypes are embedded in the structure of the organizational logic, which prevents women from reaching top positions. However, Cansu and Gözde have adopted a management style that prioritizes cooperation through more social, empathetic, and non-authoritarian communication with blue-collar workers instead of the 'managing like a man' stereotypes. Establishing empathetic social relationships with workers in lower positions is a management strategy to earn respect and trust by acceptance through the language, attitude, and behavior they choose. Therefore, although both participants worked in a male-dominant department, instead of adapting to male values and behaviors, they demonstrated the functionality of the management method with the opposite method. However, when I examine the conditions of the participating women in intermediate-level positions between managers and employees, they are accompanied by a profile who have very little housework and family responsibilities, graduate from reputable universities, accept long working hours, and have more working experience compared to other participants. The importance of this profile indicates that in professional life, women must be subject to 'certain' conditions at every stage of their lives in order to progress in their careers with their strategies; these conditions require long struggle, motivation, and labor.

5.8 Gender Discrimination in Female-Dominant STEM Fields

In the previous chapter, I discussed the strategies of women's inclination towards female-dominated STEM fields in terms of the intersectionality of gender roles and gendered science and engineering construction during the socialization process in family and education life in Turkey. While their experiences in the socialization process in family and educational institutions affect the development and orientation of women's interests, abilities, and motivations, orientation to female sets of behavior is also a guide to which STEM field they should choose a professional life in. Gender roles and identities are important criteria in decisions regarding professional life, and it has been revealed that women's participation is encouraged in these STEM fields rather than male-dominated professional life. I analyzed that most of the points on which this encouragement and women's strategical motivations are mismatched to the working conditions in STEM fields because, contrary to common assumptions, female-dominated STEM fields are far from being a female-inclusive work environment. Gendered occupational structure at work and science-technology understanding have caused women to experience gender discrimination in their professional lives through gender patterns.

First of all, as a result of women's university life and internship experiences during the early organizational socialization period, although women were in STEM fields, they did not feel that they were doing as valuable and 'real' work as male-dominated STEM fields, due to gender

relations that female-dominated fields are symbolically matched. The fact that female-dominated STEM fields are low-mathematics intensive and the knowledge and products they produce are paired with caring, nurturing, and domesticity interests have been devalued through symbols associated with 'real' engineers and science. Therefore, in both professional and university life, these areas of women are hierarchically positioned at the periphery and made to feel secondary. They experienced this devaluation sometimes when they were able to receive less salary than graduates of male-dominated fields where they worked in the same organization, and sometimes through the reactions they received from their environment in education or social life.

Second, gendered occupational segregation in female-dominated STEM fields is operated through women's attributed skills and roles based on their gender. Although this discrimination sometimes makes it appear as an advantage that women are preferred to laboratories, quality, or people-oriented departments because they are women, I believe that women are confined to these fields and limit their career lives with tasks associated with feminine qualities. These occupational segregations are also associated with male qualifications and have prevented equal competition in departments. Occupations where men are prioritized, are those that require more physical strength, long/overtime working hours, and domination over male blue-collar workers. Participants state that women are not seen as competitive candidates for these fields and that they experience discrimination based on the assumption that women's family responsibilities and gender identity are not suitable for these conditions. However, they stated that regardless of the department in which women work, their gender roles and identities create an invisible division of labor, such as being organized, efficiently communicating, being cheerful and docile, apart from their engineering and science skills.

Finally, invisible structural obstacles to women's career advancement indicate that they are not in an advantageous position in professional life. As women who graduated from female-dominated fields, they said that they do not have equal opportunities with men in getting promotions, and they developed various strategies to overcome the obstacles to their career development in professional life. The fact that the skills and qualities required in leadership and management positions are associated with masculine values and norms is the main obstacle in the organizational structure that prevents women from getting promoted. In addition, the questioning of women's technical, social, and managerial qualities more than men have required women to work harder to prove themselves and to improve their social life conditions. In order to advance in these roles and careers, women adopt masculine behaviors by muting their femininity or keeping a distance from social relations to look professional in the gendered structure of the organization. However, apart from these behaviors and strategies,

they also think that they should choose the 'right' partner who does not prevent their career and postpone having children so that social life conditions do not negatively affect them. Among the interviewees, women in senior positions emphasized that they challenged the authoritarian management approach by adopting more empathetic, non-hierarchical, and cooperative working principles. This management strategy is one of the answers to combating women's disadvantaged positions and gender discrimination.

The findings in this chapter revealed gender discrimination experiences and overcoming strategies in working conditions in the STEM fields, again through recurring gender patterns. The life-work trajectory claimed that throughout the whole socialization process of women, gender roles, stereotypes, and norms reproduced and intersected in women's inter-institutional relations. This intersectionality is essential to claim how shaping women's careers. Failure to challenge the structural conditions and gendered structure of fields such as STEM, which have hegemonic masculine values and gendered culture, has caused women to experience discrimination even in fields where they participate highly. While 'professionals suitable for women' fields are a hypothetical label of reliable participation and encouragement for women's careers, female-dominated STEM fields similarly have conditions and structures that hinder women's career development. This emphasized that gender discrimination in professional life must be analyzed in a holistic manner, intersecting with the structure of work as well as with the family and education structure.

CHAPTER 6

CONCLUSION

In this study, I endeavor to understand how gender discrimination and strategies to overcome the discrimination affect professional women in female-dominated STEM fields (biology, chemistry, chemical engineering, food engineering, and environmental engineering) from the life-course perspective in Turkey. My research question addressed the issue of the impact of gender discrimination, which women face in the socialization process in family, education, and professional life, on their career aspirations and development within the inter-structural relations of institutions that reproduce gender patterns. In line with this, I highlighted the strategies that women have developed to combat gender discrimination by revealing the structural barriers that persist in women's career aspirations and professional lives in STEM fields despite high participation. I believe that gender gap issues in STEM have a multi-layered reason, so I focus on the female-dominated STEM fields in Turkey to bring attention to structural barriers through their life course concerning gender discrimination instead of women's lack of participation and representation. By adopting a life-course perspective, this study attaches significance to addressing the discussion on women's career issues in STEM holistically.

I conducted this study with 15 young women participants between the ages of 25-35 who graduated from female-dominated STEM fields and had at least two years of work experience in Turkey. In qualitative semi-structured research via online meeting platforms and face-to-face in-depth interviews, I adopt the feminist methodology to understand women's experiences from a gender perspective. Since my research questions are designed for a socialization process in family, education, and professional lives, the life course perspective offers a retro perspective with recent experiences that can portray women's career aspirations and development. I used thematic analysis to examine inter-structural relationality through gender patterns that are repeated or reproduced in the context of gender discrimination. Tracking the women's strategic decision to participate and pursue a career in the fields, this study highlights the importance of women's agency within the subject and institution relationships. Therefore, methodologically, I framed the socialization process with the research structure of individuals interacting with institutions as active subjects rather than a

process in which they are affected as passive objects. My research methodology concerns life-course analysis since I believe that women's issues in STEM fields can be understood through gender patterns constructed throughout life.

The theoretical framework of my research is based on gender and science-technology mutually shaping/co-constructing each other. In the context of professional women's experiences in STEM fields regarding the structure of institutions, one of the manifestations of this co-constructing is gendered distribution in STEM fields in Turkey. Feminist critiques of science and technology are critical for comprehending questioning its structure and historical women's struggle with contributions in these fields from a gender perspective. Since the structure of science and technology embodies masculine values and images, recommending gender equality rights and opportunities does not ask for deconstructing gendered science and technology understanding. Harding (1986) and Fox-Keller (1983) claim that science, its ethics, and its method are constructed in dualistic positioning by adopting values based on rationality, objectivity, and impersonality, which exclude the values associated with femininity, such as emotional, subjective, and social. The dualistic construction of science and technology prioritizes masculine values and male skills in their fields, which images appropriate work for men while excluding femininity and its values (Harding, 1986; Fox-Keller, 1983; Stanley, 1983).

Feminist Science and Technology Studies have proven that symbols and images associated with gender are culturally constructed in society, including everyday life practices. The perspective is critical for identifying, understanding, and analyzing the causes of male dominance in science and technology to deconstruct. Rather than discussing the exclusion or inclusion of gender-associated values, Faulkner (2001) and Wajcman (2000; 2009) argued that gender and technology co-construct each other through artifacts, their professions, and gender roles. The traditional conceptualization of technology as a tool of war and industrial machinery is related to 'hegemonic power' and 'mastery of nature,' which identifies the masculine image of science and technology (Faulkner, 2001). The symbolic identification in technology strengthens male dominance of technical occupations by regarding men as technically competent; in contrast, women are seen as incompetent due to their gender roles associated with caring, nurturing, and domesticity. The mismatching images and practices is a socially constructed phenomenon because other than masculine values and symbols are considered excluded in practices of science and technology (Faulkner, 2000; Faulkner & Lohan, 2004). However, coexisting dualisms in practices and professional interests of these fields combine both social and technical knowledge to meet real needs and work organizations. Nevertheless, these masculinity-related symbols and images have created hierarchies between products and

professions, both in the relationship of technology and science to 'power.' In the case of Turkey, Pehlivanlı-Kadayıfçı (2015) argues that the engineering profession has gendered codes and ideals by glorifying masculinity; their gendered culture manifestation is daily language, jokes, and gendered segregation both in occupations and tasks at work. Besides, the gendered distribution among STEM departments is based on the relationship of these fields with feminine and masculine images (Zengin-Arslan, 2002). Therefore, although coexisting of these symbols and images are mutually reproduced in STEM fields, they are hierarchically positioned according to gender relations.

