GENDERED ENGINEERING CULTURE IN TURKEY: CONSTRUCTION AND TRANSFORMATION

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ABSTRACT

GENDERED ENGINEERING CULTURE IN TURKEY: CONSTRUCTION AND TRANSFORMATION

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In this study, I aim to understand gendered aspects in professional culture of engineering and its transformation in contemporary Turkey by using a theoretical tool called "Gendered engineering culture".

Deriving from the results of this study, I argue that engineering profession has a prestigious image in Turkey's society. This image has transformed due to economic and political changes. Secondly, engineering profession in Turkey is based on gendered codes and ideals. These codes mainly adress male engineer as the ideal type. Yet, this definition of masculinity has certain limits peculiar to Turkey which values mathematical ability in addition to physical toughness. In addition, findings of this study provide constrasting perspectives from different cohorts of women engineers concerning the change in gendered structure of engineering profession in Turkey. Findings of this study also indicate that gendered engineering culture manifest in engineers' communication styles; belittling jokes, daily language, caricatures, also in gendered job ads, and segregation of certain tasks in work organization which finally affects promotion strategies. The ways gendered engineering culture manifest itself

affects men and women engineers differently; women need to struggle more than men in order to survive in engineering environment.

Key Words: Gendered Engineering Culture, Turkey, Transformation, Engineer, Women.

ÖZ

TÜRKİYE'DE TOPLUMSAL CİNSİYET TEMELLİ MÜHENDİS KÜLTÜRÜ: İNŞASI VE DÖNÜŞÜMÜ

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Bu çalışmada, "Toplumsal Cinsiyet Temelli Mühendislik Kültürü" kavramsal aracını kullanarak, yakın zaman Türkiye'sinde toplumsal cinsiyet temelli mühendislik kültürünün inşası ve dönüşümünü anlamaya çalıştım.

Bu çalışmanın bulguları ışığında, mühendislik mesleğinin Türkiye'de saygın bir imajı olduğu savunulmaktadır. Söz konusu saygınlık, Türkiye'de geçtiğimiz yıllarda yaşanan ekonomik ve siyasi değişimlere bağlı olarak dönüşmüştür. İkinci olarak bu çalışmada, Türkiye'de mühendislik mesleğinin toplumsal cinsiyet temelli kural ve idealler çerçevesinde inşa edildiği öne sürülmektedir. Bu toplumsal kodlar esasında erkek mühendis imgesini Türkiye'ye has bir erkeklik tanımı çerçevesinde idealize etmektedir. Bu tanım, matematiksel beceriklilik ve fiziksel dayanıklılığı ideal erkek mühendislik özellikleri olarak kurgulamaktadır. Ek olarak, bu çalışmanın sonuçları farklı yaş gruplarından gelen kadın katılımcıların toplumsal cinsiyet temelli mühendislik kültürünün değişimi hakkında farklı görüşleri olduğunu ortaya çıkarmıştır. Son olarak bu çalışmada, toplumsal cinsiyet temelli mühendislik kültürünün mühendislerin iletişim biçimlerinde;

küçümseyici şakalar, günlük dil, karikatürler, toplumsal cinsiyet temelli iş ilanları ve işyerinde yükselme stratejilerini belirleyen görevlerin dağılımında tezahür ettiği ortaya konulmaktadır. Söz konusu mesleki kültürün tezahür biçimleri, erkek ve kadın mühendisler için farklı etkiler yaratmaktadır. Bu çerçevede, kadınlar mühendislik alanında var olabilmek için erkeklerden daha çok çaba harcamak durumundadır.

Anahtar Kelimeler: Toplumsal Cinsiyet Temelli Mühendislik Kültürü, Türkiye, Dönüşüm, Mühendis, Kadın.

To my parents, to Dinçer and to the loving memory of my grandmother.

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My mother, my father and until recently my grandmother, shared all those pain and happiness with me. They took care of Toprak. They gave everything they have so that I could study. I do not have enough words to thank them for their support.

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discussed about engineering. He told me about his experiences; he helped me to understand this profession.

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ABREVIATIONS

DSİ	The General Directorate of State Hydraulic Works
MTA	General Directorate of Mineral Research and Expoloration
STEM	Science, Technology, Engineering and Mathematics
TMMOB	Union of Chambers of Turkish Engineers and Architect

CHAPTER

INTRODUCTION

1.1 The Main Thesis

This study is about gendered construction of engineering and its transformation in contemporary Turkey. I focused on the gendered discourse within and about engineering occupation depending on the argument that gendered aspects in engineering are ideological and are based on a complex web of general and particular discourses around traditional gender roles, technical know-how, masculine *hardnes*s and feminine *softness.*

To do so, I introduce a theoretical tool called "gendered engineering culture" which is a modified version of the concept of "engineering culture[1]", created by adding a gender dimension so that I could highlight the gendered features in engineering culture

The concept of "engineering culture" in its original usage was used to describe the socially designed standard of behavior and interaction among engineers and is based on a stereotypical male gender role that works against women, on masculinities which are close to femininity and inconsistent with the ideal engineer stereotype. The conceptual tool of "gendered engineering culture" fits into the first definition with a slight difference: professional culture in engineering

[1] See, Robinson, J.G. and McIlwee, J.S. (1991). Women, Men and the Culture of Engineering. Sociological Quarterly, 32/3, pp. 403-421.

is gendered and it is socially constructed. That is to say that, gendered engineering culture is not only experienced among engineers but also its gendered codes are known, produced and reproduced by the whole society. These codes are based on male-dominated discourses that have been monopolizing the terrain of technological know-how[2]. In addition, it is materialized by the ideological images of 'the real engineer' and "the nature of real engineering job," that tend to restrict the members of the profession into one specific gender role. Thus, gendered engineering culture also shapes common sense expectations and definitions about engineering, which socially constitute the culture of this occupation. This slight modification of the first definiton makes it possible for me to follow the mechanisms behind social definitions that shape gendered imagery of behavioral and interactional codes about engineering, which come into being both for engineers and for the society as a whole.

As mentioned above, gendered aspects of engineering culture are mainly determined by men dominated discourses about technical knowledge production and technical know-how. This situation has been conceptualized by previous literature as a creation of gender blindness, embedded in the dualistic logic which modern scientific inquiries are based on (Harding, 1986;1987). Such a dualistic logic equates men with ability to reason, leads to male domination in positivist inquiry and implicitly suggest women are irrational. Previous literature has also shown that this dualism shapes common sense expectations about men and women (Hacker, 1981; Fox-Keller, 1985; Harding, 1986; 1987; 1991; 2008). It is reproduced in the socialization processes by imputing rational, analytical features with men, and emotional, illogical aspects with women.

[2]See, Cockburn, 1993; 2009.

Within the context of this study, I base my arguments on the feminist tradition which questions the gendered dimensions of scientific inquiry and technology (Harding, 1986; 1987; 1991; 2008; Fox-Keller, 1985, Hacker, 1981; Cockburn, 1985; 1987; 1993; 2009). This tradition questions the so-called neutrality of science, by problematizing the predominance of men in natural sciences. It explores the biases in the processes of choosing and defining scientific problems, the design and interpretation of experiments, and finally the use of language in scientific theoretical formulations (Fox-Keller, 1982 in Harding & O'Barr, in 1987).

Following the tradition above, technology is conceptualized in this study as a medium of power. I argue that historically, there is a material and symbolic relation of power between men and scientific knowledge. Scientific knowledge means power for men because it produces technology to command nature. In line with this argument, it is not surprising to see that during industrialization, men have always been in control of key technologies (Cockburn 1985:9). By the same token, engineers, as the bearers of technical and scientific knowledge, are one of the holders of this power in its symbolic meaning by being valued as scientific authorities.

1.2 Gender and Technology

The gendered construction of engineering is related to technological competence to some extent. The idea of which gender has technological competence and which does not, is one of the determinants of this construction. In terms of technological competence, women and men are unevenly associated with certain roles. Despite the facts in history of technology, men are usually

thought to be producers of technology, while women are accepted to be consumers of it.

In this study, I based my fundamental argument on the idea that there is nothing natural about men's association with technology production. This ideological bond, parallel to gender differences, has been socially developed.

> Men controlled the technological knowledge that governed the instruments of labour and the work processes of other men and women. With the rise of capialism, an economic system based on continual advances in technology, men were thrown into prennial conflict with capital and with each other over the possesion of technological competence and power to use it. Women were actively excluded from technological knowledge, acted upon by the technology and not interactive with it (Cockburn,1985:9).

As mentioned above, I take the knowledge and competence in technology as a medium of power (Cockburn 1981; 1983; 1985; 1987; 1993; 2009). The person who posseses knowledge of and competence in technology has always had a valuable asset. Know-how about making or using tools, brings an amount of power for the owner, not only over materials but also over people (Cockburn, 1985; 1993).

Wendy Faulkner (2000) claims that the dualism between the technical and social, engineering knowledge is associated with technical and it is thought that technique is the core of engineering practice. Following a similar fashion, Faulkner examines various ways in which technology may be gendered. She focuses, "on gender in and of technological artefacts"; "on the durability of masculine images of technology"; "on gender in the detail of technical knowledge and practice"; and "on the place of technology in (some) men's gender identities" (Faulkner, 2000:79). Faulkner's primary purpose is to highlight the feminist technology studies and 'to provide a more

nuanced and politically helpful framework for analyzing the relationship between technology and gender' (Faulkner, 2000:79).

For Faulkner there are two aspects of associating gender with technology:

1. The mutual shaping of gender symbols and technological discourses the use of sexual metaphors to label technological artifacts both reflects and reinforces the message that heterosexuality is the norm; it acts to "naturalize" heterosexual relations. (such as; hard-ware, soft-ware)
2. In terms of prevailing gendered division of labor; the technologies present in the modern household is associated with women, non-routine tasks of home maintenance and gardening are associated with men (Faulkner, 2000:79).

I consider technology in the context of this study as production technologies which is a significant factor in sexual division of labor. That is to say, my direct concern is not household technologies, or reproductive technologies. I take into account that some kinds of technologies are designed mainly for women's consumption, which also leads to a gendered dualism in classification of technologies. In fact, production technologies is also a wide conceptualization; it includes owners, technicians, manual workers and engineers. Within the ones who engage in technology production, the engineer do not only possesses formal knowledge over technology, but also has authority over the worker. Engineers use the power derived from the possession of technological knowledge, yet this power needs to be employed since it produces value for capitalist industry. Thus, engineers are the experts, therefore the possessors of technical power, even though they do not constitute capitalist class.

Related literature suggests the capitalists saw the increasing potential of profit in technological development (Cockburn, 1985; Oldenziel, 2010). Those who had traditionally worked the materials

from which tools were made were able to adapt their skills to the new machine age.

> It was only men, who had the tradition, the confidence and also the transferable skills to make the leap. It was therefore, exclusively men who became the maintenance mechanics and the production engineers in the new factories, governing capital's new forces of production (Cockburn, 1985: 33).

The social process that shaped technological development was a manly populated process. Women were excluded from the social and economic opportunities to become a producer of valuable technologies. In addition, machinery, the engine of capitalist production, did not offer fair opportunites for men and women. Engineering in this construction was accepted as a male profession because, its dynamics were based on masculine tradition and empowered by capitalist relations.

Although there have been very few women engineers since 1930's, acceptence of their existence has been only thirty years and women engineers a place in the labor market recently. It is because of the fact that labor market is a power site too and dominance of men is usually secured in capitalist relations of labor. Cynthia Cockburn argues that the power of technical knowledge provided a privileged position for engineers:

> The importance of that special category of worker that had historically garnered the creative, transferable skills of engineering, the one who uniquely was able to design and control the instruments of labor, owned by the capitalist, that shaped and disciplined the labor processes of the ordinary worker. We saw his contradictory class position. He was the only one whose job and earnings were not threatened as one new machine after another revolutionized the factories. (Cockburn, 2009: 269).

It is pointed in a study by (Canel et al, 2000) that male engineers' privileged position is a reflection of their social class. It is also argued that women engineers who came to factories in the following

years were from middle class positions. Similarly in Turkey, women who can be professionalized were also from middle and upper middle class origins (Bayrakçeken-Tüzel, 2004). Therefore, women could only become engineers if they had certain economic and social capital. These show that the social relations in the workplace are not only capitalistic and two sided but also they are interrelated bearers of class and gender.

As a result of this historical formation, men have always outnumbered women in engineering in the world and also in Turkey. According to Eurostat (2012), full time employed women researchers in science and engineering fields are 31 % in EU countries. Despite their promotion and encouragement in the last couple of decades in Turkey this ratio is 33,4 %. As for the US, according to the labor force status of recent engineering graduates, the ratio of male engineers in the labor force is % 69 in 2012, while the number of women engineers is % 31. In addition, total rate of male engineering graduates is %82. On the other hand, women engineering graduates are %18 (Asee, 2012).

The numerical scarcity of women in natural science and engineering related fields has been a starting point for many pieces of research. Previous literature on the subject matter reveals that multiple burdens for women engineers do exist in engineering education and professional life as a whole (Canel et al., 2000; Faulkner, 2000; 2007; 2009; Mellström, 2002; 2004; Miller, 2002; 2004; Wilson, 2002; Sagebiel & Dahmen, 2006; Jolly, 2007; Cockburn, 2009; Male et al., 2009; Peterson, 2009). These troubles in engineering cannot be seen from the statistics. So, the question concerning the gendered culture engineering is not only about numerical scarcity. The problem has other dimensions that are hidden in historical formations, daily expressions, prejudices and in interaction styles. It comes from the

way genders are learned; it is because of the gendered social structure which is internalized, and it is related to the capitalist relations that maintain and reinforce those gendered bondages. That is why; this study needs to be handled with a gender perspective, so that gendered codes in engineering could be traced through mentioned interactions.

1.3 A Brief History of Engineering Profession and Women

The word engineer is originated from the Latin word ingeniatorem which means mastering in creation (Levis, E.E., 2005:18). "Mühendis" in Turkish is rooted from the Arabic word "Hendese" and refers to the person who deals with geometry (Özçep et al.,2003 cited in Alparslan, N., 2011). Engineer is the person who deals with technique; *techne* meaning ability to perform artistic skill through using logia; science and invdetermined estigation (Levis, E.E., 2005:18). In sum, engineer is the person who deals with technology by using scientific methods such as geometry. Heidegger defines technicque as a way of concealment. Accoding to him, modern technique is determined by the attempt of revealing truth by using scientific summoning. This endevour is is anthropological because it is pursued by man and it is instrumental; because it means to an end (Heidegger, 1977). The ends of technological endevour may not be determined by engineers but these professionals are the human factor in mentioned scientific endevour. Heidegger also mentions that the way modern technique progresses is not only in the hands of man; but it depends on a whole framework of scientific operation that actually categorizes all the energies of nature for reaching to an end.

This end that Heidegger mentions is historically determined by hegemonic interests. Enginering profession, because of its close relation to technology making, is also strictly bonded with industrial

needs. Industrial needs had civil ends but mainly they were determined by military ends. As I will mention in coming parts, military requirements played a crucial role in creation of demands for engineering. Though not simultaneously, men and women entered into engineering profession in order to meet military needs.

When I reviewed the literature about engineering and gender, first sources came up around 1960's. These were mainly magazine articles which presented interviews with women engineers and they were also trials of promoting engineering profession for women. As I went read deeper, I learnt that women became a part of engineering long before 1960. A cross cultural comparison created by Canel et al. show that women were a part of history of technology; in fact they were important agents of industrialization. Women entered into engineering institutions in order to meet new military oriented industrial needs during nineteenth century (Canel et al, 2000). It is also shown in this study that, despite different trajectories, women found new opportunities through war times and they were employed for engineering matters in absence of men. Women found places in engineering industry in Britain around 1919's, in America and in Russia just before and during hot and cold wars; they were also employed in Nazi Germany (Canel et al., 2000:2).

Similar to other countries, engineering profession's history in Turkey is closely related to military production. The engineering profession in Turkey first emerged in relation to Ottoman modernization process. Turkey did not go through a long process of industrialization that would constitute engineers as productive actors. Before the foundation of the Republic of Turkey, the first engineering schools were founded in the 1830s due to the military needs of the Ottoman Empire. Engineers were part of army modernization (Uluçay & Kartekin, 1958:8-9). In this sense, the history of technical education and the need for engineers did not follow a cause-effect relationship

with industrialization. Rather, it was a political decision to form technical schools, since the common idea at the time was adopting western technique as one of the starting points of modernization (Uluçay & Kartekin, 1958:8-9).

Women in Turkey found the opportunity to take place in engineering profession during Republican era. According to Erbatur, one of the first women engineers in Turkey, despite the open invitation to women students, five years after the declaration of the Republic, no women wanted to attend engineering schools. With state intervention and via the support of the media, a year later, in 1927-1928, the first two women students were registered in engineering schools (Gaye Erbatur cited in Naymansoy, 2010: preface).

It is a possibility that women's entering in engineering might have followed a similar path with other countries. However there are no sources telling women's productive role in wartime technologies in case of Turkey. Yet it is official that women began to take part in engineering sectors in the second half of 20th century (Naymansoy, 2010).

1.4 Literature Concerning Gender and Engineering

Previous research indicates that women come across several difficulties starting from choosing engineering as a carrier path and continue when they are employed (Cockburn, 1981; 1987; 2009; Cockburn & Ormrod, 1993; Jagacinski, 1987; Caputi, 1988; Robinson & McIlwee, 1991; Massey, 1995; Evetts, 1998; Higgins & Koucky, 2000; Faulkner, 2000; Mellstrom, 2002; 2004; Miller, 2002, Roberts & Ayre, 2002; İsmail, 2003;

Küskü et al., 2007; Hoh, 2009; Holth & Mellstrom, 2011; Male et at., 2011). According to National Science Foundation, male science and technology workers are likely to be employed full time. Women science and technology workers to be unemployed employed part time or working in the fields outside their degrees (Xie and Shauman, 2003). Married women especially those with children are more likely to leave school and work than are men to continue engineering carriers (Xie and Shauman, 2003).

Although, there are several research projects in order to amend the scarcity of women engineers, the number of women involved in engineering in Europe and elsewhere in the world is increasing very slowly (Isaacs, 2001; Beraud, 2003). Number of women engineers increased only from 17.9 % in 2009 to 189 % in 2012 in the USA (Asee, 2012). Nevertheless, international data (EUROSTAT, 2004) suggests that women now constitute over 20 % of the student body in engineering and natural science subjects across Europe and in the industrialized world (cited in Küskü et al., 2007). Even though the ratio of female students now increased that of male students in higher education in industrialized countries, unequal representation has proven stagnant in the field of engineering (EUROSTAT, 2004 cited in Küskü et al., 2007).

There are very limited studies concerning gender and engineering in/about Turkey. These studies were conducted particularly in 2000's and consider women's underrepresentation in engineering occupations and their coping strategies. It is noted by many authors that Turkey has been successful over the past 75 years in moving from being a society with no female participation in engineering to relatively higher participation than in USA or Europe (Tantekin-Ersolmaz et al. 2006; Bayrakçeken-Tüzel, 2004; Smitha & Dengiz, 2010) yet, many of them highlighted the discrimination women faced

in male dominated occupations (Zengin, 2000; Bayrakçeken- Tüzel, 2004; Smitha & Dengiz, 2010).

Berna Zengin's unpublished masters thesis (2000) examines four dimensions of technology in regard to Cockburn's analysis in 1993. These dimensions are; having access to technology, making use of it, having knowledge of technology and control over technology. It is argued that in each case, women are disadvantaged than men regardless of their class position, race, ethnicity, age or educational background. It is because, knowledge and control of technology is associated with power. This power is mainly in the hands of men. Similarly, "engineering is practicing technical knowledge. Thus, engineers are possessors of know-how of technology." (cited in Zengin, 2000:2)

Since it is a highly technical occupation, engineering is attributed to men and is considered to be a "man's job". Women in Turkey are underrepresented in engineering fields. In addition, women's distribution in engineering fields changes in relation to the type of engineering with respect to gender roles. Some engineering fields are considered to be more feminine, and some are masculine. (Zengin, 2000:5) It is because, women engineers in certain fields cannot find job, since these fields require travelling and it is contradictory with women's social role as mother.

Another study by Zengin in (2002) examines the gendered distribution of students in engineering departments in Turkey. It states that female students in engineering departments in Turkey were 25 % in 1998. However, from a closer look, the distribution of female students in engineering departments does not seem to be even: they are more significantly represented in some departments than others. Areas that can be described as 'masculine' engineering departments and 'feminine' engineering departments have been

formed and the decisions of female and male students in their choices of departments have been affected by this configuration.

In this respect, Zengin groups engineering departments as follows:

> `Masculine' Engineering Departments: mechanical, civil, electrical and electronics, petroleum and metallurgical.
>
> `Feminine' Engineering Departments: food, chemical and environmental. (Zengin, 2002: 402).

From the differentiation made by Zengin, we see that women are concentrated in departments related to women's roles; care giving, food provider, close to nature, while, males choose to study in "masculine" departments. Such segregation indicates that in Turkey, traditional acceptances about gender determine women's choice of engineering.

Results of interviews with 15 women engineers for the course of this study, Zengin concludes that although women deny the existence of discrimination during their education.

> Covert forms of discrimination still occur in the educational institutions of Turkey, such as the tendency to guide female graduate students into those fields of engineering which are viewed as more convenient for women, jokes made by the professors about women's incompetence in engineering and the marginalizing attitudes of male classmates towards female students.(2002: 407).

In regard to engineering education a recent research by Smitha & Dengiz (2010) has been conducted as the biggest cross-sectional study of women in engineering with 800 participants. As for the results of focus groups, women stated math and technical ability and the influence of relatives and teachers in their career selection. "Prestige and income were other major factors motivating women" in their choice). Even though, the university students feel that "their male peers and their professors are not biased against them, they

also perceive a difference in opportunities and lack of role models" (Smitha & Dengiz, 2010: 12).

According to authors, in Turkey, there has been a tendency for female engineering students with PhD degrees to prefer an academic career in a university. The ones in industry or government reported differences in the types of tasks that are assigend to women. In this frame, men are involved in positions with potential while women work in supporting jobs (quality control, analysis, etc.) (Smitha & Dengiz, 2010: 56).

Arslan & Kıvrak (2004) argue that women are wishful to enter the masculine engineering occupations such as civil engineering, but after they entered into industry, they face difficulties with the industry culture and they no longer want to work in this industry (2004: 1384). Based on the results of a research about women engineers in the construction sector, authors summarize the mentioned barriers for women's retention in the industry. These barriers are:

- Responsibilities in family life
- Men's attitude towards women
- Lack of technical knowledge
- Sex discrimination
- Male dominated culture and environment (2004: 1387).

Similarly, Ecevit, et al.'s study (2003) noted the barriers in relation to reconciliation of work and family. Those women in ICT sector have to work very hard and may postpone or cancel marriage because it is too much of responsibility. Another crucial finding of the research is that computer programming occupations created a hospitable environment for women engineers. While there is a hierarchy within

these occupations and women could hardly find managerial positions if they are married and with child (Ecevit, et al., 2003).

Last research to mention is about gendered prejudice and disadvantage in engineering conducted by, Küskü et al. in 2007. Authors' starting point is the "need for research on a wider geographical area; exploring national, cultural and local factors which affect women engineers and their training for entry, retention and progression in the profession" (Küskü et al., 2007:110) . On the basis of this, they indicate that Turkey is a unique case for women because, republican reforms made possible for many women to be professionalized.

> The Turkish case is unique, as the existence of a critical mass of female students in engineering has not altered the taste for gendered prejudice in engineering studies (2007: 120).

Thus the findings demonstrate that the increasing number of women engineers does not provide a prejudice free professional environment. "The comparatively high representation of women in scientific careers in Turkish academia is paradoxically coupled with deeply steeped beliefs that tacitly condemn women to traditional roles." (Küskü et al., 2007: 122). In short, the history of gender and engineering studies in Turkey is not very long. These contemporary researches conducted in/about Turkey note important aspects of gender in engineering profession and they underline possible reasons for women's underrepresentation.

1.5 Studying Engineering from Gender Perspective

In this study, I adopt a feminist perspective because traditional approaches in sociology tend to ignore gender as an explanatory category, and thus reproduces the problem of women's invisibility. Feminist research, on the other hand, encourages the researcher to come out of her *conceptual prison of patriarchal consciousness*[3] and reveal the gender dynamics behind supposedly more apparent social relations.

I adopt the feminist standpoint that requires a continuous attention to be sensitive to operations of gender in all aspects of life, including academic research. It is this reflexivity that enables this study to search for different voices in engineering. This methodology leads to a better understanding of not only women but also men engineers' experiences in a highly gendered occupation. Moreover, I find it crucial to add the main methodological tool as feminist standpoint approach (Hartsock, 1983) in sociological inquiry, by building this study on women and men's experiences with respect to diversities and similarities in these experiences. To do so, I use subjective stories of engineers to examine their experiences. Feminist standpoint provides an epistemological advantage here, since the knowledge from experience is partial, subjective and there is never a claim of impartial truth (Ramazanoğlu & Holland, 2002:66). Without subjectivity, every participant is the same and their gender, class, ethnicity, religion, and culture become insignificant. So do their experiences and personal histories. In regard to such an

[3] Bleier, R. (1989: 199) comments that "Patriarchial consciousness is our conceptual prison. But if we are born into it, and it is all we know, how do we comprehend it as a prison, let alone destroy it for a vision of freedom that is not inherently apparent?". According to this idea, a change in this consciousness enables feminists to claim that the whole stucture of professional science and as knowledge is socially constituted (cited in Ramazanoğlu &Holland, 2002: 45).

epistemological view, this study will be organized around the feminist standpoint.

Parallel to a few studies comparing the experiences of male and female engineers, (Küskü et al., 2007; Bastalich et al., 2007; Faulkner, 2009; Foor and Walden, 2009;) I also argue that within engineering, the workplace culture constitutes a narrow set of masculine norms and is intolerant of diversity. "Within the engineering workplace culture 'women', or anyone who fails to conform to strict codes of masculine conduct, is cast out as an 'outsider' or 'foreign'" (Bastalich et al., 2007:). Thus, it is an important task to understand multiple femininities and masculinities associated with engineering. The constraints and possibilities available to women and men in this occupational field; the ways in which women and men engineers understand engineering workplace cultures; and how they happen to be employed in certain tasks are all significant areas of my research.

1.6 The Promise of the Study

I aim to focus on the way gendered culture of engineering constructed and changed in Turkey. I argue that gendered aspects in engineering are ideological and are based on a complex web of general and particular discourses around traditional gender roles, the relation between genders and technology.

This study is one of the few studies on the relationship between gender and engineering in Turkey. It introduces a narrative based, gender oriented analysis on the relation between gender, natural sciences and engineering careers in Turkey. In addition, there are very few studies comparing women and men engineers' experiences in the world and also in Turkey. The existing literature approaches the issue from the perspective of women's work, because there is a

common tendency to assume that we know all about masculinity. On the other hand, studies that analyze the masculine culture among engineers assert that the common type of masculinity in engineering might be oppressive over some men engineers as well (Cech, E.A. 2002; Cech, E. A. & Waidzunas, T. 2011). Within the frame of this study, I accept that there are several masculinities, and men as well as women are affected by the operations of gender in engineering. Thus, I aim to address experiences of both women and men engineers by using feminist approach.

On the basis of these, I base the backbone of this reseach on four main questions:

1. *In what ways is gendered engineering culture created in Turkey and how does it change over time?*

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This first research question investigates the complexity of factors behind the creation of gendered engineering culture in Turkey with respect to engineering's social image on the societal level. The concept of gendered engineering culture is taken as a composition of social definitions about engineering. It is argued that there is a complex relationship between the gender of engineering and the way it is conceptualized and valued in Turkey's society. On the basis of these creation of gendered engineering culture will be traced through engineering's image on the social level and the factors in its creation.

The possible change in gendered engineering culture is related to the age criterion. This question is closely related to engineering's social image and its impact on engineers' own perceptions. Many studies indicate that the most pursued engineering career is to become a manager who at the same time achieved the respect of other engineers as a result of hands-on experience and technical knowledge. Engineers who achieve the ideal career are experienced

people with long years of field work. This is why I argue that age is a crucial indicator for two reasons: firstly it is significant in understanding the change in gendered engineering culture across time. Secondly, it helps to examine the way engineers experience the change, the way different genders see it within and between different cohorts. On the basis of these, the sample of this study will be divided between two main age groups; participants of 40 age and over and under forty. With this diversification, I aim to compare the possible change in regard to engineering profession.

2. *In what ways does gendered engineering culture manifest itself?*

The concept of gendered engineering culture is a composition of social definitions about engineering, their impact on engineers' own perceptions which usually manifest in thoughts and expectations about ideal definitions about engineering profession. . Thus, for second research question I investigate the ways gendered engineering culture manifests in engineer's own perceptions.

Engineering culture in this dissertation is conceptualized as a set of beliefs and behaviors about the 'deal engineering work' and 'the real engineer' and 'the real engineering job'.
Engineering culture is also comceptualized as depending on three components: one's relation and power upon technology, one's ability to achieve organizational power through engineering knowledge and finally, styles of interaction, which is argued to be masculine. Engineering practice is pretty much organized around what is thought to be the ideal engineering work or the real engineer. These images are argued to be masculine and unfriendly to women's and unfriendly to women and other masculinities that do not suit mentioned idealized forms.

3. *In what ways does gendered engineering culture affect women and men differently?*

The whole idea of creating a theoretical tool to systematically understand the role of gender in engineering depends on the assumption that the engineering occupation is cut out for the male gender role.

Hence, the third question of the thesis is looking for overt and covert deeds, instances, stories, jokes and silences that benefit men more than women in engineering environments by specifically looking at engineering education, job seeking and work conditions of women and men engineers.

Within the course of my pursuit in this study, I interviewed 43 engineers composed of 25 women and 18 men working and living in Ankara. Participants were purposefully selected from different engineering fields and from two main cohorts. Elder cohort was composed of 10 women and 8 men participants; they were with 40 and over age. Younger age group was constituted of 15 women and 10 men engineers who were under the age of 40.

In addition, in order to get a better understanding of gender and engineering relation, I also conducted observation in one big factory and two workshops in Ankara's industrial districts. I believe such information is valuable and it certainly enriched the discussion within this study.

CHAPTER 2

GENDERED CONSTRUCTION OF ENGINEERING CULTURE

The concept of gendered engineering culture in this study, is based on the masculine structure of scientific knowledge production, the gendered dualistic logic attributed to rational thinking and the reflection of these ideologies in designing and consuming technologies. Therefore, the first part of this chapter tackles with the social definitions that determine the gendered aspects of the engineering occupation. The second part focuses on the learning processes of the gendered structuring of male domination in technique as a lifetime process. This part shows that gendered fundamentals of engineering culture are seeded in socialization; maintained and strengthened in university education. Lastly, the proposed theoretical concept of 'gendered engineering culture' is explained in relation to the first two parts.

2.1 Tracing the Basis of Gender in Engineering: Masculinity in Scientific Knowledge, Technology and Engineering

To demonstrate the masculine structure of engineering, this study follows a theoretical path of three steps. Firstly, the feminist critique of scientific inquiry that started during 1980's and that evoked a series of research about technology production and its masculinity will be examined. Then is the discussion of technology as being the practice of science and gender will be done. Finally, the relationship between engineering and gender will be examined.

2.1.1 The Gendered Character of Scientific Knowledge

Feminist scholars have argued that the most crucial features of systematization in natural sciences have been dominated by masculine perspectives coming from masculine experiences (Harding & Hintikka, 1983). They argue that the body of scientific thought which has emerged as the result of masculine hegemony within scientific endeavor is presented by male scientists. Despite its claims of being gender-free, scientific inquiry is pervaded by masculine biases.

In their critique of the existing system of scientific examination, feminist theorists have claimed that a 'cognitive authority' (Laslett et al., 1996: p.1). has been granted to science because of its objectivity (Harding, 1986). Such privilege to science is mistaken because the practice of science, like any other branch of human endeavor, cannot be disembedded from the value systems and implicit biases and ideologies of its practitioners (Harding, 1991, 89). In that sense, since science has been conducted mainly by men, it cannot be neutral from masculine values.

Harding points that science has allied itself to definitions of masculine dominance, which has a role in legitimating scientific authority. According to her, "the epistemologies, metaphysics, ethics and politics of the dominant forms of science are androcentric and its applications, technologies, modes of defining research problems, and conferring meanings are not only sexist, but also racist, classist and culturally coercive" (Harding, 1987: 16). As a result of this, the practice of science, from Harding's point of view is hostile to women.

Harding's criticism reveals that not only the dualistic logic of modern science but also its power to control and legitimize, and create

dominant forms and applications structurally keeps women away from scientific education and practice.

> There is a historical resistance to women's getting the education, jobs available to similarly talented men, also there are social and psychological mechanisms even if the structural barriers are diminished. All these have been justified on the basis of sexist research and maintained through technologies developed out of researches that move to control women's lives from women to men of dominant group. The social hierarchy within science preserves absolute social status: the social status scientific workers hold in the larger society (Harding, 1986:73).

We understand from Harding that scientific work holds a hierarchy based on gender, just like other types of work. Contrary to the sciences' claim of neutrality, women face structural and social barriers when entering into scientific occupations.

Fox-Keller (1985) also follows the traces of the logic of dichotomy in science and argues that the evolution of modern science helped to shape a particular ideology of gender. Although the dichotomies are ancient, the rise of modern science confirmed the equation of mind, rationality and reason with masculinity, while equating sociality and emotion with femininity. According to Fox-Keller, the ideology of modern science provided men with a new basis for masculine self-esteem and male ideology over natural processes. "The scientists, technologists and managers of capitalist societies found opportunities to show their 'superior masculinities'" (Easlea, cited in Fox-Keller, 1985; 64). In addition, as time proceeded, definitions of male and female were differentiated in ways that they were suited to the the division between paid work and home work. Just as it was required by growing capitalism (Fox-Keller, 1985:44, 61).

Awareness of this dichotomous logic in science provides an alternative vision to understand how some concepts, like rationality, were historically equated with men, how women and so called

"irrational men" were *not meant to be* the "maker" of history. Scientific knowledge, which is historically thought to be the power to conquer nature, belongs to men only.

2.1.2 Technology and Gender

Technology production, being the practice of science, is a part of the gendered logic mentioned above. Technology studies assert that technology is socially shaped. That is to say, "technology is an integral part of social infrastructure, organizing and reorganizing the industrial system of production, the capitalist economic system, survelliance and military power; and shaping cultural symbols, practices" (Edwards, 2003:185). This dissertation also asserts that technological structures are conditioned by social factors. Technologies are results of social negotiation and restructuring. Thus, construction of technologies are not objective, they are affected by social groups. These social groups are mainly inventors, developers, investors, and consumers. However, the division of labor between women and men assign them into certain tasks as producer and consumer. The exclusion of women from technology making into the role of mere consumer, leave their mark in the design of technological artefacts (Schwartz-Cowan, 1979; Cockburn, 1983; McKenzie & Wajcman, 1985; Hacker, 1989; Lerman et al., 2003).

Gender is closely interwoven with the way technological processes are accomplished.

> Childhood socialization, adoption of different role models, different forms of schooling, gender segregation of occupations, different domestic responsibilities and historical processes of expulsion have all contributed to the construction of men as strong, manually able and technologically endowed and women as physically and technically incompetent (Cockburn, 1983:203).

As a result of the mutual constitution, industrial, commercial, military technologies are regarded as masculine in the historical and material sense, whereas artifacts and forms of knowledge associated with women are simply not regarded as technology (Cockburn, 1983).

The *hard/soft* split in science and technology plays a major role in the way scientific knowledge is produced and new technologies are processed with respect to genders. The *hard/soft* terminology achieves two significant tasks in reinforcing a gendered division in science and technology. First, it draws distinct patterns of idealized images associated with men and women. Men are supposed to be tough-minded, exceptionally rational, liberated from emotion, good at mathematics, while women are emotional, supposedly irrational, and fragile. In this ideology; computers, scientists and men are hard; children, nurses and women are soft. Hard and soft also have obvious sexual connotations (Edwards in Lerman et al., 2003: 180).

The second task of the *hard/soft* split is to distinguish what counts as the 'real job' in scientific occupations based on the degree of mathematization and technicality the discipline has entailed. Thus, science's legitimacy and *hardness* is related to the management of deploying "a hard cognitive approach, using a technical language, mathematical or logical formalisms, and a technical apparatus" (Edwards in Lerman et al., 2003: 181). For instance, physics is a hard science and sociology is a soft science. Also within disciplines there are hard and soft approaches. As we shall see below, engineering has also *hard/soft* connotations between and within occupations such as; mechanical and civil engineering are regarded as masculine engineering so they are *hard*, while food and environmental engineering is thought to be feminine and *soft* fields with respect to their closeness with mathematics. "Examples of differentiations within a certain branch of enginnering include design

and core production as hard tasks and sales and quality as soft tasks" (Edwards in Lerman et al., 2003: 181).

2.1.3 Engineering and Gender

Cynthia Cockburn's works (1981, 1983, 1987, 1993, 2009) highlights the relationship between technology, engineers as the bearers of technology and the occupations' masculine structure. Historically, women have not failed to enter technology; they are refused. In this view, technology is a medium of power. It is a kind of power that performs in the intersection of capitalist relations and patriarchal relations. Cockburn shows through the history of the engineering union in 19th century, "how technically skilled men (perfectly correct in fearing that women could undermine their position in the labor market) chose the fateful patriarchal route of excluding women, rather than extending to women their organization and their skills" (Cockburn, 1987: 270). According to Cockburn, engineering represents everything that is defined as manly: the control and manipulation of nature, the celebration of physical strength and machine in action, the tolerance and pleasure of dirt, grease, physical risk, heavy work, accidents and cuts:

> Engineering is also firmly embedded into capitalist economy. The atmosphere is competitive, it is about performance … The relations surrounding technology continually renew and extend male hegemony over the rest of us. The growth of industrial technology has to be seen as part and parcel of the historical development of gender difference. It has been formative in the class relations. But it has also been part of what has made males into 'men' and females into 'girls' (Cockburn,1987:129).

The way gender is made and constituted through technology is not independent of capitalism's needs. Capitalism and patriarchy encourage the male hegemony in scientific occupations like engineering.

We can also clearly see from the *hard/soft* split in engineering fields that, capitalism reinforces the ideology of family. For instance, it is argued that food and environmental engineering are associated with femininity (Zengin, 2000) because women's role is to be a nurturing mother or it is related with fertility as in the ideology of *mother nature*. Even though, women are needed in the capitalist market, they are segregated in this market in accordance to patriarchal ideology.

Cockburn's analysisis is crucial for this study because it reveals the gendering of social processes, practices of patriarchy and capitalism, and their manifestations through engineering practice. Engineering has been a male occupation for such a long time that its workplace culture also has masculine aspects. Even though women have been allowed to get into these occupations since 1930's, they are forced to accept/live in the masculine engineering culture in the workplace.

Taking the science-gender critique as the starting point, I argue that engineering represents and contains masculine aspects and these aspects historically have been produced and reproduced by patriarchy and capitalism.

2.2 Engineering Culture as a Lifetime Construction

Gender related issues in the engineering profession have been a scholarly concern for years. Starting from the 1960's, the topic has been examined from different angles. Firstly white, middle class women were the focus of concern; then the numerical scarcity of women; the burdens of being women in a male dominated field; and glass ceiling effect[4] was examined. (Veter, 1980; Finn, 1983; Onaral, 1985; Jagacinski, 1987) Towards the 80's and 90's, studies about

[4]Glass Ceiling Effect "implies that gender (or other) disadvantages are stronger at the top of the hierarchy than at lower levels and that these disadvantages become worse later in a persons career. We define four specific criteria that must be met to conclude that a glass ceiling exists." Cotter, 2001.

women of color and a variety of ethnicities enriched the research agenda (Shenhav, 1992; Byanyima, 1994; Chinn, 1999). Finally, in the late 1990's and 2000's, studies about the issue began to include sexual orientation as the category of analysis and a variety of masculinities has also been a category in them (Faulkner, 2007; 2009; Mellström, 2004; Cech & Waidzunas, 2010).

One common point in these studies is that the engineering profession is mainly conceptualized as a masculine one. This perspective is different from taking the profession as a male dominated. Numerically, it is male dominated but at the same time, it is argued in many studies that engineering has masculine aspects. As a historically male dominated profession, engineering has a specific masculine culture that has its values, norms and styles of discourse and relations of power behind them. It is also a self-serving male dominated work culture, that is maintained and recreated through day to day interactions (Cockburn, 1981; 1987; 2009; Cockburn & Ormrod, 1993; Jagacinski, 1987; Caputi, 1988; Robinson & McIlwee, 1991; Massey, 1995; Evetts, 1998; Higgins & Koucky, 2000; Faulkner, 2000; Mellstrom, 2002; 2004; Miller, 2002, Roberts & Ayre, 2002; İsmail, 2003; Küskü et al., 2007; Hoh, 2009; Holth & Mellstrom, 2011; Male et at., 2011).

Another common point in these studies is that there is a specific 'engineering culture' in the workplace and its norms are learned at the university. The rules of engineering culture provide the blueprints of how 'real engineers' should be and how 'real engineering should be done' (Jolly, 2007). Therefore women who are conceived as being non-technical, emotional and non-inventive or any masculinity which is thought to be close to femininity are not welcomed in the engineering occupation.

The approach of this study is a combination of theories of gender socialization and structural perspectives based on an argument that 'gendered engineering culture' is the socially defined standard of behavior and interaction among engineers, which is identified with a stereotypical male gender role, that it works against women and some other masculinities that are inconsistent with the stereotype, and is manifested through daily patterns of interaction (Robinson & McIlwee, 1991). Before defining the conceptual tool that is going to be used in this research, it is important to note the gendering processes underlying engineering culture, namely; childhood socialization, schooling and workplace.

2.2.1 Childhood Socialization as a Gendering Process

Socialization constructs links between genders and technology. Such links carry different expectations for men and women, which are outcomes of the breadwinner ideology (Haines & Wallace, 2003). This ideology keeps women at home with unpaid domestic work, while men are allowed to be in the public sphere to create monetary value. Different expectations create different tools for each gender's tasks. As women stay at home, technologies related to domestic work are associated with women, such as washing machines or vacuum cleaners. Men, on the other hand, even while staying at home, are responsible for the technical know- how of machines. In this imaginary picture, women are the users; men are the makers/repairers. The picture is also consistent with the way capitalism works. Even if women participate in the labor market, they are still stuck within the breadwinner ideology and are mostly regarded as the targeted consumer rather than the producer. This sexual division reflects the patriarchal relations that are integrated into whole social system (Wacjman, 1998).

When children are born into this pre-designated world, the first time they engage with technological tools, the gender of the artifact is already formed. A child learns predesignated rules as the father uses the screwdriver and the mother cleans the house. This immediate knowledge in early childhood is the link between gender and technology. Thus with socialization, children learn how to be a man or a woman. They also learn which technology they have permission to engage in with respect to their genders.

Observation of mother's and father's space at home and technological devices attributed to them, through distribution of toys, clothing and the nature of the games that are preferred for boys and girls is a part of socialization. Games with mechanical toys like guns, trucks, cars are reserved for the boys, while dolls, doll houses, toys of cleaning equipment are for girls. Boys' games are mostly designed to take place outside; girls can play at home (Cockburn, 1987). Moreover, boys' toys encourage them to be assertive and independent, to solve problems, experiment with construction and make them more familiar with technological aspects. They also have the opportunity to experience hands-on tinkering because of the nature of boys' toys. In contrast, girls' toys, for instance dolls, refer to different skills which are associated with caring and mothering (Wacjman, 1994). Furthermore, girls are expected to help with household tasks, which is far from creating technical confidence and competence.

This socially constructed absence of competence in girls and confidence in boys are transferred into gender stereotypes that are compatible with the ongoing patriarchal system. Conceptualizations about genders is not biological, we learn about gender identities as our socialization teaches us. "These gender identities, are the internalization of the gender differentiated behaviors, expectations, and norms that exist in our social environment" (Bem, 1993).

2.2.2 Schooling as Maintenance of the Gendering Process

Constant bombardment about what it is to be a man and to be a woman continues in school life. Expectations about gender identities are varied in schooling, as courses are classified according to gender. As mentioned previously, boys are encouraged more than girls to solve problems, which lead to a familiarity with analytical and technical subjects for boys. Thus, there is a common perception that boys are good at mathematics and science related courses while girls are afraid of math (Cockburn, 1985; Cech, 2005). This crude classification is important because, it implies that boys have the ability to think analytically, therefore they are rational, and girls cannot follow an analytical path and are not accustomed to solving mathematical problems. This could be read in two ways: first, that a boy is not good in mathematics does not necessarily imply that he is not capable of rational thinking. Second, there are many girls who are also good at maths and science related subjects. As a result, this common tendency in schooling requires young individuals to identify themselves with certain kinds of topics, which have different connotations and values for different genders in the social life.

2.2.2.1 Math, Science and Engineering:

Moreover, excellence in math and science is taken as the primary requirement in choosing an engineering major (Hacker, 1983; McIlwee & Robinson, 1992; Nauta et al., 1999; Siann & Callaghan, 2001; Zengin-Arslan, 2001; Baker et al., 2002; Kent & Noss, 2002; Bradley & Charles, 2003; Cech, 2005; Hartman & Hartman, 2007; Sonnert et al., 2007; Amelink & Creamer, 2010). As Hacker puts it, in the pursuit of an engineering credential, math is the critical filter (Hacker, 1983 cited in Robinson and McIlwee, 1991). As males are

more associated with math, engineering seems to be a "natural" choice for men. The engineering profession is identified with the male gender role; the engineer is the problem solver, is good at mechanical activity. On the other hand, women can choose engineering if they persist in math and if they have supportive parents, family members who are engineers, or a role model who encourages them to choose this male dominated profession (McIlwee & Robinson, 1992; Nauta et al., 1999; Zengin- Arslan, 2002; Amelink & Creamer, 2010).

Studies show that in choosing engineering as a major, students are resegregated in terms of their gender because some fields of engineering are more male populated. Zengin's work (2000) shows that women's distribution in engineering fields change. Some engineering fields are considered to be more feminine, and some are masculine (Zengin, 2000:5). This is because, women engineers in certain fields cannot find jobs, since these fields require travelling, heavy, dirty tasks, which is supposedly contradictory with women's stereotypical social roles.

Zengin's study shows the situation in Turkey. Students enter university through an exam with an anonymous ID code. So students, whether men or women, can enter any field they choose if they have enough points for engineering departments. The results of Zengin's research show that anonymous university entrance system does not change the resegregation in engineering fields at university level. This is an indicator for patriarchal values internalized by women and men students that affect their career choices.

In addition, it is not surprising to see that core engineering fields such as mechanical and civil engineering are dominated by men. Women are mostly in departments of rather new branches of engineering which suit women's gender role such as food engineering. This fact indicates that even if women manage to enroll in

engineering, they face difficulties, especially if they are at one of the core departments.

2.2.2.2 Learning the Codes of Engineering Culture:

Many studies indicate that students learn the codes of masculine culture of engineering at the undergraduate level (Hacker, 1983; McIlwee & Robinson, 1992; Nauta et al., 1999; Siann & Callaghan, 2001; Zengin-Arslan, 2001; Baker et al., 2002; Kent & Noss, 2002; Bradley & Charles, 2003; Cech, 2005; Hartman & Hartman, 2007; Sonnert et al. 2007; Amelink & Creamer, 2010). It is argued that university education emphasizes competence in math and engineering theory but the workplace is oriented towards application and requires hands-on skills. Thus, university education fails to compensate for each student's lack of mechanical experience although it is the most demanded skill in the work life. This difference leads to different cultural codes in different periods of engineers' lives. University education might be rewarding for most of the students regardless of gender since academic performance plays a significant role. "The definition of a 'good engineer' emphasizes academic over technical skills but it still is defined by the culture that prevails at the department. In the university, the group with the most power in number shapes the codes of the culture" (McIlwee & Robinson, 1992: 50) This culture becomes more visible in the way male students get more credit at practical courses, and as they create formal and informal male social networks (McIlwee & Robinson, 1992; Baker et al., 2002; Hartman & Hartman, 2007; Amelink & Creamer, 2010).

The codes of engineering culture are also framed by faculty members. Results from studies about undergraduate women engineering majors have shown that discouragement from faculty and peers leads to

dissatisfaction and a withdrawal from engineering (McIlwee & Robinson, 1992; WECE, 2002 cited in Amelink and Creamer, 2010). Here, the underlying point is not the hostile attitudes of instructors towards minority genders. The mentioned result in related research noted that faculty members' behaviors are unrelated to gender.

> An academic situation neither encourages nor discourages students of either sex is inherently discriminatory against women because it fails in taking into account the differentiating external environments from which women and men students come … professors do not have to make it a specific point to discourage their female students. Society will do that job for them. All they have to do is to fail to encourage them. Professors can discriminate against women without really trying (Freeman, 1979: 221).

The argument above fits well with engineering majors. The same behavior of a faculty member might cause discouraging affect on minority genders. Sex composition of the engineering classrooms might be another crucial factor for lack of self confident for women students (McIlwee & Robinson, 1992: 60).

Another point about faculty members is an unspoken attitude of treating women engineering majors differently. Ignorance of faculty members is another factor for doing gender. Ignorance does not mean that genders do not exist in the classroom; it causes discomfort for women engineering students (Robinson and McIlwee, 1992).

As Cech and Waidzunas argues male engineering students are not familiar with the feeling of discomfort and the need to be careful all the time. Covert or hidden, any kind of gendered behavior is felts by students of minority gender. As for LGBT individuals, the engineering environment is also argued to be a hostile one (Cech & Waidzunas, 2010). Although there are very limited resources on this topic, existing studies claim that engineering culture is not only masculine but also heteronormative. Several gay men asserted they are experiencing pressure to conform to a straight male breadwinner

model. Also for bisexual and for lesbian women the stereotypical image of "white, straight male engineer" is difficult to cope with (Cech & Waidzunas, 2010: 15). "Experiences of LBGT individuals reveal the nature of engineering culture with a reduction" (Cech & Waidzunas, 2010: 15). The reduction lays the codes of engineering that have originated from a rather primitive classification of sexes. It is based on male/ female dualism, just as this ideology mutually accommodates with many other dualisms like, rational/ irrational, analytical/emotional, public/private, work/domestic work and so on. These norms of engineering culture isolate and pressure gender minorities to conform to the dominant hegemonic. In order to cope with this pressure, many women and LGBT individuals choose to hide their femininity and identities. They adopt masculine features in order to persist in the occupation (Ranson & Revees, 1996; Bix, 2000; Foor & Walden, 2009; Cech & Waidzunas, 2010).

These examples obviously show that engineering education is functional in producing the image of the real engineer by reproducing this image for the sake of occupational culture. Thus, the education process is a continuation of childhood socialization in that it ensures the maintenance of stereotypical gender roles and it is a preparation period for work life.