The gendered construction of science and technology and the embodying of masculinity values and images in these fields have deepened the discussion by including the socialization process during family, education, and professional life. Within the framework of gender gap issues in the STEM fields, women's lack of participation, and underrepresentation, studies focused on education and employment are aimed at sustainable solutions for gender equality. Before moving on to my analysis and findings summaries, I would like to state that I aim to understand how structural barriers shape women's careers in these fields, beyond participation rates, through gender discrimination, with a holistic understanding of this issue. This initiative reveals how the gendered understanding of science and technology was constructed throughout the woman's life course and how the woman's career has been shaped by the strategies for combating gender discrimination by focusing on intersectional relationality. Suppose the primary goal is to increase the participation of girls and women in science and technology fields; it should also be essential to challenge gender discrimination that becomes intersectional with the symbolic intertwining of gendered culture and hegemonic masculinity in these fields. In line with this, my aim in focusing on STEM fields where women dominate in numbers is to reveal gender discrimination that women's high participation could not eliminate or overcome solely.

Although I analyzed the gender discrimination of women working in female-dominated STEM fields from a life-course perspective through their experiences, there are constraints on my research design that may affect these experiences. While the conditions and strategies regarding the subject came to the fore, I noticed class intersectionality as a study limitation. The class issues encompass many relationships because their intersectionality with gender shapes women's socialization conditions (family, education, and professional life). In addition, it may be another focal point due to gender awareness, social and cultural capital, which are not analyzed in depth but affect the participants' different experiences and perspectives. I felt that one of the ways to expand this analysis framework was to address the issue with Turkey's economic and political discourse because it could contribute to the discussion that needs to be

addressed in intersectionality with gender to analyze the experiences of engineer/scientist women in Turkey.

I aimed to understand from women's gendered socialization experiences how family, education, and other social institutions prioritize gender-based roles and activities for women and orient them towards feminine sets of behaviors. I analyzed the factors that would affect their career aspiration based on the role models they encountered during this socialization period, the division of labor in the family, the transmitted behavior, lifestyle, and abilities. In addition, the socialization process in educational life follows the development of knowledge, skills, and motivation, especially in science and technology, which will directly shape these career aspirations. However, constructing gendered science and technology has been operated through gender stereotypes, mediators/role models, and the understanding of gendered occupational segregation. Therefore, the assumption of 'clean working conditions, flexible working hours, and female-dominated work environment' in female-dominated STEM fields is encouraged as it is seen as a match with feminine sets of identity, roles, and behavior that are oriented throughout family and educational life. I concluded that women prioritize gender roles in their belief that they can be more successful and competitive in their careers by strategically aspiring to these fields rather than male-dominated fields that are not encouraged during socialization.

The primary motivation for the participating women in this study to tend to female-dominated STEM fields was that they are competitive and have more employment opportunities, which was encouraged by actors in the family and educational life in the early socialization process. However, the fact that gender discrimination shapes their experiences through intersecting socially constructed science-technology understanding with stereotypes, prejudices, and gendered norms, and their limited/no experience in which they can deconstruct the relationality has resulted in their strategies to prioritize women's gender in their motivation for these fields. During the professional life experiences and socialization process, I focused on in the last chapter, I realized that the assumptions this strategy was based on were mismatched, as women needed to develop new strategies against gender discrimination. Since working conditions in STEM fields vary, participant women stated that, contrary to these assumptions about STEM fields that are related to the feminine image, women do not always have working conditions as female-dominated, seen as competitive candidates, and not conflict with gender roles.

The intertwining of science and technology with hegemonic masculinity (Henwood, 1996; Faulkner, 2000; Wajcman, 2000), devaluing and marginalizing femininity values and images, has shaped women's education and professional life in these fields. 'Real engineer/science'

related to hard/soft dualism, soft fields that women are concentrated in Turkey (Pehlivanlı-Kadayıfçı, 2015; Zengin-Arslan, 2002) reveals in this study that women do not have the same social prestige as 'real' engineers/scientists even if they are in the STEM field, which caused them to be hierarchically positioned secondary through devaluation. In the organization of workplaces, women are not seen as 'appropriate' candidates for job tasks that require more technical knowledge, physical strength, manufacturing-based, and authoritarian skills; job tasks that require documentation/writing skills, detail-oriented and people-oriented are seen as 'appropriated' to women has demonstrated the operation of this understanding. Gendered distribution in STEM fields perpetuates these dualities and gendered assumptions not only in educational life but also in professional life by concentrating women from female-dominated STEM fields to female-dominated work departments. However, women do not have the advantage of pursuing career development in these fields, where participation is encouraged by family, education, and professional life. Women needed to develop strategies to combat gender discrimination in these areas, such as glass-ceiling, glass-escalator, and networking/mentoring threatened by queen bees. Women have developed strategies to advance their careers by choosing partners who do not prevent their careers, postponing having children or having less, muting femininity, and developing an empathetic management style.

The operation of gendered construction of science and technology in the intersectional relationships of institutions has been used as a structure of analysis that explains the structural obstacles that prevent women from gaining an advantage even if they participate in these fields and even if they are represented as dominated by numbers in female-dominated STEM fields. As a result, I aimed to deepen the subject within the framework of conditions and strategies toward structural barriers beyond participation or representation in Turkey. From the life-course perspective, gender discrimination that affects women's career aspirations and career development in science and technology fields and the strategies they develop against them have been brought to the fore in the results of the study. Family, education, and work have shaped women's careers through recycling and reproduced gender patterns in inter-institutional relations. This study highlighted the conditions and strategies of women and revealed the struggle of women working in STEM against gender discrimination. It indicates that policies and improvements made to increase and encourage women through education and employment opportunities to overcome gender gap issues in the STEM fields in Turkey will remain incomplete unless these structural problems are considered holistically. STEM fields are male-dominated in terms of culture and representation, and even in fields where women are more numerous, dominance and advantages are not operated in favor of women in Turkey.

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APPENDICES

A. INTERVIEW QUESTIONS / GÖRÜŞME SORULARI

Bu mülakat soruları Türkiye'de sosyalizasyon sürecinde ve iş hayatında yaşanan toplumsal cinsiyet ayrımcılığı, kadın ağırlıklı STEM alanlarında çalışan kadınların kariyerlerini nasıl etkilediğini araştırmaya yönelik hazırlanmıştır.

Tanışma Bölümü:

Kod ad:

Yaş:

Medeni Durum:

(Varsa) Çocuk sayısı:

Lise Bölümü:

Üniversite Bölümü:

Meslek:

Çalışma Süresi:

Aile meslek: Anne:

Baba:

Kardeş(ler):

SOSYALİZASYON SÜRECİ

Çocukluk

1) Çocukluğunuza dair anılarınızı düşünürseniz en çok hangi oyunları oynardınız, nasıl vakit geçirdiniz (çizgi filmler, oyuncaklar, bilgisayar oyunları, masal, hikâye)? Vakit geçirdikleriniz arasında bilim ve teknolojiye dair merakınızı uyandıracak herhangi bir olay, durum oldu mu?

2) Anne, babanız veya kardeşlerinizin aile içindeki ilgi alanları ve görevleri nelerdi? Evinizde teknik/ teknolojik dediğiniz aletlerle uğraşan en çok kim olurdu? Ailenizin teknolojiye ve bilime yakın olup olmanıza dair bir etki yarattığını düşünüyor musunuz?

3) Genel olarak ailenizin veya çevrenizdeki kişilerin toplumsal cinsiyet rollerinizin inşasında nasıl bir etkisi oldu? Bu etkilerde belirli mesleki alanlara veya rollere desteği söz konusu muydu? Bugünden bakınca kız çocuğu olduğunuz için bu yönlendirmelerde farklılık hissediyor musunuz?

4) Büyüdüğünüzde ne olacağınızı, nasıl işler yapacağınızı hayal ederdiniz? Olmak istediğiniz mesleği söylerken çevrenizdeki kişiler, aileniz, oynadığımız oyunlar gibi birçok etkeni düşünürseniz sizi neler etkilenmiş olabilir? Bugünden çocukluğunuza kadarki süreci düşünürseniz, olmak istediğiniz mesleki alanların değişmesindeki dönüm noktalarınız neler oldu, ne zaman değişti?

EĞİTİM

İlkokul/Orta okul/Lise

5) İlkokul/ Ortaokul/Lise eğitim yıllarınızda hangi derslere ilginiz vardı? Neden ilgi duyuyordunuz? Sizce eğitim hayatında başarılı olma kriterleri ilgi alanlarınızı nasıl etkilemiş ve yönlendirmiş olabilir?

6) İlkokul/ Ortaokul/Lise eğitim yıllarınızda Matematik ve fen (MF) alanına ilginiz ne durumdaydı? Bu alanda başarılı/başarısız olmak sizi nasıl hissettirdi? Bu derslerde (MF) başarı konusunda sınıfınızda ve okulunuzda cinsiyete dayalı farklılıklar gözlemlemiş miydiniz? Bir kız çocuğu olarak eğitim ve rekabet ortamı sizin için nasıldı?

7) İlkokul/ Ortaokul/Lise öğretmenleriniz ile aranız nasıldı? Öğretmenlerinizin hangi yönleri olumlu ya da olumsuz olarak sizi etkilemiş olabilir? Mesleki anlamda erkek ve kadın öğretmenlerinizin arasındaki farklı tutum ve davranışlar var mıydı? Bunlar sizi nasıl yönlendirmiştir?