2.2.2 Maintaining and Reproducing the Gendering Process in the Workplace

When we look at the studies focusing on work life experiences of engineers, we notice that gender minorities working in different industries of engineering have different career patterns. In other words, occupational outcomes are not just a matter of personal qualities, they are also shaped by the relations of power and resources people find in the occupational structure (McIlwee and Robinson, 1992:109). This part examines the structure of the

engineering workplace in terms of career paths provided for different genders and the social interaction styles, which ensure the maintenance and reproduction of patriarchal aspects in engineering culture.

2.2.3.1 Structure of the Engineering WorkPlace

Previous research indicates that occupational market for engineering is segregated with regards to gender. Fields of industry welcome men more than women. For instance; mining, mechanical, and metallurgical engineering accepts more men, while on the other hand, industrial, environmental and food engineering employ more women.

Fields of engineering are grouped according to departments in engineering firms. Engineering practice tends to be divided according to departmental tasks such as production, research and development, sales and quality. These divisions not only determine the nature of the job, they also create a hierarchy among engineers. Despite varieties among fields, real engineering practice is conceived as including tasks that need hands-on experience at the core of the production process, or being the brain of production such as coding and design of computer programs. Other divisions in the firms such as management, sales, quality and organizational departments are not seen as real engineering. Accordig to Miller, “management, is special and constitutes the image of the ideal engineer who has years of hands-on experience before becoming a manager with practical competency” (Miller, 2004:56).

The example shows that the technical aspect of the issue is extremely important to gain respect; without technical experience even managers are not accepted as engineers.

Departmental divisions in firms refer to the sexual division of labor as well. Women in engineering firms are generally operators; their role is

output not input (Cockburn, 1985:143). If women graduate from male engineering fields and persist in working in the related sectors, firms tend to manipulate women towards quality and organizational tasks, which are not accepted as real engineering practice. The doors are open to female engineers but "they find themselves confined to 'female ghettos' "(McIlwee and Robinson, 1992: 82); they receive lower pay and status, and carry on shorter career paths. Since departments of core engineering practice are mainly reserved for males, so is the potential respect from other colleagues because of technical competency. This situation shows that the engineering workplace creates structural barriers and limited resources for women engineers.

The reasons behind this hostility are gendered prejudices diffused not only within engineering culture but also among the labor market and in the minds of the employers. The employment structure of engineering firms is based on gendered prejudices (Rothschild, 1983; Cockburn, 1985; 1987; 1993; Wacjman, 1998; McIlwee and Robinson, 1992; Oldenziel, 1997; Faulkner, 2000; 2009; Miller, 2002; Logel et al., 2009; Male et al., 2009; Watts, 2009). These prejudices or misperceptions determine the way tasks assigned to each gender and the whole gender ideology hegemonizes the workplace culture (Miller, 2002:153).

Employers tend to think that women are above all mothers. They may need to take one or more career breaks, and because of family responsibilities they may not be able to take business trips as much as men do. Those who do participate in business trips face problems of different sort.

> When you go to the field you don't take a purse because you are really rubbing female helplessness thing in and you put all your junk- the feminine hygene stuff- in your little pockets. Another thing you do when you work downtown is you wear

> wide skirts because sometimes you are going to be going to the field in the afternoon. And you can wear high heals in the office but keep a pair of flat loafers there. I always wore skirts to the office, never pants (cited in Miller, 2004:55).

This quotation points to the complexity of sex-gender system in the work environment. Carrying a purse is an indicator of helplessness. On the other hand, women are expected to be feminine at the office but masculine when they go to the field.

Gendered prejudices do not work only against women. Men who wear atypical clothes, perform effeminate ways of interaction also experience isolation or gossip based on gender even if they are heterosexuals. Miller (2004) suggests that engineering values are based on a kind of alpha male behavior. “The alpha is considered to be tough, aggressive, competitive and masculine, and men who do not correspond to this hegemonic form of masculinity may have problems in the workplace” (Miller, 2004: 58). In addition, LBGT engineers also suffer from the prejudices which are based on heterosexual man stereotype. (Cech and Waidzunas, 2010: 15).

Gendered stereotypes in a male dominated occupation create big troubles for minorities of the field. As it can be seen from previous research mentioned above, engineering culture is inherently patriarchal. Its codes, values, type of respected work and even clothing are determined through a masculine system of control and reproduction. Rules are maintained as the minorities try to adapt by hiding femininities or covering up homosexualities, and these rules are reproduced while gender minorities are assimilated in the dominant culture.

2.2.3.2 Gendered Interaction Styles in the Workplace

Styles of interaction are indicated as specific features for engineering research because engineers build daily conversation topics out of work related material. (Miller 2002, 2004; Faulkner, 2007; 2009; Watts, 2009; Cech & Waidzunas, 2010). If engineers do not talk about work, the conversations are technology-oriented because the rules of being a "real engineer" require being attached to technology as leisure time activity.

Gendered perspectives can be frequently found in non-work topics of conversation (Faulkner, 2009). Predictably, some conversations reflect stereotypical men's interests such as football and cars. Family is indicated as another gender related topic which highlights the male breadwinner model and the straight male figure in engineering. These masculine discourses are enacted through everyday interactions; they serve to sustain the gender system (Acker, 1992). Studies note that the company culture is gender normative, the stories people exchange about their private lives are heavily family-centred, and this can serve to silence and marginalize those who do not have children. In addition, generally the culture is heteronormative; most people are not openly gay (Faulkner, 2007; Bilimoria & Steward, 2009; Cech & Waidzunas, 2010).

Exclusion from informal work-related networks has been noted by many scholars to be a significant factor in women's exclusion from higher positions (Robinson & McIlwee, 1991; Watts, 2009; Schafer, 2006; Faulkner, 2007; Bastalich et al. 2007). Socializing, such as interaction during smoking break, football matches or playing golf, is a very important part of engineering culture. Although women are now nominally allowed to participate, there are few who do:

> So much of that industry happens on a very informal basis and you know, I have absolutely no interest in the world of playing golf. And the Petroleum Club and the golf course are not places that I'm going to be, and unless I'm willing to do that, the odds of me ever getting anywhere in the oil industry are minimal (cited in Miller, 2004:54).

It is obvious from the findings that male culture in engineering is constructed and maintained through formal and informal social networks. Even though these activities are not restricted for women, they do not prefer to go or they simply cannot because of family responsibilities. On the other hand, these social networks contain conversations and discussions about work; women remain isolated from such informal work-related topics.

In addition, many studies indicated that humour is an important aspect of engineering culture. Gendered jokes which object women engineers as incompetent are usually noted by these studies. (Drybourgh, 1988; Robinson & McIlwee, 1992; Faulkner, 2007; 2009; Bilimoria & Steward, 2009; Cech and Waidzunas, 2010). It is also asserted that most gender minorities do not take the jokes seriously but this behavior is something men do not have to deal with as long as they are percieved as good engineers. Humour in the workplace is not only a way to culturally inherit dominant values but is also listed as a system of control. By making jokes about female sexuality, men spread the hegemonic norm throughout the group; on the other hand, these norms function as a control mechanism.

2.2.3.3 Balancing Strategies

So far, engineering culture has been discussed as a male-friendly system of behaviors and values among engineers. This system is argued to be interconnected with childhood and education experiences that are highly gendered. These gendered experiences and the structure of the market and engineering sector, are favorable to heterosexual males more than women and men of other masculinities. In this environment, gender minority engineers adopt balancing strategies in order to cope with engineering culture.

Women tend to hide their femininity and sometimes adopt masculine ways of conduct. Especially, to be promoted, women need to adopt masculine patterns. Traditionally men have been seen as better suited than women for executive positions. The qualities usually associated with being a successful manager are 'masculine' traits such as drive, objectivity and an authoritative manner. As a result, many studies indicate that women suffer from the *glass ceiling* affect; in other words, unseen barriers against women's promotion to executive positions (Wajcman, 1998:55).

In order to keep the work-family balance, sometimes women postpone or cancel marriage (Ecevit et al., 2003). Married women, if they have children, have to recognize that work–life balance is a dynamic process. Claiming that for them a good work–life balance is achieved by mentally shutting off from work when not working (Watts, 2009:50).

As for LGBT individuals, a person may be required to adopt the strategy of "passing"; i.e., being careful about not revealing his or her sexual orientation (Cech & Waidzunas, 2010:10). Culture of engineering may create 'passing demands' which require LGBT persons to remain closeted (Cech & Waidzunas, 2010:21). In the case

of LGBT persons, engaging in covering behaviors involve concealing and downplaying cultural markers typically associated with an LGBT identity, including discussions of same-sex relationships, expressions of gay culture, or displays of same-sex affection. LGBT individuals, in other words, can use passing and covering tactics to negotiate the visibility of their stigmatized identity (Cech & Waidzunas, 2010:24).

2.3 'Gendered Engineering Culture' as the Proposed Theoretical Tool

Since gender and practices of the capitalist labor market condition women's work, women can not benefit from the channels that are mainly secured for men. They come across barriers; they mainly do not have access to certain opportunities. Although sex segregation is not the main focus of this study, I find Nicholson's (1996), categorization very helpful in regard to gendered culture in engineering. Nicholson categorizes sex segregation in the workplace into three groups. First one contains *overt* structural barriers. These are related to organizational structure and arrangements; they are visible. Second category is *covert* barriers, such as the exclusion of women from male networks and prejudices against women. The final category is the unconscious psychological impact of gendered organizations on women's motivation and self- esteem. (Nicholson, 1996:103)

I would like to modify Nicholson's model. I take gendered engineering culture instead of sex segregation and I use the categorization as a gendering process starting from childhood and maintained through practices in employment. According to this, gendered culture in engineering functions through processes during faculty years, job search and through the workplace.

Nicholson's three dimensional barriers are diffused in these employment processes in a variety of forms. One category of barrier might be more effective for one process and less for other, but both types of barriers and processes are interdependent. For instance, overt barriers might be effective while choosing a career in technical profession. Full time employment in a technical profession takes time and puts responsibilities on women. Since women are still regarded as primarily responsible for household activities and child caring, choosing a technical profession seems to contradict existing family roles.

Covert barriers might also be seen in the university system such as the association of male students with mathematics and female students with social sciences. As mentioned, even the type of engineering differs according to gender. Professions like food and environmental engineering are crowded with women students, because they are considered a women sort of technical profession (Zengin, 2000).

When women engineers are employed, they suffer from prejudices in professional life. Gendered culture, in the context of engineering, does not only disadvantage women, it also excludes non-mainstream masculinities, since the meanings, appearances and interaction styles of 'the ideal engineer' are taken to be the norm. It is also important to notice that work life is one of the main realms of patriarchal practice; it is also a continuation of childhood socialization and school relations. On the basis of these points, gendered engineering culture is taken as the socially defined standard of behavior and interaction among engineers and it is based on ideal definitions of *engineering work*, the *real engineer* and the *ideal engineering career.*

2.3.1 The Ideological Basis of Gendered Engineering Culture

With regards to the literature about engineering culture, I propose that the concept of "gendered engineering culture" is constitutive of idealized definitons of "engineering work", the "real engineer" and the "ideal engineering career". Besides gendered engineering culture is composed of three components through which the manifestations can be traced. These are the ideology of technology, organizational power and gendered forms of interaction (Robinson & MCIlwee, 1991: 405-406).

2.3.1.1 'Engineering Work'

Engineering work is defined as dirty, heavy, and open to physical risks. Prioritization of work/workplace is the norm, and the real engineer has unlimited time to spend at work, to stay late at the office, travel for meetings or to the field, and personal/family interests have to fit in these norms (Robinson & McIlwee, 1991; Brand & Kvande, 2001; Bond et al., 2002; Rapoport et al., 2002; White et al., 2003; Bastalich et al., 2007; Küskü et al., 2007; Watts, 2009).

2.3.1.2 'The Real Engineer'

The "real engineer" is argued to be rational, a problem solver, someone who has hands-on experience in mechanical devices, who gets pleasure from the technical work both at work and during leisure time. The real engineer is a perfect fit for the before mentioned 'engineering work' and these two stereotypical images together draw the frame of 'engineering culture'. (Robinson & McIlwee, 1991; Brand & Kvande, 2001; Bond et al., 2002; Rapoport et al., 2002; White et al., 2003; Bastalich et al., 2007; Küskü et al., 2007; Watts, 2009)

As it can be seen, a 'real engineer' has to be a man, or a woman who leaves her femininity at home. She also better not be married and not have family responsibilities that would interrupt long workhours. If she does, she should accept being out of the competition, because she may not be able to travel or may need a maternity leave.

In addition to stereotypical connotations about female physiology, everyday interactions are characterized by informalism and paternalism based on shared masculine interests that exclude women from power; individualistic competition combined with a dominant engineering occupational culture effectively reinforces the division of work by gender and gendered interactions (Miller, 2004).

2.3.1.3 'The Ideal Engineering Career'

The ideal engineering career goal is to become a senior engineer and achieve a role in management. Senior engineers are mainly the managers who are also the idols of freshmen and middle-ranking engineers. 'Seniors make more money; they have authority in addition to hands-on experience. Hands-on experience in engineering work is still important at the senior level; it is a matter of respect and the sign of technical talent. The ideal engineering career' shows the importance of seniority. This implies that age, in addition to gender might be a significant factor in understanding gendered engineering culture (Miller, 2004).

2.3.2 The Components of Gendered Engineering Culture

With respect to studies concerning gender and engineering, 'gendered culture of engineering' can be best traced through the examples of practices and modes of thought that effectively constitute a 'hidden curriculum' in which women and people with mismatched profiles are produced as 'not-engineers', and in which the exploitation of others, and the failure to notice the exploitation of others, is normative. This hidden curriculum lies in the rituals of day-to-day conformity: the forms of talk, gendered interaction styles, topics of conversation, humor and social networks, modes of dress that signal one's belief in the culture. It is also argued that a number of gender exclusive dynamics and practices within the engineering workplace culture manifests themselves through fraternal markers of familiarity and bonding, the use of the generic 'he', conversations dominated by men's interests, offensive humor and sanctions against those challenging these interests, heteronormative and sexualized culture, pressure to conform to particular masculinities, and organizationally powerful networks of men (Robinson & McIlwee, 1991; Cockburn, 1987; 2009; Cockburn & Ormrod, 1993; Oldenziel, 1997; Brand & Kvande, 2001; Bond et al., 2002; Rapoport et al., 2002; Mellstrom, 2002; 2004; White et al., 2003; Bastalich et al., 2007; Küskü et al., 2007; Tonso, 2007; Watts, 2009; Faulkner, 2000; 2007; 2009).

I argue that this culture has three components: the ideology of technology, organizational power, and gendered forms of interaction (Robinson & MCIlwee, 1991: 405-406).

2.3.2.1 The ideology of Technology

This concept emphasizes the centrality of technology, technical knowledge and hands-on practice as the core of engineering. Cockburn examines four dimensions of technology (1993). These dimensions are: having access to technology, making use of it, having knowledge of technology and control over technology. It is argued that in each case, women are more disadvantaged than men regardless of their class position, race, ethnicity, age or educational background. It is caused by the fact that knowledge and control of technology is associated with power. This power is mainly in the hands of men. Similarly, "engineering is practicing technical knowledge. Thus, engineers are possessors of know-how of technology." (Zengin, 2000:2)

Engineers are thought to be the bearers of technical knowledge, which includes not only abstract and innovative tasks, but also hands-on activities both in and outside the workhours. This emphasis on the craft aspects of the work relates to the kinds of workplace control engineers hold. The technology component also refers to the childhood experiences and constraints of women and men and the way genders are attached to technology.

2.3.2.2 Organizational Power

Organizational power is the acquisition of administrative power to achieve engineering success. The culture of engineering emphasizes technology's centrality in the workplace, and thus, the importance of engineers as its producers. Combining management with technological involvement is perceived to be the ideal position for an engineer's career. In order to achieve this ideal, one has to adopt long

hours of work and the priority of the workplace, combined with technological competence.

2.3.2.3 Gendered Forms of Interaction at School and in the Workplace

These forms of interaction are based on an interest in technology and organizational power, which is to be presented in an appropriate form closely tied to the male gender role. To be taken as a 'real engineer' one has to look, talk and act like an engineer. This image is closely related to the male gender role: using tools and tearing apart machinery, joining the interactional display against women through sexual jokes, stigmatizing, connotations that undermine women's technical competency, and equating professionalization with masculinity. Gendered forms of interaction also contain social networks and conversations between male colleagues that are dominated by men's interests.

On the basis of these ideas, this thesis also argues that the ideal conceptualizations in engineering culture and its components may be taken as a model. This model provides a systematic stance towards gender relationships in the engineering workplace while it also helps to take a broader look at women and men's relationship with technology and its extensions on their careers.

Concluding Remarks

This chapter presented as an explanation of the main theoretical approach in this dissertation. Within this frame, gendered engineering culture is based on patriarchal ideology that equates males with rationality, objectivity and assigns them as the ultimate producers of objective knowledge. They are conceived as problem

solving, analytical-minded individuals whose qualifications are consistent with their sexes. Engineering, as being the occupation of producing out-of-scientific facts, is clearly attributed to the male gender. Codes of such a discursive constitution can be seen in the gendering of children and segregation of toys and games. Later, it can be found in the separation of courses at school with stereotypical judgments such as 'boys are good at mathematics, while girls are good at social sciences'. Engineering education, as a matter of fact, draws the persona of "the real engineer" model by teaching the conditions of 'real engineering work. These categories are so suitable for the socially imagined male characteristics that the socially idealized women characteristics usually do not fit in. Moreover, the real engineer model is heterosexual. It overtly excludes gays or any kind of feminine behavior.

CHAPTER 3

METHOD

In this research, I deploy a feminist analysis of the gendered culture of engineering framed by qualitative research methods. My perspective takes off from the critical tradition which questions the gender of natural sciences and technology. (Harding, 1986; 1987; 1991; 2008; Fox-Keller, 1982; Hacker, 1981; Cockburn, 1985; 1987; 1993; 2009). It is a tradition that interrogates the neutrality of science by bringing evidence of the predominance of men in sciences, the biases in the choice and definition of scientific problems, the bias in the design and interpretation of experiments and finally the power of language in biasing our theoretical formulations in science (Fox-Keller, 1982 in Harding & O'Barr, in 1987). Hence, this study neither offers a universal truth nor relies on a grand theory to explain the gender- engineering relationship.

Following the criticism above, I argue that historically, there is a material and symbolic relation between power and men and scientific knowledge. Scientific knowledge means power for men because it produces the technology to command nature. In line with this argument, it is not surprising to see that through industrialization and modernization in the West and other parts of the world, men have always been in control of key technologies (Cockburn 1985, chap. 1). Thus, technology is conceptualized in this perspective as a medium of power. Engineers on the other hand, as the bearers of

technical and natural scientific knowledge, are also the holders of this power.

The feminist debate on the relation between gender and engineering can be considered as an extension of the discussion about gender and science. This discussion is a destructive and radical questioning of a deep rooted masculine tradition in science, philosophy and epistemology (Harding, 1986). It digs beneath the attribution of all scientifically valuable and productive notions only to men. Rationality, objectivity, analytical thinking, being good at mathematics are only some of these attributions. Following this tradition, feminist studies of science and technology assert that technology and its production by engineering as being the practical field for natural sciences, is secured for men, too. As a result, women who want to enter into natural science and engineering careers are faced with structural and discursive barriers both in their education and work lives (Cockburn, 1983; 1985; Cockburn and Ormrod, 1993; Haraway, 1989; 1991; Harding, 1986; 1991; 1993; Fox-Keller, 1985; 1993).

A contemporary article by Uden (2009), states that gender studies in engineering need to take feminist understandings into consideration regarding engineering practice so that they can be meaningful. Uden mainly refers to laboratory settings and human–machine interfaces. This huge area includes civil engineering, energy production, mechanical engineering and more, but has hardly been addressed in feminist writing on technology. According to Uden, previous researches on engineering focus on language or social construction, which makes it impossible to address the core practices of engineering. Thus, laboratory settings and the knowledge produced in there is situated and it is generally male. Feminist engineering needs agency to fill in these situated experiences with numbering of women into core practices of engineering (Uden, 2009).

With the feminist intervention, I believe, in gender and technology studies *the engineer* will be no longer be "he", additionally not European and not a crystallized form of modern values and dualities. On the basis of these issues, in this chapter I shall elaborate on the steps of the research process from research design to the story of the fieldwork. In this scope, this chapter is organized in four sections: a theoretical perspective on research methods, the design of research, background information about the industry in Ankara and the story of the fieldwork.

3.1 Theoretical Perspective on Research Methods

One of the respondents told me that "where you stand depends on how far you are deceived by society"[5]. Society tells us many narratives about who we are and who we are not. Gender is one of those narratives that we hear from the moment we are born and it never falls silent. It categorizes and expects certain behavior; we internalize the suggested roles. Just like the participant explains, who we are depends on how much we believe in what society tells us.

Departing from this point, I argue that critical position of feminist research shakes the gendered narratives of society. This is why the feminist stand itself is political. It craves for change and criticizes already existing structures. I believe this study would only have material projection with feminist knowledge because culture of engineering requires a critical eye to understand and serve for possible changes.

Classical sociological perspectives have certain limitations, especially the ones whose purpose is to reveal the objective truth about social reality. Feminist methodology challenges traditional epistemologies

[5] "Nerede durduğun toplumun sana söylediklerine ne kadar kandığınla ilgili". Aslı, Mechanical Engineer

which systematically ignore women in the name of objectivity and essential truth. The claim of obtaining universal truth, objectivity and value neutrality was challenged by feminists (Hekman, in Harding (eds.) 2004). According to this criticism, although science is historically presented as value neutral and objective, all research is ideological since no one can be separated from their values, opinions, and from the relations we are grown within. It is the social context, the nature of social relations, relations of production of the time that makes us who we are; we are born into this complex construction and it is all we know. In this sense, objectivity is never possible.

For the course of this research, I take a critical position to claims of objective knowledge and values subjectivity which "implies partial, personal, intuitive knowledge that comes from the consciousness of a knowing subject situated in a specific social context" (Ramazanoğlu and Holland, 2002: 52). Such an alternative knowledge is personal and grounded in participants' experiences, ideas and words about themselves to produce useful knowledge for political change. Obviously, it does not mean that there are no rules for validity; relativism in that sense would inhibit feminism from connecting experiences and gendered lives which are the basis for emancipatory political action (Ramazanoğlu & Holland, 2002: 57).

Moreover, deploying feminist research is suitable for this study because not only social science epistemologies but also the ones for natural sciences tend to neglect women. Science seems androgynous; it takes the male features as the norm. The emphasis on objectivity and the idea of rationality within scientific methodology legitimates not only scientific knowledge but also men's involvement and women's exclusion from science.

As properly criticized by feminist methodologies, I believe subjective positions of the researchers and the narrators expose the significance

of subjectivity within sociological inquiry. Subjectivity is crucial because individuals should be assumed to be the elements of the social sphere, which affect and are affected by society in return. In addition, the researcher's situated understanding and his/her interactional style during the research process in which the two sides of the interview are active participants, constitutes the richness of feminist methodology.

I find it crucial to add the main methodological tool as the standpoint approach (Smith, 1992) in sociological inquiry, by building this study on women and men's experiences with respect to diversity in these experiences. That is why I aim to reach subjective stories of engineers to examine their experiences. The feminist standpoint provides an epistemological advantage here, since knowledge is always partial, subjective and there is never a claim of impartial truth (Ramazanoğlu & Holland, 2002:66). Without subjectivity, every participant is the same and their gender, class, ethnicity, religion, and culture become meaningless. So do their experiences and personal histories. As a result it is not ambiguous to study masculine experiences using feminist methodology. In regard to such an epistemological view, this study will be organized around the feminist standpoint.

According to this, one difficulty is to position the epistemology of a feminist research. Since gender intersects with capitalist relations of production, race and heterosexism, the focus of the research sometimes has to shift because gender may not be the primary factor in all power relations. The trouble here calls attention to Sandra Harding's triple division of feminist projects[6]. Though the division is too strict in Harding's terminology, I have tried to locate my research somewhere between feminist standpoint theories and feminist

[6] See, Harding, S. 1986:24-27.

postmodernism so that I would not loose the focus when I needed to shift in terms of the intersectionality of power relations.

There are a variety of feminist standpoint theories since there is more than one position in feminism. However, the core aspect in feminist standpoint is to work independently on problems of locating knowledge or inquiry from women's standpoint or in women's experience (Smith, 1997:392 in Holland). Rejecting the Cartesian knowing self of one fixed identity, knowledge from a feminist standpoint is always partial. It explores the difficulties of establishing the relationship between knowledge and power through people telling stories about their gendered lives. However, the feminist standpoint is not given. It is a project that has to be achieved; "it involves an active intervention, a conscious and concerted effort to reinterpret and restructure our lives" (Weeks, 1996:101 in Hartsock, 2006). In addition, standpoint as a methodology working from experience, aims to reach "the tacit knowledge of gender which is known in the doing and often seen as unimportant and routine" (Smith, 1997:395).

Debates after 1980's have not only influenced accounts of late modernity, but also feminist thought. Truth, in this tradition, is what the discourse allows to be true and knowledge is constructed through discourse. Such as truth, "people are produced through the discourses. They are not born into femimine and masculine natures; they are produced in a given way of thinking and in the effects of feminine and masculine discourses" (Ramazanoğlu and Holland, 2002: 90).

By emphasizing the ways in which discourse constructs "the realities of who we are", feminist postmodernism warns feminist standpoint about the danger of using terms like "women" in case of unintentionally silencing women of color and poor women (Hirschmann, 2004:321). I believe this warning is a contribution to

merge standpoint and difference. The category of "women" was criticized to be totalizing in the sense that it does not take into account of other identity aspects such as culture, ethnicity, race, sexual orientation or class (hooks, 1984; Spelman, 1988). With this necessary contribution, the idea of a feminist standpoint, can be transformed into *multiple standpoints*[7] which allows recognition of difference while still having the paramaters on what counts as feminist standpoint; "an ongoing negotiation within and among groups of women who theorize from the standpoint of their experiences of gender, race, class, and other oppressions" (Hartsock, 1997 cited in Harding et al. 2004, pp.320).

According to this view, discourse; the dominant ideology of gender, or in this case gendered culture of engineering, materializes the concrete conditions of engineerss lives; it creates the reality of their experience but also, material conditions construct and shape the general discourse (Hartsock, 1983:288; Hirschmann, 2004:325). This conceptualization would enable this study to a better understanding of present and previous discourses about engineering and the material power relations within the occupation.

In addition, having accepted the discursive production of not only femininities but also masculinities, without being blind to intersectional aspects of constituted identities, postmodern feminism has also opened a door to invite other subordinated groups (men, gays, lesbians, ethnic and racial minorities, etc.) into research. Based on this, multiplicity of feminist standpoints as an epistemological strategy suits the design of this research, since the purpose is to understand the experiences of engineers.

[7] See,Hirschmann, 2004:320

3.2 The Research Design

At the begining of this research, I planned to listen only women engineers' experiences, but as I reviewed the literature, I saw that there are very limited studies concerning men engineers. Adding men's perspective would provide a better understanding of how the engineering profession is regarded as having a masculine culture. Then, I decided to design a larger sample by including men engineers so that I could reach the aim of this study.

During litereture review, I have noticed that studies concerning gender in natural science and technological occupations use the acronym STEM for Science, Technology, Engineering and Mathematics, as being an umbrella representation. "The Science" in STEM mainly refers to natural sciences. It excludes social sciences (Zoli et al., 2008; Sengers et al., 2008; Greene at al., 2010; Amelink & Creamer, 2010). Many studies in this literature review used the acronym STEM for the fields that women are underrepresented in. Here we go back to Sandra Harding's critical assessment of natural sciences and in 2011, we see that the rationale about science did not change for many scholars.

This is why, I never used the acronym STEM throughout this text and I tried to use the term "natural sciences" in several instances when discussing women's experiences. The reason for this is that the term STEM creates and reproduces a dichotomy between natural and social sciences, which originated from the basic dualisms of nature/social, rational/irrational, analytical/emotional and finally men/women. As a result, I reject the usage of STEM although it is very popular in gender and engineering studies.

Third, masculinity of engineering has been a major concept not only by feminist writers but also by others. Readers of this literature may

gain a theoretical picture of this masculinity but concrete cases are very limited. I think this is another point to be noticed for this very study.

On the basis of the literature review, I took a critical position to the tendency of pretending as if we know all about male world. Studies about engineering and gender are lacking argue that engineering is masculine, its practice and organization is determined in order to keep men engineers' emotions and experiences. At some point, the concept of gender excludes masculinity and studies only examine women experiences. On the basis of these, I think a comparative research based on male and female experiences would provide a more comprehensive picture.

In order to get a deeper understanding about participants' narratives, I chose to conduct In-depth interview method. In-depth interviews work well with the aim of this dissertation since "the spontaneous exchange within the interview provide possibilities of generating insights with the interviewee as the narrator tells her own story in her own words" (Anderson & Jack in Berger-Gluck & Patai, 1991). It is also significant to apply an interactional research process in which the two sides of the interview are active participants. On the basis of these points, semi-structured interviews with engineers constitute the first and the most important type of source in this dissertation. Participants were contacted through Union of Chambers of Turkish Engineers and Architects (TMMOB), the online initiative of women engineers and via personal relations and via personal relations through snow balling sampling.

3.2.1 Introduction of the Sample

Within the frame of this research, I conducted forty three interviews; 25 with women and 18 with men engineers. At the begining, I planned to interview an equal number of participants; 20 women and

20 men. However, I could only reach 18 men enginneers within the time limit. More than twenty women engineers volunteered and I did not want to exclude any participants.

On the basis of the literature, I purposefully interviewed engineers from a variety of fields. With reference to Berna Zengin's findings (2000), I assumed that some engineering fields will be more populated by men and be regarded as masculine fields. Some would be feminine and include more women. Therefore, I included participants from graduates of different engineering departments so that I can get a better understanding of the gender dynamics.[8]

I purposefully reached participants from two main age groups so that I can compare two cohorts of engineers and provide an answer for the research question concerning a possible change in gendered engineering culture. 26 participants were under the age of 40. This younger group was composed of 15 women and 11 men respondents. Other main age group was participants of 40 and over age. 17 participants of this group were composed of 10 women and 7 men engineers. These characteristics are given in the table below.

[8] See Appendix,2.

Table 1. Age Distribution of Participants

Age Distribution of Participants		
	40 and over	**Under 40**
Women	10	15
Men	7	11
Total	**17**	**26**

Women engineers in this study were mainly coming from middle class families with regard to their parents' occupation. Fathers were mostly white collar workers; mothers were composed of teachers and housewives. There were more working class men engineers on the other hand, mothers were again distributed among teachers and housewives.

Participants in this study were full time employed engineers with one exception. One man engineer was retired doe to his age, but he was also full time employed in a public institution. I wanted my participants to be employed because I was planning to ask questions about work life.

I also seeked participants employed by different sectors. In this study, 7 women participants were employed in public sector; 4 of which were academicians, 1 was self employed and the rest was working in private sector. Among men participants there were two academicians employed in state universities, while there were 3 self employed respondents. The rest of the group were working in the private sector. Moreover, apart from academicians and self employers, engineers in this study were working in engineer positions.

Lastly, respondents in this study were graduated from four types of high schools. The majority was coming from Anatolian and State High schools. Since Anatolian high schools are selecting high graded students with an exam, students graduated from these schools are expected to be successful and it is not surprising they entered engineering faculty. Graduates of Anatolian High schoold were mainly from the younger cohort. Since the history of these schools is relatively recent, elder cohort members are mostly from state high schools.

3.3 Fieldwork

I have been spending time with a group of engineers; my husband's faculty friends, for some years. This group is composed of men and women engineers mostly from mechanical and metalurgical engineering. They gather frequently. They are constantly in contact via e-mail and whatsapp[9] groups. Their online name is Somunoğulları; sons of bolt nut, as reference to a popular Turkish movie[10] and also to mechanical engineering.

The name Somunoğulları is striking because it is used as a family name, while at the same time it refers to the family's profession by mentioning the bolt nut. They think they are a family, actually sons of bolt nut; brothers in engineering. I have been a part of this online and material communication for some years. I informed my friends that I am conducting a study about engineers. I believe they see me as a member of the group, yet I am not a Somunoğlu because I am

[9] WhatsApp Messenger is a cross-platform mobile messaging app which allows you to exchange messages without having to pay for SMS. http://www.whatsapp.com/?l=en

[10] Tosun Paşa is a 1976 Turkish comedy film telling the stroy of two noble families (Tellioğulları and Seferoğulları) who are fighting for a lucrative parcel of land called the Green Valley. Retrieved from http://en.wikipedia.org/wiki/Tosun_Pa%C5%9Fa in 07.11.2014, 10:35.

not an engineer and I am a woman. They make me feel that I am the wife of a Somunoğlu.

At the begining of the fieldwork, I recognized that spending time with the group and being married to an engineer made me acquainted with common behavioral patterns in engineering. I have heard popular jokes, gendered reactions, read caricatures, watched sci-fi movies with engineers, and got used to Fantasy Role Playing jargon. I believe these experiences played a role in my field work to understand some of the experiences of engineers.

3.3.1 Interviews

In late December 2013, I began conducting my interviews. I started interviewing women engineers because I thought it would be easier for me to adapt to the field. I had also read from the relevant literature that "men participants might be unforthcoming and repressed" (Gatrell, C. 2006:244). Therefore, I began with women interviewees with the bias I mentioned. Yet contrary to my expectations, men participants turned out to be very talkative and reciprocal, which I will explain in the following pages.

I was already a member of women engineers' online initiative[11] . Although I am not an engineer, the group admin accepted my involvement when I explained to them my study. The group was founded as an alternative to Union of Chambers of Turkish Engineers and Architects (TMMOB) in order to raise and share women's oppression in the engineering profession. The online initiative was organized via an e-mail group composed of gender-sensitive women engineers from whom I was receiving e-mails.

[11] www.womenengineers.org

Firstly, I sent an informative e-mail to the group explainig that I was planning to conduct interviews and attached my thesis abstract. I asked whether anyone wanted to participate in my study. Ten women volunteered to be participants. In a few days, I began conducting the research. During the first ten interviews, the participants and I had very interactional and productive conversations. Women engineers from the online initiative were sensitive about their gendered experiences. They had thought about their previous experiences, they knew what to do in order to get rid of gendered culture and they were acting against it. Furthermore, they were organized.

After the first ten interviews, I came to a point where my study would not provide a new perspective for gendered situation in engineering. My participants had already figured out many of the things I was planning to raise. My sample was biased at the beginning, since women initiative members had similar rhetorics. Only relief was that their experiences mostly confirmed my theoretical framework.

I raised this issue to my advisor; Yıldız Ecevit, and she advised me to interview women engineers from different affiliations and through distinct sources of contact. Then I began randomly asking other engineers I knew, whether I could conduct an interview with them. I also wanted to interview men this time, because I felt more secure with the subject matter. Within a few months, I interviewed 15 more women engineers that are not activists and 18 men engineers through my personal sources of contact. The women respondents reached up to 25 because some women engineers wanted to participate and I involved them even though the field work had begun to provide resembling and repetitive answers.

All of the interviews took place in Ankara, mostly in down town pubs and cafes in the evenings. I found this fact important because it

shows that most engineers in my sample were socially active. Most of them told me they were heading out occasionally and wondered if I could conduct the interview outside. Some of the respondents asked for a couple of beers before agreeing to participate in the interview. This demand was a joke; however, it was an invitation for me to their leisure enviroment. Later, I found out that drinking is one of the most popular social activities for engineers.

Some interviews took place at respondents' home. The older participants whom I reached through personal contacts, invited me to theirhomes. They showed me hospitality and served tea or coffee during the interview.

The in-depth interviews took approximately 45 minutes to 1, 5 hours. I tried to be as flexible as possible so that the interviews might bring opportunities for more information. All interviews were recorded with a voice recorder and transcribed at the end of the field work.

I tended to send my thesis abstract via e-mail to the possible respondents when I asked them to participate. Therefore, all the participants knew about my study, and they participated voluntarily. I also got permission from respondents about using a voice recorder and made it visible while I was using it. Only one participant was nervous about the records of the interview. She was a digital security expert and she told that she acts 'paranoid' because she thought that 'everything is traceable' through digital technologies. Even her recorded interview though aour mobile phones. As I assured her, I gave nicknames to the respondents. I also changed the actual names of the firms I observed in.

3.3.2 Observing the Factory

In order to examine gendered organizational structure and interaction styles, obervation of the workplaces was crucial for my research. Without such an ethnographic experience, explanations towards engineering culture would have been incomplete. I did workplace observations of ten days in three workplaces in Ankara. The first one was a big factory producing armoured vehicles. The other two were located in industrial districs; Ostim and İvedik. The latter was rather smaller work-shop style factory. I contacted these workplaces through personal relations.

To begin with, industry in Ankara is composed of the defence industry, the production of work and construction machines, and the building of medical devices. The whole industry employs approximately 1 million 342 thousand people. Most of the industrial production is implemented in five industrial districts in Sincan, Akyurt, Çubuk, İvedik and Middle East Industry and Trade Center (OSTİM).

Ankara is the center of the defence industry. There are 25 defence industry factories in Turkey and 16 of them are located in Ankara. Existence of institutions such as OSTİM Defence and Aviation Cluster, Association of Machinery Manufacturers, Türk Loydu, along with Turkish Armed Forces General Staff, Ministry of Defence, and Undersecretariat for Defence Industries make Ankara a significant location for defence related production. The defense industry in Ankara is mostly based on Turkish-American partnership factories. They mainly produce civil and military aircrafts, armoured vehicles, and rockets. Factories employ more than one thousand employees mainly composed of engineers and technicians (ASO, 2013).

I thought big factories would be suitable places for my study to observe relations in the workplace. Therefore, I applied to four factories for formal permission. However, my applications were rejected. I was told by my contacts that “some defense industry projects hold secret information” thus, a researcher can not be allowed in the factories.

Military-based production has its own masculine structure. Apart from the engineering culture within, the military has also masculine codes. In addition, as I was told, the nature of the production holds secret information and “strangers” are not welcome in the factory. When these two conditions are combined, it can be understood that the defense industry avoids a woman researcher asking questions about gender. They also despise such effort; in one of my meetings to get permission I was told that my study is rather “insignificant to what military industry accomplishes”. I think it was because I was raising an unwanted issue such as gender and it was also unimportant to the perspective because, as long as production continued seemlessly, talking about gender was irrelevant.

Besides the common perspective, I managed to get permission from a defence industry factory located on the outskirts of Ankara. My contact person in the factory was a woman engineer. She was the director of the Research and Development Department. Since she was very sensitive about gender issues and had administrative power; she helped me to get official permission. It is important to note that if it was not for a woman director, I could never have gotten permission. The permission was valid for the Research and Development Department. The women director, Saliha, was a powerful administrator. I not only had access to the factory but also was provided transportation and food, so that I could spend more time with the emloyees. I was also allowed to go up to every engineer to

talk for 10-15 minutes. Later, when I was introduced to the head of production department, I had a chance to make observations in that unit too. My example shows the significance of finding the right contact person in order to gain access to the field.

The Research and Development Department was composed of 104 engineers and 22 draftsmen. Of the 104 engineers, 14 were women. On the first day of my study, Saliha told me that engineer women in Turkey have better working conditions than the ones abroad. She indicated that there is a harsher culture of gender concerning engineering in other countires.

At the time of the research the factory was working on four projects, two of which had Saudi Arabian partners. A woman engineer Seda, was senior engineer in one of the projects. She told me she could not go to Saudi Arabia, because of its cultural reasons and because there were not any women in the construction yard. She was upset by the situation because she "could not touch the tool she helped in producing".

Most engineers in the factory, including Seda, confirmed Saliha's ideas. I learnt throughout this study that, such international partnerships gave certain rights to all engineers. Wages are the same for all employees working on the same level. Working hours are made flexible; if one engineer takes two hours off during the day, she/he can come to factory and make up for it during the weekend. Moreover, maternity leave and permission for breasfeeding are also ensured for women employees. I think, detailed design and operation of American-partnered factories nourishes this king of work organization. On the basis of these facts, the desgin of the organization might empower the feeling of equity for employees.

During Saliha's management, breastfeeding time was added to maternity leave. The leave became 6 to 7,5 months. She also promoted one woman engineer during her maternity leave. This example created a positive atmosphere in the unit among women engineers.

Engineers in the factory were working in an open office system regardless of their gender distribution. The Research and Development Department did not have the priority to take place in production processes. Some engineers, though, were "going downstairs" to the production unit in order to supervise some tasks. Boots and special glasses under the desks were indicators of trips to the production unit.

As mentioned, I had the chance to spend some time in the production unit as well. Yet I was not allowed to go down to the factory. I stayed in the offices of the production department and had chats with the engineers working there. The general atmosphere in the production unit was different. Employees in the unit shared a common culture of humour; the walls were decorated with caricatures, drawings of favorite sci-fi characters, and above all, there were big puzzles that were made by members of the unit during lunch breaks.

The production unit was composed of mostly mechanical engineers. There were two women engineers whose majors were industrial engineering. This shows that in the production department women's existence depended on certain terms. Women engineers were not from one of the masculine departments, they were clearly employed for organizational tasks.

One of the women engineers indicated that factory was one of the best places to work because blue collars were usually "polite and respectful". Though, sometimes she had trouble going down to the

factory line to exchange holiday greetings; some workers did not want to shake hands with her.

This is, I believe, is a unique example of gendered engineering culture. Judging from the observations I have done in the factory, I can argue that women think that they are lucky and happy. Since, compared to other women engineers on the market, their basic rights are ensured by the company organization, they feel secure. The troubles such as not being allowed into the construction yard in Saudi Arabia, or being insulted by blue-collar workers do not create a big problem for them. However, these examples show that they can not perform their job in its full terms, just because they are women.

The second factory was relatively small and located in the Organized Industrial Region (Ostim) in Ankara. Founded by a mechanical and mining engineer jointly, the factory currently employs five engineers and twenty technicians; none of them are women. The firm produces melting furmaces for Mamak garbage dump in Ankara. My contact person in the firm was a mechanical engineer working as a developer in the factory. I was allowed to observe in the work shop for two days.

The workshop was a two-floor shed. The offices were located on the second floor, and first floor could be watched from glass walls. The first floor was very cold and dusty. There were safety warnings on the walls and also prayers for protection and good luck. Ahmet, my contact person, introduced me to all workers saying that “Ezgi studies engineers, asking why we do not have any women in the industrial region”. As Ahmet said this he had a smile on his face, and the workers answered him with a smile.

During the observation, I felt that my presence was despised by workers and by the engineers. Some openly mocked me;

Eat this salad, it is very clean, very organic (laughter)[12]

Some showed me the way to the women's restroom; however, such a restroom did not exist.

Another notable point in the field was that engineers I talked to did not welcome my questions about organized labor. I asked Ahmet and a friend of his about unionism among workers. They openly told me that "You are going into very dangerous places" and ignored the question. Later they acknowledged that unionism is not welcome in the industrial districts at all.

It was an unexpected finding though. Questioning gender was acceptable to some degree; however, asking questions about workers' organization was undesirable. Engineers were members of TMMOB, yet they were not active. Blue-collar workers; on the other hand, were implicitly forbidden from being organized.

On the basis of these observations, I argue that gender is not even an issue for the workshop I observed in Ostim. Therefore, asking questions about gender do not have a projection in ateliers such as this one. However, questioning the rights of workers, even opening the subject, is not welcomed. It is thought that such questions would turn the worker against the employer.

The third firm, Binnur Yedek Parça, was located in İvedik Industial Region and was a family firm of two engineers. The firm was larger than the first firm in terms of production and export capacity. Binnur Yedek Parça was producing Caterpillar spare parts and exporting them to Europe and Russia. I spent three days in the menioned firm.

Different from Ostim, İvedik was composed of financially larger enterprises. Most firms had branch offices in Russia and in China

[12] O salatadan ye bak çok temizdir. Çok organik. (gülüşmeler).

since the work force is cheaper in these countries than in Turkey. Workshops were smaller due to a limited number of workers. Offices were bigger, and they had air conditioning and large windows. The dust and heavy smell did not reach the offices.

The owners of Binnur Yedek Parça told me that production was vanishing from Turkey. They got spare parts produced in other countries because the cost is lower. Therefore, they only employ four-five workers in the main offices to check the already produced parts, and for other specific tasks. Contrary to Ostim, workers in Binnur Yedek Parça were willing to communicate with me. They behaved as if I were a guest in the firm and explained their work processes in detail.

Similar to the previous firm, there were no women workers in Binnur Yedek Parça. The wife of one of the employers prepared food for lunch. She was the only woman in the building. Ali, the employer, told me that İvedik is more women-friendly than Ostim. There are three firms he knows that employ women engineers. Later, I learnt that the women engineers he mentioned were either the daugthers or relatives of the employers. In that sense, it can be argued that women engineers might gain access to jobs in industrial districts only through a male relative.

3.4 Comparison of Interviews with Men and Women

I found that women engineers had initiative and were keen on being "listened to non-judgementally, without interruption and with interest" (Lee, 1997, p. 54). In this sense, interviewing women was a reciprocal experience for me. Men, on the other hand, were distant at the begining. Some opened up during the interview, some did not. Two men respondents even saw me as a "weaker party" and tried to

"patronize" me (McKee and O'Brien, 1983). At the begining, I feared that I might not be able to understand men. I saw that men also felt insecure because they perceived me as a stranger to their world. However, as the research proceeded interaction with some male respondents became easier and productive.

Comparing these two sorts of interviews, I can argue that women were 'sharing', while men were 'telling' their experiences. I think there is a slight difference between those two approaches. Women told me their thoughts and stories for me to understand them, while men told their stories and thoughts and they do not expect my understanding. Perhaps, female respondents thought I can grasp their experiences because I am a woman too. Men respondents had a certain distance; they talked about their experiences and demanded less from me in terms of understanding. I believe this is one of the dilemmas of feminist research with men; the two parties of the research sometimes feel obscure.

In sum, all participants were reciprocal in their own way and they perceived the interview as an opportunity to talk about themselves. Judging from the responses, it was the right decision to be flexible about the spatial conditions of the interviews, and to conduct most of them in pubs. Similar to Gatrell (2006), I believe, men respondents needed an environment where they feel more comfortable to talk. Conversely, woman to woman talk became easier when I enter their leisure space.

Determining the frame of gendered engineering culture on the theoretical level would be lacking without considering contextual dynamics. As it was put before, Turkey's history had specific periods in which engineering occupation has found its peculiar aspects. The

next chapter is an overview of the engineering occupation and the crucial points on the general discourse about engineers in Turkey.

CHAPTER 4

ENGINEERING IN AND GENDERED LABOR MARKET IN TURKEY

Understanding the creative factors behind gendered engineering culture requires that the structural conditions of the labor market should be examined. Since the market is embedded into social[13], the changes in economic and political life in Turkey obviously affect the labor market, and, in turn, the dynamics of the labor market affect engineering profession in Turkey.

The gendered functioning of the labor market is the fundamental basis for the gendered cultures within all occupations. Engineering is not unique, but being accepted in a male-dominated profession brings extra burdens for women. It is a field in which educated women and men come across in gender-related situations which show us that education does not solve everything. That is why it is important to understand the social within the labor market so that I can paint a better picture of gendered engineering culture.

In this chapter, I focus on economic and political changes in Turkey with respect to their impact on engineering profession. In addition, I will examine the labor market in Turkey with respect to structural barriers that prevent women from participating in the market and in the engineering profession. Finally, departmental segregation within engineering will be examined with respect to previous literature.

[13]Polanyi, K. 1964; O Riain, 2000.

4.1 Actors of Change: Engineers' Role in Turkey's Politics

Even though engineering profession was born as a result of industrialization and capitalist requirements in Western countires, the profession was introduced to Ottoman Empire as a result of military attempts in the state (Göle, 2008). During 19th century, Sultan Selim III decided to establish a new army rather than the existing structure. This new army was called Nizam-ı Cedid (New Order) anits foundation required reforms resulting in establishment of engineering schools called Mühendishane-i Berri Hümayun and Bahri Hümayun by (Zürcher, 1997).

In 1883, first engineering school Hendese-i Mülkiye was established by Sultan Abdülhamid. During the establishment, civil engineering instructors from Mühendishane-i Berri Hümayun participated so that the state would benefit from educated civilian engineers who were expected to accomplish the needs of the state's infrastructure. Civilian engineers were signed to to build bridges, railways and buildings as being state employees. (Çeçen, 2013).

In 1908, Ottoman Community of Engineers and Architects was established by Ottoman engineers and architects and declared their objective as "protecting the rights of Ottoman engineers and architects" (Günergün, 2004 in Günal, Y., 2013). To sum, engineering profession entered Turkey through modernization attempts of Ottoman Empire. However with the establishment of the new republic, engineers raised as a new group of technical elites.

Founded in 1923, the Republic of Turkey aimed to build a national economy through etatism during the 1930s. According to Boratav, Ottoman Empire had left an economy characterized by lack of

industrial development and it was dependent upon raw material export. During the period between 1908-1922, national capitalism was tried to be established even without the existence of national bourgeoisie and lack of capital (Boratav, 2011). In February 1923, First Turkish Economic Congress, the National Economy Programme was accepted. The Programme was based on protection for local industry but did not oppose for foreign investment. It was a mixed economic structure but state was responsible for main investments. (Zürcher, 1993: 203).

Following years, industrial production has increased thought it was on primitive basis. Yet, the endevour for industrial production continued during 1923-1929 and students were sent to get engineering education from other countries (Boratav, 2011). In addition, due to the lack of technical capability and financial resources, at first, engineers from foreign countries were brought to Turkey. In time, this situation contradicted with the etatist/nationalist perspective. Being molded with idea of national development, engineers in Turkey were against the existence of foreign engineers (Göle, 2008:113).

Necdet Eraslan's speech delivered at Turkish Engineers Union Congress in 1992 is an example of this understanding:

> I struggled with foreign technical experts from the first day of my career. I was even sentenced to prison for 15 days during my military service because I kicked out an expert with a bayonet. Here the main role is played by nationalist sensation. When a foreign expert comes to our country, we predict what he thinks about our country, because his thoughts about the capacity of this country are different from ours. That is why we need to do our best to avoid bringing foreign experts. (Necdet Eraslan:54-55) cited in Köse & Öncü, 2000: 106).

> This is both a situation of pride and honor and sovereignty. It is sad that a Turkish minister signs the consent of foreign expertise, which is also a horrible blow to Turkish Engineering. (Necdet Eraslan, 6.12. 1953 tarihli Türk Yüksek Mühendisler Birliği'nin Olağanüstü Kongresi. Er (1992:53-54) cited in Köse &Öncü, 2000: 106).