Lise Süreci:

8) Lise ortamınız, arkadaş grubunuz nasıldı? Erkek grupları ve kız grupları var mıydı? Bu durum sizce ilişkilerinizi nasıl şekillendirdi? Gruplar arasında rekabet hissettiniz mi?

9) Sınıfınızdaki belirli grubun başarı ya da başka konularda diğer grup üzerinde üstünlük kurması/kurma çabası var mıydı? Böyle bir ortamda eğitim almanın sizi yönlendirdiğini düşünüyor musunuz, sınıf ortamında nasıl hissediyordunuz?

10) Hangi lise eğitimi alanı seçtiniz, neden? Bu alanı seçerken kararınızı nasıl verdiniz, neler etkiledi? Hangi mesleğe yönelmeyi düşünerek kararınızı verdiniz?

11) Lise eğitimi sürecinde mesleki hayallerinizde öğretmenleriniz, çevrenizden veya aileniz tarafından sizi etkileyen bir olay, kişi veya söylem hatırlıyor musunuz? Yetiştirilme döneminde etkileyen yönlendirmelerde cinsiyete dayalı farklı tutumlar hissettiniz mi? Sizi bu durum nasıl etkiledi?

12) Eğitim sürecinizde Matematik-Fen alanına yönelik yeteneklerinizi ve ilginizi geliştirebilecek yeterli eğitim ve ekipman imkanlarına sahip olduğunuzu düşünüyor musunuz?

13) Çocukluk ve gençlik sürecinizde bilimsel, teknolojik gelişmeler, teknolojik aletler veya yenilikler ile aranız nasıldı, ilginizi çekiyor muydu? Öğretmeniniz, çevreniz veya aileniz bu ilgiyi arttıracak keşfettirecek bir ortam sunuyorlar mıydı?

14) Üniversite öncesi dönemde en iyi mühendis/bilim insanı denildiğinde aklınızda canlanan kişilerin cinsiyete dayalı bir tasviri oluşuyor muydu? Yetişme sürecinizi düşündüğünüzde sizce bu cinsiyete dayalı oluşan fikirleriniz nasıl oluştu?

Üniversite Süreci:

15) Bölümü seçerken nelere dikkat ettiniz? ve neden bu bölümü seçmek istediniz? Bu süreçte karar verirken kimler veya neler sizi etkiledi? Tüm bu süreci düşünürseniz sizce bölüm seçme kararında toplumsal cinsiyet önemli bir rolde midir?

16) STEM alanlarındaki bölümleri düşününce cinsiyete dair baskın dağılımlar sizce neden var? Diğer STEM alanlarını seçmemenizdeki kararlarınızı etkileyen böyle bir düşünce oldu mu? Özellikle erkek-yoğun bölümleri seçmemenizin bir sebebi var mıydı? Bölümünüzün kadın-yoğun olmasının sizce sebebi nedir? Bölümünüzde cinsiyet dağılımının eşit olması veya kadın sayısının fazla olmasının olumlu/olumsuz yanı var mıydı? Böyle bir ortam sizi nasıl hissettiriyordu?

17) Üniversite hayatınızda nelere ilgi duymaya başladınız? Lise döneminizden farklı bir sosyal hayatınız oluştu mu? Sizce bu farklılıkların sebepleri nelerdi?

18) Eğitim hayatınız boyunca arkadaşlarınız veya öğretmenleriniz tarafından okulda ve sosyal yaşamınızda mesleki alanınızı veya ilgi alanlarınızı yönlendirici cinsiyetçi söylemlere maruz kaldınız mı? Eğitim hayatınızda kadın olarak iş hayatında karşınıza çıkabilecek engellere yönelik bilgilendirme veya hazırlamaya yönelik konuşmalar söz konusu muydu?

19) Stajınızı hangi mesleki alanda ve nasıl iş ortamında yaptınız? Stajda kadın olmanıza dayalı ayrımcılığa maruz kaldınız mı veya cinsiyetinizin nerede ve ne alanda staj yapacağınıza dair kararınıza etkisi oldu mu?

20) Staj dışında üniversite yıllarınızda mesleğinize yönelik edinebildiğiniz deneyim; mentor edinme, kariyer planlama desteği, mesleki gelişim kampları, seminerler katılım imkanları oldu mu?

21) Çocukluğunuzdan yetişkinliğe kadar olan süreçte, aklınızda kalan, sizi etkileyen veya örnek aldığınız ünlü bilim insanı var mıydı? Öğrendiğimiz ilk bilim insanlarının ve kaşiflerinin çoğunluğunun erkek oluşu size neler hissettirdi? Veya öğretmenlerinizin mesleki tutumunuza yönelik katkısı var mıydı?

Mezuniyet Süreci:

22) Mezun olduğunuzda kendinizden beklentiniz ve ailenizin sizden beklentileri nelerdi? Bu beklentiler sürecinizi nasıl etkiledi? Bu beklentilerde cinsiyete dayalı farklılık hissettiniz mi?

23) STEM alanında kadın olmanın işverenler tarafından güvenilirlik ve yetkinlik açısından sorgulayıcı bir tavırlarının oluşmasına sebep olduğunu düşünüyor musunuz? Veya erkek olmanın işe alım konusunda avantajlı olduğunu düşünüyor musunuz?

Mesleki Süreç:

24) Profesyonel mühendis veya bilim insanını tanımını nasıl yaparsınız? Mesleki değerleriniz veya mesleğinizi iyi icra etmenizi sağlayan objektif, rasyonel, akılcı, duygusal, sosyal, hiyerarşik, yaratıcı düşünme gibi değerlerin hangileri uygun veya başka ne söyleyebilirsiniz? Kadın olarak mesleki değerlerinize ve yaptığınız işe aidiyet hissediyor musunuz?

25) Sizce mühendis/bilim insanı olmanın toplumda cinsiyete dayalı kalıplaşmış bir algısı var mı? Bu algı sizce nelere dayanıyor? Mühendislik ve Bilim bölümleri arasında hiyerarşik bir önem var mı? Bu algı ve yargılar size nasıl hissettiriyor? Mesleğinizi söylediğinizde çevrenizden cinsiyetçi yorumla karşılaşıyor musunuz, sizi nasıl etkiliyor?

26) İş görüşmelerinizde toplumsal cinsiyete dayalı ayrımcılığa, yönlendirmeye veya sorulara maruz kaldınız mı? Kadın veya erkek olmanın işe alımında farklı değerlendirildiğini düşünüyor musunuz?

27) Mesleğinizde kadın olmanıza dayalı bir ayrımcılık var mı? Başlangıçta veya şu an bu yüzden uğradığınız kılık kıyafetinizden veya düşüncelerinizden dolayı ayrımcılıklar oldu mu? Ücret konusunda eşitsizlik yaşadığınız durumlar oldu mu? Sizce bu eşitsizliğin sebebi nelerdir?

28) Çalıştığınız meslekte cinsiyete dayalı iş bölümü var mı? Bu iş bölümünü hangi kriterlere dayalı olarak ayırdığını düşünüyorsunuz? Bir kadın mühendis/bilim insanından beklenen farklı yetenek ve görevler olduğunu düşünüyor musunuz?

29) Yaptığınız işlerin kadın olmanız dolayısıyla değersizleştirildiğini veya görülmediğini/temsiliyetin azlığını hissediyor musunuz?

30) Tüm iş deneyimlerinizi düşünürseniz, herhangi bir pozisyondan insanla iletişime geçtiğinizde sizinle yetkin ve profesyonel ilişki içerisindeler mi yoksa cinsiyetinizden dolayı otorite ve yetkinliğinizi sorgulayan iletişim kuruyorlar mı?

31) Sizce üst pozisyonlara geçmenin şartları nelerdir? Bu şartlar sağlandığında yükselmeniz doğrudan gerçekleşir mi? Kariyer alanı olarak yönetici/lider pozisyonlarınıza engel olabilecek cinsiyete dayalı ayrımcılıklar var nelerdir? Sizinle aynı eğitimi almış, aynı bilgiye sahip erkek ile eşit rekabette hissediyor musunuz? Kadın olarak bu rekabette nasıl bir kariyer stratejisi izlemeniz gerekir?

32) Çalışma koşullarınız, sosyal ilişkiler, arkadaşlıklarınız nasıl? (Çalışma saati, günleri, ortamı, seyahat etme durumu, ücret) Ek mesai kalma, seyahat etme, hafta sonları çalışma gibi durumlar söz konusu oluyor mu? Kadın olmanın bu gibi koşullar altında çalışmanın engel olabileceğini düşünüyor musunuz? Bu koşullardaki deneyimlerinizde (iş seyahatinizde, uzun mesailerinizde vs.) iş yerinde veya iş arkadaşlarınızla çalışırken güvende hissediyor musunuz?

33) İş yerinizde toplumsal cinsiyet eşitliğine dair çalışmalar var mıdır? Toplumsal cinsiyete dayalı eşitsizlik durumlarında (şiddet, taciz) başvurabileceğiniz mekanizma mevcut mudur, daha önce işyerlerinizde bunları deneyimlediniz mi? Eğer yoksa, bu size nasıl hissettiriyor, çalışırken güvende hissediyor musunuz?

Sosyal Yaşam:

34) Sosyal yaşamınızın ve iş hayatınızın dengesi nasıl? Yoğun mesai, iş seyahati, saati belirli olmayan çalışma koşulları, “sınırsız taahhüt” gibi şartlar mevcut mu? sizi nasıl etkiliyor?

35) Kendinizi mesleki alanda geliştirmek için nelere ihtiyaç duyuyorsunuz? İş dışında sosyal hayatınızda mesleğinize yönelik kendinizi geliştirici imkanlara (çevrimiçi/çevrimdışı) vakit ayırabiliyor musunuz? İş yerinizde böyle imkanlarınız var mı, varsa bu imkanlar herhangi bir pozisyondaki herkes için eşit mi?

36) Sizin veya başka bir kadının kariyerini evliliğin ve çocuk sahibi olmanın olumsuz etkileyeceğini düşündünüz mü? Düşündüyseniz buna yönelik kararlarınızı etkiledi mi?

37) Ev içi iş bölümünüzden bahseder misiniz? Ev içi işler kim/ kimler tarafından yapılıyor? Bu işler yoğunluğunuzu artırıyor mu? Sosyal rolleriniz (ailede, iş yerinde, kişisel: bakım ihtiyacı, çocuk sorumluluğu, ev içi roller, eş desteği) kariyerinizi şekillendiriyor mu veya kariyeriniz sosyal rollerinizi şekillendiriyor mu?

38) Çocuk bakım desteği, kreş imkânı, doğum izni, emzirme izni, emzirme odası gibi imkanların olması neden önemlidir? Çalıştığınız işyeri bu imkanları sağlıyor mu?

39) Mesleğinizden veya meslek içerisinde ilerlemek istediğiniz pozisyonlardan vazgeçmeyi/ara vermeyi düşündüğünüz oldu mu? Buna yönelik cesaretinizi kıran herhangi olay yaşadınız mı?

40) Herhangi bir sendika, meslek odası, dayanışma ağında üye misiniz? Sizin için bu tür üyelikler ne anlam taşıyor? Sizce kadınların bu tür oluşumlarda erkeklerden farklılaşan deneyimleri var mı? Ne gibi? Bu alanda çalışacak genç kadınlara önerileriniz neler?

Çalışmaya katıldığınız için teşekkür ederim.

B. APPROVAL OF THE METU HUMAN SUBJECTS ETHICS COMMITTEE

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER



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28 ŞUBAT 2023

Konu: Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Prof.Dr.F. Umut BEŞPINAR

Danışmanlığımı yürüttüğünüz Ümmühan Söylemez'in "Türkiye'de sosyalizasyon sürecinde ve iş hayatında yaşanan toplumsal cinsiyet ayrımcılığının kadın ağırlıklı Fen,Teknoloji,Mühendislik ve Matematik (FTMM) alanlarında çalışan kadınların kariyerlerine etkisi" başlıklı araştırmanız İnsan Araştırmaları Etik Kurulu tarafından uygun görülerek 0148-ODTÜİAEK-2023 protokol numarası ile onaylanmıştır.

Bilgilerinize saygılarımla sunarım.

Prof. Dr. Sibel KAZAK BERUMENT
Başkan

Prof.Dr. İ.Semih AKÇOMAK
Üye

Doç. Dr. Ali Emre Turgut
Üye

Dr. Öğretim Üyesi Şerife SEVINÇ
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Dr. Öğretim Üyesi Murat Perit ÇAKIR
Üye

Dr. Öğretim Üyesi Süreyya ÖZCAN KABASAKAL
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Dr. Öğretim Üyesi Müge GÜNDÜZ
Üye

C. TURKISH SUMMARY / TÜRKÇE ÖZET

GENEL BAKIŞ

Bilim ve teknolojinin siyasal, ekonomik ve sosyal alanlar gibi birçok konuda küresel düzeyde artan önemi; daha çok konuşulan ve araştırılan çok boyutlu global bir meseledir. Ayrıca çok çeşitli ve farklı sektörlerin kümelendiği STEM (Science, Technology, Engineering, and Mathematics) meslekleri, giderek kariyer açısından en prestijli alan haline geldi. Bu alanlar Türkçede FTMM (Fen, Teknoloji, Matematik ve Mühendislik) olarak geçer. Pek çok ülkede olduğu gibi Türkiye'de de bu alandaki beceri ve kapasite açığını kapatmak ve sosyo-ekonomik açıdan rekabet edebilmek için ulusal politikaların hayata geçtiği, sivil toplum kuruluşları ve özel şirketlerin de bu amaca yönelik eğitim programları ile stratejik planlar yapmaktadır. UNESCO Bilim Raporu: The Race Against Time for Smarter Development (2021) raporu, FTMM alanlarındaki cinsiyet eşitsizliğinin/farkının (gender gap) devam ettiğini ve bu konuyu ele almak için daha fazla eyleme ihtiyaç duyulduğunu vurguluyor. Kadınların FTMM alanlarına katılımını artırmaya yönelik strateji ve politikaların toplumsal cinsiyet temelli ayrımcılık/eşitsizlik çerçevesinde incelenmesi gerektiğini düşünüyorum. Bu yüzden, katılım istatistiklere dayalı doğrusal bir perspektifin bize veremediği ayrımcılık ve eşitsizlik konusuna toplumsal cinsiyet perspektifinden odaklandım.

Tezimin temel amacı, Türkiye'de kadın ağırlıklı FTMM alanlarından mezun olan kadınların aile, eğitim ve iş hayatında sosyalleşme sürecinde yaşadıkları toplumsal cinsiyet ayrımcılığının ve buna karşı geliştirdikleri stratejilerinin kariyerlerini nasıl etkilediğini analiz etmektir. Bilim ve teknolojinin toplumsal cinsiyet kalıplarını ortaya koyarken amacım, profesyonel hayatta sürdürülen ve yeniden üretilen FTMM alanlarına katılım önündeki engeller ve kısıtlamalar karşısında kadınların ayrımcılığa karşı stratejilerine ilişkin mevcut literatüre katkıda bulunmaktır. Bu amaç, literatürde sınırlı olarak odaklanılan kadın-yoğunluklu FTMM alanlarından mezun kadınların deneyimlerinden yola çıkarak koşulları, katılım ve çalışma sürecinde ne tür cinsiyet ayrımcılığı yaşadıklarını vurgulamaktadır. Dolayısıyla Türkiye'deki FTMM alanlarında çalışan profesyonel kadınların deneyimleri, bu alanlarda toplumsal cinsiyet farkı analizine (gender gap analysis) katılıma odaklanmanın ötesinde koşulları sorgulamak için bütüncül bir bakış açısı olacaktır. Yaşam akışı perspektif

ile kadınların bu alandaki kariyerlerinin önündeki ayrımcılıkların, eşitsizliklerin ve engellerin sadece profesyonel hayata yönelik bir analiz ile değil yaşamlarının aile ve eğitim sürecindeki deneyimleriyle de analiz ederek anlamlandırmanın bütüncül bir bakış olacağına inanıyorum.

BÖLÜM 1

GİRİŞ

Türkiye'de bazı FTMM alanlarında kadınların artan katılımı, daha az cinsiyet ayrımcılığı ve kadınlar için daha fazla fırsat varsayımı yaratsa da sayısal üstünlüğün bu tür beklentileri karşılamaya yeterli olup olmadığını düşünmek bu çalışma için kritik önem taşıyor. Bu nedenle, bu çalışmada Türkiye'de “kadın egemen” olarak sınıflandırdığım FTMM alanlarından (biyoloji, kimya, kimya mühendisliği, gıda mühendisliği ve çevre mühendisliği) mezun olan kadınların deneyimlerine odaklandım. FTMM'de cinsiyet farkı (gender gap) sorununu incelerken sosyalizasyon sürecindeki cinsiyet ayrımcılığının kariyer hedeflerini ve profesyonel yaşamı nasıl etkilediğini analiz etmek gerektiğine inanıyorum. Dolayısıyla, bu çalışmada kadının aile, eğitim ve iş yaşamını kapsayan yaşam akışı çerçevesi sosyalizasyon sürecinde bu yapılar arasında kesişen cinsiyet paternlerinin döngüsellğine ve yeniden üretimini ortaya çıkarabilecek tartışma zemini hazırlamamı sağladı.

Sosyalleşme sürecinde toplumsal cinsiyet perspektifinden bakış, kadınların toplumsal cinsiyet rolleri hangi becerileri kazanacakları, hangi mesleki hedefleri olabileceği ve hangi iş türünde çalışmak istediklerine ilişkin stratejik kararları analiz edebilmem için kesişimsel gerçeklikleri görmemi sağladı. Bu bağlamda bu alandaki feminist çalışmalar bilimin, teknolojinin ve toplumsal cinsiyetin karşılıklı olarak şekillenmesi ve yapılanması üzerinde durarak birbirlerini nasıl inşa ettiklerini analiz ederler ki bu alanların kendine dair toplumsal cinsiyet yapılanmasını kavrayabilelim. Bu kritik de bana, kadınların kariyer yolculuğunda toplumsal cinsiyet ayrımcılığı deneyimlerini anlamak ve Türkiye'deki FTMM alanlarında toplumsal cinsiyet kalıplarını sorgulayarak birbirlerini nasıl inşa ettiklerini ortaya çıkarmak için rehberlik etti.