Here, it can be argued that in its core, the causes behind the need engineers at the time did not change much when compared to the 1830s. In the 1830s, the military benefited from technical expertise; engineers were bearers of western scientific thought. By their embodiment, rationality, technical know-how and modernization were brought to Turkey. In the 1930s, however, a new country was built. It was built on a national adaptation of western modernity; engineers perceived themselves as technical soldiers of the republic against western capitalism.

Köse and Öncü (2000: 105-110) divides history of engineering from 1950's to 1980 into three historical periods. These periods carry patterns of different social conditions and their effects on engineering profession as well as engineers' affect o Turkey's economic and political situation. These periods are; Capitalist Developmentalist Technicians Period (1954-1965); Social Critical Independent Developmentalist Technicians Period (1965-1973); Social Activist Independent Developmentalist Technicians Period (1974-1980). In this part, I will follow Köse and Öncü's categorization in order to provide a better understanding for engineer's route in Turkey's history.

4.1.1. 1954-1965: Engineers with Capitalist Developmentalist Perspective

The period of Second World War has brought several changes to Turkey in many aspects. The government of İsmet İnönü had become

unpopular, so was the One Party State (Zürcher, 1993). The economy was still mainly based on agricultural production. Small farmers of the countryside had not seen fundamental improvements in terms of their life standards, in health and in education. Industrial workers were a limited minorty and their financial situation was no better than farmers. The large land owners were subjected to government's "policy of artificially low pricing of agricultural produce to combat inflation during the war". In addition to that land distribution policies land owners had to give some land to the farmers in 1945 (Zürcher, 1993:217). Changes in the economic structure in addition to limited life sources within war economy created conditions for political opposition against one party state.

In 1950, Republican People's Party lost the general election to Democrat Party. Democrat Party came into power by promising a significant change in economic policies including tranferring public enterprises to private sector (Boratav, 2011) Moreover, "free enterpise, industry based on agriculture, development of roads instead of railways was emphasized" (Zürcher, 1993:217). According to Boratav (2011), he period after 1950, economy had witnessed the articulation of public and private sectors for the benefit of private capitalist interests. That is to say, state policies supported private sector investments and deeds.

The 1950s Turkey's economy had gone under liberalization. Engineers became middle class professionals as a result of New alliances between the state and private sector (Günal, Y., 2013). As the profession became popular, the private sector provided high income alternatives for engineers (Akkaya, 1996). Liberalization in Turkey carried the possiblity for engineers to share interests with the bourgeoisie. TMMOB was founded in 1954 as an umbrella

organization for engineers. Internalizing Taylorist perspective, TMMOB's main purpose was to raise professional demands. Şükrü Er, TMMOB administrator summarizes the changes in industry by telling that every profession has to raise its own administrator, its own employer in order to struggle for professional rights:

> Let us focus on the employer. The alliance between a person with knowledge and dream and another person with capital leads to entrepreneurship. Within entrpreneurship the ruling figure is the capitalist. In our age of industrial management, administration became detailed and it is as if a science. Every work brach, every profession needs to raise its own administrative group. Every university graduate is a candidate for being a future employer. He is supposed to find the work place, capitalist, employees and he will realize the enterprise.
> We must focus also on this: if we left aside the legal definition of the capitalist, in our age the object called capitalist is vanished. Everyone is employers' substitute. It is because our industry is so big that there is no employer to deal with it. Capitalist left their place to new capitalists, enterpreneurs left their place to technical class and there appeared a new administrative class to manage them (Şükrü Er from the1957-1958 period, quoted in Köse and Öncü, 2000:107-108).

During the period after 1950's engineers tried to define a new role for themselves since their role through modernization has changed due to libeal economic policies. As Er tells above, industrial developments created fundamental changes in rule of production. Previous administrative roles had been altered and a new need for administrative class had emerged. Engineers in this period, appeared to have capitalist developmentalist perspective in order to take place in new industrial order.

4.1.2 1965-1973: Engineers with Social Critical Developmentalist Perspective

Worsening of economy with regard to inflation and foreign debt had led Democrat Party to a bottleneck. Social oppositions were handled

with strict policies. In 1960, the administration of the state had taken over by a military coup d'etat. The coup was supported by student population and middle class intelligensia who embraced Republican ideals and secularism (Zürcher, 1993:253). New regime supported State technocrats who were followers of etatist policies were appointed to manage the development of state through a strict planning under the institution called State Planning Organization (Günal, Y., 2013). The coup gave responsibility to a cabinet of technocrats for executive important policy decisions (Zürcher, 1993). In addition, assisted by a group of professors, new constitution was issued. New constitution was planned to be a more egalitarian one for a wider range of political activities and supporting multiple party system.

Under etatism, without a capitalist class, engineers were the only directors of industrial production at the time. Scientific values of the west and national feelings melted in the same pot for engineers towards the main aim of development. Until the 1960s, engineers appeared as a professional group who felt in debt to the state because of their existence. They felt honored by the mission of being the enlightened and rational developers of the country (Göle, 2008:117).

In the late 1960s, TMMOB shifted its political stand towards leftist ideology. Under TMMOB engineers criticized capitalist development and sometimes challenged the state (Köse and Öncü, 2000). Engineers started to criticize their roles not only in industry but also in social life. Gathered under TMMOB, they keep theire critical position against capitalist interests. Teoman Öztürk, a significant administrator figure in TMMOB explained his perspective:

> Saving the country from underdevelopment is not to make capitalists earn more money, but to serve for the public. Interests of the technicians contradict with the current

> economical, social and political structure. Because of our objective conditions, we are at the side of the public and opposite to the ruling power groups…(Teoman Öztürk, quoted in Köse and Öncü, 2000: 109).

Engineers of the period did not hold a homogenious pattern in terms of political ideology. Even though, TMMOB and its ideology was close to socialist perspective, not all engineers were sharing leftist perspective. Süleyman Demirel[14], a civil engineer, former bureaucrat, had gained majority of votes (52.9%) and elected as head of the cabinet and Justice Party (Adalet Partisi). Justice Party followed liberal policies. The party was composed of industrialist, small traders, artisans, peasants, land owners, religious reactives and liberals (Zürcher, 1993:263). Five years later, another engineer, Necmettin Erbakan[15] founded his own party called National Order Party (Milli Nizam Partisi), by leaving Justice Party in order to form an Islamist route.

4.1.3 1974-1980: Engineers with Social Activist Perspective

During the period from 1970's until the coup in 1980, technical profesionals under TMMOB followed a social activist stand. A study conducted by Artun (1999) about political ideas of engineers for the years 1971-1975 shows that %63.5 of the engineers indicated that they take public's problems as of theirs. They also argued that TMMOB should be politically active. They believed a better world can only be achieved through social reconstruction:

> The fact that technical professionals do not use their knowledge and skills for public is a natural reason for the concrete

[14] Süleyman Demirel is 9th President of Turkey was born in 1 November 1942. He also served as Primine Minister in Turkey for seven years. Originally an engineer, he was an important figure in Turkey's politics from 1964 until 2000 (Komsuoglu, A. 2008).

[15] Necmettin Erbakan was born in 1926. He was an engineer and academician. He served as Prime Minister of Turkey for one year. He took part in Turkey's politics from 1960's until 2010's. Retrieved from www.necmettinerbakan.org

> conditions that Turkey is in. Our country is under the hegemony of monopolist capital which is fused by our countries economy, political structure, infrastructure, and supertructure. These hegemonic actors control the investments and services. They do not use these sources for the sake of our public but for the markets and interests that would provide more profit for their interests. .....Our future depends on a regime where means of production would be developed freely, where there is no differece between manual and skilled labor, and where the labor is not alienated. (Mimarlık Haberleri, 1976, quoted in Köse and Öncü, 2000:109).

Political violence between leftist and rightist groups created a difficult situation for Turkey through 1970's. Leftist people gathered not only around Workers Party of Turkey but also they found place wihin People's Republican Party. 1970s had witnessed strikes and meeting against rightist ideologies within which workers and students played a significant role. (Göle, 2008). In order to deal with the conflict between rightist and leftist groups attempted to cope with conservative measures by the state. However, the number of victims of political violence grew radiply and state autorities were unable to stop the violence (Zürcher, 1993).

In 1980, another military intervention was held and state administration was again taken over by the army forces. This time the return to democratic system was uneven because precautions were stricter. The parliament was dissolved, immunity of national assembly was taken away and leaders of political parties and two trade unions (Socialist DİSK and nationalist Confederation of Nationalist Trade Unions) were suspended (Zürcher, 1993).

1980 and on, Turkey has gone under fundamental changes towards neoliberal economy. Private sector gained a crucial role in employing middle class professions such as engineering. With the impact of the coup, formers actors of active politics prefer to keep a certain distance to politics (Lüküslü, 2009).

4.1.4 Neoliberal Structuring of the Economy and Engineering

The architect of neoliberal restricting in Turkey was the period's Prime Minister Turgut Özal. Özal was a mechanical engineer, like other engineer political figures he was originally coming from the countryside. His reform package was inspired by IMF and was made possible under the name of stabilization programme (Zürcher, 1993). Turgut Özal directed Turkey's politics after his party had firstly been elected in 1983 until his death in 1993 as a prime minister. Under his rule, with the help of available conditions provided by the coup, structural adjustment policies were realized.

Adjustment policies were based on less state intervention, export orientation towards a free market economy (Boratav, 1990). According to Enes, two important adjustment of the package were; the distributional arrangements between capital and labor, and industrial policy arrangement via credits or taxes. During this period new institutional and legal arrangements issued concerning capital-labor relations in addition to efforts to realize export orientation. Adjustments were managed through: leaving prices, exchange and interest rates, and product prices of state economic enterprises to determination of the market (Eres, 120-121 cited in Köse et al. ed., 2007).

Financial liberalization was also realized via removal of legal and institutional barriers to foreign investment. Moreover, capitalists benefitted from suppression of wages: first it reduced domestic demand and created an exportable surplus, second it also cut labor costs. Suppression of real wages opened way to public upheaveal and strict measures were taken against organized labor (Boratav, Yeldan, Köse, 2001).

The impact of the coup in 1980 and the shift from Taylorist production towards a more automatized labor processes led to a change in engineering itself. The profession had become more specialized and engineers tended to define their labor with technological processes and separated themselves from blue-collar workers whose labor was rather routine and distant from technical knowledge (Öngen, 2000:71).

According to Taylor, the engineer's stand is a compromise between capitalist and engineer. In this ideal type, the engineer is the rational calculator of the production process for the sake of the capital (Taylor, 2004). Taylor's engineer himself/herself is a part of the capital. This sort of engineer is a reformist and tends to follow rightist ideologies. In contrast, Veblen describes the revolutionist engineer who is against capital. Engineers' existence and the value of their labor are contradictory to capitalism's interests. Veblen's engineer is the person who should think and act for the best interest of society (Veblen, 1963).

On the basis of these two conceptualizations, Haşim and Köse (2000) examined different world-views among engineers in regard to Taylor's and Veblen's conceptualizations. Their research is mainly about explaining the variety of class positioning within the engineering occupation in terms of engineers' perception of the meaning of their labor; whether it is close to Taylor's or Veblen's. The results of the research showed that engineers in Turkey increasingly identify the purpose of their work with capitalist interests (2000:33).

Increasing industrialization, private intervention and the demise of etatism made visible transformations in the social role of engineers. In the 1970s TMMOB defined its own role as defending public's interest against hegemonic forces (Haşim & Öncü, 2000: 104). In this

sense, engineers not only conceived themselves as rational actors of production, but also social actors who would protect the country from external powers. In return, they were perceived as both technical experts and bearers of rational thinking on the societal level. In addition, Republican Turkey invested in the image of engineers on the social level, because they were considered to be agents of Western thinking, which was assumed to be the road towards civilization.

The social image of engineers was also being transformed, especially after 1965. Engineers, being active agents in politics, increasingly defined themselves with capitalist interests and the free market economy. In Turkey, this new definition placed engineers into different political ideologies.

Towards 1990's production industry became the dominant sector but fiancial development did not follow a stagnant pattern. The distributional relations within social classes of production sector was against labor, and reel wages have lost value. 1990's was dominated by economic crises on a frequent basis, in this period public debt increased labor market had gone under marginalization (Yeldan, E. 2001; 159-160). 2000's economic steps were taken in order to stagnate the economic instability of 1990's.

Within the period of neoliberalization, white collar labor force has increased. New sectors gained importance Engineering and management appeared as popular ad profitable professions. These changes also created a popularity shift among engineering departments. Instead of tradtional fields sucha as civil and chemical engineering has lost value. While branches that are more related to new economic structure such as industrial engineering gained importance (Kozanoğlu, 1993: 83).

In line with the changes in Turkey's economic and political sturcture, today engineers do not compose a homogeneous professional group in the political sense. However, it can be argued that they still enjoy the legacy of being technicians who would develop the country using scientific expertise. The condition of women in this profession requires a closer examination. In the coming part, I explore the steps of women's participation in engineering profession.

4.2 Impact of Republican Reforms on Women's Participation in Engineering

The declaration of the Republic in 1923 opened way to reforms, known as Kemalist reforms, which would establish the idea of the nation state by ruling out religious aspects in state affairs and in everyday life. The main purpose was to create "the liberal, democratic and secular society" in the republic (Arat, Y. 1998:85). In order to achieve this goal, adoption of Western civilization was seen as the ultimate key. Western civilization was accepted to build upon positivist science. Thus, civilization in Turkey was thought to be achieved by the guidance of western rational mentality (Mardin, 1997:189).

However, western civilization was not taken as it was. On the one hand, the inevitable consequence of regulating society according to scientific approaches was achieving western technology and material progress. On the other hand, the goal was never a total rejection of traditional and cultural fundamentals. Turkey's model was to be a synthesis of traditional and nationalistic ideologies and modernization. The frame for traditional and nationalist ideologies was Turkish nationalism, "with reference to the original culture of Turks before they accepted Islam" (Durakbaşa, 1998: 139).

Within this framework, women's status in Turkey experienced a direct impact. Nationalistic ideologies accepted the image of the new women as being representative of the modern state. Women began to be treated as citizens and given equal rights in legislation, education and in political life. (Durakbaşa, 1998:140). In addition, women's intellectual capacity was recognized and the education of women was given primary significance, since women were also conceived to be educators of next generations (Durakbaşa, 1983: 55-59). Furthermore, educated, professionalized women became symbols of the modern Republic of Turkey. Education was accepted to be one of the primary agents of socialization; ideological, moral and behavioral codes were transmitted through education (Arat, Z. 1998:16). Nationalistic ideals were embedded into school curriculums in line with principles of westernization and secularization (Arat, Z. 1998: 159).

In the context of reforms, it is possible to claim that a certain sort of gender equality was presented as a part of national identity. According to Durakbaşa, the equality of men and women was taken as "the equality of men and women citizens of a political community who shared the same ideals and responsibilities in the nation-building process" (Durakbaşa, 1998:141). However these efforts did not transform overall gendered discourses in the society. Men continued to be the dwellers of the public domain, while women stayed within the context of family, and the perception of women always determined their essential function as motherhood (Arat, Z, 1998: 26). Even though one of the aims of the reforms was acknowledging women's labor force potential in order to create possible ways for women's contribution to the economy, due to need of economic development, egalitarian discourse around genders did not fully shake traditional gender structures (Arat, Z, 1998:26).

In the same line, some authors criticized Republican reforms for defining a stereotype of Turkish women who seem to be congested between traditional values and modern knowledge (Arat, Y. 1998; Kandiyoti, 1997). The modernization project of the Republic kept the culture which conceives women as a symbol of honor of family and added that image to a bigger responsibility of being the nation's honor (Arat, Z. 1998:26). Women in this stereotype are a genderless, guardians of the nation, sisters to men in the public domain but at the same time they are expected to fulfill their duty to be women to their husbands, to be the mothers to their children; the children of the nation (Kandiyoti, 2007: 158-160). Even though religious aspects of life have been rejected, I believe it is difficult to separate traditional and nationalistic ideologies from Islamic traces. We can see this embeddedness in the identification of women with honor, because the notion of honor is closely linked to women's virginity. In that sense, I agree with Ayşe Gündüz-Hoşgör's argument that reforms and social life were still affected by Islamic patriarchy (Gündüz-Hoşgör, 1996: 155-156).

However when assessing the impact of Kemalist reforms in terms of women's professionality, it is important to note that these transformations provided real life gain, especially for urban middle and upper class women (Kandiyoti, 2007:77) Women who had access to professional education were invited by the state and their entrance into occupational life was encouraged by the modernist elite (Acar, 1996). Beside the top-down characteristic of women's professionalization in Turkey, the process has ensured women's entry into professional life. As a result, in the long run more women became active in a variety of occupations.

According to Ayşe Öncü (1982), the significant point to note in women's professionalization is that professionalization itself was a

new phenomenon in Turkey. That is to say, graduates of the higher education institutions were the first professionals of the country. The masculine structure of professions like we see in the west, masculine cultural codes and patriarchal relations of power had not yet been constructed. Therefore, women were welcomed and perhaps this changed the gendered image of some occupations. Even today, Turkey has a considerably high number of professional women who are studying in universities and participating in labor force more than the US and other European countries.

On the other hand, it is also a noted fact of the time that women were usually concentrated in departments that would coincide with traditional gender roles. Teaching, literature, pharmacy and medicine were the fields where women were mostly employed. These were also the fields that would be associated with women's role of motherhood, housewifery and nursing. Technical and engineering departments did not include that many women students, even in encouraging conditions (Bayrakçeken-Tüzel, 2004:137). This unspoken but gendered differentiation shows that the patriarchal value system was still valid in people's minds and also in underlying discourses.

Among the memoirs of the first women engineers of Turkey, there is a strong sense of gratitude to Mustafa Kemal and his reforms. In line with the nationalistic ideals, they saw themselves responsible for building the country in its most concrete meaning. Yet patriarchy manifested itself in various forms.

> Sabiha Rıfat Gürayman is one of the first engineers in 1933. She starts working in Ministry of Public Works as a civil engineer. At the beginning of her work life, she claims coming across with people who could not think her as an engineer. She had phone calls from people who said "I am sorry, wrong number", after they heard her voice on the office phone….When she wanted to participate in construction of Ankara- Beypazarı motorway, she was rejected with an alibi saying: "Women

> cannot be in the mountain and in the construction site. (Naymansoy, 2010:9).

Şemşibanu Sükan Özentürk was another engineer whose university annual, containing entries written by male classmates, shows male engineers' attitude towards women colleagues in years 1947-1948:

> We all love and respect Banu. She handled with such a difficult task of studying with 80 men and she always showed us that a girl can study like a man. She is more interested and successful in the courses. She never allows us to buy her ticket in trams. She was very upset when the mirror, which belongs to girls, was brought to construction etude. In addition, she never understands that whistling on the corridors with appreciation would be such a joyful activity. (cited in Naymansoy, 2010:20).

These examples indicate that gender ideology determined women engineers' education and work life even in the era of reforms. It is also an indicator for us to claim that, although women were encouraged by the state to be engineers, Turkey's traditionally patriarchal context was not totally transformed with Kemalist reforms; rather, it is articulated within a new gendered discourse which traps women into professionalization in the name of nationality.

Gender segregation in the labor market shapes job preferences and opportunities for women. Segregation is not restricted to engineering-related fields. Parallel to gender ideology, women in Turkey are mainly concentrated in sectors whose location is home or a private-like space, such as; laboratories, schools, and offices. Even if they are professionalized in a male dominated occupation, they are assigned to tasks related to organization and quality assurance, which is assumed to be suitable for womanly features.

Gender segregation originates from social expectations which attribute domestic duties to women and certain gender roles to accomplish, such as getting married and being a mother. These

expectations are maintained by the structural functioning and gendered discourse of the labor market. That is why it is important to discuss the low rates of women's participation in the labor market in Turkey in addtion to occupational segregation in general and its reflections on engineering occupation. The upcoming parts will center on the elaboration of these two themes.

4.3 Women's Labor Force Participation in Turkey

As a result of legal reforms during the foundation of the Turkish Republic, women were granted equal rights in the early twentieth century. Inspite of the reforms, industrialization and strategies adopted during the 1980s, Turkey's labor market has a distinctly lower labor force participation of women. In 2015, women labor force participation in Turkey is 29 % Worldbank, 2014). As a comparison, labor force participation of women in European Union (EU) (averaged for 19 countries) was 62,5 in 2012.[16]
Available literature indicates that cultural and social factors, education, urbanization and marital status are underlying reasons for lower labor force participation of women (Moghadam, M. 2001; Gündüz-Hoşgör & Smiths, 2006; Dayıoğlu & Kırdar, 2010).

Studies show that factors determining lower levels of women's participation are related with the social roles of women that are associated with childcare and housework. Other studies, however, show that Turkey has a dual economy consisting of formally developed sectors coexisting with a large informal sector (Onaran & Başlevent; 2007). Especially for women, labor market participation is low and continues to fall. This decrease is explained by various studies. (Onaran and Başlevent, 2004). They state that the decrease

[16]http://ec.europa.eu/europe2020/pdf/themes/31_labour_market_participation_for_women_02.pdf.

in the labor force participation rate is partially related to the withdrawal of the younger population from the labor force because of an increase in years of schooling, and as the continuity between household and market production is broken, women who had previously been accounted for as unpaid family workers in the rural areas have become housewives in urban areas, and are recorded as nonparticipants.

The literature indicates that the lack of women's participation in the labor market and their concentration in certain areas of employment have multidimensional reasons. Despite the fact that globalization seems to create new opportunities for women's employment in Turkey, urban women work in certain types of employment characterized as unskilled, low waged and flexible in terms of working hours and pay, insecure conditions, piece work, domestic work, and sometimes unpaid labor. On the other hand, women who have access for higher education are employed in segregated occupations based on gender. They are assigned to "woman tasks" in the work place and they are mainly affected by the liberal idea imposed as "individual success", but have to continue "choosing" within already determined employment choices.

Some studies also argue that the main driving force for women's participation in labor market is the level of education. "A university graduate had nineteen times the odds of participating in the labor market as her counterpart with less than primary schooling; the odds were three times for a high-school graduate" (İlkkaracan, 2012:20). Therefore, as the level of education increases, the probability of women entering the labor market also increases. (Başlevent & Onaran, 2003; Gündüz-Hoşgör & Smiths, 2006; İlkkaracan, 2012).

As for the case of this study, I believe the discussion must focus on gender ideology in Turkey to see how educated women are placed to certain tasks and job types in the labor market. Many studies state that work in capitalism is a gendering process. (Oakley, 1972; Cockburn, 1985; Faulkner, 2000) In this view, capitalism is organized over a preexisting gendered division of labor in family and in the modern labor market; we see that women and men are assigned to jobs which resemble their work types at home. That is to say, the division of labor in the market is determined by the division of tasks in the household.

In Turkey, women are accepted as the caregiver and men take the status of the breadwinner the in family. In the past, women were mainly dependent on their husband's labor; since women's domestic work does not have visible monetary value, women's labor was considered less valuable. In addition, women's confinement to the private sphere and men's hegemony in the public created another ideology of separate spheres, which led to the association of men's labor outside home with economic value and skill. Similarly women's work under capitalism followed the old patriarchal path, and unskilled and low waged jobs were deemed appropriate for women.

Moreover, genders are conceived to have certain essential characteristics which their home-related activities require. In Turkey, patience is considered to be a womanly feature. Women can be patient with routine tasks; they can sustain patience over labor that requires meticulousness (Ecevit, 1991). In addition, the perception about women is that they are not physically strong, so a "hard" job is men's job. A "hard" job means tasks that require handling heavy loads or the tasks that are exhaustive. Women on the other hand, are good at "soft" jobs, which are suitable for the delicate women body (Ecevit, 1998:280).

Gender ideology is also closely related to the organization of work. Gender stereotypes are significant in determining if a job is a "women's or man's job". Due to developing technology, the nature of work and its association with genders is also related to this ideology. In addition, gender ideology affects work place processes and family dynamics in relation to the production and non-production relations mentioned above (Ecevit, 1998: 270).

Turnning back to conditions of late capitalism, the global labor market needed more labor force. Women, not only in Turkey but also in other countries, were invited into the labor market. However discourse about genders, prejudices and stereotypes were too strong. Therefore, undereducated women were concentrated in unskilled jobs. Developing technology made sure that jobs which were once suitable for men, were transformed into routine tasks with mechanization. Parallel to their "pseudo features of patience and meticulousness", women became the new owners of monotonous labor (Cockburn, 1985)

In that sense, it is crucial to note that women labor needs to cope with both vertical and horizontal segregation in the labor market. 40 % of urban working women are employed in white-collar and skilled jobs; however, women working in the service sector also constitute about 40 %. Blue-collar women workers constitute 20 % of urban women. Women are mainly employed as teachers, nurses, sales clerks and as cleaning staff. On the other hand, women employed in professional occupations constitute 29 % of the labor market. Women experience problems in promotion to high level administrative staff; 11 % are men, whereas only 3 % are women (Göğüş-Tan, 2008 in TUSİAD-KAGİDER: 49).

As for the educated, women are confronted with several troublesome situations starting from their education, including work life. In line with the gendered structure of the labor market, educated women are mostly assigned to office or organizational tasks that are thought to be suitable for women's essential features with lower wages than males. Specifying the significance of competition, global market dynamics congest women between family responsibilities and labor market requirements. Maternity leave, therefore, is seen as a career break for women, whereas marital status is perceived to be a sign of a settled lifestyle for many employers. Furthermore, professional women experience the glass ceiling effect; most of them feel they have to behave manly in order to become an authority figure (Bolak, 1997). Child choice is another factor in promotion; most working women have to cancel or postpone having children so that their career would not be interrupted (Ecevit et al., 2003).

Until 2003, the social security framework and legal structure in Turkey institutionalized the male-breadwinner/female-homemaker family model (İlkkaracan, 2012). It was also set that a married woman's participation into labor force was conditional upon her husband's consent. The reform in 2003 amended the Civil Code in a more secular and gender egalitarian way. Yet, today, the AKP government maintains conservative policies that prevent the full realization of amendments in the Civil Code. Scarcity of provisions in Turkish law to ensure reconciliation of work and family still restricts women's participation in the labor market. Existing measures are determined by "the patriarchal assumption" that reconciliation is a primarily a problem of women (İlkkaracan, 2012: 15).

According to Labor Law, workplaces that have more than 150 women employees are obliged to provide kindergarden services. This law makes sure that women are the primary caregiver, since fathers in

workplaces are not associated with childcare need. Inspite of the fact that public workplaces are obliged to provide this service, due to budget cuts after the 1994 economic crisis, there were reductions in the number of public workplace kindergardens (Ecevit, 2010).

These examples show that gender division of labor is not the only socio-cultural factor shaping women's employment. It is also one of the determinants and outcomes of political discourse in Turkey. Women's opportunities in Turkey are shaped by gender ideology, socialization, education, and occupational segregation according to gender. These aspects are strongly related with women's class positions and family orientations. Moreover, I think that women in Turkey are congested between the liberal ideology of building themselves a career and the restricted structural opportunities that are accessible to them. As a matter of fact, women do not have a chance to choose their employment path in a rational or free way. Rather, they are channelled to some occupational chances due to their class positions and cultural orientations.

Engineering is one of the most popular professions which middle class women are channelled into. Before proceeding, I believe it is crucial to look at the structure of the education system in Turkey in order to understand underlying paths leading to the engineering profession. Thus, the next part elaborates on the university entrance exam in Turkey as a dynamic which helps produce and reproduce gendered images with respect to competence in maths and natural sciences.

4.4 Accessing Engineering Profession: University Entrance Exam in Turkey

Despite the gendered prejudices and stereotypes in society, entering into an engineering career in Turkey seems to be a matter of choice**.** It is result of a choice that is made before a person gets her/his result of the university entrance exam and gains the right to choose a university department. In this sense, the university entrance system in Turkey has some dynamics that should be discussed in this part.

When they finish tenth year, high school students in Turkey need to make a decision about sections which determine their future choice in the university entrance exam. Each division is based on an intensive program of courses like mathematics, physics, Turkish language and history. Deciding on a division in high school is depends heavily on the student's grades and, at the last instance, with parents' preferences. For instance, students who plan to have an engineering career would choose the mathematics and science department if they have high enough grades. Therefore, the choice of an engineering career is determined by students' division in high school. It is important to note that students who have the highest grades can choose mathematics and science (MF) division, which opens a way to engineering departments. Engineering departments on the other hand require the highest points in the university entrance exam. Thus, choosing MF and being accepted by an engineering department is a matter of prestige and it also shows intelligence.

The university entrance exam, is based on anonymous performance and choice, therefore the engineering departments do not know anything about their prospective students except their exam points and id numbers. Some studies claim that anonymity of the university

entrance exam allows more women to enter engineering departments, because departments have no say in the matter (Küskü et al., 2007).

However, the number of students in engineering departments in Turkey is not equally distributed in terms of gender. This implies that when women choose engineering, their decision is determined by gendered acceptences other than just being successful at school. The situation might also shows that the comparatively high "representation of women in scientific careers in Turkey is paradoxically coupled with deeply steeped beliefs that tacitly condemn women to traditional roles." (Küskü et al, 2007: 122).

4.5 Gendered Segregation of Engineering Departments in Turkey

The segregation of engineering fields in terms of gender is one of the most visible ways to understand the coupling of tacit acceptance of traditional women roles and their reflection both in perceptions about and perception within occupations. This advertisement of HD[17] İskender shows some distinct points about engineering perception in Turkey. It says:

> HD[18] Kitchens are under the protection of food engineers. Food engineers of HD, who are meticulous, conscientious and careful like mothers, are simultaneously monitoring our branches so that we can provide you the best service. Thus, in HD İskender Restaurants service quality is always maintained.

From the rhetoric of HD ad, we understand that a restaurant's being under the monitoring of an engineer is valuable. It shows us that the engineer's expertise is important and that the restaurant is trustworthy. Thus, the engineer in this ad is perceived as a trusted

[17] HD is a popular restaurant chain.

[18] See, appendix 1.

and prestigious person. However, this person is definitely a woman. Apart from the obvious picture of representation of food engineer, the text next to it defines a food engineer's job is to be careful like a mother. Meaning; the imagined food engineer is not only equipped with scientific knowledge but also she does her job in a motherly way.

The content of this advertisement also reveals the common perception about engineering in Turkey. It demonstrates that some fields in engineering are found to be more appropriate for women because the nature of the discipline suits traditional roles of being women. These perceptions and the gendered reality of segregated fields strengthen and reproduce gendered engineering culture in Turkey.

Studies show that gender segregation is also accepted as a part of the engineering work place and is a significant factor in women's achievement and promotion. Gender related hostilities are reported not only by newcomer women engineers but also by women engineers in the managerial positions. Sources of segregation are stated as occupational segregation among engineering occupations (such as environmental, food and industrial engineering for women; mechanical, electrical, civil engineering for men); segregation over tasks (men for technical tasks, women for quality and organizational tasks); pay gap; unequal promotion chances; glass ceiling effect and using successful women engineers to eliminate misperceptions within engineering (Miller 2002, 2004; Faulkner, 2007; 2009; Watts, 2009; Cech & Waidzunas, 2010).

In accordance with these, pay flexibility in neoliberalism provided wages varied due to the working hours and skill of employee (Keig, 2009: 15). Since women tend to work part-time and mostly in insecure jobs, they earn less money than men. Thus, there is a relation between women's low wages and occupational segregation by

sex, which is the outcome of encouraging the prioritization of family life and mechanisms of patriarchy that channel women into certain roles in society, as well as in family.

In terms of the employment patterns of educated women in Turkey, the impact of republican reforms can still be seen considerably in number of professional women in the labor market. However, only a very small percent of women can reach administrative and decision making positions. Kabasakal's research on the matter gives clues about common characteristics of female senior managers in Turkey (1998:304). Kabasakal states that the ones who manage to get promoted to administrative positions have common strategies while achieving and maintaining their status. These common strategies are described as; not putting herself forward, having a controlled feminine appearance, not being feminists, having a class position of middle, upper middle or upper class; having a strong personality; being ambitious; and sustaining a married life with children. According to Kabasakal, female senior managers in Turkey achieved their position with help of their family's status or through their husband's surname; that is why they do not need to postpone decisions about having children or adopt masculine features in order to become managers (Kabasakal, 1998). In this sense, we can claim that the impact of women's encouragement through reforms is limited to supporting upper class women by family reputation.

Concluding Remarks

The dynamics of labor markets are closely related to social values and acceptances. Relying on these norms, market structure determines professions and it is influenced by professions' dynamics in return.

That is why I find important to deploy a perspective towards engineering with respect to gendered market structure.

During the process of integration, enterprises in Turkey tended to use cheap labor power in order to deal with the competition in the market. Export-oriented strategies and the expansion of informal economy went hand in hand, because export-oriented strategies were implemented mostly in labor-intensive sectors. Most people were employed with low wages and insecure conditions in order to survive in the competitive economy.

Turkey underwent political, economic and social changes towards the 1980s. The military coup in 1980 provided suitable conditions for neoliberal restructuring. Beginning with the Stability and Structural Adjustment Program on 24 January 1980, Turkey started to build a new economic structure based on the increase of production and export in order to gain a place in the global economy (Ecevit, 1998; Karabıyık, 2012). The program was based on liberalization, the decrease of state involvement, increasing privatization and adoption of export-oriented development policies (Boratav, 1990: 199). Real wages declined, while at the same time financial liberalization led to partnerships between the public and private sector due to investments in the construction sector. Alliance between the state and the capitalist class resulted in the creation of a cheap labor force (Boratav, 2005).

During the adjustment period, Taylorist production, which aims to maximize profit by using strictly calculated procedures of exploitation over labor, were adopted. In addition, welfare policies were restructured due to decreasing state intervention. It was thought that with the help of structural adjustment policies, Turkey's employment

would increase and deficiencies like poverty, and unemployment would decrease.

In this process, women's participation into the labor force has been encouraged by legislative reforms and via applications for the indirect rise of women's opportunity to work.

Being a part of neoliberal economy, the labor market structure in Turkey is highly gendered. There is a huge gap between employment rates of women and men employees. Social and cultural factors, education level, urbanization and marital status are emphasized as the determining factors of this gap. I believe gender ideology is at the crossroads of these factors and prevents women from participating in the labor market.

Engineering, the main focus of this study, is a popular profession Turkey. Being addressed as the engine of modernization, professional engineering was brought to Turkey in the early period of Republican reforms with its pregiven social codes. These codes articulated Turkey's strictly gendered structure. From 1965 onwards, Turkey witnessed the rise of the male engineer as a political actor (Göle, 2008: 8). From 1965 until the 2000s engineer-originated politicians became ruling figures of Turkey's politics. Even though middle class women were encouraged to enter the profession, engineering was conceived as an appropriate profession for men, since publicly known examples in Turkey became symbols of managing politics and production.

Today, women in Turkey are underrepresented in engineering fields. In addition, women's distribution in engineering fields changes in relation to the type of engineering with respect to gender roles. Since

it is a highly technical occupation, engineering is still attributed to men and is considered to be a “man’s job”.

CHAPTER 5

CREATION OF GENDERED ENGINEERING CULTURE ON THE SOCIAL LEVEL AND ENGINEERS' FADING IMAGE OVER YEARS

In this chapter, I aim to provide an examination for the way gendered engineering culture is created in Turkey and if exists, a possible change in this culture previous yearsuntil present time. Not only can the dynamics of gendered engineering culture be found in organization of the workplace, but they are also embedded in the claim of a young woman who does not want to choose civil engineering because she thinks "it is not a job for women". Thus, figuring out the construction of gendered engineering culture is a complicated task.

First, judging from the findings, I argue that creation of gendered engineering culture is mainly based on definitions and acceptances about engineering on the social level. These perceptions are based on the relationship between the gender of engineering and the way it is conceptualized and valued in Turkey's society. It is about the society's perception about engineering from engineer's experiences as professionals.

As I have mentioned in Chapter 2, I take gendered engineering culture as a twofold creation. First, it is ideological and is based on a complex web of general and particular discourses formed around traditional gender roles, family, technique, technical know-how, masculine hardness and feminine softness. Within the occupational jargon, these discourses refer to ideological principles of how the "real

engineer" must act, in what conditions "the real nature of engineering job" can be accomplished and what direction "the ideal engineering career" should go.

Second, the materiality of engineering culture is embedded in the actual life of engineers who come across these discourses from the very beginning of their lives, through school and workplace. Women engineers get the tips from society about what kind of a job they should choose for the future, they have a kind of feeling about what engineering education would be like and they also somehow know that, for women, it would be difficult to find a job or to be promoted unless they make certain sacrifices. Their self perceptions and opinions about the occupation are built upon the interactional coexistence of ideological and material terrains. The society's perception of engineering on the other hand, is mainly based on the ideological aspect, which of course is not independent from material experiences of engineers.

Within the design of this chapter, I focus on the social image of engineering. Engineers' perceptions about themselves will be the subject of upcoming chapter. I believe engineers' own perceptions would give answers to another question of this research. Yet, I am aware that interactions between these ideological and material domains interactively produce and maintain gendered engineering culture as they create and manifest it.

On the basis of these ideas, I take gendered engineering culture as a conceptual frame, which enables me to understand some part of gender dynamics. These dynamics may change across countries. I believe Turkey is an interesting case and it may be important when it comes to the relationship between gender and engineering since the number of women engineers are considerably high here due to

Republican reforms as mentioned in Section 4.2 (Öncü, 1982; Smitha & Dengiz, 2010). In addition to this, the engineering profession has a prestigious image on the social level. This image is mostly affected by engineer politicians who were ruling figures in Turkey for some time. All these factors and the ones I will be mentioning in this part, reveals how gendered engineering culture is created on the societal level.

As for the course of this chapter, firstly, I will elaborate on political role of engineers in Turkey. I search for answers about how the profession was conceived as "developers" for Turkey's politics and economy. This image provided the engineer with considerable social prestige.

Dynamics of the prestige of engineering constitute a significant part of the profession's social image. It is found that the suggested social prestige is based on educational success, the position of an engineering field in the hierarchy of engineering departments, and the possibility of earning a decent income. Being conceived to be the the ideal son-in-law, manifests that social prestige attached to engineering profession also comes with acceptances of gender roles suitable for this profession. Secondly I examine these dynamics behind social prestige.

In regard to how changes in global economy affect the engineer's social image is the final topic for this chapter. It is also the answer for the question of change in gendered engineering culture. In this part, I try to picture how engineers perceive themselves with respect to their changing role in economy and their image in the eyes of the society.

5.1 Perception about Engineers as Actors with Social Responsibility

As it was mentioned in Chapter 4, engineers have been important figures in Turkey's politics. From 1965 until the 2000s, engineer-originated politicians had been ruling figures of Turkey's politics. In this part, I discuss the relation between engineering and politics in Turkey with respect to "ideology of engineers" (Göle, 2008) Ideology of engineers is a concept introduced by Göle (2008) and it reflects the idea that engineers as being analytical minded people are also able to solve social problems by using their analytical thinking ability.

My findings regarding is issue are threefold. First, the fundamental idea behind engineers ideology mentioned by some participant of this study. These participants were constituters of the same cohort; they were 40 and over age. Without knowing such conceptualization, they indicated that, with the power of mathematical deduction, one can solve even social problems. Second, Women participants of the same cohort did share the idea on a theoretical level, but they also mentioned that such ideology was not peculiar to engineering profession only. Thirdly, younger participants indicated the engineer's ideology might be common to other professional groups as well. Younger participants were rather apolitical, since they mentioned they did not believe in political struggle.

As it was mentioned in Chapter 4, Taylorizm made sure that the production process can be rationally measured and planned by engineers and by their scientific knowledge. The engineer in that sense was in charge of a mission to understand capitalists' demands and provide the most productive way of completing labor processes. According to Göle, if engineering ideology can be summarized as Taylorizm for factory environment, Thornstein Veblen's calling

engineers to possess political power as being bearers of rational and scientific values moves this ideology to societal level. Therefore, on the one hand ideology of engineers underlines the contradiction between the scientific mind and capitalism. On the other hand, it points to the close relationship between capital and technological development (Göle, 2008:10).

The common idea in Göle's conceptualization of engineers' ideology is the belief of engineers in themselves, and the belief in their ability to change and develop society by using scientific-technical knowledge. This knowledge is associated with rationality. With detailed calculation, even social problems can be solved by a mathematically-oriented engineer mind.

When asked about the relationship between engineering and politics, 7 men engineers in this study who were 40 years old or over, gave a similar definition for what Göle calls 'the engineer's ideology'.

> There has been a group of engineers in Turkish politics of course, starting with Süleyman Demirel. He was the head of the State Water Supply Administration. He became successful in his job, became the head, then some opportunities appeared and he used them. He had potential. Like I said in the definition of engineer, engineers are people with ability to analyze. They are people who can take the data, analyze it, synthesize it, and reach to a conclusion about it. Politicians also must be such a person too. It is so obvious.[19] (Vural, Man, Mechanical Engineer, 40 years old).
>
> So we came to the same point. Mathematics. Ability to analyze, synthesize, deduce, all the same. Engineers run for political positions. I think, it is interesting for engineers because they

[19] Tabii öyle bir mühendis grubu var. Süleyman Demirel'le başlayan. Süleyman Demirel Devlet Su İşleri'nin genel müdürüydü. Teknik olarak yürümüş, mesleğini yapmış, bir yerde de DSİ genel müdürü olmuş, ondan sonra karşısına birtakım imkanlar çıkmış, onu da değerlendirmiş. Potansiyeli de var. Mühendisin tanımında söyledim ya analiz etme yeteneği olan insanlardır mühendisler. Verileri alma, değerlendirme, yoğurma, sonuca ulaşabilme yetisine sahip insanlardır. Siyasetçinin de böyle bir insan olması beklenir. Çok net.

> swichted from technical subjects to social ones. Murat, Civil Engineer[20] (Murat, Men, Civil Engineer, 54 years old)

According to Vural and Murat, by definition, an engineer is the one who has the potential for deduction. Moreover, an engineer knows the logic of deduction by heart, in regard to his relation with mathematics. Murat thinks that this feature of engineers encourages them to move towards social issues like politics. Even though they followed different world views like leftist, rightist and İslamist, and took part in a variety of political positions, engineers in Turkey had a common ideology which makes them believe they can change the world and by using scientific thinking they can make it a better place (Göle, 2008).

Metin gave a parallel defition for engineering and its power of deduction:

> An expert engineer is someone who understands the origin of a subject he does not know. A classical example is Necmettin Erbakan. He was an excellent engineer. Calling him a good engineer is an insult!. They learned to solve problems at İTÜ (İstanbul Technical University). What is this guy's (Erbakan) project? How can I make this country religious? This was the guy's problem. Everybody was mocking him when everybody else was building tanks. Turgut Özal was also a very good engineer. He calculated Saddam's trajectory of thousand missiles, in one night. Süleyman Demirel was excellent. Also an excellent judge of character. …So, I think engineers make good politicians. If he focuses on problem-solving in social matters, he makes a good politician. If he has talent, he has intelligence, an engineer can play with you like a cat play with a mouse.[21] (Metin, Man, Mechanical Engineer, 62 years old)

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[20]Aynı şeye geldik gene: matematik. Analiz yeteneği, sentez, sonuç çıkarma, işte aynı. Onlar da siyasete çok ciddi anlamda atılıyorlar. Mühendisler için daha ilginç bir konu çünkü teknik bir alandan sosyal bir alana kaydıkları için ama nedeni ben büyük ölçüde budur diye düşünüyorum.

[21] Usta mühendis bilmediği bir konuda o konunun özünü yakaladığını bilendir. Klasik örnek Necmettin Erbakan. Süper mühendistir. İyi mühendis adama hakaret. Bunlara problem çözme öğretiliyor İTÜ'de. Adamın projesi ne? Bu ülkeyi nasıl dindar yaparım? Adamın problemi bu. Herkes dalga geçiyordu bununla millet tank yapıyor. Turgut Özal da çok iyi

Participants who experienced the reign of engineer politicians agreed that these figures were good at their actual profession even if they do not agree with their political ideas. However, being a good engineer came out as a positive feature in becoming a good politician. Knowledge of deduction was stated as the key characteristics for an engineer to contemplate social matters.

Recalling the memoirs of the first women engineers in Turkey, from their confrontation with male classmates and employees, we can see that engineering was already a male-dominated occupation at the time. Although engineering was thought to be a gender-free organization in Republican years because it was a new occupation in Turkey[22], in fact, masculine aspects were already part of the engineering culture. Women, even in the reform period, never considered themselves to be one of the equal members of engineers; rather, they were prepared to be assistants/sisters to male engineers (Cockburn, 1985). Composition of male domination in technique of the west, de facto dualism of public/private spheres, and inevitable realities of patriarchal relations constituted engineering occupation in Turkey with its underlying dynamics.

In line with the perspective above, the mentioned engineer originated politicians were all men. Only male participants in this study mentioned a potential link between engineers' ideology and politics. There are no studies to examine whether women engineers share the ideology of engineering. This fact made me wonder about women's perspective on the matter. Do women believe, as engineers, in their

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mühendisti. Saddam'ın silahının menzilini bir gecede hesaplamıştı. Süleyman Demirel müthiş bir mühendis. Müthiş bir insan sarrafı aynı zamanda Yani bence mühendisten iyi politikacı olur... eğer zihnini sosyal konularda problem çözmeye verirse çok iyi olur. Yeteneği varsa, zekası varsa seninle oynar bir mühendis. Kedinin fareyle oynadığı gibi...

[22]See Öncü, Ayşe,1981.

power to transform society as well as production? This question, I think, is important to understand gendered construction of engineering culture in Turkey, to understand how women experience being engineers and if this experience brings them the mentioned beliefs as it does for men.

Four women participants aged 40 and over indicated they think an engineer must have social responsibilities without pointing to its link with deduction, analytical thinking or mathematics. They only noted that not only engineers but also all occupational groups have social responsibilities.

> I never thought engineers make good politcians just because there were examples in Turkey. I think every occupation has social responsibilities. If everyone pull one's weight, this world would become a better place. [23](Gonca, Woman, Mining Engineer, 45 years old)

Some women participants thought that engineering is not a special occupation for becoming a politician. When I asked about the above mentioned idea about engineers' ideology, some participants argued that this ideology might also be common in other occupational groups.

> Engineers engaged in politics, yes. Lawyers as well. I do not think engineers are a special group. I understand your question about deduction. Hmm… yes, may be. But lawyers, doctors can deduct, too.[24] (Semra, Woman, Electrical Engineer, 40 years old)

[23] Türkiye'de örnekleri var diye mühendislerin iyi siyasetçi olacaklar diye hiç düşünmedim. Her mesleğin sosyal sorumlulukları var. Eğer herkes üstüne düşeni yaparsa bu dünya daha güzel bir yer olur.

[24]Evet, mühendisler politikaya girdiler ama ben bunun mühendislere özel olduğunu düşünmüyorum. Tümevarımla ilgili sorunuzu da anlıyorum. Hmm, yani belki. Ama doktorlar da avukatlar da tümevarım yapabilir.

It is understood that while men engineers of the elder cohort perceive deduction as a significant feature for engineers to master politics, women engineers of the same age group do not take this aspect to be specific to engineering. I believe this creates a difference between gendered images of how engineers perceive themselves. Men engineers have a self-esteemed professional view; however, women think they are ordinary. Men engineers in this study think they can carry their professional ability into politics; women do not tend to participate in politics. Since major political figures are also male, women do not think they correspond to engineers in politics. I believe these differences reflect their participation in occupational chambers and daily politics. Here, I must also note that politics, for both groups, is understood as politics in its major meaning. Daily struggles, campaigns for occupational issues and rights usually did not count as politics.

Finally, I found it interesting that participants from the cohort with under 40 age, agreed with the general concept of engineers' ideology, but they did not embrace the idea. Younger participants did not tend to conceive themselves of social actors. Regardless of gender, younger participants mentioned engineer politicians as old stories of politics in Turkey. Participants in this age group were rather apolitical.

> 'If you are messing with politics, something bad happens to you.' This is how we were raised. Our parents taught us that. I also think that it is true. I do not think so much about politics, I do not think we can change the world. (Bahar, Woman, 29, Mechanical Engineer)[25]

> I do not think politics and engineering coincide. There might be exceptions for every profession. I mean anyone can be a

[25] "Eğer politikaya bulaşırsan başın belaya girer." Biz böyle büyüdük. Annelerimiz bize böyle öğrettiler. Valla ben de aynı şekilde düşünüyorum. Politika hakkında çok fazla düşünmüyorum. Zaten dünyayı değiştirebileceğimize de inanmıyorum.

> politician. I personally hate politics, never been a part of it, never will be. (Murat, Men, 30, Environmental Engineer)[26]

These two quotations above show two common tendencies among younger generation engineers' attitude of politics. First, they think politics is dangerous, because in their parents' time it was. Children who were born after the 1980 coup in Turkey, are afraid of politics. They have heard stories of fighting students from different ideologies killing each other on the streets. Students of the past are parents of the present generation. Thus, they told their children to stay away from anything related to politics. The second tendency among participants was a distrust towardspoliticians and their deeds. These two attitudes were common among younger participants. Compared to elder cohort, the younger participants did not perceive engineering ideology as a power for social change. Even though they accept that engineers know how to deduct, this knowledge is not mentioned as a source of pride, confidence or progress as it was mentioned by elder respondents.

5.2 Prestige of Engineering on the Social Level

Engineering was indicated as a prestigious occupation by most of the participants. Prestige was mainly felt by engineers through positive reactions from society such as praising, affirmation, trust and acceptance. Some participants said that apart from the prestigious image, they were also respected by other people in regard to their profession.

According to participants, prestige is constituted of many factors. Being a successful student was an important indicator for the

[26] Ben mühendislikle siyasetin kesiştiğine inanmıyorum bi defa. Yani her meslek için istisnalar olur. Yani herkes politikacı olabilir. Ben şahsen nefret ediyorum politikadan. Hiç parçası olmadım, olmam da.

prestigious image of engineering. This aspect fited both women and men participants. Prestige started from high school departmentalization and was mainly related to success in mathematics and in natural sciences.

In addition to the successful student image, the hierarchy between engineering departments also determines the level of prestige. Respected departments enjoy more prestige than others. Women participants indicated they even got more respect than male colleagues when it came to social prestige. Women from higher departments of the hierarchy were more respected because it was the common idea that they have managed to get a place in a male-dominated profession.

Thirdly, engineering in Turkey is regarded as a middle class occupation. It has more potential for employment than many other professions. There is also more possibility of earning a higher income. This is why engineering is prestigious as a middle class occupation.

On the basis of these points, engineering is seen as prestigious and an engineer is conceptualized to be the ideal son-in-law within Turkey's popular culture. As mentioned by some participants, together with the factors above, the engineering profession is regarded as a key to successful marriage - also told in a well known joke[27].

5.2.1 "If you are smart you are a MF person": High School Categorization of Students

In Turkey, the high school education system channels students to get additional private courses for their studies. There is a huge market of

[27]" Beni ne doktorlar ne mühendisler istedi" See, https://eksisozluk.com/beni-ne-doktorlar-ne-muhendisler-istedi--226839?nr=true&rf=beni%20ne%20doktorlar%20ne%20muhendisler%20istedi

private supportive schooling, which costs money and effort for both families and students. In order to enter university, a student has to take the university entrance exam and be successful out of more than one million people each year. Therefore, high school years are highly competitive.