Kadınlar uzun yıllardan beri FTMM alanlarında var ancak bu varlık toplumsal cinsiyet eşitliğini sağlamıyor; kadınlar sayıca eşit olsalar bile genellikle ikincil pozisyonlarda veya 'uygun' iş alanlarında çalışmak zorunda kalıyorlar. Bu nedenle literatürde ve analizde bilim-teknoloji ile toplumsal cinsiyet arasındaki ilişkiselliği kadınların neden kadın-egemen FTMM

alanlarına katılma ve teşvik edilme eğiliminde oldukları açıklamaktır. Kadınların sosyalleşme sürecinde edindikleri beceri, davranış ve tutumlar, bu alanlarda çalışan kadınların rekabetçi adaylar olabilmeleri, kariyerlerinde ilerlemeleri ve stratejik kararlar alabilmeleri için gereklidir. Bu doğrultuda, Türkiye'de bu alanlarda neden bu kadar az ya da çok kadının olduğu sorusuna değil, profesyonel hayatında ve sosyalleşme sürecindeki bu cinsiyet ayrımcılığının kadınları bu alanlara katılım motivasyonlarını, ilgilerini, becerilerini ve stratejilerini nasıl etkilediği sorularına yanıt bulmayı hedefledim. Toplumsal cinsiyete dayalı mesleki ayrımcılığın ve kadınların bu alanlardaki kariyer gelişimlerinin önündeki yapısal engellerin nedenselliğini kurmak adına tüm sosyalizasyon sürecinde deneyimlerinin aktör ve kurumlarca toplumsal cinsiyet paternleri üzerinden yeniden ne şekilde şekillendiğini anlamaya çalıştım. Kadınlar FTMM alanlarında yeterince temsil edilememesi mühendis veya bilim insanı olarak görünememezlik, bu alanlardaki belirsiz çalışma koşulları, erkek egemen çalışma ortamları ve kariyer gelişimi için eşitsiz rekabet koşulları gibi toplumsal cinsiyete dayalı yapısal engellerle karşı karşıya kalması sebebiyledir (Hewlett ve diğerleri, 2008). Kadınların bu alanların bazılarında dominant bazılarında azınlık grubu olmasının değiştiremediği ve benzer ayrımcılıkların tekrarlandığını ortaya çıkarmak yapısal engelleri tartışmamı sağlayacağına inandım. Sonuç olarak temel araştırma sorum, kadınların sosyalleşme sürecinde toplumsal cinsiyet ayrımcılığı deneyimlerinin ve stratejilerinin, kadınların ağırlıklı olarak yer aldığı FTMM alanlarında çalışan olarak kariyerlerini nasıl etkilediğidir.

BÖLÜM 2

LİTERATÜR TARAMASI

Bu çalışmanın anlamlı tartışmaları ve çerçevesi feminist literatürün bilime ve teknolojiye yönelik eleştirileri ve katkılarına dayanmaktadır. FTMM'de toplumsal cinsiyet ayrımcılığının bağlamı araştırılırken toplumsal cinsiyet ile bilim-teknoloji arasındaki ilişki anlamını, değerlerini, etik anlayışını ve yöntemlerini kritik eden meta-analiz için önemlidir. Bu ilişkinin anlaşılması bizi teknoloji, toplum ve değerlerin etkileşimini içeren yapısal bir olguya götürecektir. Bu yapısal olguları tarihsel bir perspektiften ve epistemolojik bir eleştiriden inceleyebilen feminist bakış açısı, yapısökümcü ve değişken ilişkisellik vererek temel sorular sunar.

Keller (1983) ve Harding (1986), 'bilimde toplumsal cinsiyet perspektifini' ile bilim ve teknolojinin yapısına dair toplumsal cinsiyet bağlamını ortaya koymuşlardır. Keller (1983)

bakış açımızı, dilimizi ve gerçekliğimizi bilimsel dil ve metodolojisiyle nasıl kurgulandığına dair yapısal analiz sunarken bilimi ve kadını konumlandıran zihniyetleri sıralamıştır. Bilim ve teknolojinin yapısındaki 'objektiflik, rasyonellik ve analitik' yapısının düalisttik olduğunu ileri sürerek maskülenitenin değer ve prensipleriyle ilişkiselliğine vurgu yapar. Diğer bir yandan, femininiteye atfedilen "duygusal, öznel, uyumlu ve yumuşak" imgeler bilimin "kişisel olmayan, duygusal olmayan, rasyonel ve katı" erkeksi imge ve değerlerinin yönlerindeki bu zıtlığını ortaya çıkarır. Bu amaç bilimsel düşünce algısını kavramamızı sağlar çünkü bilimi kişisel ya da öznel kılan duygu ya da duygulanım, bilimdeki güç ilişkilerinin ve düalizmlerin diğer kaynağıdır. Bu düalist imgeler, kültür içindeki mitlerin paydaşları olarak gerçeklikte karşılıklı olarak şekillenen bir cinsiyetlendirilmiş bilim ve teknoloji anlayışını toplumsal olarak inşa etmektedir. Bu karşılıklı üretim öznel, deneyimsel ve duygusal olanlara karşın bu ağlar içerisinde değersizleştirilir. Temel bir epistemolojik eleştiri getirebilmek için bilimin ve hakim kültür içindeki tahakkümün hakikati üzerinde fikir birliğine varmak ve bu fikirdeki feminen değerlerin görünmezliğini/değersizliğini tartışmak gerekir. Feminist paradigma, modern bilimsel düşüncede hegemonik maskülen kültürü ve erkek egemenliğini azaltmak için kadın sorusunun ve toplumsal cinsiyet perspektifinin daha fazla incelenmek üzere içselleştirilmesi gerektiğini önermektedir.

Bilim ve teknoloji alanlarında bir azınlık grubu olarak kadınların tarihsel açıdan bakıldığında, değişen ekonomik ihtiyaçlar, toplumsal tutumlar ve kadın hakları hareketi kapsamında kızların ve kadınların bu alanlara katılımını artırmaya yönelik sosyal politikalar farklı zamanlarda uygulanmış ve çeşitli faktörlerden etkilenmiştir. Wajcman (2004) 1970'li yılların başında başlayan kadınların mesleklerdeki konumu ve katılımına yönelik hareketlerin, kadınların bilim alanındaki temel katkılarını ve bilimsel çalışmalarını ortaya çıkarmayı hedefleyerek onları görünür kılmaya çabaladığını aktarır. Kadınların bilim ve teknoloji alanlarında görünmezliği ve sanayi devrimi tarihine katkıları dile getirilmeye başlandığında bu dışlanma daha da belirginleşti. Birinci ve ikinci dalga feminist hareketler ve çalışmalar, bilim, mühendislik ve teknolojide kız çocuklarının önündeki engelleri ortaya çıkararak, kadınların eğitim ve istihdamdaki fırsat eşitsizliğine dikkat çekti (Phipps, 2008). Bu nedenle 1970'li ve 80'li yıllarda kız çocuklarına eğitim hakkı verilmesi ve bilim ve teknoloji alanında teşvik politikalarıyla sorunun aşılmasına yönelik çalışmalar feminist duruşun odak noktaları arasındaydı.

Bilim-teknoloji alanlarında kadınların katılımının artmasına yönelik duruşun fırsat eşitliğine yönelik önerileri bu alanların kendisini sorgulamaktan uzak olmasının erkeksi imajına ve yapısına yönelik değişim isteyen bir anlayış talep etmemesi eleştirilmiştir. Bu yüzden fırsat eşitliği önerisinin ötesinde bu alanların kendisini, imajını ve sembollerinin toplumsal olarak karşılıklı yapılanmasına odaklanılmıştır. Örneğin, Faulkner (2001) teknolojideki erkeksi imaj

vasıflı olduğu iddiasıyla teknik ve bilim mesleklerinde erkek egemenliğine katkıda bulunduğunu öne sürmüştür. Teknolojinin ilerlemesinde kadının rolünün aksine, kadının çocuk bakımı, yemek pişirme ve barınma ile ilgili toplumsal cinsiyet rollerinin onları eril bilim ve teknoloji anlayışı bağlamında teknolojik alanlarda teknik olarak yetersiz, vasıfsız ve görünmez kıldığını vurgulamıştır. Sonuç olarak, tarihsel olarak kadınların FTMM alanlarına katılımının artırılması ve kadın ile bilim-teknoloji arasındaki ilişkinin toplumsal cinsiyet perspektifinden analiz edilmesine yönelik feminist kritik yapısal sorgulamaları ve politikaları etkilemiştir.

Kadınlık ve erkeklikle ilişkilendirilen cinsiyetlendirilmiş varsayım ve kalıpların gömülüp yeniden üretildiği toplumsal cinsiyetlendirilmiş altyapı kavramı “gendered substructure”, örgütsel ilişkilerin ve operasyonların temelini oluşturmaktadır (Acker, 2012, s.215). Erkeklik ile bilim-teknoloji arasındaki yapısal ilişki, FTMM alanlarında cinsiyet stereotiplerini, önyargıları ve ayrımcılığı beraberinde getirmekte, bu da kadınların kariyer hedeflerini ve profesyonel yaşamlarını etkilemektedir. Bu çalışmada da görüldüğü gibi kadınların karar mekanizması FTMM alanlarının aktörler ve kurumlar tarafından ortaklaşa oluşturulan imajına ve yapısıyla etkileşimdedir. Bu kesişimsellikler doğrultusunda, kadınlarla ilişkiyi, kadın karakterizasyonunu ve kimliğini dışlayan yerleşik maskülen kültürün meslek ve eğitim alanlarındaki bilim ve teknoloji kavram ve söylemleri 19. yüzyıl çalışmalarında öne çıkmıştır (Wajcman, 2004). Sosyalleşme sürecinde anlayış bozulmadığı sürece kadınların bu alanlarında yetersiz temsilinin devam etmesinin nedenleri ve sonuçları her etkileşimde sürdürülmektedir.