As it was mentioned earlier, the high school system in Turkey directs students to choose departments. These departments are; MF - for maths and science, TM - Turkish language and maths, TS - Turkish language, social sciences, and finally foreign languages. Each department is concentrated with courses in regard to students' orientation. To be able to choose one of these paths, student's grades need to be above satisfactory in related courses.

Such categorization determines students' preferences in the university entrance exam. A MF student can only prefer occupations in which mathematics and science knowledge is fundamental. Engineering, medicine are MF occupations, whereas law, psychology, and political sciences are choices for TM.

Starting from high school, students who choose mathematics and natural sciences departments are perceived as the most intelligent ones because MF students can choose the most respected professions such as engineering and medicine. Other departmental choices are noted as laziness. Most participants declared that MF is the most wanted department in high school. It is also underlined that this image is produced by the education system itself, teachers, parents, other students and by the public. Thus, being an MF student might be seen as the first step to prestige.

Being a MF student is not only valued among students but also by parents, and the general public expects successful students to go the MF department.

> There was a general perception about being a MF student: if you are sucessful, you ought to be MF. If you are lazy, you go to TS. For instance, a friend of mine swicthed from MF to TM. He was found to be odd. He could not bear the social pressure and switched back to MF.
>
> Hence, my choice was also compatible with society's expectations. The expectation for a successful student was to choose MF, so I did choose it. I did not think much about it, I did not ask if I really wanted it.[28] (Tolga, Man, Food Engineer)

As a matter of fact, all participants in this study had preferred science and mathematics departments during their high school years so that they could apply to the engineering departments of universities. According to most participants, society is usually more familiar with occupations related with maths and natural sciences because what these occupations do, is known by more people. That is why MF is also a demanded department.

> If you are smart you are a MF person. This idea also implies the fact that, actually we can not picture what social science departments do in our minds. (Semra, Woman, Electric and Electronics Engineer)[29]

Some participants stated that choice of the high school department was not their own but circumstances led them to choose engineering. Fulya, electrical ad electronics engineer noted:

[28] Şimdi MFci olmakla ilgili genel bir kanı vardır: eğer başarılıysan, sen MFcisindir. Tembelsen TS'ye gidersin. Mesela, benim bir arkadaşım MF'den TM'ye geçmişti. Tuhaf karşılandı. O da tekrar değiştirdi. Mahalle baskısına dayanamadı. Yani benim seçimim de toplumun beklentisiyle uyumluydu. Beklenti başarılı bir öğrencinin MFci olmasıydı, ben de öyle oldum. Bunun üzerinde çok düşünmedim. Gerçekten bunu istiyor muyum diye sorgulamadım.

[29] "Sen akllıysan MF'cisindir. Bunda şey de var. Sözel bölümdeki insan ne yapar, onu canlandıramadığımız için de böyle düşünüyoruz."

> I was a successful student in high school. My grades were all 5.[30] Teachers told me to choose engineering. I did not understand the whole picture at that time. Because, if you go to social sciences, people think you are lazy. (Fulya, Woman, Electric and Electronic Engineer) [31]

Fulya supports Ayşe's narrative about the status of choosing a career path in sciences and mathematics.

> Engineering was so popular. If you choose MF, you will either choose to study medicine or engineering in the university. If you are smart you do not have any other choice. Your own preferences are not important. You cannot think of other occupations. I directly told them that I am not going to be a doctor. My only choice was to be an engineer.[32] (Ayşe, Woman, Computer Engineer)

An important indicator in choosing engineering as a profession is that it was mainly supported by teachers and families. All interviewees argued that engineering is considered a respected occupation. It is an indicator of being intelligent and hardworking. In my interviews, women participants told me that they knew they were entering one of the most male-dominated professions. They had little information about what engineers actually do.

Interpreting from experiences, I argue that the most important factor that channel young women to engineering is their ability to do maths. It is also one of the overt barriers (Nicholson, 1996) for all students.

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[30] "5" is the highest point in high school grading in Turkey.

[31] "Lisede çalışkan bir öğrenciydim. Notlarım hep beşti. Hocalarım mühendislik yazmamı söylediler. O zaman tüm resmi anlayamamıştım, çünkü sosyale gidersen insanlar tembel olduğunu düşünür."

[32] Mühendislik çok popülerdi. Eğer MFyi seçersen üniversitede ya tıp ya mühendislik seçeceksin. Zaten eğer zekiysen başka şansın yok gibi. Senin tercihlerin önemli değil. Diğer meslekleri düşünemezsin bile. Ben direk doktor olmam dedim. Dolayısıyla mühendis oldum.

The structure of the education system only allows the ones with mathematical ability to choose the engineering profession.

For male students, math is a significant factor as well, but engineering is somewhat a natural choice. According to my data, men choose engineering because they are interested in technology and machinery. On the other hand, successful women participants do not have any other choice other than being doctors or engineers. The ones that are more into maths choose engineering but their path is not as linear as men's (Robinson & McIlwee, 1992:45). This choice has background dynamics based on academic success, family background, and attractive challenges of engineering education, such as being able to cope with difficult maths problems, or creating a working tool with detailed calculation (Robinson & McIlwee, 1992).

Related literature indicates that family background is an important indicator of professional choice in engineering (Robinson & McIlwee, 1992). According to this, women engineers tend to come from engineer families. Parents' education came out as an influential factor in my study as well. As it can be followed from Table 2 below, the most frequent profession of the fathers of women engineers is again engineering. However, men engineers do not follow the same pattern. Father's education does not seem to have an impact on professional choice for men engineers.

Table 2. Parents' Occupation

Women Engineers				Men Engineers			
Father's Occupation		**Mother's Occupation**		**Father's Occupation**		**Mother's Occupation**	
Engineer	9	Teacher	12	Worker	4	Teacher	7
Soldier	3	Housewife	11	Engineer	3	Housewife	9
Worker	2	Accountant	1	Self-employed	3	Engineer	1
Accountant	2			Technician	3	Nurse	1
Worker	2			Farmer	1		
Bank employee	2			Bank employee	1		
Director/tv sector	1			Pharmacist	1		
Policeman	1			Doctor	1		
Doctor	1						
Attorney	1			Unemployed	1		

The mothers' occupations conform to the traditional gender role structure in Turkey. Mothers are mostly composed of teachers and housewives. This table shows that the father's education might be an influential indicator of choice for women engineers. That is to say, fathers might be role models for young women students who are successful in certain courses. Apart from fathers, close relatives and siblings might act as role models for participants. Ayşe indicated that her sister was her role model and affected her choice.

> My mother and father are both accountants. They think analytically. My elder sister and I took the same characteristic from them. She studied physics in Istanbul Technical

> University. She was my idol. Once I prepared a small piece for my parents when I was in elementary school. I had talent in theatre as well. My teacher told my parents that I am talented. They were proud at that time but they did not orient me into arts. [33](Ayşe, Woman, Computer Engineer)

Ayşe was unhappy with becoming an engineer. She told me she had always wanted to be in the field of arts. She does not even want to call herself an engineer. It is obviousthat her role model and her parents were influential in her choice, although she had other skills and interest in other fields. Rüya, an environmental engineer, also indicated the importance of role models in her family, which determined her carrier path.

> I have three brothers. They all studied science and mathematics. One became an electrical engineer, one is a pharmacist and the other one is a medical doctor. I was the youngest in the family. They oriented me to studying engineering. They were already earning money at that time, so they supported my studies in the university. I did not know what I was doing, actually. But when I passed the exam, I thought I was so lucky. There had never been segregation between me and my brothers in the family. Even if there was, the three of them would have protected me. Told you, I was lucky.[34] (Rüya, Woman, Environment Engineer)

Both women and men participants stated that choosing a path in high school was also matter of appearance. Since getting high grades

[33] Annemler ikisi de muhasebeci. Analitik düşünürler. Ablam ve ben de bu özelliğimizi onlardan almışız. Ablam İTÜ'de fizik okudu. Benim idolümdü. Bir defasında bizimkilere bir piyes hazırlamıştım. İlkokuldayken. Tiyatroya da yeteneğim vardı. Öğretmenim annemlere benim yetenekli olduğumu söylemiş. O zaman tabi gururlandılar ama beni sanata yönlendirmediler.

[34] Üç tane ağabeyim var. Hepsi matematik ve fenle ilgili şeyler okudurlar. Biri elektrik mühendisi oldu, biri eczacı, biri de doktor oldu. Ben en küçüktüm. Ağabeylerim beni mühendisliğe yönlendirdiler. Çoktan para kazanmaya başladıkları için üniversitede masraflarımı hep onlar karşıladı. Ben aslında ne yaptığımı pek bilmiyordum. Üniversite sınavını kazandığımda kendimi çok şanslı hissettim. Ağabeylerimle benim armada hiç ayrımcılık olmadı. Ailede yani. Olsaydı bile buna karşı çıkarlardı. Dediğim gibi, şanslıydım.

from maths and natural science courses was accepted to be a difficult task, being a MF student was prestigious because of its challenges. Some participants noted that being a successful student and the difficulty of entering engineering schools was one source of this positive opinion.

> When you enter engineering you gain self-confidence, because you are the chosen ones. People also think you are successful because you are chosen.[35](Nevriye, Woman, Chemical Engineer)

It is stated that this situation was unspoken, yet it -was known to many people inside and outside the school environment, especially to parents. Some participants indicated that choosing MF was also a way to prove themselves to their parents.

> Actually, I was interested in literature and arts. However, becoming an engineer was to be proficient. This way, I could prove myself to my father. It was like becoming a man in the eyes of my father. So I chose MF. My father told me that I did not have any other option. He stated he would have prevented me from choosing other fields. I did not want to be a lawyer or geography teacher, I had to be a science student. (Esin, Woman, Metalurgy and Materials Engineer) [36]

When I asked the same participant to open up her statement about "becoming a man in the eyes of my father", she noted that being good at maths and sciences is usually associated with being male. Her father, wanted his kids to be engineers, just like himself. According to Ender, being good at maths and related courses was the first step on

[35] "Mühendisliğe girince kesinlikle çok özgüvenli oluyorsunuz. Çünkü çok seçildik. İnsanlar da böyle düşünür, çünkü seçilmişiz."

[36] Ben aslında edebiyata sanata falan meraklıydım. Ama mühendis olmak yeterli olmaktı. Yeterli derken, babamın gözünde erkek olmak gibi bir şey. Tabi MF seçtim. Babam zaten başka seçeneğim olmadığını söylemişti. Başka şey seçersen seni engellerim filan demişti. Ne bileyim, avukat ya da coğrafya hocası olmak istemiyordum, mecbur fen öğrencisi oldum.

the way to engineering. That is why being a MF student was also a way to live up to her father's expectations.

In my study, participants of all age groups fullfilled the expectations of their social environment when they chose a path to engineering. Men felt it was natural, women made a decision out of causation. They both benefited from this choice to some degree. My findings show that the engineering profession still has considerable prestige on social level both for women and for men. Yet, the level of prestige changes according to the engineering field. Some fields get more prestige, some get less. In fact, prestigious fields attract more men than the ones which contain fewer women and are argued to be lower in prestige. In the next part, I examine the relationships between level of prestige with gender and reasons for the suggested hierarchy among engineering fields.

5.2.2 Hierarchy among Engineering Departments

Some fields of engineering are reported to have more prestige than others. Most participants argue that there is a hierarchy between engineering departments both in the eyes of the public and also among engineers. Age was not a significant category in regard to perspectives towards the engineering hierarchy. Both cohorts gave consistent answers. With respect to this, the top three engineerings are indicated as; mechanical, civil and electrical engineering.

Participants also stated that the hierarchy was spoken and it was known not only by non-engineer people but also by everyone who had a relation with engineering. However, there were different ideas in terms of the causes of that hierarchy. The most mentioned reasons for having higher rank were; its fundamentality, its close relation to mathematics, and job opportunities. That is to say, is an engineering field is one of the fundamental branches that opened up into sub

branches in time and if it is mathematics intensive then the field is accepted to have higher rank. Job opportunities is another crucial reason for being higher ranked, because it is thought that fields having features mentioned above are also capable of accomplishing other tasks even if they are specific to other branches of engineering.

5.2.2.1 Different Masculinities

My findings concerning hierarchy of engineering fields contrasted with Hacker's research in 1989 in terms of its definition of masculinity Hacker argues that electrical and computer science has more prestige than other engineering fields because these fields are clean, hard and fast. Civil engineering for instance, is too much involved in natural, messy stuff. These features are closer to the "feminine world of nature and people", while electrical and computer engineering are from the "masculine world of speed, sophistication and abstraction" (Hacker, 1989:36).

According to Hacker, the status gap between engineering fields occured as a result of gendered connotations of the nature of their work. From Hacker's terminology, my study would have revealed that fields with feminine features have higher status in the hierarchy. I believe this contradiction has its origin in both studies' contextual realities. That is to say, Hacker's research took place in the 1980s in the US. She studied in a time when digital technologies were transfroming the old mode of production. Electrical and computer engineerings were at their status peek.

The findings in my research show that in Turkey, fields requiring manual competence and mathematical intensity have more prestige. It shows that engineering in Turkey is valued because of its combination of theoretical ability and physical toughness (Cockburn,

1985; Collinson, 1988). That is to say, mathematical ability combined with manual experience, thoughness, reckless swearing, and insulting jokes about femininity defines a prestigious engineer.

Hacker argued that civil engineering had feminine features because it was close to nature and and it was messy. From my findings, working in messy conditions was stated as a difficulty of work which can be carried out by men. Being able to handle with dirt and heavy work was a sign of being an actual man. Moreover, since mechanical and civil engineering takes place in public spheres like construction yards and factories these fields were thought to be more suitable for men. As for electrical engineering, it was a field which had a vast range of job opportunities. That is why it was stated as the highest in the engineering hierarchy.

I came up with a different masculinity definition towards engineering in Turkey than Hacker found for her time in the US. The difference is not surprising yet it is significant. This difference reflects society's understanding of how an actual man should be. It also determines the expectations about engineering profession in Turkey. Being top three in the hierarchy, masculine departments in Turkey creates an ideal gendered culture in Turkey.

That is to say, the top three engineering fields in Turkey have gendered connotations just like Hacker suggests. Yet, definitions of masculinity, and valued masculine features change across cultures. In Turkey as I suggest, working class toughness, strength and freedom to work in the public sphere are mostly valued if they are combined with mathematical ability. In fact, these aspects ensure that the engineering occupation is secured for men, at least on the theoretical level. In real life, this image makes it more difficult for women to enter the engineering profession.

5.2.2.2 Reasons behind the Hierarchy of Engineering Fields

I asked participants the reasons behind this ideological hierarchy.

> When it comes to the hierarchy, fields which depend on fundamental sciences are always higher. Now other fields have sprung up as aresult of need. They are all needed. I used to think the same way, I changed my thoughts. I think all of them are important. Now electronics and computer has hegemony over all engineering fields [37](Nevriye, Woman, Chemical Engineer)

Common perspective towards departmental hierarchy was based on their fundamentality. Twenty participants noted that fields which are accepted to be basic engineering, namely mechanical, civil and electrical are the top three in the hierarchy. Participants added that these three fields sprung up and gave way to other departments. Though, the top three engineering subjects were argued to give their graduates the capability to accomplish other engineering field's work, as well.

> Mechanical, civil, electric are the top three. I find it wrong to say it, but a mechanical engineer can do everything. He/she can work with thermo, automobiles, with planes. A mechanical engineer has a larger range of knowledge. It has a very large field. A mechanical engineer knows about materials, not as much as materials engineer maybe. In regard to job opportunies, the last three; for example, there is physics engineering. I do not know what it is. For instance, environmental engineering. It is very useful but I can work in this field as a mechanical engineer. I think we get the basics (in mechanical engineering) (Aslı, Woman, Mechanical Engineer)[38]

[37] Hiyerarşiye gelince temel bilimlere dayanan dallar tabi daha yukardadır. Şimdi ihtiyaca göre diğer dallar türedi. Hepsi gerekiyor. Ben de aynı şekilde düşünüyordum düşüncemden döndüm. Bence hepsi önemli. Ona bakacak olursak şimdi tüm mühendislik dalları üstünde elektronik ve bilgisayar hakimiyeti oluştu.

[38] Makine, inşaat, elektrik ilk üçtür. Bunu ayıp buluyorum böyle düşünmeyi ama makineci herşeyi yapar arkadaş. Isıda da çalışır, arabada da, uçakta da çalışır. Daha kapsamlı bilgisi vardır makinecinin. Çok geniş bir alanı var. Malzeme de bilir makinacı. Ama bir malzemeci kadar değil orası öyle. Son üç mühendislik iş bulmaya yönelik mesela fizik mühendisliği diye

This perspective focuses on job opportunitiess. According to the participants of this view, the top three engineering fields have more opportunities in the market because their range of knowledge is wide. This brings more opportunities formore wage. Income and power were noted as other factors. I think power here refers to social and financial capital. These occupations have also more power as a result of financial and market opportunities. Their chambers are also powerful. Tolga points out that the condition of the chambers is an indicator of how powerful an engineering field is.

> It is not just my opinon. There is a spoken hierarchy between engineerings. The top is mechanical engineering. The power of its chambers is an indicator of that. Recently, the Chamber of Mechanical Engineers built its own skyscraper in İzmir. On the other hand, the Chamber of Food Engineers is hardly collecting monthly payments. They have a place just a bit larger than this one. Actually, I think fields that engage with basic engineering sciences have a unique place in the hierarchy. What are those? Mechanical, civil and electric electronic. When you look at the origins of engineering, a person who works with algebra, there should not be a field called food engineering. It is nonsense. Food is going to work with algebra? Chemical engineering is the same, textile is same. However mechanical, civil and electric they have algebra as basics. When it is called engineering in society, these are the originally fields of engineering. (Tolga, Man, Food Engineer)[39]

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bişey var ama ne olduğunu bilmiyorum. Mesela çevre mühendisliği. Çok faydalı birşey ama makineci olarak da bu alanda çalışabilirim. Temeli alıyoruz gibi düşünüyorum.

[39] Mühendisliklerin bana göre değil aslında konuşuluyor bu, en babası diyeyim makine mühendisliği. Odasının güçlü olması da bunu gösteren bir şey. En son İzmir'de kendi gökdelenlerini yapıyordu makine mühendisleri odası. Gıda Mühendisleri ise aidatları toplamakta zorlanıyorlarmış. İşte şundan biraz daha büyük bir yeri var. Aslında zaten, bana göre gerçek mühendislik bilimleriyle uğraşan bölümlerin odaları ve diğer hiyerarşideki yeri de farklı. Bunlar neler? Makine, inşaat, elektrik elektronik. Zaten mühendisliğin temeline baktığımızda cebirle uğraşan olduğunu düşünürsek, gerçekte bana göre gıda mühendisliği diye bir mühendislik olması gerektiğini ben düşünmüyorum. Saçma! Gıda mı cebirle uğraşacak? Kimya aynı şekilde, tekstil aynı şekilde. Ama inşaat, makine ve elektrik bunların temelinde cebir var. Toplumda mühendis dendiği zaman esas itibariyle bunlardır.

Here we come back to the importance of mathematics in engineering. Algebra, Tolga claims, is the origin of engineering. Departments which require the most mathematics are regarded to be on top, because mathematics is thought to be the distinctive feature for an engineer. Vural's words supports this idea:

> We still speak of laymen. There is a very clear hierarchy because there is mechanical engineering on top. It is on top but the reason is not knowledge or creativity. It is the most known, most reputable branch. Then comes electrical engineering, industrial engineering. Because it says industry, people pay attention to keywords. Among engineers, industrial engineering is lower. It is called "higher grocery calculation" in quotation. In such an insulting way. (Vural, Man, Mechanical Engineer)[40]

> Me: What do you think about industrial engineering?
>
> Metin: Industrial Engineering? (Huge laugh)
>
> Me: I wish I could use this laugh in the dissertation. (Metin, Men, Mechanical Engineer) [41]

Fields that do not contain heavy mathematics are not respected. Industrial engineering might be the most belittledd field. Within the frame of this study, industrial engineering was insulted many ways in terms of jokes, laughs and comparisons. Even though industrial engineering gets the most successful students in regard to points in the university entrance exam, it is not respected because it is verbal:

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[40] Sade vatandaşı konuşuyoruz hala. Çok net bir hiyerarşi var. Çünkü en tepede makine mühendisliği var. Makine en tepededir ama bunun sebebi bilgi ya da yaratıcılık değildir. En çok duyulmuş, en itibarlı daldır. Peşinden elektrik mühendisliği, endüstri gelir. Çünkü endüstri geçiyor orda. İnsanlar keywordlere takılıyor. Mühendisler arasında daha aşağıda durur. Endüstri mühendisliği için tırnak içinde yüksek bakkal hesabı denir. Bu kadar aşağılayıcı bir şekilde.

[41] Ben: Endüstri mühendisliği hakkında ne düşünüyor sunuz?
Metin: Endüstri mühendisliği mi? (kahkaha)
Ben: Bu kahkahayı tezde kullanabilsem iyi olurdu.

> Esin: With respect to the prestige coming from society I put electric electronic, computer, mechanical and civil engineering on top. For many people metallurgy is not a basic branch. It has evolved from chemistry. It was a sub-branch of it, then it appeared as a department.
>
> Me: What about others like environmental, food engineering? Are they not basic engineering subjects?
>
> Esin: Of course they are not. Industrial, environmetal and so on are not basic engineering. Industry is “endüttürü”, I mean it is like nothing, not nominal. Mathematics is rather less. It does not require much intelligence. Environmental, food and industrial engineerings are feminine engineerings. (Esin, Woman, Metallurgy and Materials Engineer)[42]

Here, it is obvious that engineers think mathematical ability equals intelligence. They usually do not count verbal ability as a sort of intelligence. Therefore, they accept rather verbal fields as peripherial and insignificant.

Another important aspect of the hierarchy was related with gender. Mechanical, civil and electrical engineering are the least women populated departments. Women populated fields such as food, environmental, chemical, and industrial engineering are accepted as the last fields in the suggested hierarchy.

> Me: Do you think there is a hierarchy between engineering departments?
>
> Mine: "Yes! And how! I can mention the hardcore engineerings right away. Electric, civil, mechanical. It is like two plus two equals four. Also computer, recently... Why hardcore? I think the reason is obvious. They earn a lot. These three fields earn a

[42] Esin: toplumda gördüğü saygıya göre bence mesela en tepeye elektrik elektronik, bilgisayar, makine, inşaat koyulur. Çok insana göre metalurji temel bir branş değildir. Kimyadan evrilmiş gibidir. Orda bir alt alanken iken sonradan bölüm olarak ortaya çıkmışır.
Ben: Peki çevre, gıda temel mühendislik değil midir?
Esin: Değiller tabi. Endüstri, Çevre filan temel mühendislik değiller. Endüstri zaten endüttürüdür yani hiç böyle, sözeldir. Nispeten matematik azdır. Çok zeka gerektirmez. Çevre, gıda, endüstri zaten kadın mühendislikleridir.

> lot. Power also strengthens masculine culture. The scarcity of women feeds it.[43] (Mine, Woman, Civil Engineer)

Within the suggested top three fields, women are fewer in number. As a result, the professional culture is mainly masculine and does not welcome women. Power and masculine culture goes hand in hand according to Mine. Male hegemony in these departments produces and reproduces its gendered culture through social and financial opportunities open to men.

It is argued by many participants that fieldwork and difficult conditions characterized masculine engineering fields. The top three and fieldwork requiring departments were accepted as masculine engineerings. However, some participants argued so-called feminine engineering fields, also had dirty and heavy work loads. Mine indicates that chemical engineering might be even harder than civil engineering in terms of work conditions.

> It is very interesting. Chemical engineering for instance! Once I was told "chemical engineering, such a sweet engineering!" I do not know why there is a perception like that. Chemical engineers work in factories. They work in a masculine environment. One-to-one with workers. I think it is harder than civil engineering. For example, the director of the construction yard has a separate office. However, a chemical engineer is just inside the production. They experience more difficulty. But Chemical engineering is perceived as a female occupation..[44] (Mine, Woman, Civil Engineer)

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[43] Ben: Sen mühendislikler arasında bir hiyerarşi var mı?
Mine: Evet! Hem de nasıl var! Hardcore mühendislikleri hemen söyleyeyim: elektrik, inşaat, makine. Bu artık iki kere iki dört gibi birşey. Bilgisayar son zamanlarda...bence sebebi çok açık. çok kazanıyorlar. Bu üç dal çok kazanıyor.

[44] Çok ilginç birşey. Mesela kimya mühendisliği. Hatta bana "kimya mühendisliği ay çok tatlı bir mühendislik" demişlerdi. Orda neden öyle bir algı oldu bilmiyorum. Kimyacılar hep fabrikada çalışırlar. Çok eril kültürün içinde çalışırlar. İşçilerle birebir çalışırlar. Bana göre inşaata göre daha zordur. Yani şantiyede mesela şantiye şefinin ayrı yeri vardır. Ama öbürü direkt üretimin içindedir. Çok daha fazla zorluk çekerler. Ama o bir kadın mesleği görülür. Kimya mühendisliği.

Feminine engineering fields' work load mainly takes place in rather private spaces. Chemical, food, environmental and industrial engineering are all performed in closed and refined places. I believe this situation supports traditional space distinction among genders. Women stay in the private sphere even if it is a workplace. That is how their presence is accepted.

In addition, the private sphere work load oriented departments are accepted as feminine departments.

> Engineering has a respected image. If you are a woman and an engineer, you get more respect. Because people think that it is unbelievable. It is unbelievable in other countries too. For instance, in Italy when you say 'I am engineer', people say 'wow'. (Nevin, Woman, Mechanical Engineer)[45]

Women participants in this study stated that being an engineer is respected and being a women engineer is always plus one in the eyes of the public. As Nevin mentions, a woman who becomes an engineer is regarded as "unbelievable". Though not spoken out loud, women are not accepted to be usual occupants of engineering. Entering into engineering departments is already difficult in Turkey, its education is hard to carry on, and above all it is perceived to be a male occupation. That is why, it is implied, and women engineers are more respected. Furthermore, being a woman member of masculine[46] engineering fields, which are less women populated are indicated to be more prestigious. A woman doing a man's job is respected in the society, because it is perceived to be beyond her ability.

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[45] Mühendisliğin saygın bir imajı var. Kadınım ve mühendisim dediğinde daha çok saygı duyuluyor. Çünkü bu insanlara inanılmaz geliyor. Yurt dışında da böyle. İtalya'da mesela birine mühendisim desen 'ooo' diyor."

[46]Masculine Engineering Departments, Zengin, 2000.

> If you are from one of the masculine engineerings, for instance, electrical engineering, being a woman is more respected. Women practicing engineering are not usual in Turkey. (Fulya, Women, Electrical Engineer)[47]

On the other hand, some participants stated, among engineers themselves being a woman engineer is not as prestigious as it is in the eyes of the public. Women engineers are not respected by their male colleauges. Moreover, femininity as a whole is also not welcomed among engineers. Activities atttibuted to femininity such as wearing a skirt and using makeup affects the degree of respect women engineers get from colleagues. Aslı's story is a clear example of this understanding:

> Women even get a better one. People think "she managed to be an engineer". Especially fields like mechanical and civil engineering gets more respect, or that is how I feel. However between engineers when your gender is on the surface, the respect you get decreases. I think there is so much negative reaction to femininity. You wear a skirt, you put on makeup...[48] (Aslı, Woman, Mechanical Engineer)

When asked about the level of respect for both women and men engineers, Aslı told me that women get better reactions from other people. Since engineering is accepted as a male-dominated and difficult profession, managing to become an engineer is a big accomplishment in the eyes of the public.

On the basis of these points, the hierarchy of engineerings is a phenomenon in which overt and covert barriers for women intersect.

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[47] "Erkek mühendisliklerinden birindeysen, mesela elektrik gibi, kadın olduğun için daha çok saygı görürsün. Bence kadınların mühendisliği yapması hala çok oturmamış Türkiye'de.

[48] Kadınlar daha iyi bi tepki bile alırlar. İnsanlar şöyle düşünüyor: bu kız mühendis olabilmiş. Özellikle mesela makine, inşaat gibi bölümler için daha çok saygı duyulur. Yani en azından ben öyle hissederim. Mühendisler arasında öyle bir tepki almazsın, hatta cinsiyetin ön planda ise saygı azalabilir bile. Kadınlığa karşı çok önyargı var. Etek giyersen, makyaj yaparsan...

The top three engineering fields are mostly preferred by men. These fields require heavier conditions yet they have more opportunities for employment and income. Women are overtly excluded from these departments because there are very few women. In addition, they deal with covert barriers because social acceptances about women's nature do not coincide with the heavy conditions of work. Therefore, women usually opt for feminine engineering fields.

5.2.3 Engineering's Image as a Middle Class Profession

Social class is what makes an operator different from an engineer. (Oldenziel 1999; 2010). Engineers are white collar workers of production processes. Historically, the engineer has never been the patron of the means of production. The engineer is the skilled technician who exchanges his technical knowledge for wage (Cockburn, 1985).

> Engineering is one of the occupations where class difference hits you in the face. In engineering workshops, from the construction yard to the factory, a person memorizes class struggles, distinctions, reactions of people from different social classes. How they think, how they see...[49] (Esra, Woman, Mechanical Engineer)

As Esra clearly puts it, the factory is a place where a person can easily observe class struggles, their thoughts and reactions. Everything that makes a person a member of a class position; values, behaviors, words, jokes, mymics also determines the occupational class. Engineering in Turkey is mainly defined as a middle/ upper middle class occupation regardless of its income potential. However heterogenious, many engineers also work with enough income to

[49] Mühendislik sınıf ayrımının insanın suratına çarptıran mesleklerden bir tanesidir. Mühendislik ortamlarında şantiyeden tut fabrikaya kadar bir insan sınıf çatışmalarını, ayrımlarını, hangi sınıftaki insanın nasıl düşündüğünü ve gördüğünü, ne tepki vereceğini ezbere bilir.

sustain middle/upper middle class lifestyle. Therefore, social class becomes one of the most obvious factors that makes an operator different from an engineer in the factory.

Köse and Öncü (2000) examine engineer's economic class positions in Turkey with respect to engineers working in public and private sectors. According to Köse and Öncü, engineers being enrolled in small and medium size firms do not hold an exact class position. They are either self employed and they are management based capitalist investors or they are employed by small and medium size firms and their position is closer to that of blue workers. However in both cases, engineers have higher rank since they are conceived to be technical experts (Köse and Öncü 2000:13).

As for engineers in public sector, Köse and Öncü state that since public work hierarchy is different than private sector, engineers' class positions are ambiguous. Yet engineers tend to stay as an indepentdent technical group between admnistrators and blue collar workers (Köse and Öncü 2000:13).

Table 3. Engineers' Economic Class Positions in Turkey

Engineers' Economic Class Positions in Turkey	
	%
Capitalist	17
Middle Class	54.7
Working Class	27.3
Small Bourgeoisie	0.9

Table 3 Shows engineers' economic positioning in Turkey and it is derived from Köse and Öncü's study (Köse and Öncü 2000:15). According to authors, capitalists are composed of capitalists with

means of production and capitalists with administrative positions. Middle class is constituted of waged engineers employed in the public sector and engineers working in less institutionalized and highly institutionalized organizations. Working class engineers on the other hand, are workers of small private firms.

As the analysis shows, majority of engineers find a middle or higher position in industrial hierarchy. This creates the image about engineering of being a middle class profession. In addition, highly competitive education system in Turkey might lead students from middle and upper classes to get private educational support. Although there are no findings in my study supporting this argument, I should note that only two women and two men out of forty three participants declared they were coming from working class families. Others define their class position as middle class.

Zeynep, a geological engineer, indicated that she grew up in a working class family, being an engineer was like an upward step. Zeynep argues that even if a person becomes an engineer s/he needs a backup mechanism to do her/his job which also intersects with financial opportunities.

> We were working class. I am daughter of a miner. Mining worker. Since you are born this way, even when you become an engineer you need to stand on your own feet. My family did not have opportunities to build a firm for me.[50](Zeynep, Woman, Geological Engineer)

Engineering is conceived a decent job with a good income. Vural told me he saw engineering as a way out of his economic deficit.

> My family's economic condition was very bad. Family relations were also not so good. My father was usually unemployed. Mother was struggling so hard…To me, being an engineer

[50] Biz işçi sınıfıydık. Benim babam madencidir. Maden işçisi. Böyle doğunca, mühendis çıkınca kendi başımın çaresine bakmam gerekti. Ailemin bana şirket kuracak parası yoktu.

> meant earning money and being powerful. I had no choice but to earn money. I chose engineering because it has opportunities for more income. I was manipulated by high school friends. Friends who were successful in maths and physics. They chose MF. I wanted to be there, to earn money, to find a job easily and because of its image. You see from your friend. He wants to be an engineer, you want to be like him,....[51] (Vural, Man, Mechanical Engineer)

In addition to financial opportunities, some participants pointed to mobility in the social hierarchy. According to them becoming an engineer also provided mobility in terms of status.

> We, while becoming engineers, we experienced upward mobility. In our time, engineering was respected and had more financial opportunities. In our home city, İzmir, there is a strong class discrimination. It is never said out loud, but everyone knows it. I realized it when I moved to İstanbul. Even though we earned money from engineering, we could never be a part of Rotary Club in İzmir; in İstanbul we did.[52] (İrem, Woman, Chemical Engineer, 55)

> I graduated from Gülveren Lisesi in Ankara. My parents were workers. I was successful so I chose to be an engineer. It was not a conscious choice, though. I studied so hard, being an engineer was prestigious in our environment.[53] (Elçin, Woman, Metallurgy and Materials Engineer)

[51] Ailemin ekonomik durumu çok kötüydü. Ailevi ilişkileimiz de iyi sayılmazdı. Babam sürekli işsizdi. Annem tabi çok zorlanıyordu. ... Mühendislik benim için para kazanmak ve güçlü olmak demek gibi birşeydi. Mühendisiliği bu yüzden seçtim. Para kazandıracak imkanları daha çoktu. Okulda arkadaşların etkisi çok oldu. Matematik ve fizikte iyi olanların. Onlar MF seçtiler. Ben de onların yanında olmak istedim. Para kazanmak, kolay iş bulmak için. Yani imajı yüzüden. Arkadaşından görüyorsun. O mühendis olmak istiyor, sen de onun gibi olmak istiyorsun...

[52] Biz, mühendis olurken bir yerde sınıf atladık. Bizim zamanımızda mühendislik çok saygındı. Çok kazandırıyordu. Bizim İzmir'de keskin bir sınıf ayrımı vardır. Hiç konuşulmaz ama herkes bilir. Ben bunu İstanbul'a taşınınca anladım. Mühendislikten para da kazansak İzmir'de olsak asla Rotary Klübe giremezik. Almazlardı. Tabi İstanbul'a gelince girdik

[53] Ben Gülveren Lisesi mezunuyum. Bizimkiler işçiydi. Çok başarılı olduğum için mühendisliği seçebildim. Yine de bilerek yaptığım bir seçim değildi. Çok çalıştım. Bizim oralarda mühendis olmak prestijli birşeydir...

As it can be seen from the quotations in this part, becoming an engineer is a desirable career choice due to financial and social opportunities for some participants. As for others who did not mention social class as a distinctive category, perceived social and economic possibilities of engineering occupation as a natural domain of what they already experienced. That is why, I believe, social class was not noticed by some participants.

Participants in this study, both women and men repeatedly told me that a freshman engineer needed to prove him/herself to blue collars if he/she wanted to be accepted. It is argued that occupational respect was directly related to ability, knowlege and skill of immediate problem solving. In order for an operator to accept an engineer, he/she had to pass some tests in the production process. These tests are unspoken and mainly conducted by blue collar workers to see if the engineer is trustworthy in professional meaning. Thus, an operator knows how to build a machine to some degree. Operators, the ones working in big factories, also do know how to read a project. They are not a part of research and development, only. Thus, one of the most important things that separates an operator from an engineer is actually their class positions.

Some participants underlined the importance of engineering's social class position. Their evaluation was not common to all participants. Yet I want to mention this evaluation, because this fact also led me to think why social class does not matter to other participants. I find it interesting to indicate that middle class originated engineers did not perceive social class as an important part of their identity because they were born into this class. However the ones who managed "upward mobility", noted engineering's occupational class as middle class.

5.2.4 Engineer as the Ideal Son-in-Law

> There is a saying in Turkey who wants to show how precious they were when they were young 'so many doctors and engineers asked for my hand in marriage'. It is originated from our childhood. Being an engineer, a doctor is something important. Because, studying is difficult, entering is difficult, plus there is an opportunity to make money.[54](Tolga, Man, Food Engineer)

Most people who grew up in the 70s came across with the replic of Turkish movies: a young woman, telling someone that her hand is wanted in marriage by doctors and engineers. She looks proud because being the bride of a doctor or engineer also shows that she is worthy.

> I liked your abstract and wanted to participate. You wrote "so many doctors and engineers wanted to marry me". It is true. The ideal son-in-law in this society is either a doctor or an engineer.[55] (Ayşe, Woman, Mining Engineer)

It may be expressed as a joke but men from these two professionals are the ideal son-in-laws because they earn good money, and not everyone is chosen for engineering or medicine. Therefore, the ideal image for engineering is a man.

> You know, the wording is doctors and engineers…[56] However, for a woman, it is not as prestigious as being a teacher. Being an engineer in this society…..a male engineer is accepted (Esin, Woman, Metallurgical Engineer)

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[54] Beni ne doktorlar ne mühendisler istedi diye bir şey var. Çocukluğumuzda beri vardır bu laf. Mühendis olmak, doktor olmak önemlidir. Çünkü çalışması zordur, okuması zordur. Para da kazandırır.

[55] Abstraktını okuyunca çalışmaya katılmak istedim. "Beni ne doktorlar ne mühendisler istedi" yazmıştın. Çok doğru. Bu toplumda ideal damat ya doktordur ya mühendis.

[56]Beni ne doktorlar ne mühendisler istedi dir ya hani. Ama kadınsan öğretmenlik daha iyidir. Mühendis olunacaksa…erkek mühendis kabul görür.

Ender underlines an important difference between women and men engineers. Engineering may be an appropriate profession for men but women are usually found to be more suitable to be teachers.

Taking an engineer as the ideal son-in-law clearly shows the general acceptence about the profession gender. Engineering is thought to be a profession mainly for men. This finding leads to the discussion about gendered image of engineering profession in Turkey.

5.3 Gendered Image of Engineering Profession in Turkey

> The first image in the mind is a male engineer. Both for engineers and for other people. As for women engineers, they are not members of the fraternity. Sami Abi is a caricature about a girl who claims to be best friends with men rather than women. In the caricature, men ask the girl if she goes to Russian women or something. It summarizes the whole situation. What is the measure of getting along with men? You never become one of them.You are not one of them anyway[57] (Aslı, Woman, Mechanical Engineer)

The mentioned caricature, which can be seen below, reveals how gender stereotypes are embedded in occupational perceptions. Not only for engineering but also any profession creates man as the first image in mind.

[57] Akla ilk gelen imaj tabi erkek. Hem mühendisler için hem de diğer insanlar için. Kadın mühendisler için ama onlar bu erkekler arasındaki şeyin, bağın dicem, bir parçası değiller. Sami abi diye bir karikatür var. Karikatürde bir kız var işte erkeklerle kızlardan daha iyi anlaşıyorum diyor. Karikatürdeki adam da "Rusa falan mı gidiyorsun?" diye soruyor. Yani bence bu durumu özetliyor. Erkeklerle iyi anlaşmanın ölçüsü nedir? Hiçbir zaman onlardan biri olmuyorsun. Onlardan biri değilsin de zaten.

Figure 1. Caricature Sami Ağabey

> Definitely engineering has a masculine image. This image is both hidden and overt. Even unconsciously people give such reflexes. These stereotypes in the mind have been created long ago. For instance, when I hear someone telling his/her child is an engineer, I imagine the child as man. Just like this.[58] (Vural, Man, Mechanical Engineer)

As Aslı and Vural indicate with different wording, these reflexive images are strongly related with stereotypes of gender. This ideological knowledge of gender, overt or hidden, determines which gender is found suitable for what occupation. They affect the whole working structure, where even if a woman manages to become an engineer, she can never be a part of "the fraternity", as Aslı states. Engineering was fraternity already. Historically the occupation is situated to be male (Oldenziel, 2010). Oldenziel shows how women have been and continue to be omitted from engineering by telling the absurdness of many "first women engineer stories"; but that was not

[58] Kesinlikle mühendislikle ilgili imaj erkek. Bu da hem gizli hem değil. Yani insanların bilinçaltında refleksleri var. Kafalarındaki kalıplar çok önce yaratılmış. Mesela, birinin çocuğunun mühendis olduğunu duysam onun erkek olduğunu düşünürüm. Bunun gibi.

the case; a limited number of women have long been a part of this occupation (Oldenziel, 2010). In Turkey, women are comparatively populated this profession to some degree. Still women in this occupation feel they are not/ can not be a part of the already existing "fraternity".

> Engineering has a masculine perception. I went to the field as a woman engineer, villagers tended to call me "Mr. engineer lady". Think about it, they could not even pronounce miss/mrs. engineer. For the villagers an engineer can only be a man.[59] (Gonca, Woman, Geological Engineer)

It is understood from Gonca's narrative that the male image of engineering is ingrained. The first picture that comes to mind is always male. Thus, even calling a woman engineer by feminine connotation might be difficult in some situations. Metin said that this perception has to do with commonplace image of a male engineer working in a construction yard. This image perfectly matches with traditional gender stereotypes by empowering masculine strength and hard conditions of work.

> Me: Does engineering have a gender?
>
> Metin: Absolutely. If we talk about the public, the media show them as men working in the construction yards wearing hard hats. The image is usually male.[60] (Metin, Man, Mechanical Engineer)

Furthermore, some participants mentioned that some engineering departments are found more appropriate for women. Specifically for the ones that require field work, being male is a reason for preference.

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[59] Mühendislik hakkında tabi erkeksi bir algı var. Kadın olarak sahaya gittiğimde köylüler beni mühendis bey hanım diye çağırırlardı. Düşün, mühendis hanım bile diyemiyorlar. Onlar için mühendis sadece erkek olabilir.

[60] Ben: Sizce mühendisliğin cinsiyeti var mıdır?
Metin: Kesinlikle. Halk için konuşursak, medya onlara şantiyede çalışan kasklı adamları gösteriyor. Genel imaj erkek.

> Especially some engineering departments have the male thing. In mechanical engineering, in geological engineering...I mean the more the job requires field work the more men are preffered. Some engineering fields are masculine, it is maybe because men are thought for jobs which require long hours of work, maybe because women work less or because of health issues. But the concept of engineering in general is masculine. Once engineering is mentioned, a male comes to mind.[61] (Ayşe, Woman, Geological Engineer)

Different experiences among cohorts have appeared concerning gendered image of engineering. 3 men (Akın, Ömer, Barış) and one women (Nevriye) participant who were 40 and over, stated that the masculine image of engineering changed over time. The increasing number of women engineers changed the general idea about the profession's gender. According to them, the profession is more open to women and working conditions are more suitable for women's work. On the other hand, respondents with ages under 40 did not mention such change in the image.

> People in the industry, since they do not see any women, they act like jerks, since they did not usually see women in the industry, women were a taboo. At first female cargo carriers came to the region. Men harassed these women. They did so many bad things. When a woman walked on the streets of the region, it became a big event, everybody talked about it all day. Some of us, told these guys not to do such things. We reminded them of their wives and daughters.[62] (Akın, Man, Mechanical Engineer, 60 years old)

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[61] Özellikle bazı mühendislikler de erkek şeyi var. Makinede, Jeologide...yani iş ne kadar saha gerektirirse erkekler o kadar çok tercih ediliyor. Bazı mühendislikler erkek işi gibi görülüyor çünkü uzun saatler çalışmak gerekiyor. Kadınlar daha az çalışabiliyor sağlık sebepleri yüzünden. Ama mühendislik kavramı genel olarak erildir. Mühendislik denince akla erkek gelir.

[62] Sanayideki insanlar kadın göremedikleri için mal gibi davranırlar. Böyle sanayide kadın tabudur. Kadınlar buraya ilk kargocu olarak geldiler. Erkekler, laf attı, eziyet ettiler. Çok kötü şeyler yaptılar. Bir kadın sokakta yürüyecek, sanayide, büyük olay olurdu. Herkes bunu konuşurdu. Biz bu adamlaı uyardık, dedik ki sisizn de karınız kızınız var, yapmayın dedik.

> Think about it. I was the only one (woman) in the docs. But I was very distant, very serious. I did my job well. I let anybody to mess with me.[63] (Nevriye, Woman, Chemical Engineer, 55 years old)

As Akın and Nevriye notes, lack of women engineers in the profession made their limited existence awkward for the rest of the industry. The mentioned harressments and Nevriye's endavour to keep her distance shows that the environment was unfriendly to women. Being serious and being work oriented mentioned as a way to handle with gender difference in those times.

> Ten years ago engineering definitely was a male occupation. Especially civil and mechanical engineers were all men. Today, there are more women engineers. The segregation has changed positively over the years. Also, there are more women in the industry zone. There was a metallurgical engineer in the industrial zone. The first women in this region. I saw this woman and told her that she is doing well. If your numbers increase, we become accustomed to it, become more civilized.[64] (Akın, Man, Mechanical Engineer, 60 years old)

Akın raised some interesting points. He mentioned that the occupation became more "civilized" with respect to the increasing number of women engineers. Being civilized was used to express that men in engineering sectors should get used to presence of women. It does not necessarily mean that women were welcome. Akın's narrative shows that masculine codes in industrial zones are very strict and hostile to women. Being harressed and hearing insulting

[63] Düşünsene tersanede tek kadın amir bendim. Ama çok mesafeliydim, çok ciddiydim. İşimi çok iyi yaptım. Kimsenin bana dalaşmasına müsaade etmedim.

[64] On yıl önce mühendislik kesinlikle erkek mesleğiydi. Özellikle inşaat ve makine hep erkekti. Şimdi daha çok kadın mühendis var. Bu ayrım yıllar içinde değişti. Bir de sanayide de daha çok kadın var artık. Bir kadın metalürji mühendisi vardı eskiden. Sanayide ilk kadın. Gördüğümde ona valla bravo dedim. Eğer sayıları artarsa, biz de alışırız, medenileşiriz.

language in work life should not be a burden to cope with in the work life. Not for women, not for anyone else.

This example also shows that gendered perceptions address educated and publicly working women outside their as a target for masculine attack. My intention is not to victimize women engineers. On the contrary, I aim to specify that being a working woman is the only reason for the mentioned harrassment. Daring to involve in men's business puts women in a condition that is different from the condition of other women who are wives and daughters. That is to say, gendered perception about working women make some men think that they have the right to violate women working in the public sphere.

I also should add that I do not agree with the "civilization" thesis. Throughout this study, many times, I came across men who think they value women by calling their presence "civilizing", "giving color to work/education atmosphere" and they even call women "the flowers of profession". With due to respect to my participants' positive intentions, I think this perception produces and reinforces existing hierarchies and gender stereotypes. Conceiving of women as the color of an occupation equates with seeing their presence as supplementary to the male existence. As a result, we came back to the sentence of the first quotation I used in this part: "You never become one of them. You are not one of them anyway." (Aslı, Woman, Mechanical Engineer)

5.4 The Changing Image of the Engineer in the Global Economy: The Fading Image of Engineering in Turkey

In terms of differences among cohorts, another significant point has been raised by participants aged forty and over was the changing character of engineering's image in Turkey. All participants in this

group declared that engineering had lost its status in recent years with respect to some factors. These are; increased number of engineering departments, easiness of becoming an engineers compared to previous years, and changing role of engineering in the global economy.

To begin with, Akın and Kerem emphasized the effect of the increasing number of engineering departments and decrease in quality of engineering education. They pointed out that this fact undermined the occupation's value both on the social and on the professional level.

> Engineering was respected in our time. Now, medicine has surpassed engineering. Back then, we entered from the first 600, now it has dropped until 5000's[65] (Kerem, Man, Computer Engineer, 42 years old)

> Yes, I think it was respected. It used to be more prestigious. The respect has decreased over years. The reason is related to money. The more engineers come into the market, the less respect they see from the public. The money they earn has also lost its value. In the past, there were few engineers in industrial sector, almost none. Now there are so many new graduates, and not every one of them has good qualities. Some, I think have qualities. But some study engineering just to study it. For those who have lower qualities, uneducated people think they do not know anything.[66](Akın, Man, Mechanical Engineer, 60 years old)

[65] "Bizim zamanımızda saygındı. Şimdi tıp mühendisliklerin önüne geçti. Bizim zamanımızda biz ilk 600'den giriyorduk. Şimdi 5000'lere düştü."

[66] "Evet bence saygın. Eskiden daha saygındı gitgide azaldı. Niye azalıyor çünkü sebebi parayla orantılı. Mühendisler çoğaldılar. Bunun için itibarları eksildi. Eskiden sayısı çok azdı. Sanayide az mühendise rastlanıyordu yok denecek kadar azdı. Şimdi gençlerden yetişenler çoğaldı ama tabii yine de bence en kaliteli adamlar yine iyiler. Kalitesiz yetişen mühendisler de var. Sırf okumak için okuyup da mezun olanlar var. Onlara karşı okumamış insanlar çok şey düşünüyorlar. Bir şey de bilmiyor, gibi."

According to participants, the increasing number of engineering schools trains more engineers; thus, the number of engineers in the market diminishes the monetary value of engineering job. In addition, entering engineering departments has become easier. However chosen, engineers' success in university enterance exam has lessened, which is accepted to be a significant factor for the loss of respect.

> When you say "I am an engineer", the reaction is positive. It was positive in the past and it still is, because the occupation has a legacy. Today, it is easier to become an engineer, why should it be respected? Prestige is not entirely about numbers actually. The perception is that the occupation is meant to have remarkable qualities. Qualities that other people do not have. What does this mean? It means being able to solve a math problem or being able to understand a physics theory. Back in our time, in order to enter engineering school you needed more points in the university entrance exam. Now, there are more engineering departments. [67](Ömer, Man, Electric and Electronics Engineer, 62 years old)

Ömer, Electric and Electronics Engineer thought that the profession still has value because of its former legacy. The mentioned legacy of engineering profession is based on several features. First it depends on the ability to understand what ordinary people can not. Such as a difficult abstraction. Second, the person needs to get remarkable grades from the university entrance exam in order to be accepted by engineering schools. The person should be hardworking. Therefore, the general image is that engineer is not only clever but also diligent. Legacy that Ömer indicated has another source. As it was mentioned in Chapter 4, engineer originated politicans were leading actors of

[67] Mühendisim dediğinde alınan tepki olumlu. Eskiden de olumluydu şimdi de öyle. Çünkü mühendisliğin bir mirası var. Bugün mühendis olmak daha kolay, neden saygı duyulsun ki? Saygınlık sadece mezun sayısıyla ilgili değil aslında. Genel algı bu mesleğin önemli özellikleri olduğu üzerine kurulu. Herkeste bulunmayan özellikler. Bu ne demek? Bir matematik problemini çözebilmek veya fizik teroemini anlayabilmek. Bizim zamanımızda mühendisliğe girmek için daha çok puan almak gerekirdi. Şimdi çok daha fazla mühendislik bölümü var.

Turkey's politics. They were seen as the developers of the country, even saviors from the economic burdens of World War II. Presence of these figures is seem to be influencial for the profession's image in the eyes of society.

> An engineer needs to be good at mathematics and physics. If he is, the family expects big things from their child. They think that he is going to find a decent job. The neighborhood also creates expectations, then comes countries'expectations. Smart students also have the psychology of becoming a big guy because we have Özal, Demirel, Erbakan…[68] (Ömer, Man, Electric and Electronics Engineer, 62 years old)

Turgut Özal, Necmettin Erbakan and Süleyman Demirel were politicians whose occupational identity was a part of their political image. They were the technical elite agents of Turkey's developmental politics (Göle, 2008). They were accepted as the "big guy" who knows what other people do not know; who are educated to build dams, bridges, buildings.

Men engineers within the elder cohort of this study argued that they respect engineer politicians in the professional meaning. They all suggested that these figures were very successful engineers regardless of their political orientation. Just like Ömer noted, society expected engineers to be like Özal, Erbakan and Demirel. It is understood that engineers also thought they would become something more than an engineer. Becoming an engineer with respect to related figures also meant becoming the engine of development and improvement of the country. Given this social responsibility, as Göle suggests (2008), engineers were the technical elites of Turkish politics.

[68] Mühendis dediğin matematikte ve fizikte iyi olacak. Eğer iyise, ailesi ondan çok şey bekler. İyi bir işi olacağını düşünürler. Komşuları benzer şeyler bekler, Sonra ülkenin beklentileri aynı şekilde gelir. Bir de Özal'ı gördük, Demirel'i, Erbakan'ı. Akıllı öğrencilerden büyük adam olması beklenir.

As discussed in Section 5.1, same group of participants argued they agree with “Engineers’ ldeology” (Göle, 2008) and noted that engineers do have social responsibility because of their ability of deduction. On the basis of these, I believe that the existence of this figures might be influential on especially elder man engineers in this study. As Ömer noted, these politicians were seen as the “big guy”, who was not only clever and ambitious but also they managed to get somewhere important in the eyes of the public. I think, engineering had gained the mentioned legacy and respect with regard to these public figures.

Man participants of the elder cohort have grew up by watching and hearing engineer politicians. I believe that their career choice had been affected by the impact of the respected image of this occupation. On the other hand, women participants of the same cohort neither embraced engineers’ ideology, nor did they mention their enthusiasm about being a “big guy”. I believe, the noted aspects of engineering’s legacy in Turkey also create a masculine culture which puts unseen barriers in front of women. Absence of women public figures, women engineers of this cohort did not indicated any pursuit towards engineer politicians.

Finally, women and men participants with 40 and over age told that engineering lost its previous image due to transformation of its role in global economy. Increasing integration of technology in production processes and flexible specification of tasks has changed job definitions of engineers. Previously engineer were working closer to blue collar workers within production. With Post-Fordist production, engineer and worker has physically separated and engineers became contollers of other engineers working for tasks other than production such as design, research, development and quality assurance (Ansal, 2000). Artun perceive this specialization as alienation from integrity

of production processes and also from the product itself (Artun, 2000). Accoding to Artun (2000), engineer lost its value as production is characterized by digital technologies. Machines have taken place of human power in factories now, sybernetics are employed instead of engineers' mental labor.Since digital technologies are tools of capitalist interests, engineer's role in this hiearachy is under pressure.

These transformations made reflections on engineers I Turkey and their political positioning. In Turkey, up till 1980, engineers mainly positioned themselves against capitalist industrialization. Being accepted as the bearers of rationalization and positivism; most engineers were followers of the leftist ideologies and positioned themselves as revolutionist social modifiers (Göle, 2008:14; Artun, 1999:47). In addition, in the 1970s Turkey's political turmoil included different ideologies among which there were left and right oriented engineers. Süleyman Demirel and Necmettin Erbakan were among rather reformist wing, and they kept discourses close to engineering jargon, like project making and industrialization (Göle, 2008).

In this sense, the engineer within Taylorist production got to have a new direction, a new position between capitalists and workers. Though my study did not provide confirming results, some researchers see this change as the sign of a shift in engineers' political stance from leftist to reformist ideologies. This shift was also marked by a transition in engineer's identities, which built its peculiar professional identity and began to take part in Turkey's politics as long as they could develop social perspectives (Göle, 2008; Artun, 2000; Öngen, 2000; Haşim & Köse, 2000).

Haşim and Köse (2000) examined different worldviews among engineers in regard to Taylor's and Veblen's conceptualizations. Their

research is mainly about explaining the variety of class positionings within the engineering occupation in terms of engineers' perception about the meaning of their labor; whether it is closer to Taylor's or Veblen's conceptualizations. Results of the research showed that engineers in Turkey increasingly identify the purpose of their work with capitalist interests (2000:33).

I can argue that findings of my research confirm Haşim & Köse's findings. Participants who witnessed the impacts of these transformations thought that the engineering profession lost its previous image. As discussed above, the engineer, who was once a pioneer agent of Fordist industrialization and even the modifier of society, has adopted competition and the urge to make more money as the new conditions of a knowledge-based economy. In addition to this, with the impact of the increasing number of engineering graduates and the decreasing opportunities in the market, the profession's image might fade not only in Turkey, but also in the world.

Women's enterance into engineering profession is also related to transformations in the global economy. As discussed in Chapter 4, the number of women engineers participating Turkey's labor market has increased due to political reforms and the need of labor force with respect to neoliberal economy. In addition, with reference to section 5.3, I can argue that gendered image of the engineering profession has also witnessed a positive change. An increasing number of women in engineering have created familiarity about women's existence and have lead to a change in the social image.

Concluding Remarks

I argue that gendered engineering culture in Turkey is created by several factors. These factors constitute the profession's social image and they also constitute a masculine culture. By defining such an ideal model, unconformities are being excluded or, at least, are not welcomed.

The findings of this study show that the social image of the engineer is affected by the perception of "the west" because Turkey's modernization process was determined by the idea of achieving western civilization in science and technique. Engineering appeared as an occupation of expertise and found respect on societal level. Although women were encouraged, even invited into the engineering profession with the impact of republican reforms, the occupation remained male-dominated. However, women participants indicated that women engineers have taken advantage of social prestige.

Both women and men participants agreed that they get positive reactions from other people because of their profession. Positive reaction was defined as affirmation, trust, and acceptance. Acccording to the findings of this study, occupational prestige has several aspects. Being a successful student, being a woman in a male-dominated occupation, and having power to create a tool constitutes prestige and respect for the occupation. Some participants also noted that possession of technical knowledge, the sort of knowledge that is not common for ordinary people, is itself a source for respect.

On the basis of this chapter, I argue that engineering is thought to be prestigious because of social meanings attached to the occupation. Engineers' being leaders of political change, bearers of Turkey's

modernity, and being possessors of scientific and technical knowledge are factors for these social level attributions. Women and men engineers both enjoy the trust and respect attached to their professional position. The main reason of this respect is related to the repondents' gender. Being a woman engineer is argued to be respected more, since the profession is perceived more suitable for men. Thus, women who can manage to be engineers enjoy a considerable degree of prestige.

On the other hand, almost all participants agreed that the image of the engineer is male on the social level. The image is defined as a person who has mathematical intelligence and ability to think analytically. These features were mainly accepted as "natural gifts" by most participants. Women in this sense, are noted as having a disadvantageous position because the female mind is stereotypically associated with verbal ability.

In line with the male image in the society, participants also defined the nature of the engineering job as suitable for men. Dirty and heavy work, and hands on experience are noted as the most significant features of the engineering job. These aspects also underlined as appropriate for the male identity image. On the basis of these points, a respected engineer is a person who combines mathematical ability with the ability to cope with manual requirements of engineering.

This finding contradicted with Hacker's argument about respected engineering fields. According to Hacker, prestigious departments require only threoretical ability; that is why they are associated with masculinity. However, I argue that in Turkey, respected fields require a different image of someone who can manage theoretical knowledge and manual toughness at the same time. I agree with Hacker that an engineer is conceptualized as a man in its ideal; however, the

definition of masculinity has different aspects in contemporary Turkey.

Engineering is also indicated as a middle class occupation. The women participants in this study defined their family's class positions as middle class with two exceptions. Only two woman and two men participants mentioned that they came from working class families. In comparison, there are ten men engineers who told me they had working class families. These findings support Ruth Oldenziel's study (2010), and show that engineering in Turkey is a middle class profession whose female occupants have mainly middle class origin, while men engineers might come from working class families.

Finally, it is asserted that engineer's image is fading due to its role in the global economy. With the impact of increasing engineering graduates and decreasing opportunities in the market, the profession's image might fade not only in Turkey but also in the world. In addition, respondents noted a change in gendered image in engineering on the social level due to the increasing number of women participating in the profession.

CHAPTER 6

GENDERED ENGINEERING CULTURE MANIFESTS THROUGH ENGINEERS' OWN PERCEPTIONS

Ali Artun (2000) starts his article titled "The Engineer" with an enthusiastic sentence: "During 1970's the engineer was at the top of his reputation. From that time on, the engineer was responsible both for production and rationalization of society." Artun indicates in this very sentence that engineer, "apart from being assumed to be the leader of technological and social developments, is also the embodiment of the victory of human over nature, he is the vessel of a harmony between mind and body. Also, with his ability to reason, he is the sovereign over realization of human utopias" (Artun, 2000: Preface). In addition, the engineer of the 1970s was considered to be a "prototype of a power in which human and machine, design and application, science and technique, finally labor and production come together" (Artun, 2000: Preface).

Taking a closer look at Artun's conceptualization of the engineer image, I sense the hope in the engineer's mission to end the everlasting dualisms of human history. The engineer in this perspective is someone who could get rid of these contradictions by using reason. The problematic point here is that historically, one pair of these dualisms such as body vs. mind, rationality vs. irrationality is associated with femininity (Fox-Keller, 1985). Thus, the engineer is conceptualized as the person of reason and the image associated with it is male.

Engineering was brought to Turkey as a new profession, yet it was already built with masculine conceptualizations. The meanings attached to the engineering profession were very much influenced by Western definitions of the engineer and its profession. As I have discussed in Chapter 4 and 5; western values rely on gendered stereotypes, which allow men to take the main role in science and technique. Turkey's patriarchal structure has been well suited to gendered engineer ideals. The image of the real engineer and the ideal nature of engineering job have definitions that are redefined gendered meanings suitable to Turkey's values.

In this chapter I attempt to understand the ways in which gendered engineering culture manifests through engineers' own perceptions in Turkey. In order to do this, I explore constituters of ideal images about engineering on the professional level. I ask about engineers's perceptions about characterisics of their profession, the nature of their work and ideal images of engineering for engineers themselves.

In this chapter, I will disscuss some aspects of engineering which were more frequently mentioned by respondents. These aspects were indicated because participants thought that the engineering profession is best characterized by the suggested features. Within this discourse, the ability to do maths, analytical thinking, problem solving, being able to handle heavy and dirty work conditions, having hands-on experience, lacking humane aspects will be subjects of discussion. These features were asserted to define engineering profession in the eyes of engineers; they also constitute ideal models for how a real engineer should be and what the real engineer job should be like.

Later, I will focus on themes of hard and soft engineering. In this part, I explore the way hard and soft refer to genders, to engineering

fields and to certain tasks. Finally, I will focus on the gendered image of engineering on the professional level.

6.1 The Real Engineer: Mathematics, Analytical Thinking, Problem Solving:

Pursuing manifestations of gendered engineering culture in engineers' experiences, I asked participants about their perceptions of engineering. I gave participants a small list of concepts and asked them to choose three from the list which they think explains engineering most accurately. The list was made up of these concepts:

> Mathematics, organization, patience, analytical thinking, quality, attention, problem solving, and creativity.

Mathematics, analytical thinking and problem solving were the most frequently mentioned concepts. Out of forty participants, thirty five engineers told me that these three concepts explained engineering the best. Apart from these concepts, eight participants also picked creativity.

When preparing this question, I added some personal features which are usually associated with women like patience, organization, and attention to the list. These concepts were stated to be important but not necessary as the mentioned three.

> If we go deep into the origins of engineering, we say "engineer" in English. When we look at the Latin origin of this "engineer" the verb "create" comes out. Our equivalent for it is "hendese". Arabic. It has Arabic roots, and it is geometry. So, hendese means, a person who is engaged with calculation, mathematics, and who does it well. (Murat, Man, Civil Engineer)[69]

[69]Hani biraz mühendisliğin kökenine inersek aslında İngilizcede mesela *"enginer"* deriz. Bu *"enginer"* aslında Latin kökenine baktığımız zaman "yaratmak" "creaction", yaratmak fiili ortaya çıkıyor. Bizdeki mühendisliğin karşılığı aslında "hendese"dir. Arapça. Arapça

The definition of engineering is related to mathematics. Thus, mathematics is accepted as fundamental for engineering.

> Mathematics defines engineering the most because it is systematic. What I understand from engineering is that it is based on serious procedures of systematically calculated complex structures.[70] (Vural, Man, Mechanical Engineer)

> Murat: Engineering is mathematics to a great extent ... Do you know why it is mathematics?... to learn maths is very significant. Perhaps, you will never solve integral. I also did not solve it. I have never solved integral in my whole career. But maths gives such a thing to a person; I think that is the touchstone.
>
> Me: Does it create a thinking system?
>
> Murat: Mathematics provides analytical thinking. Actually, it is interesting. I believe that. Mathematics gives a person the ability to collect data, to analyze, to cluster them. Like I said before. And I think it is mathematics that helps to come up with a conclusion from the data, to make a synthesis of it. This is how important maths is.[71] (Murat, Man, Civil Engineer)

Analytical thinking is perceived to be an extension of mathematical ability. Participants had a tendency to see this ability as a biological

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kökenlidir, o da geometridir. Yani hesapla, kitapla, matematikle iştigal eden, onu iyi yapan, ilgilenen anlamındadır hendese.

[70] Matematik mühendisliği tanımlar çünkü sistematiktir. Mühendislikten aladığım şu benim: kompleks yapıların sistematik bir şekilde ciddi prosedürlerle hesaplanması.

[71]Murat: Mühendislik aslında büyük ölçüde matematiktir. Şimdi tam da oraya geliyorum. Niçin matematiktir biliyor musun? Yani, şunun için matematiktir. Matematik öğrenmek çok önemlidir. Sen belki zaman içinde integral çözmeyeceksin. Ben de çözmedim ki. Hiç integral çözmedim ben meslek hayatım boyunca. Fakat matematik öyle bir şey veriyor ki insana. İşte o işin mihenk taşı bence.

Ben: Bir çeşit düşünce tarzı mı yaratıyor?

Murat: Analitik düşünme yeteneğini veren matematik oluyor. Çok ilginç bir şey alında. Ben buna inanıyorum. Yani matematik insana öyle bir yeti sağlıyor ki verileri toplama, verileri elde etme, onları bir araya getirme, analiz etme. Dedik ya biraz önce. Ve onlardan bir sonuca ulaşma, sentez çıkarma yeteneğini saptayan matematik diye ben düşünüyorum. İşte mühendislik bölümleri için matematik bu kadar önemli.

feature. They argued that a person either does have maths ability or does not. Once a person has it, analytical thinking follows it. According to this, maths provides a systematic mind to build causal relations and analyze a situation and it also leads to finding solution for problems. These findings are similar to previous research concerning the relationship between mathematics and engineering. Excellence in math and natural sciences were indicated to be primary factors for choosing the engineering profession (Hacker, 1983; Robinson & McIlwee, 1992; Zengin-Arslan, 2001; Amelink & Creamer, 2010).

> For engineers there are two definitions of engineering. One is rather the core definition which sees production as the origin of engineering work. The other is related with research and development or the quality of engineering. These tasks are not counted as engineering. They are not core engineering tasks. Thus, fields like mechanical, civil engineerings, which are based on concrete production, are valued more than computer engineering for instance.[72] (Kerem, Man, Computer Engineer)

I find it very significant to note that, although all the steps of tool production contains calculation, and analytical problem solving for that matter, the production process itself is regarded as core engineering. As Kerem points out, the creation of a concrete object, rather than production of software, makes a difference in the last instance. Later, Mine explained about the value of concrete production.

> Mine: Definitely mathematics, analytical thinkinking and problem solving. In time, analytical thinking becomes a part of you. It flows within you, you do not think about it. If you work in the crude, construction yard, of course. Otherwise, you work with projects in the office.
>
> Me: What is the difference between these two kinds of tasks?

[72] Mühendislikte iki tanım vardır. Bir core anlamda mühendislik işi. Diğeri de mühendisliği geliştirme işi hani ar-ge, kalite mühendisliği gibi. Bunlar genelde mühendislikten sayılmazlar çünkü core işler değildirler. Yani makina, inşaat gibi somut yapılar ortaya çıkaran alanlar bilgisayar mühendisliği gibi soyut şeyler yapandan daha çok tutulurlar.

> Mine: In Turkey, there is a gap between theoretical engineering and its practice. Engineers in the construction yard feel like they do more important work than the ones in the office because the work is thought to be harder, and dirty. The ideal would be the combination of theory and practice. However there is a class difference between these two. [73] (Mine, Woman, Civil Engineer)

Mine's narrative underlines the difference between theoretical and practical engineering. The gap between these two also creates a hierarchy, as Gülrü mentions. Engineers who work in the field, who are on the application side of mathematics, analytical thinking and problem solving, are more valued than the ones working in the office.

Concrete production takes place in the field. The process contains dirt, heavy work and long working hours. It requires strength and endurance. The engineer in this ideological picture is someone who has mathematical ability to analytically solve problems in the field. Plus when accomplishing it, he also produces some concrete object. The engineer in this picture is definitely a man, since women are seen as naive and lacking mathematical ability.

On the basis of the findings, I can argue that success with mathematics and science was a significant filter (Hacker, 1983) for engineers in my study. It is the first step in the pursuit to engineering. It is also a determining factor in women's route to this profession. Since mathematical ability is seen as a natural feature for men, women actually choose engineering as a way to hold on to their success in mathematics and science.

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[73] Mine: Kesinlikle; matematik, analitik düşümek ve problem çözme. Zamanla zaten analitik düşünmek senin bir parçan olur. Böyle içinden akar gider üzerine düşünmezsin. Şantiyede çalışıyorsan tabi. Yoksa ofiste çalışırsın.

Ben: Bu iki iş türü arasındaki fark nedir?

Mine: Şimdi Türkiye'de teorik mühendislik yapmakla pratiğini yapmak arasında fark var. Şantiyede çalışanlar daha önemli bir iş yaptıklarını düşünürler. Ofistekilerden. Çünkü işleri zordur, pistir. İdeali bunların hepsini yapmak olurdu yani teori ve pratiği. Ama bunların arasında bir sınıf hiyerarşisi vardır.

6.1.1 Hands-on Experience

Hands-on experience came out as significant for engineers. I wanted participants to think more about the possible interaction between the toys they had played with as a child and their professional choices.

Five women and 16 men from the participants stated that they had tendency to engineering because they were breaking and repairing things since from their childhood. Results showed that boys are raised with more freedom than than girls in terms of taking things apart.

> A doll is definitely has a form; you can move its legs, its eyes have a colour, you can comb its hair. You can not break a doll. It is a very visual thing and it is one, singular. However I (boy) usually had a train and robot. I could take apart that robot, and put it back together. Sometimes I was able to do it, sometimes I wasn't. I can dismantle a toy car and see the engine. Here, what I am coming to by this; these kinds of activities affects children's brain activity. Humans actually complete development after birth. You still develop and what you see, feel, smell, observe, contemplate seriously determine what kind of a person you end up becoming.
>
> The brain of a person who plays with a doll and another that plays with a mechanic toy would completely develop into different angles. Dolls have colors. When you open a toy car you dont see any color. It is the color of steel. Toy cars have geometry. Children who play with dolls move away from analysis and geometry, they play with a visual tool whose surface is important and that does not have a function. It is a subliminal message. For the rest of their lives these two kinds might study mechanical engineering and be different. It is so normal of course. (Vural, Man, Mechanical Engineer)[74]

[74] Bebek kesinlikle bir şekildir. Bacaklarını oynatırsın,gözü renklidir, saçını tararsın. Bebeği kıramazsın çok görsel bir şeydir, tekildir ama benim trenim ve robotum vardır. Robotu kırabilirim yeniden birleştirebilirim ya da birleştiremem. Arabayı sökerim motoru görürüm. burdan şuna varıcam: bunlar çocukta beyin gelişimini etkiliyor. İnsan aslında gelişimini doğduktan sonra tamamlıyor. Hala gelişiyorsun ve gördüklerin, hissettiklerin, kokladıkların, gözlemlediklerin, kafa yordukların nasıl bir insan olacağını çok ciddi belirliyor. Bebekle oynayanla mekanikle oynayan insanın zekaları tamamen farklı yönde gelişecektir. Bebekte bir renk vardır. Arabanın ise içi açılabilir ve renk menk yoktur, çelik rengidir. Arabalar geometriktir. Bebekle oynayan çocuk analitikten geometriden uzak, daha dış görünüşün önemli olduğu işlevi olmayan birşeyle uğraşır. Bu da subliminal bir mesajdır. Bundan

Vural admirably explained the way different paths of socialization influences what kind of people we become. In regard to the kinds of toys, boys become more accustomed to hands-on activities. They are free to take apart their toys since their toys do not have any humanistic connotation. Since girls are attributed emotional aspects, playing with a doll psychologically trains for becoming mothers.

Sally Hacker (1983) describes why technology and its making does not mean simply making machines. Technology is a composition of social relations of productions, in which men are mainly described as producers and women as consumers (Wajcman, 1991; 1994). Gender inequality with respect to technologies creates power imbalances between the sexes. Men's relation with technology starts with a childhood fascination with the technicalities of cars, radios, electrical machines and leads to a feeling of pleasure of work with technology. The kind of pleasure few women can develop because of the different structured childhood experiences (Hacker, 1983).

Parallel to Hacker's research (1983), more than half of the women participants told me they did not experience hands–on activity before engineering faculty and they are not as obsessed with technology as their male colleagues are. They ended up in engineering because they were successful in mathematics and natural sciences.

With respect to occupational choice, hands-on experience and above all its whole psychology prepares the two genders for professionsl life. The findings in my study are similar to previous studies (Hacker, 1983; Robinson & McIlwee, 1992; Cockburn, 1985). For most

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sonraki hayatı boyunca da bu iki çocuk da makine mühendisliği okuyabilir ve farklı olabilirler. Bu çok normal tabi.

engineers in my study, hands-on activity was attractive in engineering. They both saw it as a challenge and as a pleasure.

Engineering in that sense, has an underlying image which encourages hands-on ability. It contains expectations of hands-on experience in its professional impression. Within culture of engineering, students and professionals are strongly identified with having an interest in technology, having experience as tinkerers and adopting a competitive style at work.

6.2 The Nature of Real Engineering Work: Heavy and Dirty Work

I asked participants their thoughts and experiences about the nature of the engineering job. Ten women and twenty men out of forty participants stated that engineering job requires dirty tasks. Coping with dirt and heavy conditions of work came out as a requirement of being a satisfactory engineer in the eyes of blue collar workers.

Replies to issue of dirt appeared as a contradiction between genders in this study. Women indicated dirt as a condition to be handled, while men participants embraced being dirty of work and some mentioned their pride about it. Male engineers also stated that dirt in engineering work is a necessary situation which needs to be handled especially in the presence of blue collar workers.

> In order for a worker to understand and to judge the validity of the job done, the engineer should get his/her hands dirty to a greater extent. Sometimes you need to do the job of an unqualified worker with him. It is very important and necessary to improve your place in the eyes of workers and to increase the communication with them. (Tolga, Man, Food Engineer)[75]

[75] Çalışanın iyi anlayabilmesi ve yapılan işin doğruluğunu anlayabilmesi için mühendisin çok büyük oranda elini pis işe sokması gerekir. Bazen vasıfsız işçiyle bile onun yaptığı işi yapman gerekir. işçilerin gözündeki yeri iyileştirmek onlarla iletişimi artırmak için de gerekli ve çok önemli.

Cynthia Cockburn (1985; 1987) asserted that masculinity is embedded into many jobs based on craft. Getting dirty, heavy lifting, moving large tools with muscle are components of traditional working class masculinity. The combination of these abilities with theoretical knowledge and initiation redefines a new sort of masculinity for engineers. The definition holds significance of material strength and abstract knowledge. As I have discussed in Chapter 2, these characteristics are maily asscociated with men. Gender role of men is distant from what societies call feminine, with its motherly, irrational, emotional image.

> Work is here (industrial district), production is here, dirt is here. Everything is produced here. You need to look at industrial district from here. (Akın, Man, Mechanical Engineer)[76]

Akın was a firm owner in the industrial district. He had clean and brand-name clothes but his hands looked dirty. He showed me his hands and told me that the dirt is oil. Even if he tries, the dirt is not easily washed away. He added with pride; his hands are like this for some years.

The pride in dirt was interesting to notice. Ömer, an electrical engineer, also told me he never thought the job was dirty. He saw labor of such kind as bright and shining.

> I do not think that engineering is dirty. Even if I was a mechanical engineer I would not say so. The idea is wrong. It is not the case. I also worked as a master. I conducted engineering as a master[77], I had a smock and so forth. I worked under and over the machines, I got oily, I got tarnished. I

[76] İş burada, üretim burada, pislik burada, herşey burada yapılıyor. Sanayiye buradan bakacaksın.

[77] Mechanics Technician

> never felt that I was dirty. This expression never occured to me. A mechanic, working in a workshop in OSTİM; under and over the turning machine...even if his hands are oily, he does a glistening job. It is not dirty. [78] (Ömer, Man, Electric and Electronics Engineer)

Ömer and Akın's perception of their labor was crucial. Their answers made me notice I was asking this question with a bit of a prejudice because I unconsiously thought that dirty working conditions push women away from production. Then I tried to open women participants' thoughts up with regard to their pride towards the dirtiness of their job. Only two women participants mentioned such positive perception of dirt.

> Girls do not prefer to get dirty. That is why they are employed in quality, documentation, and production planning departments. Even if you do not need to get your hands dirty, it is the perception about engineering in the society. I worked in dirt. I handled it very well. I was laying under a tank. I wore something like a spaceman suit. (laughs). Really I had a spaceman suit.[79](Nevin,Woman, Mechanical Engineer)

> I was asked to work here. It is because I have enough experience. I work with balistics. There are very few people who work in this field. Women do not exist or something. If you prove yourself in your field, nobody cares if you are a woman or man. (Elif, Woman, MiningEngineer)"[80]

[78] Bence mühendislik işi pis değildir. Yanlış yani. Öyle değil. ben de bizzat usta gibi çalıştım. Mühendisliği de öyle yaptım, önlüğüm vardı bilmem ne vardı filan. Cihazın altına girdin üstünden çıktım, yağlandım paslandım filan da, o hiç pislik hissi uyandırmıyor. Bu tabir hiç aklıma gelmedi. Bir makinecinin, Ostim'de bir atölyede tornanın altında üstünde çalışırken...eli yağlı da olsa pırıl pırıl bir iş yapıyor. Pis değil.

[79] Kızlar pisliğe batmak istemezler. Bu yüzden kalite, dokümantasyon ve üretim planlamada çalışan çok kız olur. Pisliğe elinizi sokmanız gerekmese bile toplumda mühendislikle ilgili bu algı var. ben pislik içinde çalıştım. Tankın altına da yattım. Böyle uzay kıyafeti gibi bişey giyiyordum. Gerçekten uzay kıyafeti yani.

[80] Buraya çalışmak için çağrıldım. Çünkü yeterli tecrübem vardı. Ben şimdi balistik alanında çalışıyorum. Benim alanımda çalışan çok az kişi var. Kadın desen yok gibi birşey. Kendini kanıtlarsan her yerde iş bulursun. Kadın mısın erkek misin bakılmaz.

Nevin and Elif were proud of their work because they think they proved themselves. Their work's nature is heavy and dangerous but this very fact gives them self-esteem. They are happy with their work and they enjoy it because they think gender is not a factor in their lives. Professional confidence seems to alter gender related disadvantages.

In contrast, other women engineers told me it is difficult to work in dirty and heavy conditions.

> When you say mechanics, dirty places come to your mind. The smell of oil. Your clothes get dirty. Mechanical engineering is like Survivor[81]. For example, when I first started to work in the factory, I had headaches because of the clinch sound. I could not get used to it. It smells, it is dark, it does not have air, the hangar's door opens; it becomes freezing inside. It is difficult, not only a difficult as an occupation, but also the environment is difficult. (Aslı, Woman, Mechanical Engineer) [82]

> Four participants told me that dirtiness and heavy conditions can also become obstacles for women engineers.

> Me: What do you think is the nature of engineering work?

> Esin: It requires problem solving. For instance when a tool is broken you need to find out why it broke or how it will not be broken again. You might need to get your hands dirty. For example, I had a friend, she was pregnant. Her director made her climb on top of a helicopter. The director was also a woman, a captain. [83] (Esin, Woman, Metallurgy and Materials Engineer)

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[81] Survivor is a reality show with harsh natural conditions.

[82] Makine deyince insanın aklına böyle pis bir yer geliyor. Yağ kokusu. Üstün başın kirlenir. Makine survivor gibi bir yer. Mesela ben ilk fabrikaya taşındığım zaman perçin sesinden başım ağrıyordu, alışamamıştım. Kokusu, karanlık olur, havasız olur, hangarın kapısı bir açılır buz gibi olur. Daha zordur sadece meslek olarak değil, ortam olarak da zordur.

[83] Ben: Sence mühendislik işinin tabiatı nasıldır?
Esin: Problem çözmeyi gerektirir. Mesela bir malzeme kırılıyor. Sen onun nasıl kırıldığını bulmalısın ya da bir daha nasıl kırılmayacağını. Elini pis işe de sokman gerekebilir. Mesela hamile bir arkadaşım vardı. Helikopterin tepesine çıkarmıştı amir onu. Çıkartan da kadındı. Albay.

Esin's example tells much about gender relations in the workplace. She mentions dirty, heavy and risky work and how these can be used as an obstacle for women engineers especially when they were perceived to be in "vulnerable" conditions such as pregnancy. She adds that this obstacle was intentionally created by the women director. Struggles between women were stated by three other participants in relation to toughness against difficult conditions. I call this gender struggle because the male participants did not mention this kind of an antagonism between men engineers. They only mention it in relation to blue collar workers.

I believe it can be argued that the abiliy to cope with heavy conditions of work empowers masculinity and it empowers the ideal engineer image in the workplace. As argued in Chapter 2, coping with hardships of engineering work made women feel that they fit in the ideal definitions of how a “real engineer” should be like. Women engineers who can handle these conditions are accepted and feel more self-esteem. On the other hand, when it comes to competititon, women might use the challenging conditions to intimidate each other.

6.2.1 Lack of Humanity in Engineering Work

Although five women participants noted lack of humanity in engineering, I find it crucial to share it within this study. These women were from the elder cohort, younger respondents did not indicate this aspect.

Since it was only mentioned by women participants, I thought such perception might be unique to women’s perspective. Respondents’ perception had two angles. Firstly, the difficulty of engineering major does not leave much room for socialization. Second, the engineering job itself lacks humane aspects; that is why it seems far and unknown to other people.

The first reason for lacking humanity was stated as the difficulty of engineering major. Most participants complain about hardships of engineering education. According to them, especially male engineers become asocial as a result of hard education.

> Engineers are asocial people, especially males. When you graduate from the department, you need to study hard. No social life. In university there are very difficult classes, he has to study a lot, no social life. Sometimes they come from male high schools, some can not look a girl in the eye and they are scared to talk to girls. Also they are asocial in worklife. Very few become politicians. They build weak social relationships. You do not have time to socialize. (Nevriye, Woman, Chemical Engineer)[84]

> Engineering... I mean I am sure other departments are also heavy. For example, you need to study the subjects; you can not follow other things. Especially when you are studying (at university), you stay far from human sciences, etc. (Semra, Woman, Electric and Electronics Engineer) [85]

Second, according to five women participants, the engineer has the inhumane figure who possesses the power of knowledge. This sort of knowledge makes them experts of technique, which is also foreign to ordinary people. In addition, the lack of humanity was explained to me as "having an engineer's mind":

> We engineers have dramatic differences from sociologists, for example. In our thinking system, I mean. We have this "mühendis kafası (engineer's mind)"[86]; it works as if everything is compartmented, calculable and it is based on mathematics.

[84] Mühendisler çok asosyal insanlardır. Özellikle erkekler. Fen bölümünü bitirirken çok çalışmak zorunda sosyal hayat yok. Üniversitede çok ağır dersler var çok çalışmak zorunda sosyal hayat yok. Erkek okulundan gelir bazıları kıza bakıp konuşamazlar korkarlar. İş hayatında da hep asosyaldir. Politikacı olanı çok azdır. Sosyal ilişkileri zayıftır. Sosyalleşmeye vaktin yoktur.

[85] Mühendislik...yani diğer bölümler de eminim ağırdır da. Mesela bir konuyu çalışmak zorundasın. Birçok şeyi takip edemiyorsun. Özellikle okurken (üniversitede) insan bilimlerine vesaire çok uzak kalıyorsun.

[86]Mühendis Kafası

> It is plain logic. We do not really pay attention to human emotions. In this sense, engineering is lacking humanism.[87] (Gonca, Woman, Geological Engineer)

Engineering work in this perspective is clean, systematic and predictable. Taylor calculated the work processes, and the production time in detail (Taylor, 2004). As Hacker puts it with reference to a telephone operator, "engineers can treat people like elements in a system" (Hacker, 1983:36). Treating the production process as if it does not contain any human values is an excellent example of this perspective.

> People's perception about engineers and teachers are not the same. Let me give you an example: when we go to the field we have maps or projects in our hands. Generally nobody wants to help us. I questioned this. They told me that engineers come with maps in their hands. There are no people on the maps; the situation is always against us. Because there are no marks for humans on the map. I found this very critical, I still think it is. People see us not as humans but as the law, a power holder and a person who knows that he/she has power. (Gonca, Woman, Geological Engineer [88]

As it is stated, compartmental thinking, ideas based on calculable facts defines what is called an engineer's mind. I believe this kind of thinking is determined by the jobs nature. Though it is based on human consumption, engineering work in its production process does not necessarily contain human factors. Dealing with

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[87] Biz mühendisler mesela sosyologlardan dramatik biçimde farklıyızdır. Yani düşünce sistemimiz farklıdır. Bizde bu mühendis kafası dediklerinden vardır. Herşeye ölçülebilir, kategorize edilibilir diye bakarız ve bunu matematikle yaparız. Düz mantıktır. İnsani duygulara pek önem vermeyiz. Bu anlamda diyorum, mühendislik insani şeylerden yoksundur.

[88] İnsanların mühendise bakışıyla öğretmene bakışı bir değil. Örnek vereyim, araziye gittiğimizde elimizde harita olur ya da proje. Genel olarak kimse yardım etmek istemez. Ben onu soruşturduğumda şöyle demişlerdi bana: eli haritalı mühendisler gelince haritada insan hiç göremiyorlar onun için hep bizim aleyhimize oluyor. Çünkü haritanın üzerinde insan işareti yok. Bu bana çok önemli görünmüştü. Halen de öyle düşünüyorum.

nonnumeric factors is not a usual endeavor for engineers. That is why having an engineers' mind also refers to acts without emotions and empahty.

As for the distinction between women and men participants, women might have noticed inhuman aspects as a lack, because they are raised to be more humane than men. Their gender role lead them to be humane. Whereas men might have not noticed this feature in engineering because they might think it is natural for the profession.

6.3 Ideal Perceptions of Engineering: Hard Engineering vs. Soft Engineering

During the literature review and informal conversations within engineers, I came across concepts of hard/soft engineering. I asked participants to explain this division in more detail.

> Female populated engineerings are soft. The first one that comes to my mind is food engineering. Food engineering is a woman's job. There are many women professors in our department. Almost half of them are women. Our department even has options in it. Electric is more of a men's preference while computer is preferred by women. There is such a distinction. (Semra, Woman, Electric and Electronics Engineer)[89]

Many participants agreed with Semra about a hard/soft distinction. According to this, *hard* symbolizes hardcore engineering departments and hardcore tasks, such as mechanical, civil, electric engineering and tasks related with production. On the other hand, soft refers to periphery work/tasks/subjects such as verbal courses at university,

[89] Kadınların gittiği mühendislikler soft. İlk aklıma gelen gıda mühendisliği. gıda mühendisliği kadın işidir. Bizim bölümdeki hocalardan da çok kadın var. Neredeyse yarı yarıya. ama bizim bölümün kendi içinde bile optionlar var. Biraz elektrik erkeklerin daha çok tercih ettiği bir kısım. computer daha kadınların tercih ettiği kısım gibi. Böyle bir ayrım var.

and tasks take place in the office environment or do not require hands-on ability and mathematics.

With reference to Semra's narrative, it is obvious that soft engineering fields are also regarded as feminine engineering departments. In line with Berna Zengin's study in 2000, I argue that engineering departments are divided according to gender features attributed to them. This distinction is parallel with the fact that some departments have more women than others. For instance, food, environmental, chemical and industrial engineering are regarded as feminine departments. On other hand, departments that require field work are masculine, such as mechanical, civil, mining, petroleum, electric electronic and metallurgy.

> I have not heard the hard/soft split out loud. I dont have to. I feel it. For instance we called industry 'endüttürü'. It means soft. We also said chemical engineering can also do the job of environmental and food engineering. (Esin, Woman, Metalurgy and Materials Engineer) [90]

Esin tells us how engineers cluster in other departments in regard to their hardness and softness. In this scheme, industrial engineering becomes a joking matter and is mockingly called "endüttürü" because it is soft. Here soft also refers to jobs which can be accomplished by other engineers such as chemical engineer's doing food engineer's job. It means that some departments were subdivisions of other departments and in time they became independent fields. However, most engineers in this study thought basic engineering fields can even manage the tasks of specific fields. That is why they asserted that fundamental engineering fields are the most respected.

[90] Hard/soft diye bir ayrım duymadım. Ama duymama gerek yok. Bunu ben hissediyorum. Endüstri için mesela endüttürü dedik. Yani soft işte. Çevre, gıda için de kimya onların yaptığı işi yapar dedik.

6.3.1 Gender of Engineering for Engineers

> Me: Do you have Nevin's[91] phone number? I would like to talk to her for my dissertation about engineers.
> Male Mechanical Engineer: What will you do with her? You know, Nevin does not count as a woman (laughing).
> Me: What do you mean by saying she does not count as a woman?
> Male Mechanical Engineer: I mean she is not like other women. She can participate in "male talks", she can swear like us, drink with us.
> Me: So she is one of you.
> Male Mechanical Engineer: No, not one of us. She is just a friend.
> Me: Do you think she is a good engineer?
> Male Mechanical Engineer: Engineer?... hmmm... probably she is[92].

This conversation and a similar example of it took place between me and two different men mechanical engineers on separate occasions. Nevin in the conversation is also a mechanical engineer and she is a classmate of the mentioned men. Apparently, the male classmates do not see Nevin as a woman because she can participate in "male talks", which are assumed to be sexually oriented. She also can drink like men so she can not be a woman. Even though she can swear and drink like a man, Nevin is not a part of the male classmates group, because she is *just* a woman friend at the end of the day. I guess here, *just* refers to being a woman. "Being a woman" is not the password for being a part of the social network. In addition, she

[91]Nevin is a mechanical engineer and the dialogue is between me and a male classmate of hers.

[92] Ben: Sende Nevin'nun telefonu var mı? Onunla tezim için görüşmek istiyorum.
Erkek Mühendis: Onunla e konuşacaksın ki? Nevin kadın sayılmaz (gülüyor).
Ben: Kadın sayılmaz derken?
Erkek Mühendis: Yani diğer kadınlar gibi değildir. Erkek muhabbeti yapar, küfreder, içer filan.
Ben: Yani sizden biri mi?
Erkek Mühendis: Tam olarak öyle de değil. Arkadaş yani.
Ben: Peki sence iyi bir mühendis mi?
Erkek Mühendis: Mühendis...yani belki.

might be a good engineer, her classmate puts a probability sign in the sentence; again, because she is a woman.

The conversation above reveals that isolation for women engineers does exist in engineering education and occupation as a whole. These troubles in engineering cannot be seen from the statistics. So the question concerning women engineers is not only about numerical scarcity. The problem has other dimensions that are hidden in daily expressions, prejudices and in interaction styles. It is the gendered construction of the engineering profession. Not only are women excluded as occupants of this profession, but also this culture is build upon masculine cultural codes. This culture is a part of the patriarchal structure of Turkey. We cannot break off engineering culture from Turkey's general culture.

On the basis of these, I decided to tell participants about this concept and wanted them to think about its existence. All participants but two accepted that engineers have a gendered occupational culture.

> Gendered culture in engineering exists. I do not know if the whole event happened this way but at least it is the route in my mind: I imagine there are tomatoes. A guy carves a stone, puts tomatoes in it. Sets up wheels under it. He carries more tomato at once. That guy becomes the engineer. I mean engineering started with production from nothing. A woman also discovers a spoon, but her discovery did not affect more than three or five people. That is why it did not attract attention. The situation has such natural dynamic. Man made machines that affects more people, they are more visible. Women's products are less known, and less valuable commercially.[93] (Vural, Man, Mechanical Engineer)

[93]Cinsiyetçi bir kültür tabi ki var mühendislikte. Şimdi şöyle düşünüyorum ama şey gerçekte böyle mi olmuştur bilmiyorum. En azından kafamda şöyle bir gidişat var. Önce domatesler varmış. Eski zamandaki adam bir taşı oymuş içine domatesleri yerleştirmiş. Altına tekerlekleri takmış. Bir defa taşımış bu domatesleri. İşte o adam mühendis olmuş. Yani mühendislik yoktan birşeyler üreterek başlamış. Bir kadın da kaşığı icat etmiş ama onun bulduğu şey iki üç kişiden fazlasını etkilememiş. Bu sebeple ilgi çekmemiş. Bence olayın dinamikleri böyleymiş. Erkek daha çok insanı etkileyecek makineler yapmış, dikkat çekmiş. Kadınlar daha az bilinen, ticari değeri az olan şeyler üretmişler.

University education is noted as the place where the codes of this culture are first felt.

> I think what you mention exists in reality. Because for example when I was in PhD, I was the only girl in class. I was very alone. Even though I was working on a subject especially popular among males, nobody helped me or liked what I was doing. I was like oxymoron.[94] (Fatma, Woman, Computer Engineer)

Gendered engineering culture might be first noticed at university. However, so far we have seen that participants have gone through different childhood experiences in regard to gender. They also indicated they got different reactions from society when they mention their occupation. Therefore, socially, engineering constitutes an ideal image both in the eyes of the occupants and in other people. So it would be difficult to suggest gendered engineering culture first appears during university years. Yet, I believe it is institutionally seeded in university education, but backed up with its social construction. Altough not revealed on every occasion, Metin's ideas examplify major prejudices towards women:

> Since ladies who can think analytically are rare, they are also rare in this occupation. Statistically speaking. 10 for each 100 men. In environmental engineering 20, may be. (Metin, Man, Mechanical Engineer)[95]

In addition, it is argued that gendered culture may be caused by lack of women professors as role models at university.

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[94]Ben dediğin şeyin gerçekte olduğunu düşünüyorum. Çünkü mesela ben doktoradayken sınıfta tek kızdım. Çok yalnız kaldım. Hatta bizim alanda daha çok erkeklerin ilgilendiği bir konuda çalışmama rağmen kimse ne yardım etti ne de yaptığım işi beğendi. Oksimoron gibiydim (gülüyor)."

[95] Analitik düşünebilen hanımefendi sayısı az olduğu için bu mesleğe de az geliyorlar. İstatistiksel olarak yani. Yüz erkeğe belki on. Çevre mühendisliğinde yirmi, belki.

> Since all professors at university are men, women students goes from one class to another; a guy gives her knowledge all the time. The source of knowledge is men. I think this gives women a kind of unconscious idea. It is so obvious. Once professor is distant or smiles a lot, what is this girl gonna get from him? When they get degrees, such women who were uncomfortable with professors might have missed some technical things. But this is a structural problem, independent from women, because of social issues.[96] (Vural, Man, Mechanical Engineer)

Some participants indicated that professors create gendered engineering culture through their attitudes and advice.

> Actually professors create that culture. They have an image in their minds about how an engineer should be. If you do not fit in you do not count as a good engineer. For example, we had this professor; he gave advice before every class. In worklife everything will be like this like that, prepare yourself other wise you cannot find a job. But he always talks about the construction yard. I mean as if there are no women in class, as if everyone will work in the field. (Emine, Woman, Metallurgy and Materials Engineer) [97]

Gülay was not the only one who complains about professors creating codes of gendered engineering culture. Serpil mentioned some professors ignore women students and she told me that this attitude also supports the hegemonic culture.

> The first thing I learned at university was not to bother swearing. Otherwhise you cannot hang out with others. And

[96]Hocalar tamamen erkek olduğundan kadın öğrenci bir derse giriyor diğerinden çıkıyor. Bilgi kaynağının sürekli erkek olması bilinçaltında bir fikir üretiyor bence. Üzerine hoca bir de mesafeli veya fazlaca gülüyorsa nihayetinde diploma aldığında bu tarz konulardan rahatsız olan kadınlar bir miktar birşeyleri gözden kaçırmış olabilirler teknik anlamda. Ama bu yapısal bir sorun. Kadından bağımsız. Toplumsal durumlar yüzünden.

[97]Asıl hocalar yaratır o kültürü. Bi imaj vardır kafalarında işte mesela mühendis dediğin nasıl olmalı gibi. Sen o kalıba giremezsen seni iyi mühendisten saymaz falan. Mesela bizim bi hoca vardı her derste önce bi süre öğüt verirdi. İşte çalışma hayatında şöyle olacak böyle olacak kendinizi hazırlamazsanız iş bulamazsınız gibisinden. Ama anlattıkları hep şantiye işleri hakkında. Yani sanki sınıfta bayan yok herkes erkek, herkes de şantiye de çalışacakmış gibi."

> there are professors. Man or woman, it does not matter. They all act as though there are no women in class. Actually, it is worse because ignoring gender does not mean it is not there. If women professors does not support you, either you have to adapt or you stay alone. [98] (Serpil, Woman, Metalurgy and Materials Engineer)

Next I wanted to learn if gendered culture of engineering continues after university. Most participants argued that after university, the culture is experienced even more harshly. Participants mostly mentioned pressure from many different angles. Details about cultural pressure will be explained in the coming chapter, but for now, I want to share some narratives showing how gendered engineering culture affects women engineers's self esteem, their marital status and acceptance to social networks.

> We already got damaged at university. I mean by men. In the workplace it is even worse. This time they interfere with my clothes, they do not approve of my work, they do not include me in the group. I mean our suffering does not end. (laughs). [99] (Fulya, Woman, Electric and Electronics Engineer)

Most participants also stated that engineering requires full commitment of both professional and leisure time. Full mind engagement and addiction to technology were noted as ideal features of an engineer's personality.

> I see that the culture is very masculine. For sure. I graduated from university. I was not aware of gender segregation. I started

[98]Üniversitede ilk öğrendiğin şey küfürlü konuşmaları takmamak ya da takıyosan sınıf ortamlarına hiç takılmamaktır. Bi de tabi hocalar var. Erkek kadın hoca fark etmez. Bunlar sınıfta hiç kız yokmuş gibi davranırlar. Aslında bu daha kötü çünkü cinsiyetten bahsetmemek onun orda olmadığını göstermez. Kadın hoca bile sırtını sıvazlamazsa, mecbur ya erkeklere uyarsın ya da yalnız kalırsın".

[99]Zaten üniversitede bi darbe yedik. Yani erkeklerden. İş yerinde daha beter. Bu sefer de kıyafetine karışır, işini beğenmez, aralarına almazlar falan. Yani bitmiyo çektiğimiz (gülüyor)."

> to do my master. I felt so unsuccessful during the masters. I never thought it was because of my advisor….Now I notice we never study together, we rarely saw each other. I thought 'I could not write a thesis, I am incompetent, I better start working in the public sector and not as an engineer'. However I graduated with the best degrees. It is contradictory. When working, they say 'you have little kids, you can not travel.' My kids became seven years old, still the same story. "I got my children taken care of. Why are you thinking about it in stead of me?" We experience these practices without noticing. They are not only gendered practices, the whole structure intersects. (Mine, Woman, Civil Engineer)[100]

Mine underlines a very important experience. The lack of self-esteem among women who engage in engineering has been noted by many participants. Women engineers complained about their insecurity towards technology and related subjects. They indicated that even though they had entered university with assurance, they experienced a decrease in confidence during univeristy years because they felt insecure with technology. Participants argued that women's bond with technology is not as close as its bond with men. Moreover, Mine notes that women experience gendered practices without noticing them. These practices are a part of our daily lives and we take them as natural. The ideology about gender roles constitutes the basis for these acceptances and without reflexivity it is difficult to notice such practices.

[100] Kültürü çok eril görüyorum kesinlikle. Üniversiteden mezun oldum. Şeyin hiç farkında değilim cinsiyet ayrımcılığının. Yüksek lisans a başladım. Yüksek lisansta çok başarısız hissettim. Hiç bir zaman danışmanımdan dolayı olduğunu düşünmedim. Sonradan fark ediyorum hiç birlikte çalışmamışız, çok az görüşmüşüz. Tezi yapamıyorum, ben kabiliyetsizim, en iyisi mühendis olarak çalışmayayım da devlete gireyim diye düşündüm. Halbuki dereceyle mezun olmuştum. İki tezat uç. Çalışırken de senin küçük çacuğun var seyahate gelemezsin. Çocuğum yedi yaşına geldi hala aynı terane. Ben çocuğuma baktırıyorum, siz niye benim yerime düşünüyor sunuz? Ama bunlar hep fark etmeden yaşadığımız şeyler. Sadece cinsiyetçi bir pratikten dolayı değil, tüm yapı birbirinin içine giriyor.

6.4 The Impact of TMMOB and Its Gendered Organization on Engineers' own Perceptions

As I mentioned in previous chapters, neither in other countries nor in Turkey has access to scientific knowledge production and application been without limits for women in its material sense. The ideology of separate spheres, patriarchal stereotypes, not only capitalist but also Marxist conceptualizations of worker as men, has trapped women's work inextricable situations.