Kadınların FTMM alanına artan katılımı, kadınların erkeklerle aynı statüye ve eşit fırsatlara sahip olamadığını göstermemiştir. Türkiye’de kadınların bu alanlardaki mücadelesi ve dayanışmasının durduğu noktalar yapısal engellerin ve geleneksel kalıplaşmış kalıpların görünürlüğünü artırsa da toplumsal cinsiyet perspektifi edinen siyasi ve ekonomik sürdürülebilir adımların atılmadığı raporlanmıştır (Beşpınar ve Pehlivanlı-Kadayıfçı, 2021). FTMM alanlarına katılımında yaşam boyu toplumsal cinsiyet ayrımcılığına dayalı deneyimlerini anlamayı hedeflediğim için kadınların katılım öncesi ve iş hayatındaki stratejilerine ve deneyimlerine odaklanıyorum. Dolayısıyla literatürdeki 'cam tavan', 'cam yürüyen merdiven' ve 'kraliçe arı sendromu' kavramları aracılığıyla sunduğum ayrımcılıklar kadın-yoğunluklu FTMM alanlarında da bu bağlamdaki engellerin aşılamadığına bütüncül bir bakış açısı sağladı. Sonuç olarak, bilimin ve teknolojinin feminist yapısal ve epistemolojik kritiğinden edindiğim bakış açısıyla kadınların aile, eğitim ve profesyonel hayatı içerisindeki toplumsal cinsiyet sosyalleşmesinin kariyer hedeflerinde ve gelişimindeki yapısal engelleri dile getirerek çalışmamda kesişimsel bir tartışmasını genişlettim. Bu kurumların yapıları ve kadınların

deneyimlerini toplumsal cinsiyet ve bilim-teknoloji kesişimselliğini gözeterek FTMM alanındaki kariyer yolculuklarını yaşam akışı bakış açısı geliştirmeyi hedefledim.

BÖLÜM 3

METODOLOJİ

Bilim ve teknolojinin yerini ve anlamını toplumsal cinsiyet perspektifinden anlamayı hedeflediğim analizimde; yapısal analiz, kadınların çoğunlukta olduğu FTMM alanlarında kadınlara yönelik cinsiyet ayrımcılığının nedenselliğini ve inşaa sürecini ortaya koydum. Feminist metodolojinin izinden giderek araştırma soruma kadınların deneyimine dayanan niteliksel veri ile cevap vermeye çalıştım. Görüştüğüm katılımcılardan veri toplamak amacıyla yarı yapılandırılmış, derinlemesine görüşmeler gerçekleştirdim. Araştırma sorularım kadınların egemen olduğu FTMM alanlarında eğitim almış ve çalışan kadınların ailedeki, eğitimdeki ve iş hayatındaki sosyalizasyon süreciyle ilgili olduğundan, araştırmamı bir yaşam akışı analizi yapacak şekilde tasarladım. Analiz katılımcıların deneyim, duygu ve düşüncelerine dayanmaktadır. Bu çalışma aynı zamanda Türkiye'nin toplum yapısında, eğitim sisteminde, üniversite bölümlerine ve istihdama yönelik çalışma koşullarındaki sosyalleşme sürecinden etkilenen kadınların karar ve stratejilerine genel bir bakış sunabilmektedir. Ayrıca kadınların katılım oranının yüksek olduğu için bu çalışmada 'kadın egemen' kategorizasyonunu FTMM alanları için sayısal egemenlik olarak kullandım; 'erkek egemen' kategorizasyonunun zıttı olarak çerçevenmemelidir.

Araştırma katılımcı kriterlerime uyan katılımcılara ulaşmak için kartopu, amaçlı ve kota örnekleme gibi olasılıksız örnekleme yöntemlerini kullandım. Bu kriterler; 25-35 yaşları arasında, en az iki yıllık iş tecrübesine sahip, Türkiye'de kadınların ağırlıklı olduğu FTMM (biyoloji, kimya, kimya mühendisliği, gıda mühendisliği ve çevre mühendisliği) bölümlerinden mezun, yüz yüze veya çevrimiçi platformlar (Zoom, Microsoft Teams, Google Meets) aracılığıyla görüşme yapmayı kabul eden 15 kadın katılımcıdan oluşmaktadır.

MAXQDA aracılığıyla verileri analiz ederek kadınların toplumsal cinsiyet ayrımcılığı bağlamındaki deneyimlerini tematik analiz kullandım. Yaşam akışı perspektifi, aile, eğitim, iş kurumlarının etkileşimleri yoluyla kadının kurumlar içerisindeki sosyalizasyon sürecindeki toplumsal cinsiyet ayrımcılığı deneyimlerinin kariyerini nasıl etkilediğini analiz etmemi sağladı. Bu nedenle her kurumda kadınların bilim ve teknoloji anlayışını ve karşılıklı

ilişkiselliği şekillendiren etkileşimleri ortaya çıkarmayı amaçlayarak, FTMM alanındaki kariyer hedeflerini ve deneyimlerini bu çerçevede analiz ettim.

BÖLÜM 4

ERKEN SOSYALİZASYON SÜRECİNDE KARIYER HEDEFİ

Kadınların FTMM alanlarına katılımını artırmayı amaçlayan araştırma, politika ve projelerde kız çocuklarının bilim ve teknolojiye olan ilgilerini erken yaşta geliştirme konusunda erkeklere göre daha az fırsata sahip olduklarını vurgulanmıştır (Phipps, 2007). Türkiye'de bazı FTMM alanlarında kadınların temsilinin yüksek olması ve kadınların sosyalleşme deneyimleri, kalıplaşmış yollara maruz kalarak bu katılımın nasıl işlediği hakkında fikir vermektedir. Bu sürecin bütünsel bir sonucu olarak kadınların deneyimlerini takip etmek ve tekrarlayan cinsiyet kalıplarının kadınların bu alanlara katılım stratejileri aracılığıyla ilişkiselliğini kavramakla mümkün olduğunu düşünüyorum. Erken sosyalizasyon süreci, toplumsal cinsiyet ayrımcılığının sürekli eğitim ve iş yaşamında yeniden üretilme kalıplarını ortaya çıkaran bir başlangıcın tezahürlerini barındırmaktadır. Toplumsal cinsiyete dayalı sosyalleşmede kız çocuklarının aile içindeki dinamik etkileşimleri ve çocuğun sosyalleştiği ortamlarda rol modellerle eğitim almaları kariyer hedefleri oluşumunda etkindir. Bu bölümde, erken sosyalleşme döneminde beceri, ilgi ve motivasyon gelişimi yoluyla kariyer hedeflerine yön verebilecek davranış ve deneyimlerle rol modellerinin aktarıcı tutumlarına odaklandım.

Bu çalışmadaki bulgular katılımcıların ailelerinin kız çocuklarının eğitimine önem verdiği ve teşvik ettiğini gösterir. Fakat bu teşvikin yönelimi lise eğitimi sürecinde matematik-fen bölümü ve üniversite bölüm seçiminde kadın-egemen FTMM alanına yönelik olduğunu belirtmek gerekir. Öte yandan katılımcıların aile ve eğitim hayatında bilim ve teknoloji alanında merak, bilgi ve ilham geliştirme konusunda sınırlı fırsatlar sunulurken, onların toplumsal cinsiyete dayalı davranış, yetenek ve becerilerini yönlendiren bir etkileşim ortamında sosyalleşme süreci yaşadıklarını tespit ettim. Kadınların bu alanlara katılabilmeleri ya da yönelebilmeleri için eğitimin yanı sıra aileyi de kapsayan bir oryantasyon süreci gerekmektedir çünkü bu alanlarla ilişki kurmalarını sağlayacak öğrenme sürecini sürdürürler. Bu nedenle, kadınların FTMM alanına katılımını ve kariyer gelişimini artırmak için geleneksel toplumsal cinsiyet stereotiplerini, rollerini ve kimlik inşasını kurumlar aracılığıyla sürdüren ve yeniden üreten yapısal engellerin yeniden yapılandırılması ve tüm aktörleri kapsayan etkileşimlerinin dengeli dağılım ve kısıtlandırılmamaları için değiştirilmesi gerekmektedir.

Toplumsal cinsiyet farkındalığının ve yeterli bilginin olmadığı bu süreçte kadın ile bilim-teknoloji arasındaki ilgiyi kalıplaşmış imajlar, kimlikler ve bağlantılar üzerinden kurgulamışlardır. Bu süreçte FTMM alanlarındaki bazı bölümlerde, Türkiye'de kadın imajı ve kimliğine en yakın ya da daha az erkeksi ve erkek egemen olmayan alanlara yönelik motivasyon geliştirebilecekleri bir ortam sağlanmıştır. FTMM alanlarında ilgi ve yeteneklerinin öz-yeterlilik sağlayabileceği, iş hayatında kadın olarak rekabetçi olabileceği, çalışma koşullarının toplumsal cinsiyet rolleriyle çatışmadığı alanlara stratejik olarak öncelik vermişlerdir. Kadın-egemen FTMM alanları, erkek egemen alanlara göre 'temiz, erkek egemen olmayan bir ortam, masa başı iş ve daha kısa çalışma saatleri' gibi stereotip bir imaja sahiptir. Bu imajların ve çalışma koşullarının kadının toplumsal cinsiyet kimliğine ve rollerine uygun olmasının varsayımsal sebebiyle öğretmenlerinin, ailelerinin ve çevrelerinin teşvik etmesi onları motive eden sebeplerdir. Dolayısıyla bu stereotipleri yıkacak kadın rol modellerinin olmayışı, bilim ve teknolojide bilgi artırıcı materyallere yeterince erişilememesi ve sosyalleşme sürecinde kurumlar arası toplumsal cinsiyet kalıplarının yeniden üretilmesi; kadınların ilgi ve motivasyonlarının temel dinamiklerini oluşturmaktadır. Stratejik bir karar olarak bu kadın egemen FTMM alanlarına yönelik ilgi ve motivasyonlarını toplumsal cinsiyetlerine yakınsama ve öz-yeterliliklerini bu açıdan kurgulamaları bu alanlara yönelmelerindeki en önemli etkidir.