On the basis of these points, perhaps not spoken out loud in engineering chambers, but hidden in TMMOB's functionings is that women engineers are just seen as a nominal contribution to the engineer image in Turkey. The union was founded in 1954; today it functions as a corporate organization with 443.981 members. Out of 23 administrative board members, only 4 are women. While keeping in mind that engineers have to be registered in TMMOB in order to work in Turkey, we see that working women engineers is one sixth of male engineer population under TMMOB. Yet it is important to note that neither historical sources of engineering schools nor more contemporary studies, including TMMOB's own research about engineering, open a debate about gender within the occupation (Öncü, 1996; 1999; Artun, 2000; Haşim & Öncü, 2000; Öncü, 2010; TMMOB, 1976; 1998; 2009). Apart from recording the numbers of women members, TMMOB, even in its latest study on the profile of architects and engineers in 2009, did not indicate in any way that gender was a problematic issue needing to be examined.

The majority of participants in this study were members of TMMOB, whether on paper or in action. Most participants advocate its existence and many agreed that TMMOB is a necessary organization with a political claim.

> Does the chamber attract enough attention in the public? I am looking for the answer to this question. For instance, the accelerated speedy train accident.[101] The Chambers of engineers prepared a thousand reports regarding it, they shouted about it; nobody cared. Since that accident happened they said they stated that it was going to happen. I find this kind of stuff interesting for a chamber. Of course engineers' rights must be protected or they need to get help in worklife, but the chambers also should solve problems. They had this initiative before. Now it has been taken out of their hands. Because political power decreased this initiative.[102](Vural, Woman, Mechanical Engineer)

TMMOB for most participants is a necessary organization because it seems critical for the current political atmosphere. In addition to TMMOB's responsibilities as an umbrella chamber, participants stated they expect a political stance towards the deeds of current government in Turkey. As an occupational organization, participants expect TMMOB to speak up in front of the public and make them know about bad technical decisions which were made politically.

I wondered if participants thought TMMOB represents the whole of engineers as an occupational group:

> I think chambers do not represent all engineers. It is not embracing. This is reflected in the elections. As far as I know, right wing members attended the elections. They had a fraction called "Unity in Engineering" or something. They resisted during the 80s but then they gave up; they do not come to the

[101]Accelerated speedy train (high speed train) went off the rails because of overspeed in Pamukova in 2004. Retrieved from http://www.seslisozluk.net/?word=a%C5%9F%C4%B1r%C4%B1+h%C4%B1z&lang=tr-en.

[102] Mühendislikler odası toplumda yeterince dikkat çebebiliyor mu? Bu sorunun yanıtını arıyorum ben. Hızlandırılmış tren kazası mesela. Mühendislikler odası onunla ilgili bin tane rapor hazırladı. Birçok kez bağırdılar ama işe yaramadı. Ve kaza olduğunda biz bin kere demiştik dediler. Odaların bu tür işleri bana daha çekici geliyor aslında. Tabi ki mühendisliklerin özlük hakları savunulsun, iş hayatında onlara destek olunsun. Öte yandan birçok sorunu çözme inisiyatifi daha yüksekti odaların. Şimdi ellerinden alındı. Siyasi erk tarafından yetkileri azaltıldı.

> elections anymore. So I do not think the chambers represent everyone. (Ömer, Man, Electric and Electronics Engineer)[103]
>
> From its own perspective, I mean as engineers, TMMOB questions the politics of the country, they are concerned with issues regarding the profession. They criticize the current government. It is natural. Thus, it does not contain any engineer who represents this government. For sure. (Ömer, Man, Electric and Electronics Engineer)[104]

Three participants who identify themselves as conservative and central right were also members of TMMOB. However, they stated they do not attend meetings and elections because their ideology does not fit in with TMMOB's.

> Member..., I am registered. I mean I do not fulfill membership. I do not go to meetings. Every year, it's the same story. I do not care because every year they select the same guys. They do not want to hear other voices. They have no idea about real world. (Metin, Man, Mechanical Engineer)[105]

Participants who feel they do not fit in with TMMOB also underlined that TMMOB does not provide occupational support. According to this perspective, TMMOB is acting as a political organization whose job is to criticize.

Relatively young participants agreed with the idea that TMMOB needs to act like a professional chamber and make sense of its existence through amending working conditions, and engineers'problems.

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[103] Bence odalar tüm mühendisleri temsil etmiyor. Kucaklayıcı değil. Seçimlere de yansıyor. Ben bildim bileli mesela sağ görüşlüler seçimlere katılır. "Mühendislik Birliği" mi neydi bir fraksiyonları vardı. Her seçime girerlerdi. 80'li yıllarda biraz direndiler. Sonra havlu attılar. Artık seçimlere de gelmiyorlar. Bu yüzden temsil ettiğini düşünmüyorum.

[104] Kendi bakış açısıyla, kendi derken, tabi mühendis olarak. Ülkenin siyasi politikalarına mesleğiyle ilgili konulara kafa yoruyor. Öyle olunca da bugün itibarıyla eleştiriyor iktidarı. O da normal. Dolayısıyla iktidarı temsil eden hiç bir mühendisi kapsamadığı kesin.

[105] Üye... kayıtlıyım. yani üyelik şeylerimi yerine getirmiyorum. toplantılara gitmiyorum vesaire. çok da takmıyorum çünkü her sene aynı terane. hr sene aynı herifleri seçiyorlar. Diğer sesleri duymak istemiyorlar. Gerçek dünya hakkında bir halt bildikleri yok.

> For instance, when your (chamber's) main occupational field contradicts with politics, you should not prefer politics. You should prefer technicality. You must head towards technicality. Because you are an occupational chamber. I have not seen this perspective. Thus I did not stop by the chambers in five years. They also stopped sending me periodicals. Thus we lost contact. I also think that the women's branch is the same. I think politics weighs more heavily. (Derya, Woman, Civil Engineer) [106]

Murat agreed that TMMOB acts more like a political rather than an occupational organization.

> I will tell you something about the chambers. In regard to structure of the chambers, the chambers and women's work groups cannot be different, I guess. I think the chambers are political organizations. They do not hide it anyway and it is natural. However I always find it odd that they make politics their priority. Politics should not be a priority. In Turkey it always comes from political perspective. You need to protect your chamber against political organizations. In that meaning you need to be political. Yet, the essence of your task is not politics. The essence should be technical. You are in a position to assemble people who chose this occupation as an organization. As a result, you should give priority to the occupational troubles of members. (Murat, Man, Civil Engineer)[107]

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[106]Senin mesela ana iştigal sahan olarak gördüğün siyasetle çeliştiği zaman sen siyaset boyutunu tercih etmemelisin. Teknik boyutunu tercih etmelisin. Oraya yönelmelisin. Çünkü sen benim meslek odamsın. Böyledir, böyle olmalı. Bu yapı bu şeyle çalışıyor olmalı. Ben öyle bir yaklaşım görmedim. Göremediğim için dedim ya beş yıl uğramadım. Onlar da bana gönderiyorlardı meslek dergisi. Onu da göndermemeye başladılar. Dolayısıyla öyle bir diyalog kopukluğumuz oldu. Kadın kolunun da aynı manteliteye sahip olduklarını düşünüyorum. Siyaset kısmının ağır bastığını düşünüyorum.

[107]Odalarla ilgili genel olarak ben sana şöyle bir şey söyleyeyim. Odaların yapısı, odalar böyledir ama kadın kolları farklıdır gibi bir şey olmaz sanırım. Odaların ben siyasi yapıda organizasyon olduğunu düşünüyorum. Zaten bunu da saklamıyorlar. Doğaldır da... Doğaldır, fakat önceliği buraya vermelerini ben hep yadırgamışımdır. Öncelik siyaset olmaz.Olay artık tamamen siyasi perspektifle geliyor. Sen meslek odasısın. Sen meslek birliğine siyasi organizasyonlara karşı, siyasi platformlarda savunma anlamında tabii ki onlarla bir şeyin olacak. Siyasi de olmak zorunda zaten bir anlamda. Fakat işin özü bu olmamalı. İşin özü teknik olmalı. Sen o mesleği seçen insanların üye olduğu bir organizasyon tepe yapısı konumundasın. Dolayısıyla yine o mesleği seçen üyelerin mesleki sıkıntılarını ön planda tutmak zorundasın.

Only one engineer admitted that although he shares TMMOB's political ideology, he does not spend enough time to criticize the organization. According to him, if someone is to judge TMMOB, she/he has to make an effort within the chamber.

> Yes I am a member of EMO (Chamber of Electrical Engineers). In the past I was also in administration, when I was in Trabzon. It works well, but troubles in the social organization also exist in EMO. I always thought people who criticizes occupational chambers or unions criticize without making an effort.Thus, even if I have bad feelings for EMO, I would not dare to declare it out loud because I did not attend its meetings, picnics…not only political, I mean. (Ömer, Man, Electric and ElectronicsEngineer)[108]

Professional problems are perceived as peripheral for many participants. Participants stated that political causes are bigger than occupational struggles. I believe this perspective closes many doors in the political struggle as well. If we go back to a note I mentioned above, participants mostly perceive politics in its populist, major meaning. They think politics can only be done on the organizational level. However, occupational struggles are political struggles of everyday life. Especially when it comes to gender, sometimes daily battles are the only ones one can manage to win. Organization is difficult and is obstrcuted by structural barriers.

> We are designers of unearned income. For instance, buildings collapse in earthquake. TMMOB is silent. Who made the buildings? Who signed the projects? Rent designers... Engineers seem on the side of society, slogans claiming "engineers protect public" conceal reality. This superstructure,

[108] Evet EMO'ya üyeyim. Geçmişte üye olmaktan öte yönetiminde de bulundum, ben Trabzon'dayken. İyi çalışıyor evet, ama bu toplumsal örgütlenmedeki sorunlar meslek odasında da var. Meslek odası ile sendikaları eleştiren herkesin çaba harcamadan eleştirdiğini düşünmüşümdür ben. Dolayısıyla Emo için bir şey hissetsem de söyleyecek cesaretim olmaz çünkü toplantılarına gitmemişim, pikniklerine gitmemişim, ille siyasi değil yani....

> the structure of army corps, that rationality, does not want to be questioned, does not want you to ask any question. (Gonca, Woman, Geological Engineer)

Similarly, in a meeting at MMO (Chamber of Mechanical Engineers), I discussed with a women who was also a board member of MMO, her ideas on women's movement in TMMOB. She told me that TMMOB's and other chambers' major cause of existence is class struggle. She added that feminist struggle is only secondary and also divisive. According to her, women who want to claim their rights should support major causes of TMMOB, because once class antagonism is solved in favor of the working class, then women's oppression will also end.

Being one of the biggest occupational unions of Turkey, TMMOB determines engineering culture, at least on the surface. Publications, research studies, books, web sites and gatherings of TMMOB reach almost all engineers in Turkey. In that sense, TMMOB's standpoint is constituted within engineering culture in Turkey including being blind to gender.

Women have recently tried to raise their voice in TMMOB after the 2000s. They gather in women work groups functioning in member chambers under the umbrella of TMMOB. The first women's congress under TMMOB was held in 2009. It was agreed that the congresss should be traditionalized and be held in every two years. In the conclusion text of the first two congresses, women engineers summarized their demands as such:

- "Equal wage for equal work
- To work in the field as well as in the office
- To be promoted regardless of their gender
- To end gender-based division of labor

- A minimum 35 % quota in TMMOB and in member chambers' boards
- To end discrimination, harassment and mobbing in the workplace
- To have kindergarden opportunities" (TMMOB, 2009:36-41).

Even though women engineers gathered under TMMOB after the 2000s, TMMOB still preserves masculine organization in its discourse and its body by putting the blame on capitalism when it comes to the problems of women engineers[109].

> The engineer is leftist. (Esin, Metalurgy and Materials Engineer)[110]

Political fractions have different connotations in every country. In Turkey right and left has several definitions as well. Within the frame of this study, the majority of participants preferred to define her/his political position as leftist, with three exceptions. Three participants saw themselves as conservative and middle right. Ten participants declared engineering is a leftist occupation by nature. They stated that an occupation dealing with science needs to be leftist because it relies on scientificially proven rules and progress. Definitions of left and right are not a subject of this study. However, I must note that what is called the left by participants has a very wide range of meanings and reflections in Turkey's politics.

Women participants in this study agreed that the perspective above is common among TMMOB authorities. Men participants generally do not pay enough attention to women's existence in TMMOB. They usually state that women do not want to participate in chamber

[109] See http://www.tmmob.org.tr/genel/bizden_detay.php?kod=2802&tipi=2

[110] Mühendis dediğin solcu olur.

business since they have household responsibilities to attend to. As a matter of fact, administration and organization of TMMOB is mainly populated by men.

> I suffered as a woman in the field. When I started to take part in politics, I recognized that neither my leftist friends nor TMMOB is better than the ones in the field. Even gender discrimination in TMMOB is more project-based, systematic, technical and programmed. At the time we felt we belonged, we thougt we had managed something. In time we understood that they never put you in certain positions, certain chairs. Perhaps, it is one of the places that patriarchy is most felt in Turkey. I call TMMOB army corps and organized evil. (Gonca, Woman, Geological Engineer)

Similarly, some participants noted that TMMOB authorities use financial difficulties as a barrier to women commisions. In that sense, many argued TMMOB is a patriarchial organization both in terms of its male population and the systematic obstacles from masculine administration.

> There is a very strong and hidden resistance towards the women's movement in TMMOB. You demand very little money. "The Chamber does not have money!" Then it needs to continue voluntarily but it is very difficult. They appear to support women groups, but actually they do not. We managed to send a friend to Gender Studies program in Ankara University. We made the chamber pay for it. We did it but how….with intrigue…with threats…we threathened to tell everywhere that TMMOB is discriminatory. (Serap, Woman, Geological Engineer)

According to Serap, women's organization in TMMOB is prevented by many channels. Financial excuses are one of them. Yet women commisions exist in different chambers of TMMOB. They voluntarily organize meetings and seminars.

> Yes, I am a member of TMMOB. A very patriarchal organization. I became a member of EMO (Chamber of Electrical Engineers) because it has women work groups. It is the reason for my participation and it is interested in issues about women. EMO has women comissions. They are voluntary. Volunteers individually work for whatever they have in mind, they try to unite and organize." (Semra, Woman, Electric and Electronics Engineer)[111]

On the basis of voluntary efforts, the first women convention of TMMOB was held by the impact of women comissions in 2009. It is held regularly every two years.

> I attented the first women convention of TMMOB. I could not attend the second one. The third will be held this year. But they have troubles, it is not a free convention because we do not have an information network. Most people do not know why the women convention is organized, what it is about. The first convention was rich in terms of discussions, the second repeated itself.
>
> Plus, people who are against feminism and who are pro-class might, you know, sabotage the convention. As people who comtemplate feminism, we cannot participate in most workshops. We can not communicate. As a result, we do not move forward. We could not accomplish it...Inside TMMOB's hierarchy, it does not work. It is said that we can not do whatever in our minds.
>
> ...I do not know how to answer the class thing or I do not know how to react to people who deny gendered practices. I mean, we also need to learn but human relations are very important. Persuading someone by talking...It is lacking in engineers. (Semra, Woman, Electric and Electronics Engineer) [112]

[111] Evet, TMMOB'a üyeyim. Son derece erkek egemen bir topluluk. Bu açıdan beni emo'ya üye olmam kadın çalışmaları grubuyla beraber olmuştur. Benim EMO'da olmamın nedeni kadın komisyonu kurulmasıdır ve kadın çalışmalarıyla ilgilenmesidir. Böyle komisyonlar oluyor. Gönüllü komisyonlar bunlar. Kendin gidip kafana göre birşeyler yapıyorsun. Birlik olup örgütlenmeye çalışıyorsun.

[112] TMMOB'un birinci kadın kurultayına katıldım. İkincisine katılamadım. Üçüncüsü de bu sene olacak. Onun da sıkıntıları var. Çok özgür bir kurultay değil çünkü bilgi ağımız yok. Çoğu insan niye kadın kurultayı oluyor, burada ne konuşulacak bilmiyor. ilk kurultay dolu dolu olmuştu. İkincisi biraz tekrar oldu. Bir yandan da feminizme karşı olan sınıf şeyini böldüğünü düşünen kişiler biraz böyle, şey yapabiliyorlar, sabote edebiliyorlar. Bu konuda kafa yoran kişiler olarak bizler katılamıyoruz oturumlara. İletişemiyoruz. O Yüzden de ilerleyemiyoruz. Şeyi gerçekleştiremedik... TMMOB'un hiyerarşisi içinde olmuyor. Siz

Even though women in TMMOB try to organize and ask for their occupational rights, they come across several difficulties. These difficulties are mainly argued to be excuses of the patriarchal mind common to TMMOB organization in general. Semra, admirably describes how women commissions can not work freely because there are social pressures as well as financial burdens.

Raising feminist claims is conceived as a problem of its own. As mentioned at the begining, negative reactions about feminism are caused by an ideological view that claims women's movement divides class struggle. Semra also underlines the importance of sharing knowledge when it comes to the discussion of subjects like class struggle. She also thinks that engineers lack communication skills in that matter.

> I had a friend Ayşe, she declared that she is feminist in a meeting of TMMOB. After the meeting a woman came and told her that she was very sorry to hear that Ayşe was feminist. Even if you are working about women you should not use the word feminist. I think women's movement proceeded well in TMMOB, or I just want to think positive. A lot of women participated in the conventions. A big controversy took place. One side supports the quota the other does not. [113](Serpil, Woman, Metalurgy and Materials Engineer)

Declaring that one is a feminist is not welcomed. Participants told me that women issues can be spoken about everywhere, but with a hidden terminology and without overtly using the word feminist. Mine

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kafanıza göre her şeyi yapamazsınız deniyor. ...sınıf şeyine ben nasıl cevap vereceğimi bilemiyorum. ya da işte inkar edenlere, cinisyteçi uygulamaları. Yani bizim de öğrenmemiz lazım. Ama insan ilişkileri çok önemli. Konuşarak ikna etmek... O da mühendislerde eksik.

[113] Odadan Ayşe diye bir arkadaşım var. Bir toplantıda konuşurken dedi ki ben feministim. Toplantı bitti başka bir kadın arkadaş geldi" Ayşe feministmiş çok üzüldüm" dedi. Kadınlarla bile çalışırken feminist sözcüğünü kullanmayacaksın. Ben TMMOB'da kadın hareketinin iyi ilerlediğini düşünürüm, olumlu düşünmek istediğim için. Pek çok kadın katıldı kurultaylara. Büyük anlaşmazlıklar da oldu. Kotayla ilgili mevzularda. Bir kısım istedi, bir kısım istemedi.

states that feminist is perceived as "bogyman" to men and also to some women. Women who claim their rights are conceived as feminist and that is why, even the most natural demands like quota becomes a big contraversy. At the moment, there is no quota application in the chambers of TMMOB, though efforts of women commissions are continuing.

> TMMOB had to open to women's way because it has leftist and socialist claims. It is defeated to its own glaze. That is why TMMOB is one of the organizations that had to listen women's voice. (Derya, Woman, Civil Engineer)

As discussed before, throughout this study, also during meetings in TMMOB and in different chambers, many times I came across with men who think they value women by describing their presence as; *civilizing, making work/education colorful* and they even calling women *the flowers of occupation.* Although I respect the participants' positive intention, I think this perception produces and reproduces existing hierarchies and gender stereotypes. Conceiving of women as the color of the profession is the same as with seeing their presence as supplementary to male existence. In this view, women are seen as guests to engineering, not real members of the occupation.

A Note on "The Online Initiative of Women Engineers: [114]

Only in the second half of the 2000s were women engineers gathered as an e-mailing group and a website based initiative with 450 members. Without being officialized under TMMOB women engineers began to raise their voices in order to make discrimination against women in work life visible. They called for more professional women in chambers to join them. As a result, in 2009, the first general meeting of women gathered under TMMOB.

[114] http://www.kadinmuhendisler.org/

Apart from the e-mailing group, women engineers work within work groups of TMMOB, usually follow TMMOB's political stance. In that sense, TMMOB's masculine character and organization does not question itself, but provides opportunity to women members to raise their voices within TMMOB's hegemonic discourse[115].

Concluding Remarks

In this part, I attempted to understand the manifestations of gendered engineering culture on the professional level. I found that the cultural codes manifests in engineers' own perceptions about themselves and their profession, which can be seen in their occupational organizations, and declarations. Nevertheless, such a frame is lacking unless social dynamics and structural factors of employment are considered in the creation of professional culture. That is why I constantly reminded myself that the image of the engineering profession on the social level is always in interaction with engineers' own perceptions.

Similar to Artun's engineer, for my participants, the "real engineer" was conceptualized as a person who has the ability to think analytically and use mathematical language to make sense of the world. The engineer was also a person of reason. He/ she acts according to calculations and his/her decisions are based on the findings. In addition, a real engineer was expected to cope with heavy and dirty working conditions. Hands-on experience was also required because engineering work benefited much from taking things apart and putting them back together.

[115]http://www.tmmob.org.tr/resimler/ekler/09152d7a39d0756_ek.pdf TMMOB 2. Kadın Kurultayı Birleştirilmiş Karar Önerileri.

The theoretical framework is confirmed by the findings of this study. Both men and women participants declared that ideal images about engineering adresses men as the natural engineer. Women, however can only be exceptions for the profession. Both on the social level and on the professional level, participants indicated that the image of the engineer is masculine.

TMMOB who acts as the umbrella organization for engineering chambers was also reported to have and maintain gendered conceptualization. Although participants mostly think that chambers must exist and defend their rights, women participants thought they do not have equal chance of participation in TMMOB's organization.

Finally, participants commented on the hard and soft split in engineering. Some engineering fields were found to be more suitable for femininity and some for masculinity. Similar to Berna Zengin's findings in 2000, I can still argue that hard and soft terminology determines the gender of engineering departments. That is to say, core tasks are indicated to be hard and soft tasks are found peripheral. Just as "hard tasks" connotes masculinity and are conducted by men engineers, women engineers accomplish soft tasks and mainly stay in the periphery.

CHAPTER 7

AFFECT OF GENDERED ENGINEERING CULTURE ON WOMEN AND MEN ENGINEERS

In this chapter, I aim to understand how gendered engineering culture affects women and men engineers differently. With this aim, I examined the experiences of forty three participants. These experiences were carrying traces of childhood and university memories. They are based on different values on the basis of the participants' gender, class positions, ethnic backgrounds and sexual identities. In fact, these features cross cut each other in real life and they make us who were are. I tried to examine narratives by keeping this idea in my mind.

From this perspective, I divided this chapter into three parts. I discuss how gendered culture of engineering affects men and women engineers in the faculty environment, in the labor market and in worklife. I examine differences and similarities by giving voice to participants' narratives.

7.1 Engineering Faculty

I graduated from a technical university in which natural and applied sciences are favoured. Social sciences are found to be vague and uncertain. Despite the changing ratios, engineering departments are mostly populated by men. Since social sciences accommodate more

women, engineering students tend to enroll service courses of these departments in order to meet women students.

Masculine departments are men-populated while feminine departments have more women professors at universities in Turkey. Similarly, student distribution shows resembling patterns. So is its culture. Gendered jokes, phrases, stories about nominal scarcity of women in engineering departments are at least heard once by everyone.

Participants of this study told me various stories about their department lives. Some took the gendered culture serious and tried to fight against it. Some literally ignored the local perspective, and some others intentionally ignored it as a survival strategy in the department.

On the basis of the findings, I argue that codes of gendered engineering culture become visible first at department. In this part I will focus on the engineering faculty and its gendered structure by relying on participant's experiences. I also attempt to understand how codes of gendered engineering culture are formally seeded among men and women engineers.

7.1.1 "Women Having a Mustache": Being a Women Engineering Student

One of the most encountered jokes about women students in the engineering faculty is that they have a mustache. This common saying about "mustache" is firstly mentioned by one of the women participants. Then, I heard the same phrase from other participants as well. I learnt that it is a common joke within the engineering faculty to mock women students who are hardworking and do not care about their appereances.

Women engineering students do not literally grow mustaches but having a mustache has two symbolic meanings. First, it is believed that it symbolizes masculine competence. Second, it is used to refer to desheveled women engineering students.

To begin with, the "mustache" is important for men in Turkey. It is thought that having a mustache shows manliness. It symbolizes competence and strength. Being physically able to grow mustache is seen as a step towards becoming a man. In this case, a women can only be an engineering student if she has a mustache. It has two submeanings. One; these women should be extraordinary in order to deal with men's stuff. They are neither men nor women. They are perceived as something in between; women with a complementary part. The idea of the mustache completes these women in the eyes of men.

The other submeaning is that, since women are thought to be incompetent in mathematics and in analytical thinking, a woman can only be an engineering student if she has masculine features. In that sense, having mustache means that the woman is man like; she can manage man's work. Moreover, she is seen different from her mainstream counterparts, who are thought to be naive and non-technical minded.

Secondly, "women with mustache" is used for desheveled women engineering students. Meaning; women who do not pay attention to their looks.

> There are ragged girls. They are called mustached.[116] (Volkan, Man, Mechanical Engineer)

Ignorance of appearence might be a strategy for girls who are struck by male dominance in the department. Although, no participants told

[116] Bakımsız, kendini öyle salmış kızlar vardır. Onlara bıyıklı denir.

me that they were desheveled as a coping strategy, I believe it might be a way to be invisible as a woman. Being desheveled also hides feminine aspects and might provide an easier faculty life for many women.

In addition, participants mentioned desheveled women are the hardworking ones. They slyly indicated that women with mustache are students with the highest grades without social life. In this logic, in order to work hard, women need to ignore looks.

Judging from the findings, I can argue that faculty life is a battle for most women engineers. Some participants told me that they were lacking technical self-confidence during university years.

> I did not have self-esteem in technical matters. I only studied very hard. I even did not have Commodore 64[117], how can I have self-esteem? (she laughs).[118] (Fulya, Woman, Electric and Electronics Engineer)

Similar studies show that women's lower self-confidence in technology is partly a result of childhood experiences in that activities they were engaged in were defined as masculine (Cockburn, 1985; Betz &Fitzgerald, 1987). On the other hand, academic success helps women students to overcome their feelings of insecurity in faculty life (Robinson & McIlwee, 1992:49). In that sense, being desheveled and hardworking might also function as a way to overcome the lack of self-esteem in women engineering students.

Regardless of their gender, participants in this study told jokes and stories about desheveled students in the faculty.

[117] Commodore 64 home type computer which was popular during late 80s in Turkey.

[118] Teknik alamda kendime güvenim hiç yoktu. Sadece ders çalışmışım. Commodore 64'üm bile olmamış, neyin güveni olacak (gülüyor).

> I mean in engineering everyone is desheveled. There were women who wore things no different from male outfits.[119] (Semra, Woman, Electric and Electronics Engineer)

Ignoring one's appearance is stated as a common attitude among engineering students. According to participants, it shows how hard their student life is, and it highlights their struggle with very difficult courses. They do not have time to spend on their appearance, because they have to deal with complex mathematics and physics. Although, being desheveled is a sign for being busy with more important matters than appearance, women's tendency to ignore their looks is told as if it is shameful, while men were proud of their business with the courses.

> The minute you enter university, courses come all over you. You cannot think of anything else. It is like this until the third year. Towards the end of final year, women upgrade themselves. They pluck their eyebrows, make their hair...[120]. (Yiğit, Man, Mechanical Engineer)

According to men engineers, their ignorance is not only natural but also permanent. However, girls tend to change their attitude by "upgrading" their looks.

I believe this idea implies that women also need to pay attention to appearance because eventually they will begin job hunting and try to build a family. I should also note that in this perspective, finding a job and finding a husband requires similar outlooks. This also shows the gendered idea about women, regardless of their professional status.

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[119] Yani mühendislikte herkes bakımsız. Erkek giyiniminden hiç farkı olmayan kadınlar vardı.

[120] Üniversiteye geldiğinde dersler üstüne bir çullanır. Başka şey düşünemez olursun. Üçüncü sınıfın sonuna kadar böyledir. Dördüncü sınıfın sonlarına doğru kızlar upgrade ederler kendilerini. Kaşlar alınır, saçlar yapılır falan...

Four women participants told me that women with mustache are just a division in the engineering faculty. There are two other types of women; the masculine type and the family type.

1. Masculine Type: Women like men. This type of women engages in masculine conversations and they do not mind slang language in social relations.
2. Family Type: Goodlooking women who are medium level hardworkers. They usually engage with office work after graduation. They do not perform "real engineering".

Family type is described as being hardworking on the medium level, having better looks than other girls and well-kept to some degree. These women are the ones who choose to be invisible in the faculty. They do not participate in social activities with classmates; they usually hang out with other departments. Eventually, they do not work as engineers but they prefer to apply to positions related to organization. Masculine type, on the other hand, is dedicated women engineers, who hang out with men students, and have masculine manners.

> I went to Kaçkar this summer for trekking with tour. We were ten people. I met a lot of people there and while chatting, there was a guy who was 4 or 5 years older than me. He told me the first time he saw me he thought that I am from an engineering department; male populated engineering[121] (Aslı, Woman, Mechanical Engineer)

Aslı's experience shows that women studying in male-populated engineering subjects adopt a certain style of behavior. Looking from this perspective, the way she talked, topics she mentioned were the ones that our society make us expect from a man. She knew about

[121] Kaçkara gittim ben bu sene yazın kaç kar dağına turla gittim. Orda toplam biz 10 kişiydik orda işte bi sürü insanlaa tanıştım onlarla muhabbet ederken orda işte benden 4-5 yaş büyük bi çocuk vardı. Bana dedi ki seni ilk gördüğüm an erkek yoğunlukta olan bir mühendislikten mezun olduğunu anladım dedi.

the automobile industry, she had technically detailed ideas about digital technologies. Plus, she does not wear anything feminine. Aslı told met that the last skirt she wore was her high school uniform.

Aslı is one of the masculine type women from the typology above. I do not think she intentionally prefered to look masculine. She adopted masculine features that she felt comfortable with. I believe it is also a way to be accepted within engineering circles, because she works in a big factory's production department. As I will discuss later, it is difficult for women to be employed in production departments. However Aslı is a member for some time and I believe her appereance and behaviors are important factors in her employment environment.

Nevin was one other participant who studied in a masculine department; civil engineering. She indicated that she had to be like men because she wanted to be a part of the student circle. She also mentioned three-legged division of women in the engineering faculty. Nevin added that she sees herself in the masculine type and she was proud of it. According to her, being a family type girl was despising:

> Good family women work in big factories. They do project engineering. This type can also be found in feminine departments. In food or in environment. They are all good family type women.[122] (Nevin, Woman, Mechanical Engineer)

Throughout the study I occasionally came across women participants who despise other women colleagues. Nevin sees non-masculine women students as incompetent to be real engineers because real engineering in her mind is dealing with heavy tasks. Project engineering is regarded to be feminine and is appropriate for women who work in office-based factories, as she mentions. In her opinion,

[122] İyi aile kızları tai de roketsan da çalışırlar. Proje mühendisliği yaparlar. Bunlardan bir de kız mühendisliklerinde çok olur. Gıda da çevrede filan. Ordakiler hep iyi aile kızıdır.

feminine engineering departments, like food and environment, accommodate mostly this type of girls. I believe the reason is that these departments are not basic engineering fields and are regarded as soft engineering subjects.

These categorizations are highly gendered. At least theoreticaly, some women engineers do gender over other women. They categorize them by femininity level and think femininity is something that pulls them back. In addition, feminine women engineers are associated with certain departments. As mentioned before, these departments' gender is socially attained due to the nature of the job done and the degree of mathematics they involve.

"Women having a mustache" is a common joke at university. With this very joke gendered ideas embedded in engineering become obvious. Such jokes obtain certain prejudices on the faculty level. They are traditionally articulated and become a part of the professional culture.

7.1.2 Attitudes of Professors

Ideas about engineering faculty provided different results for two cohorts in this study. I have found that participants aged 40 and over spoke of their professors with gratitude and respect, in contrast to younger participants. Both women and men participants from this age group indicated that professors supported them not only during university life, but also for the work life.

As it was mentioned before, the first women students in engineering faculties were encouraged by the state itself. It is understood from participants that support for women students was carried out by faculty members. This attitude of professors created the feeling of gratitude for elder engineering students.

> I believe I owe so much to my university. I owe much to my professors in undergrad. There was a professor who I liked a lot. He always told me if he were reborn, he would want to be an engineer, again. He said he likes engineering a lot. I was influenced by him. He encouraged me. Even he helped me find employment after graduation. [123] (Nevriye, Woman, Chemical Engineer, 55 years old)

Gratitude is common to women students of elder age group in this study. I believe this feeling can be seen in other professional groups and it is not unique to engineers. Women of a certain age in Turkey who had access to higher education and professional life has mentioned gratitude for state and faculty members in other studies (Naymasoy, 2010). Thus, women engineers indicated a similar perception of their faculty members. In this sense, my findings support other studies concerning professional women in Turkey (Bayrakçeken-Tüzel, 2004; Naymasoy, 2010). Women engineers felt they owe their knowledge and self-confidence to their professors in terms of further employment. In addition, positive discrimination was stated as a habit of engineering faculties of the time.

Men participants of the elder cohort mentioned faculty members with respect. They did not indicate gratitude but respect to their professional knowledge and experience.

> We were students before the 80s. Compared to those times, professors of today are very amateur. We had a professor who knew everything. He would even build the machine with his own hands. He had that much experience. He welded, he bent metal...[124] (Ömer, Man, Electric and Electronics Engineer, 62 years old)

[123] Okuluma çok şey borçlu olduğuma inanıyorum yani lisans eğitimimdeki hocalarıma çok şey borçlu olduğuma inanıyorum. Şimdi şöyle benim çok sevdiğim bir hocam vardı. Hocam derdi ki ben bir daha dünyaya gelsem yine mühendis olurdum. Mühendisliği çok seviyorum derdi. Ondan çok etkilendim. Beni o teşvik etti. Mezuniyetten sonra iş ararken bile desteği oldu.

[124] Biz 80'lerden önce okuduk. O zamanki öğretim kadrosuyla karşılaştırıldığı zaman şu an çok amatör bir kadro var. Bize bir hoca gelirdi adam her şeyi silmiş süpürmüş bir de neredeyse makineyi elinde yapacak. Yani öyle tecrübeli. Kaynak yapar, metali büker…

In addition to that men engineers age 40 and over praised the faculty's quality. They thought faculty members of their time were technical elites. This idea is consistent with their perception about engineering education's having higher quality in the past. As mentioned in the Section 5.4, elder engineers stated the quality of engineering education has decreased because a lot of students are enrolled in engineering faculties. As for faculty members, elder engineers think professors of their time were better.

Younger participants, on the other hand, did not mention that they respected faculty members except for certain examples. Men and women participants did not indicate gratitude or respect for that matter.

Getting along with faculty members is not exactly a significant factor of success in engineering. Both women and men participants indicated rather distant relationships with faculty members. When first asked about attitudes of professors, two third of them told me that they did not experience any gendered behavior from professors and their faculty lives in this sense were gender-free.

The gender of the faculty was not a topic to talk about for elder participants. They did not mention any women professors. However, the distribution of the number of women professors among contemporary engineering faculties in Turkey is parallel to student's distribution in engineering departments (Zengin-Arslan, 2002). That is to say, masculine departments remain to be masculine in terms of faculty members, while the feminine departments employ more women professors.

> There are a lot of women professors in our department. Actually, half and half. I think role models are very important. Especially in departments where professors are fond of men students...[125] (Rüya, Woman, Environmental Engineer, 43 years old)

> We experienced it many times. For instance, the professor comes to class and says 'good morning gentlemen'.[126] (Semra, Woman, Electric and Electronic Engineer, 40 years old)

Women participants like Rüya, stated the existence of women professors as a factor that encouraged them. However she also added that professors are usually fond of men students in engineering. This perception has several reasons: the gendered labor market demands men engineers, employers prefer to recruit men rather than women, and some women engineers do not want to work in certain conditions. As a result, women students feel that professors or the department itself does not accept them as fellow students or new generation engineers (Robinson and MCIlwee, 1992).

Semra's example shows how professors's daily language is determined by the gendered culture. Seeing women students' existence and not adressing them might be an unconcious act. However, the act unintentionality also shows the gendered engineer image in the professors' minds.

Rüya and Semra think they are not taken seriously. Most of women engineers might feel same hostility. As a result, they lose confidence and motivation for the profession. Confirming other studies' findings, women felt insecure in a male-dominant environment because engineering training carries "a men-only image" (Robinson and McIlwee, 1992:50). In this sense, women have to struggle with burdens not shared by their male classmates.

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[125] Bizim bölümde hocalardan çok kadın var, yarı yarıya hatta. Bence örnekler çok etkili oluyor. Hocaların sadece erkeklerden hoşlandığı bir bölümde...

[126] Çok olmuştur mesela hoca derse gelir 'günaydın beyler' der.

10 out of 25 women participants told me that they avoided professors although their grades were good enough. They mentioned that especially men professors had strict prejudices against women students. These prejudices are usually based on the idea that women students do not want to take part in practical courses such as labs, and field couses.

Participants told me that the commonsense idea bout women is that the do not want to participate in practical courses such as field work. According to them, this idea is known and maintained by fellow men students, faculty members and some women engineers themselves, who do not really want to participate.

> I did not like field work. I am irritated by insects. I was not comfortable when I go. We have special days, whatever. When I told (the professor), it is like I am evading. I mean, my university life went like this. [127] (Berrin, Woman, Geology Engineer, 32 years old)

Some women participants told me that they were reluctant to take part in the field. Many participants criticized this behavior because they thought going to field is a part of the profession and it needs to be handled if a person claims he/she is an engineer. As Berrin mentions, being reluctant about going to the field creates contradiction between professors and students. Participants indicated that unwillingness usually comes from women students when it comes to fieldwork. This might be the reason for prejudice about women engineers and also it is the most common excuse for not letting them into the field. On the other hand, 3 men participants told me that conditions in the field might be disturbing for them as

[127] Ben hoşlanmıyordum alandan. Börtü böcekten huylanıyordum. Gittiğim zaman rahat edemiyordum. Özel günün var, bilmemnen var. Olmuyor yani. Söyleyince kaytarıyormussun gibi oluyor. Yani okul hayatım böyle geçti.

well. Though, they noted it is nothing to mention because it is the nature of their profession.

Regardless of their cohort, men and women participants differ in their perception about attitudes of professors. Men students mentioned they did not feel gendered behavior from faculty members. On the other hand, women students indicated gendered engineering culture is mainly created by professors.

> Actually, the culture you mentioned is created by professors. They have an image in their minds. It is like how an engineers should be. If you do not fit into that image, he does not see you as a good engineer. For instance we had a professor; he constantly gave advice during the class. Such as when you go to worklife it will be like this, if you do not prepare yourself you cannot find any job. But he was tellings things about construction yards. As if there are no women in class, everyone is men. As if everyone is going to work in the construction yard.[128](Emine, Woman, Metalurgy and Materials Engineer, 45 years old)

Emine stated she actually does not think of working in the field. She internally accepts the field is a man's work. She obviously plans to work in the office environment. Emine's perspective was common to some participants. Some women do not want to participate in fieldwork of any sort, but they complain about the gendered prejudice saying that women engineers do not want to go to field. Even if they could participate, they were given jobs related to organization or quality assurance. Fatma indicated that some professors discourage females in finding jobs that include fieldwork.

[128] Asıl hocalar yaratır o kültürü. Bi imaj vardır kafalarında işte mesela mühendis dediğin nasıl olmalı gibi. Sen o kalıba giremezsen seni iyi mühendisten saymaz falan. Mesela bizim bir hoca vardı her derste önce bir süre öğüt verirdi. İşte çalışma hayatında şöyle olacak böyle olacak kendinizi hazırlamazsanız iş bulamazsınız gibisinden. Ama anlattıkları hep şantiye işleri hakkında. Yani sanki sınıfta bayan yok herkes erkek, herkes de şantiye de çalışacakmış gibi.

> Our teachers did not take us (women students) seriously. We did not have any problem with our grades. But when it comes to courses about implication, it was always male students working in the science work groups. Once a female friend participated in the group and they became the quality assurer of the project. (Fatma, Woman, Computer Engineer, 40 years old)

Feeling left out was only mentioned by women participants in this study. Similar to Robinson & McIlwee's research in 1992, women students do not share the same burdens with their male classmates. As it was mentioned before, engineering has a demanding curriculum for all students. Yet women students must cope with feelings of being left out, and decreased self-esteem. Moreover, 5 women participants complained about professors' ignorance of gender in class.

> It does not matter if the professor is a woman or a man. They act as if there are no women in the class. Actually, it is bad because ignoring gender does not mean that it is not there. If women professors do not encourage you, either you conform to men, or you stay alone.[129](Serpil, Woman, Metalurgy and Materials Engineer, 30 years old)

The professors I interviewed for this study were composed of six participants, four women from Civil, Computer and Chemical Engineering and two men from Mechanical and Computer Engineering Departments. Men professors told me that they think their behavior is equal to all students. Women participants on the other hand were active participants of women engineers' group, and they were sensitive about the issue. They insisted that as professors they also experienced silence or ignorance in their departments.

[129] Erkek kadın hoca fark etmez. Bunlar sınıfta hiç kız yokmuş gibi davranırlar. Aslında bu daha kötü çünkü cinsiyetten bahsetmemek onun orda olmadığını göstermez. Kadın hoca bile sırtını sıvazlamazsa, mecbur ya erkeklere uyarsın ya da yalnız kalırsın".

I believe, silence about gender is one of the ways to maintain hierarchies. Professors might think they behave positively by doing silence over genders; they might even think they do it in the name of equity. However, by being silent, professors not only ignore women students but also sustain the existing status quo between genders.

7.1.3 Social Relations

Social relations in department were told to be a combination of education-related and leisure time activities. Becoming studying buddies and exchanging course notes were mentioned as education-related activities. Leisure activities are an extension of studying; basically spending time together while studying and becoming drinking buddies. The gender composition of departments were not mentioned as an obstacle for spending educational and leisure time together by most women and men engineers.

To begin with, nearly all participants noted the difficulty of classes, and the workload makes it impossible to sustain a rich social life. Yet, they prefer to hang out with each other; studying groups turn to friendships for leisure. Many participants indicated that they maintain still faculty friendships in their present life.

Becoming study buddies are mentioned as the most effective way to achieve success in the faculty. Buddies become fellows for social activities other than studying. 10 men participants mentioned studying buddy as a system to survive in engineering education. They also asserted that women participants could be studying buddies with each other but mostly they are note providers for male classmates.

> Women were note takers. In every section there was a girl like that. That person is always a girl, I do not know why. I did not understand a guy's note, anyway. Anyhow, we got notes from

girls then we studied hard one day before the exam.[130] (Emrah, Man, Mechanical Engineer)

It is interesting to observe that women students play the role of the care taker. Even in the faculty environment. Taken-for-granted gender roles make this division of labor obvious for men and women. In the classroom organization women plays the note taker; their role is to organize and prepare the needed notes just like she prepares meals for the household.

Engineering faculty is said to be a place where all students share a common situation of powerlessness (Robinson & McIlwee, 1992:63). They need to cope with the difficulties of engineering education. While doing this, they know they must cooperate. Women participants told me that they usually get better grades than male classmates. They make studying buddies with each other but also they can form bigger groups for studying. In both cases, women students were welcomed since they are thought to be more organized than men peers.

Regarding engineering education, Zengin(2002: 407) states that although women deny the existence of discrimination during their education, "covert forms of discrimination still occur in the educational institutions of Turkey, such as the tendency to guide female graduate students into those fields of engineering which are viewed as more convenient for women, jokes made by the professors about women's incompetence in engineering and the marginalizing attitudes of male classmates towards female students."

The findings of my study confirm that women engineering students felt lonely and they needed to adopt the masculine environment in

[130] Kızlar iyi not tutardı. Her section da bir kız vardı öyle. O kişi niyeyse hep kızdır. Erkeğin tuttuğu not anlaşılmaz zaten. Neyse, alırdık notları işte oturur kasardık bir gece öncesinden.

many ways. Adoption includes familiarity with the language used, man-like behavior, clothing and leisure activities.

> I guess you somehow adopt what is around you. You adapt the majority. And I think it is necessary for them to like you or accept you. Especially when you consider Gazi Makine (Gazi University Department of Mechanical Engineering) people drink, my friend. And they listen to rock music. [131] (Aslı, Woman, Mechanical Engineer)

In order to get along with classmates a woman engineer is required to fit in a role which is already given and is suited to cultural stereotypes. Listening to rock music or drinking are personal choices, however they determine the way one person builds relationship with others. As Aslı suggests if these activities are majorly coded in an environment, they became norms of that place's culture. Thus, some people always stay out of it. As mentioned in previous part, women students in masculine engineering departments are already classified by jokes and implications. Therefore, one choice for women students is to adopt one of the categorized identities. Some behave rather reserved, some try to fit in, whether they really like it or not

> The first thing I learnt in university is that I should not mind slang language. Otherwise I should not hang out in class environments. Because otherwise, you could not get along well with people.[132] (Ayşe, Woman, Geological Engineer)

Fitting in may not be easy for every student. Most participants told me that using slang is a way to be accepted in masculine medium.

[131] Hani sanırım etrafındaki şeye uyuyorsun bir şekilde. çoğunluğua uyuurosun ve sanırım onlaırn seni sevmeleri onların kabul etmeleri için de biraz öyle olman gerekiyor. Özellikle mesela gazi makine diyince insanlar içerler arkadaş ve rock müzik dinlerler."

[132] Üniversitede ilk öğrendiğin şey küfürlü konuşmaları takmamak ya da takıyosan sınıf ortamlarına hiç takılmamaktır. Çünkü anlaşamazsın o zaman.

Insulting language towards the difficulty of engineering education and towards professors is stated as a common way for using slang.

Swearing or using slang language is a part of masculine identity. It is a way to show masculine power by mentioning sexual connotations of a resembling situation. In basic slang of Turkish language, men are always the subject while women are the object. The object in any slang sentence can be changed by another object. It is a way to insult the object, whatever or whoever it is, by putting it in a subordinated position. Thus, using slang freely is also a powerplay, in which a man often shows his power and maintains it through threathening possible objects in slang language.

7.1.4 Jokes

In this study, I realized that even the most innocent jokes might be a form of exclusion for minorities in engineering education. It is a way to create a masculine culture and maintain it through the language used. Women, regardless of age, are usually irritated by the jokes, however they do not react because they think they should get used to them since it is a part of the faculty culture.

That is why, I prefer to open up a subchapter and using one of the most mentioned jokes about women's having a mustache as the title. Jokes in the engineering faculty mostly insult women's appearance and mocks their numerical scarcity. Jokes are usually heteronormative, they even become homophobic.

One of the most known examples is the joke that says women engineering students are more handsome than men in the same department. Just like arguing the way women have mustache, this very joke insults women student's appearance in the engineering faculty.

Another known joke, also often mentioned by participants, is that there are 250 gr of women for every man in engineering faculty. It implies that there are very few women in engineering. The joke also speaks of women in an insulting way, as if they are not human beings. These two jokes show the ways gendered communication styles exclude women and produce a male-dominated culture. Collinson's research shows that, masculine style joking is aiming to define male dignity in the eyes of others as sexual rampant. (Collinson, 1985: 192) It is understood that swearing and sexual jokes are a form of solidarity for men in the faculty. It enpowers gendered engineering culture through masculine forms of communication.

Faculty based jokes sometimes address women, and some they are directed to faculty members. Each type of joke reflects different characteristics and kinds of relationships. Jokes about women maintain solidarity between men peers. They also create an atmosphere in which women can not behave freely and are always controlled by the threat of mocking.

Emine and Ayşe were members of different cohorts in this study. They both indicated that sometimes they cannot bear the jokes related with sexuality from men classmates. Emine was metalurgy and materials engineer. She emphasized she was one of the few women students in faculty. She was very disturbed with faculty environment especially because of male jokes and curses.

> Sometimes they made such sexual jokes that they did not need to swear at me or at any other thing. I understood their jokes but I did not show my anger because, if I did, our relations

> would collapse. So I kept my distance.[133] (Emine, Woman, Metalurgy and Materials Engineer, 45 years old)

Ayşe provided another example from the time she studied in the faculty.

> We had a study group. We communicated through a mail group. I was the only girl. One day I realized the boys talked on some subject that I never received an e-mail about. I wondered if I lost the topic or something. Then I realized they were mailing each other without sending the emails to me. I openly asked one of them why they did this; he said that they were making male jokes and they did not send all mails to me. Because they thought I would be disturbed.[134] (Ayşe, Woman, Geological Engineer, 28 years old)

Ayşe's example is striking because, there is no way out of "male jokes" if she wants to be a part of the mailing list. Though such lists are generally for exchange of contact information of studying time and topics, they are also a medium for male students to socialize and perform their language. Another significant point here is that men thought that Ayşe would be disturbed, without asking her. They took this for granted. Considering that her "kind" is the object of the male jokes they usually made, men engineering students exclude her from the mailing group when it comes to using their own style of communication.

[133] Ya bazen öyle cinsel şakalar yapıyorlar ki bana ya da başka birine küfretseler aynı şey olur yani. Şakaları anlıyorum ama kızgınlığımı belli etmiyorum çünkü şimdi bişey desem ilişkiler kopacak.

[134] Bir çalışma grubumuz vardı. Mail listesinen haberleşiyoruz. Ben grupta tek kızdım. Bir gün oğlanların mail grubunda benim bilmediğim bir konudan bahsettiklerini fark ettim. Hani dedim ben mi atladım, okumadım mailleri filan. Sonra fark ettim ki benim dışımda da mailleşiyorlar. Yani aynı grup ama beni dışarda bırakıp kendi aralarında yazışıyorlar. Açıktan birine sordum niye böyle yapıyorsunuz diye. Verdiği cevap; biz işte erkek şakası yapıyoruz, sana göndermiyoruz o zaman. Çünkü rahatsız olursun filan.

7.2 Employment and Recruitment

Job seeking might be a long and painful process for every new graduate in Turkey. Engineers, as they hoped to find a decent job easier than other professionals, might be claimed luckier. In Ankara, there are 3 industrial districts and several factories to attain military industrial production. Most engineers in my study, work in the military industry or in industrial districts unless they are a part of the public sector.

Table 4. Participants According to Sectors

Sector	Women	Men
Public	7	2
Private	17	13
Self Employed	1	3
Total	**25**	**18**

7.2.1 Hardships of Job Seeking for Men Engineers: Military Service

Men participants indicated it was not so difficult to find a job. There were 2 men participants who chose to be academicians. The rest indicated they were employed just few months after they graduated. However, compulsory Military Service in Turkey appeared to be a hardship for men engineers in this study.