BÖLÜM 5

ÜNİVERSİTEDE VE PROFESYONEL HAYATTAKİ ORGANİZASYONEL SOSYALİZASYON SÜRECİNDE TOPLUMSAL CİNSİYET AYRIMCILIĞI

Bu bölümde toplumsal cinsiyete dayalı organizasyonel sosyal ilişkiler, iş bölümü ve bunların FTMM alanındaki profesyonel yaşamındaki uygulamalarına ilişkin analizimin bir incelemesini sunuyorum. Bu literatür ve araştırmam, Türkiye'de bu alanda çalışan kadınlara yönelik organizasyon içindeki cinsiyet ayrımcılığını ve yapısal engelleri anlamak için bir çerçeve sağlıyor. Yapılar arası ilişki içerisinde aile, eğitim ve iş bize toplumsal cinsiyet ve bilim-teknoloji ilişkilerinin toplumsal cinsiyeti kurumsallaştırarak karşılıklı nasıl sürdürdüklerine dair önemli bir bakış açısı sunuyor. Bu nedenle, bilim ve teknolojinin toplumsal cinsiyetle ilişkiseliliğine ilişkin feminist eleştirilere dayanarak, perspektifi işyerindeki örgütsel sosyalleşmeyle kesiştirdim.

Türkiye'de aile ve eğitim hayatında sosyalleşme sürecinde toplumsal cinsiyet rolleri ile

toplumsal cinsiyete dayanan bilim insanı ve mühendislik inşasının kesişimselliği açısından kadınların kadın egemen FTMM alanlarına yönelme stratejilerini ortaya çıkardıktan sonra profesyonel hayatta bu stratejinin varsayımlarını inceledim. Aile ve eğitim kurumlarındaki sosyalleşme sürecindeki deneyimleri, kadınların ilgi, yetenek ve motivasyonlarının gelişimini ve yönelimini etkilerken, kadın davranış kalıplarına yönelim aynı zamanda profesyonel yaşamda hangi FTMM alanını seçmeleri gerektiği konusunda da yol göstericidir. Meslek hayatına ilişkin kararlarda kimlik ve rollerin önemli bir kriter olduğu ve bu alanlarında erkek egemen meslek hayatından ziyade kadınların katılımının daha çok olduğu alanlara teşvik edildiği ortaya çıkmıştır. Bu teşviklerin ve kadınların stratejik motivasyonlarının bu alanlarındaki çalışma koşullarıyla uyumsuz olduğu noktaların çoğunun, genel varsayımların aksine, kadın egemen FTMM alanlarının kadınları kapsayıcı bir çalışma ortamı olmaktan uzak olduğunu analiz ettim. İşyerinde toplumsal cinsiyete dayanan organizasyonel yapısı ve bilim-teknoloji anlayışı, kadınların iş hayatlarında cinsiyet kalıpları üzerinden cinsiyet ayrımcılığı yaşamasına neden olmuştur.

Öncelikle kadınların erken organizasyonel sosyalleşme dönemindeki üniversite hayatı ve staj deneyimleri sonucunda kadınlar FTMM alanlarında yer almalarına rağmen kadın egemen alanların toplumsal cinsiyet ilişkileri nedeniyle sembolik olarak eşleştirilmesi erkek egemen alanları kadar 'değerli' ve 'gerçek' işler yaptıklarını hissetmemektedirler. Kadınların egemen olduğu FTMM alanlarının az matematik yoğunluklu olması ve ürettikleri bilgi ve ürünlerin bakım, besleme ve evcimenlik ilgileriyle eşleştirilmesi, 'gerçek' mühendislik ve bilimle ilişkilendirilen 'matematik, rasyonelite, analitik düşünme' gibi semboller aracılığıyla değersizleştirilmiştir. Bu hiyerarşik konumlandırma literatürde de bahsettiğim bilim ve teknolojinin toplumsal cinsiyete dayalı düalizim anlayışıyla örtüşmektedir. Dolayısıyla hem iş hayatında hem de üniversite hayatında kadının bu alanları hiyerarşik olarak çeperde konumlandırılmakta ve ikincil hissettirilmektedir. Bu değersizleşmeyi bazen aynı kurumda çalıştıkları erkek egemen alanlardan mezun olanlardan daha az maaş alabildiğinde, bazen de üniversite veya sosyal çevrelerinden aldıkları tepkilerle deneyimlemişlerdir.

İkincisi, kadın egemen FTMM alanlarında toplumsal cinsiyete dayalı mesleki ayırım, kadınlara cinsiyetlerine göre atfedilen beceri ve roller aracılığıyla yürütülmektedir. Her ne kadar bu ayrımcılık bazen kadınların kadın oldukları için laboratuvarlara, kalite departmanlarına ya da insan odaklı bölümlere tercih edilmesini bir avantaj gibi gösterse de kadınların bu alanlarla sınırlı kaldıklarını ve kariyer hayatlarını kadınsı niteliklerle ilişkilendirilen görevlerle kısıtlandıklarını ortaya çıkmaktadır. Bu mesleki ayrımlar aynı zamanda erkek nitelikleriyle de ilişkilendirilmekte ve iş bölümlerinde eşit rekabeti engellemektedir. Erkeklerin öncelikli olduğu meslekler, daha fazla fiziksel güç gerektiren, uzun/fazla mesai gerektiren ve erkek

mavi yakalı çalışanlar üzerinde otorite kurmasını gerektiren mesleklerdir. Katılımcılar, kadınların bu alanlar için rekabetçi adaylar olarak görülmediğini, kadının aile sorumluluklarının ve toplumsal cinsiyet kimliğinin bu koşullara uygun olmadığı varsayımından yola çıkarak ayrımcılığa maruz kaldıklarını belirtmektedir. Ancak kadınların çalıştıkları departman ne olursa olsun, mühendislik ve bilim becerilerinin yanı sıra, toplumsal cinsiyet rolleri ve kimliklerinin daha düzenli olma, etkili iletişim kurma, güler yüzlü ve uysal olma gibi beklentilerle görünmez bir iş bölümü oluşturduğunu belirtmişlerdir.

Son olarak kadınların kariyer ilerlemesinin önündeki yapısal engeller, kadınların yoğun oldukları alanlara yönelmelerine rağmen onların iş hayatında avantajlı bir konumda olmadıklarını göstermektedir. Kadınların ağırlıkta olduğu alanlardan mezun olan kadınlar, terfi alma konusunda erkeklerle eşit fırsatlara sahip olmadıklarını belirterek, iş hayatında kariyer gelişimlerinin önündeki engelleri aşmak için çeşitli stratejiler geliştirdiler. Liderlik ve yöneticilik pozisyonlarında aranan beceri ve niteliklerin eril değer ve normlarla ilişkilendirilmesi, organizasyonel yapıda kadınların terfi etmesinin önündeki temel engeldir. Ayrıca kadınların teknik, sosyal ve yönetsel özelliklerinin erkeklerden daha fazla sorgulanması, kadınların kendilerini kanıtlamak ve sosyal yaşam koşullarını iş ihtiyaçlarına yönelik uyarılma için daha fazla çalışmalarını gerektirmiştir. Kadınlar, cam tavan, cam yürüyen merdiven ve kraliçe arılar tarafından tehdit edilen dayanışma oluşturma ve mentorluk edinme gibi toplumsal cinsiyet ayrımcılığıyla mücadele etmek için stratejiler geliştirmeleri gerekmiştir. Kariyerlerde ilerlemek için kadınsılıklarını susturarak ya da organizasyonun cinsiyetçi yapısında profesyonel görünmek için sosyal ilişkilerden uzak durarak erkeksi davranışlar benimsemeyi seçebiliyorlar. Ancak bu davranış ve stratejilerin dışında sosyal yaşam koşullarının kendilerini olumsuz etkilememesi için kariyerlerine engel olmayan 'doğru' partneri seçmelerinin önemini ve çocuk sahibi olmanın kariyerlerini olumsuz etkileyeceklerini düşündüklerini de belirtmişlerdir. Daha az çocuk sahibi olmak veya çocuk sahibi olmamanın kadının kariyerleri için bir strateji olduğunu göstermiştir. Görüşülen kişiler arasında üst düzey pozisyondaki kadınlar, daha empatik, hiyerarşik olmayan ve işbirlikçi çalışma ilkelerini benimseyerek otoriter yönetim anlayışına meydan okuduklarını vurguladılar. Bu yönetim stratejisi, kadınların dezavantajlı konumlarını tersine çevirebilecek, toplumsal cinsiyet ayrımcılığına ve otorite kalıplarına karşı mücadeleyle verilen yanıtlardan biridir.

Bu bölümdeki bulgular, yinelenen ve tüm sosyalizasyon sürecinde tezahürleri bulunan cinsiyet kalıpları aracılığıyla, FTMM alanlarındaki çalışma koşullarındaki cinsiyet ayrımcılığı deneyimlerini ve bunların üstesinden gelme stratejilerini ortaya çıkardı. Yaşam-ış trajektörü, kadınların sosyalizasyon süreci boyunca toplumsal cinsiyet rollerinin, stereotiplerin ve normların kadınların kurumlar arası ilişkilerinde yeniden üretildiğini ve kesiştiğini ileri

sürmemi sağladı. Bu kesişimsellik, yaşam-akışı perspektifinden kadınların kariyerlerinin bu ilişkisellikte nasıl şekillendiğini iddia etmek için önemlidir. FTMM gibi hegemonik eril değerlere ve toplumsal cinsiyete dayalı kültüre sahip alanların yapısal koşullarının ve yapısının sorgulanmaması, kadınların katılımlarının yüksek olduğu alanlarda bile ayrımcılık yaşamasını önleyici aksiyonlar önündeki engeldir. 'Kadınlara uygun meslek' alanları, kadınların kariyerleri için güvenilir katılım ve teşvikin varsayımsal bir etiketi olsa da kadınların hakim olduğu FTMM alanları da benzer şekilde kadınların kariyer gelişimini engelleyen koşullar ve yapılarla sahiptir. Sonuç olarak bu çalışmada, iş yaşamında cinsiyet ayrımcılığının, iş yapısının yanı sıra aile ve eğitim yapısıyla da kesişen bütüncül bir şekilde toplumsal cinsiyet perspektifinden incelenmesi gerektiğini vurgular.

BÖLÜM 6

SONUÇ

Bu çalışmada, toplumsal cinsiyet ayrımcılığının ve ayrımcılığın üstesinden gelme stratejilerinin, Türkiye'deki yaşam akışı perspektifinden kadın egemen FTMM alanlarında (biyoloji, kimya, kimya mühendisliği, gıda mühendisliği ve çevre mühendisliği) profesyonel kadınları nasıl etkilediğini anlamaya çalıştım. Araştırma sorum, kadınların aile, eğitim ve mesleki yaşamda sosyalleşme sürecinde karşılaştıkları cinsiyet ayrımcılığının, cinsiyet kalıplarını yeniden üreten kurumların yapısal ilişkileri içindeki kariyer hedefleri ve gelişmeleri üzerindeki etkisini ele aldı. FTMM'deki cinsiyet farkı sorununun çok katmanlı bir nedenleri olduğuna inanıyorum, bu yüzden kadınların katılım ve temsil eksikliği yerine cinsiyet ayrımcılığı ile ilgili yaşam akışı perspektifiyle yapısal engellere dikkat çekmek için Türkiye'deki kadın egemen FTMM alanlarına odaklanıyorum. Buna paralel olarak, yüksek katılıma rağmen kadınların kariyer hedeflerinin ve FTMM alanlarındaki profesyonel yaşamlarda devam eden yapısal engelleri ortaya çıkararak kadınların cinsiyet ayrımcılığıyla mücadele etmek için geliştirdikleri stratejileri vurguladım.

Bilim ve teknolojinin cinsiyetli inşası ve bu alanlardaki erkeklik değerlerinin ve imajının kritiği, aile, eğitim ve profesyonel yaşam sırasında sosyalleşme sürecini dahil ederek tartışmayı derinleştirmiştir. FTMM alanlarındaki cinsiyet farkı sorunları, kadınların katılım eksikliği ve yetersiz temsiline eğitim ve istihdam açısından odaklanan çalışmalar, cinsiyet eşitliği için sürdürülebilir çözümlere yöneliktir. Yapısal bariyerlerin bu alanlarda kadınların kariyerlerini toplumsal cinsiyet ayrımcılığı yoluyla nasıl şekillendirdiğini, bu konuyu bütünsel

bir şekilde anlamayı amaçladığımı belirtmek isterim. Diyelim ki birincil hedef, kızların ve kadınların bilim ve teknoloji alanlarına katılımını artırmaktır o halde toplumsal cinsiyetleştirilmiş kültürü ve hegemonik erkekliğin sembolik iç içe geçmesi ile kesişimsel hale gelen cinsiyet ayrımcılığına meydan okumak da önemli olmalıdır. Bu noktada kadının kariyerinde yaşadığı toplumsal cinsiyet ayrımcılığının kurumlar arası ilişkisellikte toplumsal cinsiyet örüntüleriyle yeniden üretilen engelleri görmek adına yaşam akışı perspektifi önemli bir katkı sunmuştur.

Bu sosyalleşme döneminde karşılaştıkları rol modellerine, ailede iş bölümüne, aktarılan davranış, yaşam tarzı ve yeteneklere dayanarak kariyer isteklerini etkileyecek faktörleri analiz ettim. Sonrasında, eğitim yaşamındaki sosyalleşme süreci, özellikle bu kariyer isteklerini doğrudan şekillendirecek olan bilim ve teknolojide bilgi, beceri ve motivasyonun gelişimini takip etmektedir. Toplumsal cinsiyete dayalı bilim ve teknolojinin inşa edilmesi, toplumsal cinsiyet stereotipleri, arabulucular/rol modelleri ve toplumsal cinsiyete dayalı mesleki ayrımcılık anlayışı ile operasyonelleşmiştir. Bu nedenle, aile ve eğitim hayatı boyunca kadın egemen FTMM alanlarına kadınsı kimlik setleri, roller ve davranış ile yönlendirilen bir eşleşme olarak görüldüğü için teşvik edilmiştir. Kadınların, sosyalleşme sırasında teşvik edilmeyen erkek egemen alanlardan ziyade bu alanları stratejik olarak hedeflemeleri, kariyerlerinde daha çok ilgisini çekeceği, başarılı ve rekabetçi olabilecekleri inançlarında toplumsal cinsiyet rollerine önceliklemleri ve yakınsama hissetmeleri öne çıkan faktördür. Fakat, bu alanlar için motivasyonları toplumsal cinsiyet ayrımcılığının, stereotiplerin, önyargıların ve normların sosyal olarak inşa edilmiş bilim-teknoloji anlayışını kesişimselleşerek deneyimlerini şekillendirdiği yönünde tartıştım. Bu ilişkiselliği bozabilecekleri sınırlı/hiç deneyimleri olması, kadınların toplumsal cinsiyetini önceliklendirerek stratejilerik karar almasına neden olmuştur. Mesleki yaşam deneyimleri ve sosyalleşme süreci sırasında, bu stratejinin dayandığı varsayımların eşleşmediğini fark ettim, çünkü kadınlar toplumsal cinsiyet ayrımcılığına karşı yeni stratejiler geliştirmek zorunda kalmıştır. FTMM alanlarındaki çalışma koşulları değiştiğinden, katılımcı kadınlar, kadınsı imajla ilgili FTMM alanları hakkındaki bu varsayımların aksine, kadınların her zaman kadın egemen olduğu, rekabetçi aday olarak görüldüğü ve toplumsal cinsiyet rolleriyle çatışmadığı çalışma alanlarının çok kısıtlı olduğunu belirtmişlerdir.

Bilim ve teknolojinin hegemonik erkeklikle iç içe geçmesi (Henwood, 1996; Faulkner, 2000; Wajcman, 2000), kadınlık değerlerini ve görüntülerini devalüe etmek ve marjinalleştirmek, bu alanlarda kadınların eğitimini ve mesleki yaşamını şekillendirmiştir. 'gerçek mühendis/bilimci' 'sert/yumuşak' düalizmi ile ilgili, kadınların Türkiye'de yoğunlaştığı yumuşak 'soft' alanlar (Pehlivanli-Kadayıfçı, 2015; Zengin-Arslan, 2002) bu çalışmada, kadınların aynı sosyal

prestije sahip olmadığını ortaya koyuyor. Kadın mühendisler/bilim insanları aynı FTMM alanında olsalar bile, devalüasyon yoluyla hiyerarşik olarak ikincil konumlandırılmalarına neden olmuştur. Bu anlayışın işleyişini FTMM alanlarındaki toplumsal cinsiyete dayalı dağılımını ve toplumsal cinsiyete dayalı iş bölümünü sadece eğitim yaşamında değil, aynı zamanda kadın egemen FTMM alanlarından kadın egemen çalışma departmanlarına yoğunlaştırarak profesyonel yaşamda da sürdürür.

Sonuç olarak, Türkiye'de katılımın veya temsilin ötesindeki yapısal engellere yönelik koşullar ve stratejiler çerçevesinde konuyu derinleştirmeyi amaçladım. Yaşam akışı perspektifinden bakıldığında kadınların kariyer hedeflerini ve bilim-teknoloji alanlarındaki kariyer gelişimlerini etkileyen toplumsal cinsiyet ayrımcılığı ve bunlara karşı geliştirdikleri stratejiler çalışmanın sonuçlarında ön plana çıkarılmıştır. Aile, eğitim ve iş, kurumlar arası ilişkilerde toplumsal cinsiyet kalıplarının yeniden dönüştürülmesi ve üretilmesi yoluyla kadınların kariyerlerini şekillendirmiştir. Türkiye'de FTMM alanlarında toplumsal cinsiyet eşitsizliği sorununun üstesinden gelmek için kadınların eğitim ve istihdam olanaklarını artırmak ve teşvik etmek amacıyla yapılan politika ve iyileştirmelerin, bu yapısal sorunları bütünsel olarak ele alınmadığı takdirde eksik kalacağını göstermektedir. Türkiye'de FTMM alanlarının yapısı, imajı ve temsili açısından toplumsal cinsiyet bağlamında erkek egemen olup, kadınların daha fazla olduğu alanlarda dahi egemenlik ve avantajlar kadınların eşitlik lehine işletilememektedir.

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