> I did not search for job for a long time. Three months after graduation, I started working at a firm in Teknokent. I was controlling subcontraction of tools in Ostim. Then I went for military service. When I came back, I continued in the same firm. [135] (Göker, Man, Aerospace Engineering)

[135] Ben pek iş aramadım. Mezun olduktan 3 ay sonra çalışmaya başladım. Teknokentte bir şirkette. Ostimde parça üretimini takip ediyordum. Sonra askere gittim dönünce aynı firmada devam ettim.

Military service was indicated as a signifcant factor for men engineers. Military service is compulsory in Turkey. For university graduates military service takes about 5,5 months. For specific needs, the service might take up to one and a half years, for which soldiers get a monthly wage during this time. Only 1 participant had a long military service in my study. Men participants stated completing military service is an advantage for employment. Reportedly, most of the firms perceive military service as a career break and they usually prefer the ones who have completed the obligation. In addition, two participants told me that wages might increase if one does military service, because that person is seen as a permanent employee.

7.2.2 Hardships of Job Seeking for Women Engineers: Field Work

13 out of twenty five women participants indicated it was difficult to find a job in the market and they had to compete with male colleagues in advance. I interviewed 8 women who did not want to take place in field work. 3 women who wanted to go to the field but could not because the international partner of the project they worked in were Arabic countries and they could not go. The rest of the women interwievees were taking place in field work and believed that women engineers must go to the field if the nature of job requires them to do so.

Table 5. Women Engineers' Attitude towards Fieldwork

	Number	%
Do not want to go to field work	8	32
Want to go to field work as a natural requirement of work	14	56
Want to go to the field but not allowed to go becacuse of the nature of the current project they are employed in	3	12
Total	**25**	**100**

Narratives of eight participants confirm the general idea that some women do not want to work in dirty and heavy conditions. The majority of the women participants declared it was their job to participate in the field and they were willing to do that. With few exceptions, participants in my study do not confirm mentioned prejudice.

However, from narratives I learnt that the conditions of fieldwork have degrees. Some were stated to be "bearable" some were said to be difficult for both men and women. Pınar told the story of her first job application and how she declined the offer.

> The first time I started looking for a job, I said that I would go to fieldwork. I saw an ad in the newspaper. A small firm. Has fieldwork near Kırşehir. I called the firm, I said I would go to the field. The man on the phone explained work conditions. According to him, we were to go to the field as two engineers. On a shift basis. When one engineer works the other will rest. One gets up from bed the other sleeps. On the same bed. In the same construction house and the other engineer is a man. I said, thanks, I will pass. [136] (Pınar, Woman, Geological Engineer, 31 years old)

[136] İlk iş aramaya başladığımda dedim ki sahada çalışırım. Gazetede bir ilan gördüm. Küçük bir şirket. Kırşehir yakınlarında saha işleri var. Aradım, ben dedim sahaya giderim. Size

Emile Zola (Zola, E. first publ.1885, transl.in 2004) pictured the difficult lives of worker families in French mines. When I was listening to Hatice, the same pictures from Germinal came to my mind. Working in shifts, while sharing the same bed with colleagues must be seen as hardship for not only women but also for men. When a woman declines the job because of the conditions, the decline is understood as her deficience and softness. When it comes to men, they cannot refuse the conditions because it diminishes the image of their masculinity.

> We need to work in every condition. Look, you see how this place is. Sometimes we enter into the machine with worker. If I do not, they would not listen to me. On the other hand, if lady friend comes she says my clothes will get dirty, my hands will be blackened; it does not work here. [137] (Emrah, Man, Mechanical Engineer, 33 years old)

As Emrah indicates, dealing with dirty and heavy conditions might be a necessity for engineers to get acception from workers. It is also a sign of toughness. The ideology about man's being tough and strong creates inevitable expectations for men. These expectations also trap men engineers and even though they do not like to deal with certain tasks, they do not express it out loud. Expressing their dislike would undermine their image, and bring it closer to that of women engineers who are recultant to work in the field.

Mine indicates that going to field might be advantageous because engineers earn more money. Hence, not only women engineers but also men do want to go to field in general.

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koşulları anlatalım dediler. Adamın anlatmasına göre iki mühendis sahaya gidecekmişiz. Vardiyalı. Biri işi yaparken diğeri uyuyacak, o yatacak diğeri çalışacak. Aynı yatakta. Aynı şantiye evinde. Diğer mühendis de erkek. Yok dedim sağolun, ben almayayım.

[137] Biz her türlü yerde çalışmak zorundayız. Bak görüyorsun buranın halini. Yeri geliyor ustayla makinenin içine giriyoruz. Girmezsem sözümü dinletemem. Ama bayan arkadaş gelir aman üstüm pislenir, elim kararır derse bu iş olmaz.

> My director at DSİ has a saying, I raise the sentence everywhere: "women engineers are our flowers. Actually we are fond of them but they do not want to go to field work." In DSİ where I worked, there were a lot of opportunities for fieldwork. I think this saying is completely a lie. Everybody went to field because our wages were too low, not because we are women or men. We took field work money. Everyone was struggling to go to the field at the time. The idea of women's not going to field work is definitely a lie. There might be one or two women. One or two reluctant men as well. [138] (Mine, Woman, Civil Engineer, 50 years old)

Confirmed by Mine's statement, some men engineers also do not prefer field activities. However this fact is rarely mentioned. It is rather unspoken, even hidden. On the other hand, women engineers are trapped into a discourse in which they are perceived as educated office workers in the engineering environment. As a result, mentioning field work as employment requirement is one of the indicators in job ads that segregate, even discriminate against women engineers.

This vicious cycle also empowers the prejudice that women engineers do not prefer to take part in field-related jobs. This prejudice is common among men engineers, men workers, employers and also among a few women engineers.

Elçin is one of these few women. She indicated that women students do not prefer to work in industries including production of iron and steel, because it is generally a "man's industry".

> When graduated I started working in an iron casting factory. In our sector, materials engineering women do not prefer to work

[138] DSİ'deki müdürümün şöyle de bir cümlesi vardır, onu her yerde dile getiriyorum; "kadın mühendisler bizim çiçeklerimizdir, aslında onları çok severiz, ama araziye gitmiyorlar". Benim çalıştığım yerde çok araziye gidiliyordu devlet su işlerinde. Bu birincisi külliyen yalan. Herkes araziye gider, şundan dolayı gider, kadın erkek vs. Gibi bir sebepten değil, maaşlarımız çok düşük olduğu için. Arazi tazminatı alırız, onu almak için herkes o dönemde çırpınırdı araziye gitmeye. O kesinlikle doğru değil yani kadınlar araziye gitmez filan. Bir iki kadın vardır ama bir iki tane de erkek çıkar öyle.

> in production. Some do and they find a job. [139] (Elçin, Woman, Metalurgy and Materials Engineer, 36 years old)

This also creates hostility towards women engineers within the labor market. As it was discussed before, the employment structure of firms are based on gender prejudices (Rothschild, 1983; Cockburn, 1985; 1987; 1993; Wacjman, 1998). If the sector does not include field work, then production departments within factories or in industrial workshops are accepted as male-populated areas. As a result, women engineers are not preferable for production departments.

Though not mentioned by participants, I believe that age is a discriminatory indicator for both men and women engineers. Most of the job advertisements from newspapers and from the web note the job requires five to ten years job experience. This means that new graduates or young engineers without working experience are not welcomed in some firms. I understand that certain positions need years of experience, but these positions are usually employed through promotions from inside. However, I think putting a work experience requirement in advertisements is discriminatory for young people. In addition, work experience in engineering sometimes mean field experience. This case, women engineers are being cut away from the applicants' pool.

[139] Mezun olunca demir döküm fabrikasına girdim. Bizim sektörde malzemeci (metalurgy and materials engineers) kadınlar üretimde çalışmayı pek istemezler. Az da olsa çalışmak isteyen çıkar onlar da iş bulur.

7.2.3 Gendered job ads

I also asked questions about job advertisements. Out of twenty women interviewees, 10 indicated that even the ads were dicriminatory. Men participants did not mention any anomaly. I believe the reason behind being aware of this discrimination is connected also to participants' activities out of the work life. Participants noting segregation in ads were working in women groups of TMMOB, or they were members of women engineers' online initiative, or basically, they experienced it. As for these cases, women engineers in this study thought that women have fewer opportunities than men in finding a job. Younger women participants on the other hand, were aware that there is unequal distribution of opportunities between men and women in the labor market. They thought they needed to work hard in order to cope with this situation.

Women engineers from different cohorts provided diverse experiences for this matter. Members of the elder cohort told that gendered practices in job advertisements are not new in Turkey. 3 participants from Geological and Civil Engineering, with age 40 and over indicated they witnessed that two big public engineer employing organizations DSİ (The General Directorate of State Hydraulic Works) did not recruit women engineers for some time. Even one of the biggest engineer employer public firm for geological and mining engineers, MTA (General Directorate of Mineral Research ad Expoloration), declared that the firm would not recruit women engineers.

> DSİ declared it would not recruit women engineers for some time. Women in TMMOB immediately talked to an attorney. The attorney said that this was discriminatory based on gender. Women went back to TMMOB and they sued DSİ. The case was won on the advantage of discrimination. But this time another problem arose. DSİ could not fire the men engineers it recruited. It had to recruit women engineers as well. MTA also pulled back its discriminatory advertisement when it saw what

happened to DSİ. [140] (Gonca, Woman, Geological Engineer, 60 years old)

Members of the younger cohort, did not witness gender discrimination in job ads of state institutions. They did not also mentioned they heard of it. However, I believe being witnessed to discrimination by official ads from state institutions created a different perception about gender in engineering for elder participants of this study. Elder cohort experienced that state institutions took a step back when women engineers organized and reacted to advertisements. They struggled to get a place in those institutions and they struggled for other women.

On the other hand, younger women engineers seem to accept the gender hierarchy within the profession. Since they do not confreont with overt discrimination fromstate institutions, for instance, they choose to work hard within work in order to deal with hidden operations of gender.

In addition, job advertisements are concrete examples of the gendered image about engineering and the nature of the job. I would like to give two examples of sexist job advertisements from Turkey in order to show how women engineers are confronted with prejudice before stepping into worklife.

"12.06.06 Kariyer.net-Norm Elektronik[141]

[140] DSİ kadın mühendis almayacağım demiş bir süre. TMMOB'da kadınlar Hemen bir avukatla görüşüyorlar. O da diyor ki devlette bu ayrımcılığa girer, hemen dava açabilirsiniz. Gidiyorlar TMMOB'a, TMMOB hemen dava açıyor. Dava kazanılıyor. Siz ayrımcılık yaptınız diye. Ama bu sefer şey sorun oluyor, ne yapacağız, bu ise aldıklarımızın yarısını çıkaracağız mı diye... Onu da yapamıyorlar. Bu yüzden ne kadar erkek aldılarsa o kadar da kadın aldılar, MTA da bunu duyar duymaz, ayrımcılık yaptığı ilanı ilanı geri çekti.

[141]Retrieved from http://www.kadinmuhendisler.org/ayrimci_ilanlar.aspx on 06.08.2012

- Job applicant must be a graduate of a decent universities' industrial or electrical engineering departments, or physics department.
- Job applicant must speak and write in advanced English. Applicants are expected to travel abroad. Being a private high school graduate or being graduated from an English speaking university will be a reason for hiring.
- Previous work experience in purchase of electronic materials
- Job applicant is expected to complete military service.
- **Man:** We believe in the advantage of male employers in keeping foreign contacts, travelling abroad, and sustaining personnel Networks in the workplace. Please do not think that it is discrimination by sex. But our experiences make us think that male workers are advantageous for some positions."

"24.04.2006 Kariyer.net -Laserpress Mechanics and Steal

- Mechanical Engineer and advanced level of English language
- Adaptable to teamwork
- Not being afraid of competition and people who can manage dynamic solutions during competition
- People who like travelling and who conceive it as a part of the workload.
- People who completed military service and who are above 30, male."[142]

These examples show that segregation does not exist only by sex. Both ads imply their target category of employee as having middle or upper middle class positions. Attending a good university costs money in Turkey. Job experience is another dimension which implies

[142]See, http://www.kadinmuhendisler.org/ayrimci_ilanlar.aspx. Translated by the author.

age segregation. The young population generally do not have years of work experience. Military service directly ensures the employer profile for male workers. The mentioned engineering types are commonly accepted to be “male fields”. In addition, having no trouble with travelling is generally not applicable for women who are married.

7.2.4 Applying to Engineering Position, Recruited to be Quality Workers

In my study, I asked participants about their recruimentt status. Both women and men participants told me they were employed as new graduates. Twenty men participants stated they were recruited to be engineers with no exception. They were hired into engineering positions. Four indicated they applied to several departments of the same factory, while human resources placed them in one of the applied departments. They were happy about their current positions. They also told me that it is possible to switch departments, if the senior engineers or employers agree.

7 women participants indicated that they applied to a position where they can actually “do” engineering. Yet, they were asked to work in quality and contractual departments. Three of them agreed to start working as quality assurers. Then they switched to other departments where they could work as engineers.

> I found a job in an iron company in the quality department. Women engineers usually start with quality departments. Men do the production part. I worked there for two years. I showed my boss that I can do engineering. Then he allowed me to transfer to the production department. [143] (Elçin, Woman, Metalurgy and Materials Engineer)

[143] Bir demir fabrikasıda kalite departmanında iş buldum. Kadınlar genellikle kalitede başlarlar. Erkekler üretim kısmını yapar. Bu fabrikada iki sene çalıştım. Patronuma mühendisliği yapabildiğimi gösterdim. Sonunda beni üretime geçirdi.

The important point in Elçin's words is that women are stated to begin in the quality departments of factories. It means that the firm in Elçin's case did not employ her for an engineering position. She was employed because she is thought to be more effective in organization tasks rather than application.

The division of labor in the workplace is determined by misperceptions about gender roles. This ideology mainly determines gendered culture of engineering (Miller, 2002). In this regard, women perform the role of office secretary to the professional engineers. In production, they play the least skilled, base line tasks (Cockburn, 1985:11).

Fatma, academician in computer engineering department, confirms this perspective. According to her, women engineers are usually preferred in fields like "quality assurance and organization". As I understood from this segregation, the mentioned departments are more like the private sphere of a factory while the production unit might be considered the public sphere. Women engineers are employed in closed, private factory environment. On the other hand, men engineers do the "real job", produce the machine and deal with men workers. A woman engineer is to be employed in quality, contractual departments; they work in an office environment without facing workers. In departments dealing with contracts, they become the presentational image of the factory and in that sense being a woman is conceived as advantageous.

7.3 Work Life

> If she is a civil engineer and works at construction yard, she starts the profession with a 3-0 score. If she works at technical

office, static bureau, then the situation is equal. *mabeynihumayun* [144]

I took this quotation from an online dictionary which provides funny/sour definitions for topics created by dictionary authors. The definition here was given for the title "women engineer". Provided defitions for the topic resemble each other in terms of their gendered judgements about women engineers. At the same time, definitions give a perspective on how women in the engineering profession are perceived. According to this, a woman engineer is someone who needs to work harder than men colleagues, especially if she is to work in physical environments like construction yards.

Within the frame of this study, I can argue that women and men engineers do not share equity even in offices because there is a huge gap in terms of numerical existence, for starters. The nominal majority of men set certain rules, daily expressions, ways of behavior which are favorable to men more than women. As one of women participants told me “It is not like working in a bank. One has to act accordingly”[145].

However, most participants think they have an egalitarian atmosphere. On the contrary, men engineers accept themselves as natives of engineering habitat. They think they speak the native language which is mathematics, better. They have the courage to speak up about technical matters. They are recruited to be engineers not to be in other positions.

In order to understand gendered culture of engineering in the work place, I interviewed participants who described doing real engineering, prejudice, exclusion from social networks, teasing,

[144] Retrieved from https://eksisozluk.com/kadin-muhendis--2435403?p=3 02.12.2011 10:55

[145] Bankada çalışmakla aynı şey değil. Ona göre davranmak lazım.

harresment and mobbing as obstacles for engineers in most of the work places.

7.3.1 Absence of Women in Industrial Districts of Ankara

I have been to 3 factories in Ankara. 2 of them were small workshop-type factories in which no women were employed apart from those responsible for cooking and cleaning. These workplaces do not employ women. Since the industrial district is populated mostly by men, the employees of first two factories thought employing women would harden their workloads. The reason behind this is twofold.

First, the structure of production industry doe not let women workers in. There are no women operators to employ. Contrary to Cockburn's study (1983) it is difficult to find women machine operators or workers in the production sector in Turkey. Blue collar workers are mainly men. According to Ahmet, self-employed mechanical engineer in Ostim, even if there were women workers, "they would not have worked in this sector because men workers would not let them in". My raising this point was ridiculous to Ahmet; because he thinks there would be a big resistance from workers.

Second, members of the industrial districts think that women engineers can not build authority in the eyes of blue collar workers. Women engineers were not more than the fingers of a hand in the industiral districts of Ankara. The factories I have been to in Ostim and İvedik did not employ women engineers. I have interviewed 1 woman mechanical engineer from Ostim; she told me she heard of two women engineers apart from herself in the whole district. Thus, there may be women engineers to employ but employers do not really prefer to recruit them because the environment would show hostility.

As one of the employers indicated, “If I recruit a woman engineer, she can not make workers to do their jobs.”[146] I was told that since blue collar workers are all men, they have resistence to women superiors. They do not see women as an authority. Employers in industrial districts indicated that women engineers also do not apply to work in Ostim and İvedik. The ones working here were either the employers’ close relatives or they worked in an office environment. Plus, they do not usually come in contact with blue collar workers.

Although, there are women engineers working in private factories and public institutions in Ankara, they are structurally absent in industrial districts. This absence creates a gap within the gender system of production industry in Ankara. As a result of this discrepancy, women engineers can exist in certain parts of the sector and they can not in some others. In this compartmentalized structure, production industry accepts women enginers with limitations. Women are welcome if they agree to stay in closed factories with restricted contact to blue collar workers.

Tolga, Man, Food Engineer told that women engineers were not assigned to the project he is working in at the time of the interview. The project was related to the production of certain kind of wheet in ŞanlıUrfa[147] and the project manager is supposed to go and monitor activities of producers in the town. According to him, the reason that women engineers were not recruited was that the firm thought women engineers would not be able to deal with villagers.

Although from a different sector, Tolga’s example is consistent with the reasons behind women’s absence in industrial districts. Women are excluded from the fieldwork of food sector. These examples show

[146] “Kadın mühendis çalıştırsan, işçilere iş yaptıramaz ki” Ahmet, Mechanical Engineer, Employer in Ostim.

[147] SouthEastern town in Turkey.

that although women engineers are recruited by important parts of production industry in general, they are also absent in the other hald of the sector.

This structural gap found in this study, is a crucial barrier created by gendered taboos in engineering. Women engineers are not welcome in actual production processes because of masculine taboos. This gap is not only a part of the gendered culture but also it is a reproducer of it.

7.3.2 'Doing Real Engineering': Workshop vs. Factory Production

Definitons of 'Doing Real Engineering' found to be different for some participants. Workshop employees noted their work is more real than the one processed in big factories in Ankara because they are closer to their product than mass production of factories.

Workshops I have been in industrial distrcits in Ankara were rather small in terms of production unit and number of employees. Employers of both factories told me that they are doing "real engineering". One of them even despised bigger factories in Ankara that engage in military production. He said:

> I do not think they do real engineering. In big factories, engineers are given tasks which are not related to creativity. Everything is settled. Tasks are certain. The man sits down and does his job. He does not even think if it can be realized. Those engineers remind me of Matrix (the movie). They work isolatedly. They have no idea of reality[148]. (Ahmet, Man, Mechanical Engineer, Employee in Ostim)

[148] Onların gerçek mühendislik yaptıklarını düşünmüyorum. Büyük fabrikalarda mühendislere görev veriliyor. Yaratıcı olmayan. Her şey bellidir. İşler bellidir. Adam oturur yapar. Yapılabilirliğini düşünmez. Ben oradaki mühendisleri Matrix'e benzetiyorum. İzole çalışırlar. Gerçeklikten haberleri yok.

Ahmet mentioned an important point that was not raised before. Creativity is important for the realization of the engineering job. Small factories produce piece work. Usually, they have to create a piece needed both in theory and practice. In other words, they even find the idea, design the product, design the toolds to produce it and finally they realize the product itself.

This kind of creativity gives the employer a feeling of confidence with his work. Moreover, he is proud of what he is doing because he creates something that works and that he creates it from nothing. The produced machine also has reality for him because he can touch it; he can see what he produced at the end. However a production engineer in a big factory only produces a piece of a big aircraft. He/ she does not have an opportunity to approach its full production. They are far from reality of their own production, as Ahmet puts it; “they live in the Matrix”.

Comparing these two types of workloads refer to the comparison of different modes of production. Workshop production vs. factory production. Ahmet’s small workshop still uses manual power to produce. His relation to his product is a closeness is in Marxian meaning (Marxi 1954). However, factories use machines that make machiery. Engineers and operators only control and maintain problem-free production. Ahmet despises the factory form of production because the laborer and his means of production is no longer “closely united, like the snail with its shell” (Marx, 1954:339). Tools of craftsmen were put to use in specific and multiple tasks in big factories; the production of pieces of a giant machine does not require the previous closeness of producer with the product.

Akın, another employer from İvedik industrial district told a similar fact that bigger factories work on settled rules. They produce machines that are already designed for a need.

> When you look at big firms they produce many things. They produce in big numbers. They usually produce already designed parts. That is not engineering, rather it is processing. Actually you do not produce anything. I mean for instance Boeing will do the production; it has already done its research and development. It tells you to produce that certain part. You only control the production and that is the process. [149] (Akın, Man, Mechanical Engineer, Employee in İvedik)

Akın later told me that workshops in industrial districts have to create new products that the sector needs. They need to see these gaps and produce the product that would fill the gap. According to him, this is the core of engineering.

Both for Ahmet and Akın the way they work is called *real engineering job*. It requires creativity, hands on tinkering, practicality, theoretical knowledge, and dirty and heavy conditions of work (Robinson and McIlwee, 1991; Brand & Kvande, 2001; White et al., 2003; Bastalich et al., 2007, Küsü et al., 2007; Watts, 2009). They also mentioned the importance of creating something new for the market.

I also have been into one of the big factories that were mentioned as doing ready made engineering tasks. It gave me the opportunity to compare the nature of the work done in two types of production. The factory was engaged in military sector. There were four hundred engineers. The factory employed two women engineers in the production department. The research and development department

[149] Büyük sirketlere bakıyorsun. Adam birsürü şey üretiyor. Çok sayıda üretiyor. Genelde hazır parça üretiyor. O da mühendislik değil de prosses yani belli şeyi kontrol etmek aslında yani bir şey üretmiyorsun daha çok yani mesela boeing üretecek. Boeing zaten onun argesini yapmış geliştirmiş sana diyorki şu parçayı üret sen sadece üretimi kontrol ediyorsun orda işte proses.

was composed of 104 engineers, of which 14 were women. Plus, the director of the department was also a woman.

At the time of my study, the research production departments were sustaining four projects. Contrary to previous ideas, some of the vehicles produced in the factory were created from the beginning. Their research, development and production were accomplished in the same factory. I have been told in the production department that military industry is the only sector in Turkey where production is done both on the theoretical and practical level.

The engineers working in the factory see their work as real engineering. However, some tasks are reported as real engineering and some others are comlementary tasks.

> Production is always important in engineering. Because it requires expertise and experience. For instance, a 22 year old new graduate is recruited here. In the Research and Development Department. He draws an aerocraft on the computer and sends it to us to produce. We take this guy and educate him by telling him that the work should not be done like that. Because life is not like that. Then, they employ someone else and he draws a piece of art. If it is impossible to produce it, then the art piece has no point.[150] (Göker, Man, Aerospace Engineering)

I found in this study that production and realization is what counts as real engineering work. That kind of work has an end product in the material sense. Producer has a certain closeness with the product and his/her experience requires involvement and practical apprenticeship for some time.

[150] Mühendislikte üretim her zaman daha değerlidir. Çünkü uzmanlık ve tecrübe gerektirir. Buraya 22 yaşında yeni mezun bir tasarımcı alırlar. Ar-ge'ye. O da uzay gemisi çizer bilgisayarda bize gönderir. Biz bu adamı alırız, bak oğlum bu böyle olmaz diye eğitiriz. Hayat öyle değil çünkü. Başka birini alırlar sanat eseri çizer. Yapılamadıktan sonra yemişim sanat eserini.

7.3.3 Innate Characteristics: Meticulousness of Women

Observing the working environment of engineers was a part of my study. As I have mentioned above, I got permission to make observations in a factory near Ankara. The facility was producing armed vehicles. It employed hundreds of engineers especially from fields of mechanical, metallurgy and materials, and electric and electronics. The director of the Research and Development department was a woman; a mechanical engineer who was the reason for the permission for my study. She was sensitive about gender issues, especially in engineering, because she had a tough career as a women engineer.

With two kids, she told me, she worked so hard to achieve her present position. She also stated that she does positive discrimination for women engineers in her department. She thought women engineers are more meticulous than men and they are better in tasks related with research and development.

> I do positive discrimination to women and I do not hide it. Because in our business, in research and development, one should work in detail. One should not miss anything. I can not make men engineers sit at the table for that long. They get bored. They slack the work. Women are more meticulous and detailed. That is why we have to support women more.[151] (Esra, Woman, Mechanical Engineer)

Women engineers working for Esra conceive themselves lucky to work with her. They experience no difficulty when taking maternity leave, and they are encouraged to have a second child. In return, they are expected to work hard and in detail. Having a women director in that sense created a women-friendly atmosphere in the factory. Women engineers are confident; they know they will not loose their rights.

[151] Ben kadınlara pozitif ayrımcılık uyguluyorum. Bunu da saklamıyorum. Çünkü bizim işimizde, argede, detaylı çalışmak lazım. Bir şey atlamayacaksın. Erkek mühendisi masa başında bu kadar süre oturtamam. Sıkılırlar. Kaytarırlar. Kadınlar daha sabırlı ve detaycı. Bu yüzden kadınları daha çok desteklemek lazım

Even though Esra's approach to women engineers seems like a positive approach, it is another way of stereotyping. It is a repetetition of the same old distinction; women can deal with boring tasks, men can cope with heavy conditions (Cockburn, 1985; Hacker, 1989; Robinson & McIlwee, 1992). It is the reproduction of a similar ideology on which the "real engineer" stereotype is based. When women are reserved for repetitive and detailed tasks, there is no room for them to take part in tasks called real engineering.

Meticulosity of women engineers was mentioned by other participants as well. Ender, who worked in a steel factory in Konya, heard the same comment from her employer, saying that women are patient and meticulous. Ender told me that she was encouraged by this perspective and it led her to work harder.

> Our work required of months of working in detail. I was working with another engineer, a man. We sometimes helped each other. I saw he missed some parts.[152] (Esin, Woman, Metalurgy and Materials Engineer)

Esin was one of the participants that adopted the idea about women's meticulosity. She thought that women are better for certain tasks and it is a positive aspect for them. As understood, both Esra and Ender see patience and meticulosity as positive features of women's existence. However this idea also creates an image about women engineers and at the same time it traps them into this very image's limitations. Such an idea also implies that men engineers get bored when they engage with tasks that require detailed study. This is why women engineers are usually attained to office duties and men to field tasks.

[152] İşlerimiz aylarca detaylı çalışma gerektiriyordu. Ben de başka bir mühendisle çalışıyordum. O erkekti ama. Bazen birbirimizin işine de yardımcı oluyorduk. Bakıyordum, bazı yerleri atlamış.

Stereotyping leads to resegregation of women engineers. Similar to Robinson and McIlwee's research in 1992, women engineers in Turkey face the problem of resegregation in work life. That is to say, on the surface they are welcomed to the profession but they find themselves "confined to female ghettos", in which they get lower wages, limited opportunities to prove themselves and shorter careers without much of a chance for promotion (Kanter, 1977).

In engineering vocabulary, delicate tasks which require detailed work refer to; quality, organization and contracting. All three usually take place in rather private spheres; inside offices or in laboratories. Women's employment in these departments actually does not change the traditional separation of spheres. In addition, within closed spheres women can not find the chance to develop engineering skills, and they would not long for higher career status.

On the other hand my findings show that women engineers, if they choose to cope with other tasks, can go to field work or to construction yard. Women participants in this study can be classified in two groups. If one prefers to stay in office jobs the nature of women makes them advantageous in worklife. This point was raised by ten women participants. Others think they need to take part in the field for their job and they try to use their chances for it.

> Men's leadership in production, their physical strength and their place in family life, women's being more talented in organization is very natural. I think women can be more successful in organizing and creating something. [153] (İrem, Woman, Chemical Engineer)

[153] Üretim alanında erkeklerin önde olması hem fiziksel kuvvetleri hemde aile yaşantısına geçildikten sonra ki durumlarda erkeğin orda olması bana daha doğal geliyor organizasyonda kadın daha yeteneklidir birşeyi düzenleyip ortaya çıkarmak konusunda daha başarılı olabileceğini düşünüyorum.

İrem was one of the ten women participants; she stated that it is natural for women to engage with tasks requiring patience and meticulosity. They indicated these features are essential to women only. According to this view, men's nature is not suitable for delicate matters. Apart from these participants, five women engineers argued patience and meticulosity are learned features. That is to say, women learn to become patient since they traditionally deal with delicate tasks.

Men participants mentioned women's meticulosity in a negative way. According to two participants, women are too much into details.

> Women are more into detail than men. They might be a bit more questioning and sometimes it is unnecessary. In production you should not do that. Otherwise you can not produce.[154] (Bahadır, Man, Environmental Engineer)

> The previous lab director was sharing responsibilities with another director. Microbiology, taste tests and design. Now I am responsible for all these. The general director took their responsibilities and gave them to me. They were appointed to other tasks because they were women. The reason is not gender discrimination. The reason is that they were too much into detail. My director told me this reason, the reason for wanting a man in here.[155] (Tolga, Man, Food Engineer)

Meticulosity is a wanted feature in engineering to some degree. As it can be seen, women are preferred by employers in order to deal with detailed tasks. However, men colleauges criticize their meticulosity to

[154] Kadınlar erkeklere göre biraz daha detaycı. Bana göre biraz gereksiz olsa da, fazla sorgulayıcı olabiliyorlar. Üretimde o kadar olamazsınız, o zaman üretim yapamazsınız. Üretim biraz kitap kurallarına uymayan... Ama kalite uyuyor.

[155] Benden önceki zaten laboratuvar yönetimi şu şekildeydi, mikrobiyolojiye bakan, tat testi ve dizayn onayına bakan iki kişi benim yaptığım işleri paylaşmıştı. Genel Müdür laboratuvarların tamamını ikisinden aldı, olduğu gibi bana verdi, onlara başka iş verildi. Sebebi de bayan olmalarıydı. Onun da sebebi cinsiyet ayrımcılığından değil demin bahsettiğim gibi fazlasıyla detaycı olmalarıydı. Bunu müdürüm de bana söylemişti, buraya bir erkek istemeseinin sebebi buydu.

some extent because, according to them, detailed work creates problems in getting a job done.

I argue gendered culture of engineering sets social behaviors for different genders. At the same time it also sets power relations referring to those role behaviors in engineering. In this case, women's meticulosity is wanted if a woman is an employer. When she is to gain a status of responsibility, to get work done, her meticulosity is thought to be an obstacle to production.

I believe describing women with meticulousness or with any other innate characteristic would lead them to be assiged the tasks that fit their stereotypical image. It might be seen as positive discrimination to assign women work in detailed tasks. However, this perspective restricts women into one role that makes them tokens in engineering profession. It also creates an understanding that men insult women's work because of too much meticulosity when it comes to protect their privilege and power in the work place.

7.3.4 Career Route

As suggested in Chapter 2 and confirmed by the findings of this study, the summit of their career is to become an administrator. Both women and men engineers wanted to proceed in their careers as engineer managers. Some try to realize this by founding their own firms, some try to get promoted in the workplace or they change their workplaces to get promoted.

Table 6. Positions at Employment

Men Engineers		**Women Engineers**	
Director Engineer	1	Director Engineer	2
Employer	3	Employer	1
Employee	14	Employee	22

Among men participants, I interviewed three small firm owners, one director engineer who were all from elder cohort except for one man engineer who was self employed. They were all married with children. As for women engineers, I only interviewed two women directors; one was over forty and the other was thirty six. The older women participant was married and had two children. The younger woman told me she had decided to postpone and later cancel marriage in order get administrative duties. Otherwise she thought she could not get the position.

With regard to promotion, participants indicated that engineers prefer to work with engineers as administrators. It means the director, manager or administrator of any sort needs to possess engineering knowledge. Otherwise, he or she would not get respect. This finding confirms previous research about the relationship between engineers and respected administrators (Miller, 2004). Experience is reported as the key for promotion. Also, it is stated by both women and men participants that knowledge and experience wins when it comes to promotion. It is stated that if a women engineer can prove herself in her expertise, she can become director, regardless of her gender.

To begin with, the promotion for an engineer takes experience and it also takes years. Since the nature of the work requires production by problem solving, creativity and sometimes hands-on activity, experience is the key to get promoted.

> A new graduate is a rookie in our eyes. He knows nothing. We know that he does not know because we have been in his place. Experience is gained through master and apprentice relationship. In no ther way. It never comes with university knowledge.[156] (Metin, Man, Mechanical Engineer)

[156] Yani yeni mezun mühendis bizim gözümüzde çaylak. Hiçbir şey bilmez. Bilmediğini biz de biliriz çünkü biz de öyleydik. Tecrübe usta çırak ilişkisiyle olur, başka türlü olmaz. Okuldaki bilgilerle de hiçbir şey olmaz.

Metin notes that experience is gained through apprenticeship. He talks about an engineer-to-engineer relationship. The master engineer teaches the apprentice engineer. He also mentioned that the engineer he saw as his master taught him the job in five years in the construction yard. The work was difficult and it took a long time to learn and apply. Learning through a master-apprentice relationship was also highlighted by two women engineers. One was hoping to be promoted in the next three years as director engineer and she thinks she has a master engineer, a woman, to teach in her current career.

> This is my fifth year working with her. She taught me many things about the job. Things that I can never learn by myself. She told me about her experiences, she backs me up in meetings. If she were not here, I mean in this company, I could not even become a senior engineer.[157](Nevin, Woman, Mechanical Engineer)

Nevin thinks that she owes working experience to her director, a women engineer. Their relationship resembles the one Metin mentions. Experience is transferred through cohorts, by working together. The striking point here is that the two sides of these relationships are same genders. That is to say, Metin, a man engineer learnt from another man engineer. Ayşe also was learning from a woman engineer. I did not have enough information whether women engineers cultivated men engineers or vice versa. Yet, from the scarcity of women directors, I believe the master-apprentice relationship must be working within convergent genders.

This situation shows that although all genders seem to be equally promoted, men engineers have more chances to become apprentices since there are more men managers. If master-apprentice

[157] Bu müdürümüzle çalıştığım beşinci senem. İşle ilgili çok şey öğrendim. Kendi başıma öğrenemeyeceğim şeyler öğrendim. Tecrübelerini anlatır, toplatılarda arkanı kollar. Eğer müdürümüz olmasaydı, yani bu şirkette, lider mühendis bile olamazdım.

relationship works within genders, it is also very difficult for a woman engineer to learn from women masters since women masters are low in numbers. I believe it certainly affects their promotional chances when compared to men's.

Third, most participants told me that once an engineer proves her/himself to be a good engineer, promotion is not about gender. However, it is also understood from above quotations that women may not have same opportunities to show their abilities and knowledge as well as they find the chance to get master-apprentice experience. Plus, the glass ceiling affect is very strong in engineering because of the mentioned prejudices about women's unwillingness to go to field work, family responsibilities, travelling, and maternity leave (Tonso, 2007; Watts, 2009; Faulkner, 2000; 2007; 2009). Although women and men engineers seem to have equal chances, women get little opportunity to break these prejudices and to be appointed as administrator.

Cockburn argues that certain technologies of which men had knowledge about had a specific importance in production. Since the Bronze Age, women produced by means of man-made technologies. Women were subjected to certain forms of "material control that comes of men as a sex having appropriated the role of tool-maker to the world" (Cockburn, 1985:27) According to her, it was only men that historically had the tradition, confidence and "transferable skills to make the leap" (Cockburn, 1985:30).

From this frame, men have had more opportunites than women. It is not surprising that they are protective of this particular knowledge. Aslı was one of the few women participants who worked in the production department. As she states, the master-apprentice

relationship is important for gainning experience yet it is difficult to obtain.

> Senior engineers do not help you. Master workers do. Only if you are lucky. There is uncle Mehmet, a senior worker in the factory. He calls me his daughter. He taught me so many things. He really educated me.[158] (Aslı, Woman, Mechanical Engineer)

As I understood from the interviews it is also crucial to get involved in production processes. Since women are so restricted from gaining access in production departments, it is more difficult for them to gather practical knowledge. If they get this experience by chance or by hard work, they get as much respect as their men counterparts.

> Women build authority by doing their jobs better. (Nevin, Woman, Mechanical Engineer)

> People do not talk about an engineer who does the job well. (Ahmet, Man, Mechanical Engineer)

Throughout this study I heard about one crucial idea common to engineering circles. If an engineer does his/her job well, if he/she can prove that he/she knows what he/she is doing, then not only colleagues but also blue collar workers respect him/her. On the one hand, proving oneself is a crucial step for all engineers in different sorts of sectors. On the other, the way to prove oneself is full of barriers for women engineers. Fitting into the real engineer stereotype is difficult for women. Dealing with prejudices, accessing employment in production departments is again a hardship. Therefore, women

[158] Lider mühendis yardım etmez öğrenmene. Ustalar yardım eder. O da şanslıysan. Bizim Mehmet Amca vardır, fabrikada ustabaşı. Bana kızım der. Bana çok şey öğretmiştir. Beni resmen eğitmiştir.

engineers are not counted as real engineers in most cases. They are thought more appropriate for offices.

7.3.5 Gendered Social Relations in the Work Place

Social relations in the work place are more complicated than the ones at university. Interviews and observation experience showed me that every work place has its own culture. Twenty engineers stated they are working in the same factories with their classmates. Thus, they were holding on to university networks for work and leisure activities. Ten women engineers were members of the women engineers' online initiative or they were participating in feminist circles. Therefore, they have a social network other than the workplace.

From the interviews I conducted and from the observation experience, I understood that every work place has its own culture. Yet, some aspects can be generalized within the frame of this study. Gossiping, isolation from men networks, encouragement to marry, teasing and masculine language are described as significant features of gendered social relations in the workplace.

7.3.5.1 Gossip about being Feminine

In the armed vehicle factory, I witnessed two women engineers gossiping about another women engineer, who works in the contracting department. I was having lunch with mentioned women engineers. It was the second day of my observation and they start gossiping about another colleague, Zeynep, and they also shared it with me. Zeynep was passing by our table at the time.

After watching her pass by, the women I was having lunch with told me that engineers usually do not work in contracting department.

The common policy in the factory is to test engineers for some time and then decide which department they are going to be assigned to. They told me that Zeynep was one of the engineers who were assigned to the contracting unit, because “she could not manage engineering”. According to them, Zeynep’s appearance was an indicator of this situation. She was far too well-kept and preoccupied with her appearance. They said: “If she were a real engineer she would not wear those things. We (real engineers) do not have time for that much care.”

Zeynep was a mining engineer who had a feminine and well-groomed appearance. She was wearing high heel shoes and her hair was coiffeured. At that time, I realized that she was the only women wearing feminine clothes I had seen in two days. Other women engineers, including the ones I was having lunch with, were in sweaters and trousers with outdoor boots. They had very slight or no make up, their hair was made updo.

Later, I also realized that Zeynep behaved reluctant to me when I wanted to talk to her by telling her about my research. I think that Zeynep knows or feels that some gossip is made about her. This fact, made her unwilling to participate in my study because she thinks other engineers despise her.

This example shows that some women adopt the idea of real engineering and use it to criticize one another for being out of norm; just like men engineers despise women because they think women have certain characteristics not fitting the image in their minds.

In this example, femininity of a colleague is perceived as weakness. Engineers think they have no time for such insignificant things like appearance. Just like the common attiute of university engineering students. Being reckless about appearance is accepted as an

indicator of busyness with other important things such as advanced mathematics or building a tool. By gossiping, women engineers not only exclude women who do not act according to norm, but also they reproduce the masculine image of engineering in the work place.

7.3.5.2 Exclusion from Social Networks

It was indicated by six women participants that smoking is a crucial factor in building male networks. Men employees get together in smoking rooms during work hours. Another example is the relationship between football and women employees isolation. Fulya states men colleagues organize football matches outside working hours and on weekends. They even carry this togetherness to social life, including their wives, out of the work environment. Fulya told me that she cannot take part in male networks first because she is not a smoker and she is not married.

> Male colleagues get together in the smoking room four or five times a day. I do not smoke so I do not go. I also hear that they spend weekends together with their families. I am not invited because I am single.[159] (Fulya, Woman, Electric and Electronic Engineer)

Interestingly, smoking room and marriage complements one another in the isolation of single women worker. Elçin stated that she chose not to marry because she was ambitious about her work. Now, she is very successful in her company, she has a managerial position but cannot take part in informal social activities because she does not have a husband to provide her access to male networks.

With respect to previous research, I can argue gendered culture of engineering can be traced through day to day conformity; the forms of

[159] Erkek arkadaşlar günde dört beş defa bir araya gelirler. Sigara odasında. Ben içmediğim için gitmiyorum. Bir de hafta sonları ailecek takıldıklarını da duydum. Ben çağrılmıyorum bekarım diye.

talk, topics of conversation, and the way people gather in social networks. These activities carry an unspoken curriculum that women and mismatched people are produced as “not members” and even “not engineers” (Cockburn & Ormrod, 1993; Mellstrom, 2002; Faulkner, 2000; 2007; 2009).

7.3.5.3 Encouragement for Marriage

One other important point is encouragement for marriage. In my study the majority of men participants were married. The rest told me that marriage is something they wanted for the work life. Almost half of the women participants were single. Ten women and five men participants told me that marriage is encouraged in the work environment.

Table 7. Marital Status of Participants

Marital Status	**Women**	**Men**
Married	10	13
Single	15	5
Total	**25**	**18**

According to the feminist perspective, marriage is a structure of power relations which traditionally is a resource for men’s bread-winner role. It is an obstacle for women’s career. Family is based on unequal power balance; men have the most benefit from women’s role of primary caretaker of both household responsibilities and children. Men are not thought to be responsible for many of these tasks; thus, they have more opportunity to take part in the labor market than women (Hartmann, 1976; Cockburn, 1985; Eisenstein, 1998). In addition, once women and men are in the work life, men enjoy his breadwinner status and benefit from more opportunities. Women on

the other hand, are a source of lower-paid labor and they are expected to take family responsibilities as their primary role (Robinson and McIlwee, 1992:145).

> When I first became research assistant in this department I was single and was living alone. The head of the department kept advising me to get married and settle down. [160](Fatma, Woman, Computer Engineer)

> I got married when I was in my thirties with a civil engineer from my work place. After that I became the "yenge"[161] for the workers. [162](Rüya, Woman, Environmental Engineer)

On the basis of these points, I argue that married women gain a different status from single women engineers in the workplace. Fatma and Rüya were both encouraged by their employers. The common image about single women is that they do not belong anywhere. Their satus is vague and marriage gives them a new and distinct place in the eyes of public. As Rüya mentions, they become the "yenge", they belong to some men; their status is settled, so is their family. As for men participants, marriage means that men would have a regular life, and would not look for other opportunities in order not to change his family's routine.

From the feminist perspective, by encouraging marriage, women and men engineers are assigned to certain roles. These roles are distinct and entail the mentioned reponsibilities for men and women. In this scheme, women are trapped in the mother/caregiver role. She is usually expected to have children and take maternity leave so that she would sustain her secondary position in the work place. Within

[160] Bölümde ilk asistan olduğumda bekardım ve yalnız yaşıyordum. Bölüm başkanı da sürekli evlen de aile kur filan diyordu.

[161] Yenge is used when referring informally to one's own wife or to a friend's wife. Retrieved January, 14, 2010 from http://www.seslisozluk.com/?word=yenge&sbT=Search&ssQBy=0.

[162] Evlendiğimde otuzlarımdaydım. İş yerinden bir inşaat mühendisiyle evlendim. Sonra herkesin yengesi oldum.

the discourse of supporting marriage, women participants indicated that maternal leave is a big problem for their promotions. There is an obvious contradiction between the family discourse and mother's not being promoted. I believe this contradiction is caused to keep masculine networks alive. On the other hand, Siebert and Sloane (1981:126) indicate that married women's relatively restricted mobility might also cause them to receive relatively low pay. On the other hand, men keep their status as bread-winner in the family while he can freely compete for high status positions. Settling down only supports his postion in work place.

7.3.5.5 Language: Teasing and Swear

During my observation in the production department I noticed very big puzzles on the office walls. On every puzzle there was lace work. Lace work is a traditional way of decoration common to Turkey's culture. They are usually used by our mothers and grandmothers to cover a small table up. They can be found in almost every house in Turkey.

I wondered if they were put on puzzles intentionally. I learnt that the puzzles were made by engineers working in the production department during lunch breaks. Dentelles were brought by department members in order to mock the traditional usage. There were two women engineers in the unit. They participated in making the puzzles. Dentelles are a shared joke within the department. It is asserted that the production department is different than others in terms of social activities. They described the relation as a "fraternity" in which work and leisure activities shared on the department basis.

According to Collinson, workers create "their own joking culture to be a symbol of freedom and automony, which contrasted with the more

reserved work conditions and character of office staff" (1988: 186). In my study, the production department had its own joking culture which symbolizes members' freedom to be themselves. They had their own jokes of mocking themselves, their own work and sometimes other departments. As one man engineer told me, "we do not sit in the office. We constantly go down to the production unit. It is not like other places in factory."[163]

Collinson argues that the shop floor can be seen as a free space in which the true self could be expressed through "swearing, mutual ridicule as contrasted to politeness, cleaniless and more restrained atmosphere of the offices" (1988, 186). Findings in my study confirm Collinson's research that engineers in the production department express themselves through their own culture of jokes. Lacework on puzzles are jokes specific to this department. They not only mock about womenly cleanliness and order, but also they glorify masculine pride in intellectual and manual productivity on puzzles. In that sense, the production unit acted as if there were no women within the department; as they argue, they have a sort of "fraternity". This realtionship is produced and maintained through jokes in the work place.

Another point where my findings are similar to Collinson's work (1988) is about swearing. Collinson argues that job-floor humor embodies pressure on conforming to working-class masculinity. He emphasizes manual workers are required to give and take a joke, to swear, to retain their domestic authority (Collinson, 1988:198). In my case, production engineers whose nature of work is closest to manual tasks, created resembling joking patterns. Swearing and usage of slang language are common communication styles. Here are some examples I heard during my observation in the production unit:

[163] Ofiste oturmuyoruz, sürekli aşağı inmemiz gerekiyor. Fabrikanın diğer yerleri gibi değil.

I would have sworn if you were not here. [164]

I was gonna say something now, anyway...[165]

I heard frequently after swearing: You already knew that, you are accustomed to these words, she is from us...[166]

If a woman wants to be a part of this atmosphere, she has to get used to these jokes and bad words. Otherwise they are isolated. In my study, swearing created a sense of shared masculinity (Collinson, 1988; 185). Such masculinity is usually based on the idea of men's being sexually dominant. Common swearing patters were determined by that idea of men's sexual deeds of women, the work itself, the management, and the potential problem at work. Men partcipants accepted that they swore because they "felt relief" or they "felt better". Women, however, were mostly irritated by swearing of men. Some reported they got used to it, and some told me they try to ignore bad language. Either way, women were oppressed by the act of swearing in the work place.

7.3.6 Mobbing, Harassment: Covert and Overt

Mobbing and harassment are significant problems of work life. Not only engineers but also all professional groups experience covert and overt forms of pressuring behavior.

[164] Küfretcem ama sen yanımda olmasaydın

[165] Şimdi bir şey diyecektim ama, neyse..

[166] Küfrettikten sonra sen de biliyorsunudr sende alışkındırsın zaten bu da bizden gibi şeyler çok duydum.

In this study, men did not mention any kind of mobbing or harassment experience. While four women participants mentioned experience mobbing either from colleagues or from employees. They stated the most common way of mobbing is to take responsibility away from woman engineer on either temporary or permanent basis.

> I wanted to learn more about system engineering. I asked a male colleague if he can teach me some tips. He did not help me. I told this to the boss but my colleague told him that I was not intelligent to learn, so he did not want to waste time with me.[167] (Fulya, Woman, Electrical Engineer)

> I experience mobbing at least one time in six weeks. As if he (her boss) does it periodically (she laughes). If I make a mistake, he takes all responsibility from me for a week or so, then, he gives them back. He thinks he punishes me.[168] (Elçin, Woman, Metallurgical and Materials Engineer)

As seen from the two examples above, mobbing or "unconscious psychological impact" as Nicholson (1996) puts it, might be used in two forms. In Elçin's story, her boss intentionally takes responsibility away from her so that she will not do the same mistake in the future. In his mind, it is a punishment mechanism.

In Fulya's example, mobbing is used to keep the female engineer down in the knowledge hierarchy by the male colleague. In both forms, it creates psychological harassment and, saying it unconsciously or not, it has practical consequences on women's motivation.

[167] Sistem mühendisliği hakkında daha çok şey öğrenmek istiyordum. Erkek çalışanlarda bir arkadaşa bana ufak tefek şeyler öğretir misin dedim. Yardımcı olmadı. Bu durumu patrona taşıdım, bana yardımcı olmadığını anlattım. Bunun üzerine o da gitmiş demiş ki işte 'Aysel yeterince akıllı değil, öğenemiyor, vakit harcamak istemedim'.

[168] Altı haftada bir mutlaka mobbing yaşarım. Sanki periyodik olarak yapıyor (gülüyor). Bir hata yapsam şöyle bir iki hafta tüm yetkilerimi alır, sonra geri verir. Aklınca beni cezalandırıyor.

7.3.7 ESİN-A CASE OF HARRESSMENT

Harassment was reported by three wome participants. Two told narratives that took place in their work places but they were not the object of harassment. They were witnesses. Esin, metallurgy and materials engineer told her experience in her previous work place.

Esin was harassed by a blue collar worker in her previous workplace. She was also harressed and threatened by her director at the firm. As she told her story:

> The work was shift base. I was giving workers some tasks to finish until morning. Since I was single and accesible during nights, they had my number. They were calling me sometimes for work.
>
> I do not remember when it began, but it was after I quit this job. Workers texted me telling that they were sorry because I left. They told me I deserve better places. Normal messages. Later texts became insisting. I did not want to break their hearts so I replied. One worker insisted more and went even further. He called me from a private number at night. At first I did not understand, I got so scared because I was working and living alone in Konya.[169] I did not know who it could be. I went to the attorney general. I wanted them to find the number. After the investigation, the number was found and it turned out to be that workers' number.
>
> At the same time, I was formally complaining about the firm because they did not pay my primes. Because I had signed some forms as a part of the job, I had responsibility. My work in that company was proved some way and the firm got punished. My previous director in that firm got very angry and called me saying I should watch out for myself. He was also angry because I reported the worker to police for harassment. He said we could have found another way to work this out. We could have given your money or warned the worker.[170]

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[170] Başlangıcı çok hatırlamıyorum ama işten ayrıldıktan sonra orda çalışan ustalar bana mesaj attılar. Esin hanım biz çok üzüldük ayrıldığınıza ama siz daha iyilerini hak ediyordunuz gibi böyle. Normal mesajlar. sonrasında daha böyle ısrarcı olmaya başladı. Ben de kıramıyorum geri dönüyorum mesajlara. O ara bu bahsettiğim usta biraz muhabbeti ilerletmeye çalıştı. ben cevap vermedim arada kaldı ama aradan zaman geçti ben o sırada

Esin's experience contains different forms of multiple harassments. First, she was harassed by the firm because her primes were not paid. She was employed on an informal basis. She did not have insurance. Until she quit the firm she could not officially report it. Esin told me that she was a new graduate at the time she applied to this job and she needed money. She took the offer because she thought she did not have any other choice.

Second, she was harassed by a blue collar worker after she quit her job which she thought had a sexual intention. She was harassed the third time by the director, when she reported these problems. She was threatened to take watch out for herself. It implied that some harm might happen to her, because she was digging the situation. The case was closed when she reported them to the attorney general.

Esin's experience is a complex example of harassment. Two other particiants told me resembling stories they had witnessed. In all examples women engineers were oppressed either by directors or by blue collar workers. I believe that it is problematic to reflect women as ultimate victim and men as oppressors. However, women seem to

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Konya'da çalışıyordum, orada yaşıyordum. Gece bana telefon geldi özel numaradan. Önce anlayamadım alo efendim filan dedim ama çok korktum. bi de yalnız yaşıyorum acaba hani orayla ilgili mi bilemedim. Kim olduğunu da bilemedim. Sonra savcılığa gittim. Numaranın bulunmasıyla ilgili ifade verdim. Bu arada şöyle bir şey oldu. İlk işyerim benim sigortamı yapmadığı için müdüre gitmiştim benim sigortam yatmadı primlerimi elden mi vereceksiniz dedim. Müdür öyle şey olmaz primler elden verilmez ben olsam burayı şikayet ederim dedi. Ben şaşırdım. Sonradan bir de ben orayı da şikayet etmiştim primlerim yatmadı diye. Sorumluluğum da vardı çünkü yaptığım iş gereği orda imza atmışım. Benim orda çalıştığım bir şekilde belgelendi. Şirkete ceza kesildi.

Sonra numara istediğim yerden beni aradılar. İsim verdiler. Böyle böyle birisi diye. Böylece ben o usta olduğunu anladım. Ondan sonra ilk çalıştığım yerdeki amirim beni aradı. Sağına soluna dikkat et dedi. Sen hem dedi Hasan'ı (usta) şikayet etmişsin dedi. Şikayet etmeyip ne yapcaktıysam. Hem de bizi şikayet etmişsin dedi. Hallederdik biz onu verirdik paranı, anlaşırdık manlaşırdık dedi.

be easy targets for pressure in the work place. They are perceived vulerable to low-waged jobs and to insecure work conditions.

The way Esin's previous director threathened her shows that harassment can continue even after work life and become a danger for women. Along with sexual harassment go the attempts of cover-up. I think Esin's example shows that cases of sexual harressment are frequently hidden within work places.

7.3.8 Reconcialization of Work and Family

In this part, I explore family lives of engineers; their attempts to reconcile work ad family responsibilities. Keeping a balance between work and family is difficult and difficulties are not specific to engineers. Yet, women in male-dominated professions like engineering, medicine, law are less traditional in their gender attitudes. These women tend to see their careers as as much importance as of their husbands' and less likely to give family primary importance (Robinson & McIlwee, 1992, Betz & Fitzgerald, 1987).

As it was discussed in "encouragement for marriage", dynamics of family building and fixation of sex roles in the family discourse is significant in women's employment patterns. Women's and men's gendered roles in the household have been transferred to economic activities in the public sphere to a certain extent.

In Turkey, marriage and having children is encouraged by state institutions. On the other hand, employers think giving birth interrupts women's career paths. Therefore, many women are channeled into part-time and low-waged jobs in order to continue their caring responsibilities. Women's possibilities of getting well-paid jobs are mainly limited by discrimination. As a matter of fact, a way

to get a place in the labor market for women means, being employed in a *women's job*.

As for engineering, Onaral states that the engineering occupation is not an attractive profession for young women because statistics correlating family life with professional responsibilities reveal that a 52 % of executive women in the world have either never married or are divorced or widowed, and that 61 % are childless, as opposed to only 5 percent of male executives. This profession obviously results in conflicts of family and work life. Thus young women students are facing an insoluble problem, as Onaral puts it, "It is a problem with more unknowns than equations" (1985:239).

In my study, out of forty three participants, ten women and thirteen men engineers were married and some of them had children.

Table 8. Marital Status and Children of Participants

Marital Status & Children	**Women**	**Men**
Married w/o child	4	3
Married with child	6	10
Single	15	5

Men participants did not mention any difficulty about sustaining work life with children. They generally stated it was their wife's job to take care of children. In some cases, children are taken care of either by their wives, mothers, mother-in-law or by a nanny. They argued they helped taking care of household responsibilities yet childcare was seemingly women's sphere in every meaning. Those who had older children were attending kindergarden or school. Hence, men

participants did not perceive themselves as the main responsibles of children and their care.

As a matter of fact, reconciliation of work and family became an issue for only women; women engineers, in my case. Women participants, with the exception of five, stated that childcare is a task more appropriate for women.

> We claim women and men are equal. We are equal for sure but there is also reality. Our nature is suitable for childcare. We are more patient for example. We are more caring. I think it is good that men have authority as father figure.[171] (Derya, Woman, Civil Engineer)

Women with children argued childcare and household responsibilities are both women and men's work. However, they stated this equity is never realized in daily life.

> I can not go home before eight p.m. When I finish washing dishes and sit down, it is close to ten p.m. My husband is home but I do the work. He sees the dishes but he does not put them in the machine.[172] (Serap, Woman, Geological Engineer

Women who can work by overcoming pre-participation difficulties, either work while they are single or they quit their job after having a baby. The ones who continue working have to bear a life with "double shift" in order to overcome family and work responsibilities (İlkkaracan, 1998:299). In addition, the private sector does not provide kindergarden services. Participants working in private firms and factories asserted that in order for a factory open childcare facility 150 women engineers have to work in a factory. That number is never achieved for participants I interviewed. Despite men workers ad engineers who have children, private firms insist the number of

[171] Kadın ve erkek eşit diyoruz. Tabi eşitiz ama bir de gerçekler var. Bizim tabiatımız çocuk bakımına daha uygun. Daha sabırlıyız bir defa, daha sefkatliyiz. Erkeği bence o anlamda otorite olması iyi bir şey. Baba figürü.

[172] Saat 8'den önce eve gelemiyorum. Bulaşıkları yıkayıp oturduğumda 10'a geliyor. Eşim de evde ama bana kalıyor. Bulaşığı orda görüyor ama makineye dizmiyor.

women needs to reach to a certain level. This implication clearly shows that childcare is accepted as *mother's work*. Since the number of women engineers are far less than 150 in factories, childcare services will hardly be achieved in the near future. It might also be a strategy for private firms to recruit less women workers.

One striking finding in my study is that there were relatively less cases of two engineer marriages.

Table 9. Participants Married with an Engineer

Marriage with	Women	Men
Engineer	6	4
Other	18	14
Total	24	18

In line with Robinson and McIlwee's results, women were most likely to be married to status superiors while men to status inferiors (1992:150). One participant told me that her husband is a status superior; otherwise he would not attract her:

> Have you seen the TV show: Asmalı Konak[173]? You know the Seymen there. His wife was educated. Just like that. No matter how educated we are, we are looking for a Seymen. We are not interested in loser men. [174](Nevin, Woman, Mechanical Engineer)

I think Meltem's ideas were specific to couples of the same profession. She gave me a perspective for understading marriage patterns of professional people. In regard to this, marriages of engineers also involve power and status relationships. Women, regardless of their

[173] Asmalı Konak was a TV show. It was based on a story of two lovers; a traditional while educated land lord and a painter women who fell in love and settled in man's small town.

[174] Asmalı Konağı izlemiş miydin? Oradaki Seymen'i biliyorsun. Onun karısı da eğitimliydi. Aynı bunun gibi. Ne kadar eğitimli olursak olalım bir Seymen arıyoruz. Ezilen erkeğe ilgi duymuyoruz.

education level might look for traditional masculine features in men. Even if they are from the same profession, higher status is an indicator of attraction for women. Men in this picture enjoy their status of being the traditional superior not only in the family but also in work life. This perspective also reproduces existing gendered status quo within work and family.

If women are single, the potential of setting up a family becomes problematic for their career.

> We postponed marriage for some time. My master, his PhD; it was hard to get married. At the same time we were working. Therefore, we postponed until I got my degree.[175] (Nevriye, Woman, Chemical Engineer)

> At a point in my career I felt that I needed to make a decision about marriage. I chose to be a single woman. If I did not make that decision, today I would not be at my position (in the work place).[176] (Elçin, Woman, Metallurgy and Materials Engineer)

Postponing or cancelling marriage was indicated by two participants. Nevriye and Elçin thought that it was the right decision for their career. Marriage brings more responsibilites for a woman's life. It makes work life difficult if it is in competition towards higher status positions. In addition, it was indicated that taking a maternity leave is accepted as a career break for most women.

Similarly, Ecevit, et al.'s study (2003) noted the barriers in relation to reconciliation of work and family. According to Ecevit et al., women in ICT sector have to work very hard and may postpone or cancel marriage because it is too much of a responsibility. Within technical

[175] Bir süre evliliği erteledik tabi. Benim masterim oun doktorası derken zor oluyordu. Bir de çalışıyoruz. O yüzden ben master i bitirene kadar erteledik.
[176] Bir zaman geldi eve evlilikle ilgili bir karar vermem gerektiğini hissettim. Bekar bir kadın olmayı seçtim. Eğer böyle karar almasaydım, bugünkü yerimde olamazdım.

professions, women could hardly find managerial positions if they are married and with children (Ecevit, et al., 2003).

Concluding Remarks

Judging from the experiences of participants, I argue that gendered engineering culture manifests in different realms of engineering and it affects women and men differently. Within the frame of this study, I examined university life, the job seeking process and the work life of engineers.

Findings show that codes of gendered engineering culture are firstly seeded at the faculty. Jokes about the nominal scarcity of women, male-dominated environment, hostility and ignorance of faculty members are reported as gendered practices. These practices work as covert and overt barriers for women students. Men students usually feel confident in the environment; however, women students reported that the psychological impact of these practices resulted in loss of self-esteem and motivation.

Since engineering education has a difficult curriculum, all students try to survive under harsh conditions. Women students are mainly note providers. Students become studying buddies and exchange course notes with one another. Students in the engineering faculty are high achievers. All students enter university with highest math and natural science scores. Yet, women participants told me that university education fails to improve their lack of self-confidence towards technical matters. Field work and courses that require hands-on tinkering magnify women's insecurity within male-dominated environment. Some do not prefer to take place in field work because they think they can not handle conditions. However,

some are willing to accept the challenge since it is a part of the profession.

Older participants felt respect and gratitude towards faculty members. Men engineers mentioned they had deep respect for their professors. Women participants also indicated gratitude. I believe these feelings are related to contextual aspects. Older participants lived in a time that engineering was a very respected occupation. They were chosen students. Women were even fewer; becoming a professional was seen as something to be in debt for. Younger participants, on the other hand, had a certain distance to faculty members; they did not mention feelings of respect or gratitude.

Man participants did not indicate gendered attitudes from faculty members. While women students complained that some professors were fond of men students or they simply ignore gender as though there were no women in class. In addition, due to the limitation of female professors who support women students and be role models, women students have more difficulty than men classmates.

Social relations in the faculty were positive in regard to studying. Since women were note providers, they are welcomed to studying groups. Under difficult conditions of studying, all students are powerless in engineering education.

However, it is also a power terrain. The pressure to prove herself and to show that she is as good as men students is an additional burden for women students. Women are competing for their profession, but they are also struggling for power and status. Women already know that they are "losing 1-0 from the start"[177], at least in the eyes of men fellows, faculty members, in the labor market and in the minds of employers. They accept this status when they decide to become

[177] Erkeklerin gözünde bir sıfır yenik başlıyoruz. Nevin, Mechanical Engineer

engineers. They also know that they need to study more than men. However, I believe that working hard in the faculty does not lead to a decent job for women engineers. Even though they are good students in theoretical courses, prejudice about women and sometimes their acceptance of this given status, serve to intesify insecurities about women engineering students.

In the engineering faculty women students are tokens (Robinson and McIlwee, 1992:77). If they are to be engineering students they must have mustache. They must have masculine features to be competent. It is also a way to access men's networks to some extent.

All these interactions are carried to the job hunting process and to the work place. When graduates seek jobs, men participants indicated they had been able to find a job in a short notice. Above all, women participants indicated that prejudice about women's engineering creates problems. In Nicholson's terms (1996), prejudice is a significant covert barrier that women engineers have to cope with. Women participants also mentioned fieldwork, travelling, and marital status as difficulties of finding job.

Women and men participants described work life as a competitive medium in which men are set to be natural habitants. Women are chronologically latecomers. More importantly, women are socially bounded by overt and covert barriers such as being meticulous, being mothers, ideas about their being verbal-minded and household responsibilities. Traditional gender roles, obligations and expectations from each gender become the backbone of our identities. Bounded by social weights, the woman engineer does not experience equity, not even in the office atmosphere because equity is not a matter of profession, but it is a structural problem of societies.

Judging from experiences related to work life, gendered engineering culture occurs with respect to social acceptances and expectations. It affects women and men differently. Some participants of this study agreed that the engineering profession has a culture of its own which favors masculine features. Women engineers, in that sense, are usually seen as outsiders. They need to work harder than men in order to prove themselves. This does not mean that all men engineers are welcomed parties in the culture; only if they show technical competence.

Both women and men participants described certain definitons of "real engineering". These definitions confirmed my theoretical framework. The real engineer is someone who can cope with heavy work conditions, has mathematical ability, and is technically competent. Participants also emphasized that the real engineer has a disheveled appearance: he/she does not have time to pay too much attention to his/her apperance. Busyness, in that sense, is an indicator of being engaged with more important matters such as building an aerocraft. It was obvious that both women and men engineers were proud of their profession if they perceived themselves as "real engineers".

Real engineering was also compared on the type of work. The labor in workshop basis and type of work in big factories seem to differ in production processes. Workshops in this study design and produce machinery, and labor is manual labor to some degree, while big factories mainly produce already designed machinery. Machines make machine and the engineer and master worker controls its processes. Two participants argued that this very difference between two types of production also have a reflection in the definition of real engineering work. Workshop basis production is argued to be real

engineering work, since the product is made of creation, and it is accesible in the end.

Some participants argued that women are more meticulous than men. Meticulosity was defined as being patient and being able to work in detail. While men are conceptualized to be more competent in physical and tecnical matters; they are more suitable to work on field/production basis. I believe this categorization produces and reproduces the existing gender hierarchy in the work place. From this perspective, women are trapped in stereotypes based on gender ideology. This leads to resegregation in the work place and women find themselves in *female ghettos* such as offices, quality and contracting departments. They do not have the opportunity to prove themselves in tasks which require more "real engineering."On the other hand, men participants are assigned to tasks in production departments or workshops. Their abilities and experience are far from questioning.

Stereotyping influences careers of men and women. Findings showed that women engineers have to cope with more barriers than men in order to get promoted. These barriers are: difficulties with the industry culture, men's attitude towards women, lack of technical knowledge, lack of opportunity to gain technical experience, and responsibilities in family life.

Social life in workplaces leads women and men engineers to gather in differrent groups. Manliness, in the heteronormative sense, is determinant of jokes, slang language, male social networks, and leisure activities. Women who can adapt to the male-domiated environment gain access to a certain extent. Still, family life plays a significant role in accessing into social networks outside work activities.

Mobbing and harassment were mentioned by few participants. These participants were all women. Men participants did not mention any experience of mobbing and harassment.

Reconciliation of work ad family was reported as women's responsibility. Men participants told me that they are helpful in household responsibilities. No men asserted they share responsibilities.

CHAPTER 8

CONCLUSION

In this study, I attempted to understand gendered construction of engineering occupation and its transformation in contemporary Turkey. I started by investigating three main questions, through which, I tried to understand how gendered engineering culture is created and transformed, manifested, and experienced in Turkey by referring to engineers' narratives. Respondents in this study were composed of women and men engineers mainly coming from two cohorts. One age group was composed of engineers with 40 and over age and the other was populated by engineers under 40 age. The reason for selecting two age groups was to reach a better understanding for a possible transformation of gendered engineering culture. Due to vast economic and social changes Turkey had gone under since the foundation of the republic, age distinction within this study revealed significant differences in perspectives and experiences of engineers.

There are three main results of this study. Before proceeding into details, I argue that engineering profession has a prestigious image in Turkey's society however this image has transformed due to economic and political changes. Secondly, engineering profession in Turkey is based on gendered codes and ideals. These codes mainly adress male engineer as the ideal type. Yet, this definition of masculinity has certain limits peculiar to Turkey. In addition, findings of this study provide constrasting perspectives from different

cohorts concerning the change in gendered structure of engineering proffesion in Turkey. Lastly, judging from the findings of this study, I also argue that gendered engineering culture manifest in engineers' communication styles; jokes, daily language, caricatures, also in gendered job ads and segregation of certain tasks in work organization which finally affects promotion strategies. The ways gendered engineering culture manifest itself affects men and women engineers differently; women need to struggle more than men in order to survive in engineering environment.

Through my pursuit, some significant concepts dominated the analysis of this study. These are, different definitions of masculinity that I found in this study and the one was provided by Hacker in a similar study in 1989. Second, comparable answers provided by two cohorts in this study which provides a picture for a change in engineering culture itself. Thirdly, another difference asserted by self employed men participants of this study; the diversity between doing engineering work in workshop and in factory. Finally, the absence of women in certain parts of production industry and its impact on gendered engineering culture.

On the basis of these, in this chapter, I will discuss the results of this study with respect to main concepts mentioned above.

To begin with, findings of this study show that engineering profession had been created as a prestigious occupation on the social level. This prestigious image has faded due to economic and political changes occurred in Turkey. The change of engineers' role in neoliberal economy, increasing number of engineering schools in Turkey and decreasing quality of engineering graduates were reported as the reasons for such transformation by participants from both cohorts. Yet, it is also found that engineers of younger age group still enjoys

the profession's social prestige, since it has a powerful heritage on the social level. On the other hand, elder cohort indicated that the respected image has faded when compared to past.

Findings of this study revealed that creation of gendered engineering culture and social prestige of the profession is mainly based on the general discourse about engineering which was affected by the perception of "the west", because Turkey's modernization process was determined by the idea of achieving western civilization in science and technique. Just as feminist critique of science and technology asserted, practice and production of science and technical knowledge was historically gendered. Therefore, being addressed as the engine of modernization, professional engineering was brought to Turkey in earlier times of Republican reforms with its pregiven masculine codes. These codes articulated with Turkey's strictly patriarchal structure.

In addition, 1965 and on Turkey has witnessed the rise of male engineer as a political actors. From 1965 until 2000's engineer originated politicians had been ruling figures of Turkey's politics. As a result, engineering was conceived as a prestigious profession for men, since publicly known examples in Turkey became symbols of managing politics and production. Reputation of the profession has grown and marrying an engineer or even getting a proposal from one, is seen as a symbol of status for a women. Thus, engineering appeared as an occupation of expertise and found respect on the societal level for men. Although women were encouraged, even invited into the engineering profession with the impact of republican reforms, the occupation remained male dominated.

I argue that understanding the dynamics behind the social prestige of engineering profession also helps exploring creation of gendered

engineering culture in Turkey. I took social image of engineering as a mean to examine the profession's gendered culture, because the image is constructed by certain social expectations, values and ideal types. These very features also determine the structure of how gendered engineering culture is created.

Deriving from my findings, the social image of engineering is mostly influenced by presence of engineer politicians as much as it was influenced by the perception about "technique in the west". First engineers were perceived as developers of the country. Due to the political atmosphere of the time, women were also invited to technical professions. However, even today women engineers' rates have never reached more than 30 %'s.

Prestige were argued to be the most important feature of the profesion's social image. According to my participants, both men and women enjoy to get positive reaction from public. Positive reaction were defined as affirmation, trust and acceptance. For women participants, surprise and more respect might be added to these definitive marks. Being a woman engineer is argued to be respected more, because the profession is accepted to be more suitable for men and it is even more difficult for a woman to achive becoming an engineer for both cohorts.

The social prestige had two main origins; ability for analytical thinking and having opportunity to find a middle class job. In this frame, engineer is supposed to be good at mathematics, problem solving and analytical causation. With proper education, engineer is one of the professionals who can find a decent job and middle class level income. For both women and men participants the respected image is also based on educational success, the position of an engineering field in the hierarchy of engineering departments and the

potential of earning a decent income. These indicated and supported by the respondents that engineer is expected to be a person of expertise with an income to afford middle class life style and have mathematical ability to be successful in engineering education. The existence of women in this picture is vague, since it is mentioned by some participants that female mind is stereotypically associated with verbal ability on the social level.

Participants from diverse age groups in this study, also differed in their beliefs of engineers' ideology (Göle, 2008). Elder men participants belived that engineers have the ability of deduction and with this ability they can solve social problems. Thus, engineers have social responsibilities with regard to their ability. Women participants of the same age group also believed in the ideology, however they also thought that other professional groups might have the same ability.

Elder cohort grew up in times that Turkey was ruled by engineer politicians and they were raised to be "big guys" like them. I think, the existence of important "guys" in Turkey's politics also created a masculine culture within which engineering is associated with men. That is the reason, I believe women participants of the same cohort did not indicate they took engineer politicians as role model since these figures were not provided to be guide for them by their environment.

On the other hand, participants of the younger cohort did not mention about the ideology and they rather stated they are apolitical. Engineers in this age group have parents experienced the 1980 coup. They have seen people from different ideologies kill each other and they also witnessed the state's and military's reaction against rivalry. That is why, I believe younger cohort is raised to remain silent in terms of politics.

According to the results of this study, respondents from two cohorts indicated that engineering is prestigious, however this prestige has faded because it lost its respected role in production processes. Increasing specialization and the change in mode of production also transformed engineers' responsibilities. Previously being technical experts of production, the profession's role has reduced to monitoring production processes. According to elder cohort, engineers' role has transformed and it led to a decrease in the social prestige. Moreover, younger cohort respondents mentioned increasing number of engineering schools as a result in fading prestige. However, younger participants think they still enjoy the level of prestige on the social level.

Second main finding shows that engineering profession in Turkey is based on gendered codes and ideals and these codes mainly adress male engineer as the ideal type. Yet, mentioned masculinity has a certain definition peculiar to Turkey.

Participants of this study indicated that nature of engineering work is mostly defined as dirty, heavy and requiring hands on experience and combines these features with mathematical ability. Thus, the ideal engineer needs to be physically resistant and mentally skillful. This finding contradicted with Hacker's argument about respected engineering fields and also showed that Hacker's findings and my results are defining two different sort of masculinities.

Hacker suggested that highly respected engineering fields are associated with mental ability, therefore they are masculine. However, I found that the fields which require more physical ability in relation to higher achievement in mathematics are defined as masuline engineering fields (Hacker, 1989).

This discussion leads me to argue that Hacker and I am providing two different sort of masculinities. Hacker's is an example of classical dualism of mind and body. On this theoretical hierarchy, mind is superior than body. Thus, mind meant to be associated with men and body with women. In theory, mind is captured by the limits of the body. Within the classical dualism, mind despises body. In that sense, her findings confirms the dualism and puts men in relation to mental success. It also created a sense of masculinity whose treasure is his talent of mental work.

On the other hand, my study shows that in Turkey, masculinity requires more than ability of abstraction. It needs manual toughness in addition to theoretical skills. I think this slight but significant difference shows that some aspects of masculinity I found in this study might be peculiar to Turkey. It also shows the depth of patriarchical paradigm in this culture. Men in Turkey, can be conceived as masculine as long as they are physically strong and tough. If they have also theoretical ability, then they are to become *the ideal grooms* for women in this country.

If I go back to what I have argued in the beginning, I claimed that engineering profession was brought to Turkey with its pregiven masculine codes and it well suited to Turkey's patriarchical structure. I can argue that engineering culture is created on gendered principles in Turkey. My findings above showed that theoretical requirements of engineering integrated with its works' manual hardness and this created an ideal notion of engineer only suitable for men. Women are not only historically excluded in this picture but also their place has never been constructed in terms of social definitions. That is why, women's becoming engineers leads to a surprising and even more respected reaction, since they accomplished a mission culturally designed for men.

Participants of two cohorts differed in their opinion about gendered image of engineering profession in Turkey and its transformation. Elder cohort indicated that previously engineering profession was lacking women in numbers and this created a hostile environment for women entering the profession. According to participants, currently the atmosphere of the profession get accustomed to women's existence. Respondents of the younger cohort did not indicate concrete answers for the transformation, yet they asserted they think the profession needs to be more egalitarian for women.

Women participants of two cohorts are compared on the basis of their experiences about gendered job advertisements. Elder cohort members mentioned their experiences of discriminatory job ads published by two state institutions. Women engineers organized and reacted until the institutions changed the advertisements. Thus, elder cohort had the idea that they can change gendered codes in engineering. On the other hand, younger participants rather seem to accept the gender hierarchy, they have less to struggle and they try to deal with the situation as they work harder.

On the basis of findings concerning a general change in gendered engineering culture in Turkey, I argue that the culture has changed because the dynamics of the profession has transformed. With global economy, the role of engineering profession has shifted from being the actual producer to desginer. As the need for technical labor forced extended, the number of engineers also increased. Engineering students began to be chosen with more flexible measure. This transformation is perceived by elder participants as a decrease in engineering's prestige. In addition, more women entered into the profession and their struggle also changed some rules in the gendered structure.

Within the jargon of engineers some aspects of engineering were frequently indicated because participants thought that the engineering profession can be best explained by these suggested features. These were the ability to do math, analytical thinking, and problem solving. Engineer in this frame is a person of reason who has the ability to think mathematically and solve even social problems with the help of systematic thinking. As mentioned above, participants in my study agreed that engineer is a person who has the ability to make sense of the world in an analytical manner because he/she has mathematical mind. This idea, might be the motive behind engineer politicians in Turkey from 1960's until 1990's or it might be the engine for Union of Chambers of Turkish Engineers and Architects (TMMOB) and leftist fractions of engineer groups organizing alternative to TMMOB.

Within the limitations of my study, I did not give priority to engineers as a political group. However, I explored my participants' distance to politics and to TMMOB, because I think Professional organizations are determining factors on the perception within and about professions. My findings showed that respondents with 40 and over age were believers of engineers' ideology, in the sense that Göle mentioned in 2008. On the other hand, younger generation regardless of gender, has lost faith in political change and do not believe that engineers would have a role in a progressive future.

I think this shift has to do with Turkey's current political atmosphere, engineering profession's fading image as some participants claimed and it also has to do with TMMOB's political organization. It is indicated by some participants that TMMOB does not have a holistic approach for administration with respect to other ideologies than itself and to feminist claims in that manner. Women participants thought that they do not hold equal chance for participation in

TMMOB's administration. According to some participants, TMMOB has a gendered organization and keeps women away unless they give priority to notion of class struggle. In that sense, feminist claims are accepted secondary and the unhappy marriage of Marxism and feminism (Hartmann, 1979) seems to continue in the organization.

This structural inequality is one of the examples of how gendered engineering culture affects women and men professionals. From choosing engineering as a major to being really involved in the work life, this study showed that men and women engineers have different experiences.

Lastly, the results show that the ways gendered engineering culture manifest itself affects men and women engineers differently; women need to struggle more than men in order to survive in engineering environment. I also argue that gendered engineering culture manifest in engineers' communication styles; jokes, daily language, caricatures, also in gendered job ads and segregation of certain tasks in work organization which finally affects promotion strategies.

Being aware that the dynamics I have mentioned above and more concrete examples from engineer's narratives are a part of the manifestation, I decided to focus on the perception of engineers about their profession in order to understand how gendered engineering culture manifests in Turkey. I found that cultural codes of this profession manifests in engineers' own perceptions about themselves and their profession, which can be seen in occupational organizations and in their declarations. Therefore, I explored ideal images of engineering on the professional level.

University is argued as a place that codes of gendered culture is first seeded via jokes, about numerical scarcity of women and their appearance. Masculine jargon of talk and gesture, ignorance of

faculty members are reported as covert and overt forms of gendered practices. Men participants mentioned they usually felt confident and natural in the environment. While some women asserted they felt loss of self-esteem and motivation.

Although, only applies with younger cohort, one of the most frequent jokes mentioned that women engineering students had mustache. Mustache is a cultural symbol for proper masculinity in Turkey. This jokes implies the idea that if women are to be engineering students, then they must have mustache. They must have masculine features to be competent.

One striking finding was also that women has the role of note providers at university. Women continue to be suppliers just as their social role as mothers and caregivers. They mostly have outstanding success in theoretical courses yet, they lack of self-confidence when it comes to matters that require field work or hands-on tinkering. Some women prefer to take place in fieldwork because they think it is a part of their job, some simply look for jobs which do not require practical tasks. On the other hand, men engineers' success in university reported to be the average level, however they said they could find jobs easier than their female classmates.

Women and men engineering graduates told me different stories about their job seeking processes. Women participants indicated that the prejudice towards women engineering created problems. Confirming Nicholson's argument (1996), prejudice in this study is found to be a significant covert barrier that women engineers have to cope with. Stereotypical prejudices as surround the commonsense ideas about women's fieldwork, travelling and marital status and reported as difficulties of being recruited to a job.

As for the work life, my findings indicated that gendered engineering culture produced and reproduced in the work place relations with respect to social acceptances and expectations. The ideological definitions of 'real engineer', 'real engineering job' and 'ideal engineering career' were most visible in work life experiences. Both men and women engineers has certain definitions for these three ideal types which favors masculine features and keep women to be outsiders. Women participants told they need to work harder than their male counterparts. As ideal definitions require a certain type of masculinity, I believe, it does not welcome all men unless they can keep up with the ideals.

Industrial sectors in which engineers are employed in Turkey are reported as highly competitive and gendered. Confirming Zengin's findings back in 2000, I argue that some engineering departments are conceived as masculine and some are feminine. Moreover, certain tasks in engineering are accepted to be masculine. Masculine fields and masculine tasks mostly take place in public sphere or they require close relation to work with blue collar worker or with villagers. It is not only engineering itself which favors manly aspects but also the structure of industry is based on patriarchal acceptances. Many men participants in my study argued that women engineers can perform like male colleagues if they are given the same conditions. A few men and two women told me women do not have the natural prerequisites for engineering. It is the patriarchal industrial relations which keeps women away from getting deeper into production. Blue collar workers are resistant to women authority and employers are unwilling to recruit women engineers.

I also found that disheveled appearance is a part of gendered engineering culture. It is seeded at university years and maintained in work life. Having little time to pay attention to one's appearance is

accepted to be busy with more serious matters other than looks. Thus women and men engineers may be proud when they are disheveled because they feel like 'real engineers'.

The value given to real engineering job and real engineering practice was also a subject of dispute. The workshop type production which contain design and creation argued as having more value in the eyes of engineers. This finding also fits the general acceptance that production process; creating a concrete object is more real than other work processes. That is to say, engineers think that creating an object by calculating and designing from the beginning must be the real nature of engineering job. Some participants even underappreciated big factory type production because the laborer and his means of production is no longer closely united. Therefore, I can argue that it is crucial for engineers to get involved within production processes.

Yet, this is difficult for women engineers. Their experiences showed that women are restricted from gaining access in production departments. They are usually assigned to tasks that require meticulousness. Women engineers are segregated just because they are women since they are accepted to be patient and careful. This creates another categorization in the existing gender hierarchy and leads to desegregation in the workplace. As a matter of fact, they are rarely assigned to tasks which counts as real engineering.

Findings also showed that women have to deal with more barriers than men with respect to promotions and getting respect within work environment. These barriers are reported as difficulties with industry culture, men's attitude towards women in the production sector, proving oneself in front of blue collar workers, lack of technical

experience and lack of opportunity to gain that sort of practicality, and difficulties of managing work and family life together.

On the one hand, proving oneself and get promoted is a crucial step for all engineers in different sorts of sectors. On the other, the route for promotion is full of overt and covert barriers for women engineers. Fitting into the real engineer stereotype is difficult for women. Dealing with prejudices, accessing employment in production departments is again a hardship. Therefore, women engineers are not counted as real engineers in most cases. They are thought to be more appropriate for offices.

Moreover, mobbing, harassment and gossiping only mentioned by very few participants. As a matter of fact, I cannot create a representative argument on the basis of these examples. Nevertheless, all three cases were raised by women participants. No men ever mentioned any related experience. Thus, it may be argued that women are more likely to suffer from adverse experiences in work life and work related life.

Findings of this study revealed that not only professional culture of engineering profession but also whole value system around this culture is highly gendered and favors certain ideal types. However, within the realities of industrial production in contemporary Turkey, these ideal norms of profession rarely applies. As I mentioned before, the labor market structure in Turkey is gendered. Women and men has distinct places in the market and the distance they can get is usually premeasured. In this route, women have to cope with more structural barriers than men. Although it is frequently mentioned by participants of this study that women can accomplish engineering work as well as men do, women and men do not have equal chances for the same missions. They also do not have equal contribution

from society. Women engineers, though they are respected, are welcome up until to a certain career point. Later, they are expected to get married, have children and have a suited life to traditional gender roles.

On the basis of these, my study confirms many research in feminist technology studies literature and contradicts with a few. Yet it provides productive discussions. My findings confirmed that not only the social image of engineering but also its profesional image is gendered. From restaurant advertisements, caricatures[178], job ads, to sour definitions from websites, it has made clear how a man should be, what features an engineer should have and how women are socially restricted to that well protected area. Not only circles of engineering profession but also close environment of the profession is highly gendered. For instance, the industrial zone. It is indicated that women's mere existence in the zone were a problem for a long time let alone women engineers. This very example shows that, any kind of change requires an ideological shift in the society as a whole. Furthermore, narratives of both women and men give me a better understanding of how engineering is experienced in Turkey. I believe without men's voice, this study would provide a lacking picture. My study once more confirmed that professional cultures are some miniature versions of the whole culture in which they are existing. Thus, engineering culture in Turkey has patterns of gendered aspects within this country. These are inseparable. That is why, I believe a major amendment in gendered features would require an ideological shift in the general discourse.

[178] See appendices 1,2,3.

REFERENCES

Acar, F. (1994). Türkiye'de Kadın Akademisyenler: Tarihsel Evrim ve Bugünkü Durum 'in. *Akademik Yaşamda Kadın/Frauen in der akademischen Welt*, 75-102.

Acker, J. (1992). From sex roles to gendered institutions. *Contemporary Sociology: A Journal of Reviews*, 565-569.

Ackerly, B., & True, J. (2010). *Doing feminist research in political and social science*. Palgrave Macmillan.

Adkins, L. (1995). *Gendered Work. Sexuality, Family and the Labour Market*. Open University Press, 1900 Frost Road, Suite 101, Bristol, PA 19007 (hardcover: ISBN-0-335-19297-1; paperback: ISBN-0-335-19296-3).

Akkaya, F. (1996). *Ömrümüzün Kilometre Taşları: STFA'nın Hikayesi.* İstanbul:Bilimsel ve Teknik Yayınları Çeviri Vakfı.

Akkök, F., Gökçe, S., İşsever, A. (1993)."Kadın Makine Mühendislerinin Mesleki-Sosyal Durumları ile ilgili Belirlemeler".II.Ulusal Makine Mühendisliği ve Eğitimi Sempozyumu, TMMOB.

Amelink, C. T., & Creamer, E. G. (2010). Gender differences in elements of the undergraduate experience that influence satisfaction with the engineering major and the intent to pursue engineering as a career. *Journal of Engineering Education*, *99*(1), 81-92.

Ankara Sanayi Odası. 2013. Der. (Koç, B. & Baskıcı, M.) *Bozkırdan Sanayinin Başkentine*. ASO: Ankara.

Ansal, H. K. (1997). *Teknolojik gelişmelerin sanayide kadın istihdamına etkileri: Türk tekstil ve elektronik sanayilerinde teknolojik değişim ve kadın istihdamı:[ocak 1996];[* TC Başbakanlık Kadının Statüsü ve Sorunları Genel Müdürlüğü.

Ansal, H. (2000). "Dünyada Teknolojik Değişim ve Mühendisler".*Toplum ve Bilim*, 85 Yaz: 36-47.

Arat, Z. (eds.) (1998). *Deconstructing Images of the Turkish Woman.* New York: St. Martin's Press.

Arat, Y. 1998."Feminists, Islamists, and Political Change in Turkey". Political Psychology Volume 19, Issue 1, pages 117–131, March 1998.

Arslan, G., & Kivrak, S. (2004). The lower employment of women in Turkish construction sector. *Building and Environment*, *39*(11), 1379-1387.

Artun, A. (1999). *Fordizmin ve mühendisin dönüşümü*. TMMOB.

Artun, A. (2000). "Mühendis, 1975-2000". *Toplum ve Bilim*, 85 Yaz: 47-60.

Baker, S., Tancred, B. & Whitesides, S. (2002). Gender and Graduate School: EngineeringStudents Confront Life after the B. Eng. *Journal of Engineering Education*, January, pp.41-47.

Bastalich, W., Franzway, S., Gill, J., Mills, J. and Sharp, R. (2007).Disrupting Masculnities Women Engineers and Engineering Workplace Culture.*Australian Feminist Studies*, 22/54, pp. 385-400.

Başlevent, C., & Onaran, Ö. (2004). The effect of export-oriented growth on female labor market outcomes in Turkey. *World Development*, *32*(8), 1375-1393.

TÜZEL, G. B. (2004). *Being and Becoming Professional: Work and Liberation through Women's Narratives in Turkey* (Doctoral dissertation, MIDDLE EAST TECHNICAL UNIVERSITY).

Bem, S.L. 1993. *The Lenses of Gender. Transforming the Debate on Sexuality*. Yale University Press: The USA.

Beraud, A. (2003). A European research on women and Engineering Education (2001-2002). *European journal of engineering education*, *28*(4), 435-451.

Berg, H. M., & Ferber, M. A. (1983). Men and women graduate students: Who succeeds and why?. *The Journal of Higher Education*, 629-648.

Betz, N. E., & Fitzgerald, L. F. (1987). *The career psychology of women*. Academic Press.

Bilimoria, D., & Stewart, A. J. (2009). " Don't Ask, Don't Tell": The Academic Climate for Lesbian, Gay, Bisexual, and Transgender Faculty in Science and Engineering. *NWSA Journal*, *21*(2), 85-103.

Bix, A. S. (2000). " Engineeresses" invade campus: four decades of debate over technical coeducation. *Technology and Society Magazine, IEEE*, *19*(1), 20-26.

Bleier, R. (1984). *Science and Gender: A Critique of Biology and Its Theories on Women.* Teachers College Press.

Bolak, H. C. (1997). WHEN WIVES ARE MAJOR PROVIDERS Culture, Gender, and Family Work. *Gender & Society*, *11*(4), 409-433.

Boratav, K. (1990) "Interclass and Intraclass relations of distribution under structural adjustment: Turkey during the 1980s" in Arıcanlı and Rodrik (ed.) The Political Economy of Turkey: Debt, Adjustment and Sustainability, London: MacMillan Press

Boratav, K., A.H.Köse and E. Yeldan (2001) 'Turkey: Globalization, Distribution and Social Policy' in Lance Taylor (ed.) External Liberalization, Economic Performance and Social Policy, Oxford: Oxford University Press.
Boratav, K. (2005) *1980'li Yıllarda Türkiye'de Sosyal Sınıflar ve Bölüşüm.* Ankara:İmge.

Brandth, B., & Kvande, E. (2001). Flexible work and flexible fathers. *Work, Employment & Society*, *15*(2), 251-267.

BYANYIMA, W. (1994). The role of women engineers in developing countries.*RSA Journal*, 57-66.

Canel, A., & Oldenziel, R. (2005). *Crossing Boundaries, Building Bridges*. Routledge.

Caputi, J. (1988) Seeing Elephants: The Myths of Phallotechnology. *Feminist Studies*, Vol. 14, No. 3 (Autumn), pp. 486-524.

Cech, E. A. (2005). Understanding the Gender Schema of Female Engineering Students: A Balanced Sex-Type and an Ideal of Autonomy. *Women in Engineering ProActive Network*.

Cech, E. A., & Waidzunas, T. J. (2011). Navigating the heteronormativity of engineering: The experiences of lesbian, gay, and bisexual students. *Engineering Studies*, *3*(1), 1-24.

Cockburn, C. (1981). The material of male power. *Feminist Review*, 41-58.

Cockburn, C. (1983). *Brothers: Male Dominance and Technical Change*, London: Pluto Press.

Cockburn, C. (1985). *Machinery of Dominance: Women, Men and Technical Know-how*
London: Pluto Press, and Boston: North Eastern University Press.
Cockburn, C. (1987). Caught in the wheels: the high cost of being a female cog in the male machinery of engineering. In MCkenzie, D. A. & Wajcman, J. *The social Shaping of Technology*. Philedelphia: Open University Press.

Cockburn, C., & Ormrod, S. (1993). *Gender and Technology in the Making*. SAGE Publications Ltd.

Cockburn, C. (2009). On the machinery of dominance: Women, men, and technical know-how. *WSQ: Women's Studies Quarterly*, *37*(1), 269-273.

Collinson, D. L. (1992). *Managing the shopfloor: Subjectivity, masculinity and workplace culture* (Vol. 36). Walter de Gruyter.

Collinson, D. L. (1988). 'Engineering humour': masculinity, joking and conflict in shop-floor relations. *Organization Studies*, *9*(2), 181-199.

Cotter, D. A., Hermsen, J. M., Ovadia, S., & Vanneman, R. (2001). The glass ceiling effect. *Social forces*, *80*(2), 655-681.

Cowan, R. S. (1979). From Virginia Dare to Virginia Slims: women and technology in American life. *Technology and Culture*, 51-63.

Chinn, P. W. (2002). Asian and Pacific Islander women scientists and engineers: A narrative exploration of model minority, gender, and racial stereotypes. *Journal of Research in Science Teaching*, *39*(4), 302-323.

Cronin, C., Roger, A. (1999). Theorizing Progress: Women in Science, Engineering, and Technology in Higher Education, *Journal of Research in Science Teaching*, 36/6, pp. 637–661.

Dayıoğlu, M., & Kırdar, M. G. (2009). Determinants of and trends in labor force participation of women in Turkey. *Türkiye'de Kadınların İşgücüne Katılımında Belirleyici Faktörler ve Eğilimler."*.

Dryburgh, H. (1999). WORK HARD, PLAY HARD Women and Professionalization in Engineering—Adapting to the Culture. *Gender & Society*,*13*(5), 664-682.

Durakbaşa, A. (1998). "Kemalism as Identity Politics in Turkey".In Arat, Z. (eds.) *Deconstructing Images of the Turkish Woman.* New York: St. Martin's Press.

Easlea, B. (1983). *Fathering the Unthinkable: Masculinity, Scientist and the Nuclear Arms Race*. London.

Ecevit, Y., Gündüz-Hosgör, A., & Tokluoglu, C. (2003). Professional women in computer programming occupations: the case of Turkey. *Career Development International*, *8*(2), 78-87.

Ecevit, Y. 1991. Shop floor Control: The Ideological Construction of Turkish Women Factory Workers, in Redclift, N., Sinclair, M. T., & Sinclair, M. T. (Eds.). (2013). *Working women: international perspectives on labour and gender ideology*. Routledge.

Ecevit, Y. (1998). Türkiye'de Ücretli Emeğin Toplumsal Cinsiyet Temelinde Analizi in Berktay-Hacımirzaoğlu, A. (Eds.).*75 Yılda Kadınlar ve Erkekler*. İstanbul: Tarih Vakfı Yayınları.

Ecevit, Y. (1998). "Küreselleşme, Yapısal Uyum ve Kadın Emeğinin Kullanımında Değişmeler". In Özbay, F. (eds). *Küresel Pazar Açısından Kadın Emeği ve İstihdamındaki Değişimler: Türkiye Örneği*. İstanbul: Takav Matbaacılık.

Ecevit, Yıldız. 2010. "Aile ve İş Yaşamının Uyumlaşması Bağlamında Türkiye'de Erken Çocukluk Bakım ve Eğitimi" [Childcare and preschool services in Turkey in view of work–family reconciliation], in Ipek Ilkkaracan, ed. Emek Piyasasında Toplumsal Cinsiyet Es¸itli_g ine do_g ru: _ Is¸ ve Aile Yas¸amını Uzlas¸tırma Politikaları [Toward gender equality in the labor market: Work and family life reconciliation policies], pp. 87–114. Istanbul: Women for Women's Human Rights and Istanbul Technical University (WSC-SET).

Edwards, P. (2003) "Industrial Genders: Soft/Hard" in Lerman et al. *Gender and Technology: A Reader*. The Johns Hopkins University Press: Baltimore and London.

Eisenstein, Z. (1999). Constructing a theory of capitalist patriarchy and socialist feminism. *Critical Sociology*, *25*(2/3), 196-220.

Eisenstein, Z. R. (1998). *Global obscenities: Patriarchy, capitalism, and the lure of cyberfantasy*. New York University Press.

Madsen, D. L. (2000). *Feminist theory and literary practice*. Pluto press.

European Commision. (2012). *She Figures 2012: Gender and Research and Innovation.* European Commission: Brussels.

Evans, J. (1995). *Feminist theory today: An introduction to second-wave feminism*. Sage.

Evetts, J. (1994). Career and motherhood in engineering: Cultural dilemmas and individualistic solutions. *Journal of Gender studies*, *3*(2), 177-185.

Evetts, J. (1998). Managing the technology but not the organization: Women and career in engineering. *Women in management review*, *13*(8), 283-290.

Faulkner, W. (2000). The power and the pleasure? A research agenda for "making gender stick" to engineers. *Science, Technology & Human Values*,*25*(1), 87-119.

Faulkner, W. (2000). Dualisms, hierarchies and gender in engineering. *Social Studies of Science*, *30*(5), 759-792.

Faulkner, W. (2007). Nuts and Bolts and People'Gender-Troubled Engineering Identities. *Social studies of science*, *37*(3), 331-356.

Landström, C. (2007). Queering feminist technology studies. *Feminist Theory*,*8*(1), 7-26.

Faulkner, W. (2009). Doing gender in engineering workplace cultures. I. Observations from the field. *Engineering Studies*, *1*(1), 3-18.

Faulkner, W. (2009). Doing gender in engineering workplace cultures. II. Gender in/authenticity and the in/visibility paradox. *Engineering Studies*, *1*(3), 169-189.

Felder, R. M., Felder, G. N., Mauney, M., Hamrin, C. E., & Dietz, E. J. (1995). A longitudinal study of engineering student performance and retention. III. Gender differences in student performance and attitudes. *Journal of Engineering Education*, *84*(2), 151-163.

Finn, M. G. (1983). Understanding the higher unemployment rate of women scientists and engineers. *The American Economic Review*, 1137-1140.

Foor, C. E., & Walden, S. E. (2009). " Imaginary Engineering" or" Re-imagined Engineering": Negotiating Gendered Identities in the Borderland of a College of Engineering. *NWSA Journal*, *21*(2), 41-64.

Fox-Keller, E. (1985). *Reflections on Gender and Science*. Yale University Press: New Haven.

Fox-Keller, E. & Longino, H. E. (ed.) (1996).*Feminism and Science*. Oxford University Press: Oxford, New York.

Franzway, S., Sharp, R., Mills, J. E., & Gill, J. (2009). Engineering ignorance: The problem of gender equity in engineering. *Frontiers: A Journal of Women Studies*, *30*(1), 89-106.

Freeman, J.(1979). ed. "How to Discriminate Against Women Without Really Trying". *Women: a feminist perspective*, 2nd ed. Palo alto, calif.:Mayfield publishing.

Frehill, L. M. (2004). The gendered construction of the engineering profession in the United States, 1893–1920. *Men and Masculinities*, *6*(4), 383-403.

Gill, J., Sharp, R., Mills, J., & Franzway, S. (2008). I still wanna be an engineer! Women, education and the engineering profession. *European Journal of Engineering Education*, *33*(4), 391-402.

Gill, J., Mills, J., Franzway, S., & Sharp, R. (2008). 'Oh you must be very clever!'High-achieving women, professional power and the ongoing negotiation of workplace identity. *Gender and Education*, *20*(3), 223-236.

Goodman, I. F. (2002). Final Report of the Women's Experiences in College Engineering (WECE) Project. *Online Submission*.

Göğüş-Tan, M. (2008). "Eğitim, Türkiye'de Toplumsal Cinsiyet Eşitsizliği: Sorunlar, Öncelikler ve Çözüm Önerileri", in Kadın/Erkek Eşitliğine Doğru Yürüyüş: Eğitim, Çalışma Yaşamı, İstanbul: TUSİAD-KAGİDER.

Göle, N. (2008). *Mühendisler ve İdeoloji: Öncü Devrimcilerden Yenilikçi Seçkinlere*. 4th Edition.İstanbul: Metis Yayınları.

GÜNAL, Y. (2013). *NEOLIBERAL TRANSFORMATION AND PROFESSIONAL MIDDLE CLASSES: CASE OF ENGINEERS IN TURKEY* (Doctoral dissertation, MIDDLE EAST TECHNICAL UNIVERSITY).

Gündüz-Hoşgör, A. (1996). "Development and Women's Employment Status: Evidence from the Turkish Republic 1923-1990", PhD thesis submitted to the Faculty of Graduate Studies, The University of Western Ontorio, London (unpublished).

Gündüz-Hoşgör, A., & Smits, J. (2008, April). Variation in labor market participation of married women in Turkey. In *Women's Studies International Forum* (Vol. 31, No. 2, pp. 104-117). Pergamon.

Greene, J., Stockard, J.,Lewis, P., and Richmond, G. (2010). COACh Career Development Workshops for Science and Engineering Faculty: Views of the Career Impact on Women Chemists and Chemical Engineers. *Journal of Chemical Education*, 87/4, pp. 386-391.

Hacker, S. L. (1981). The culture of engineering: Woman, workplace and machine. *Women's Studies International Quarterly*, *4*(3), 341-353.

Hacker, S. L. (1989).*Pleasure, Power and Technology: Some Tales of Gender, Engineering ad the Cooperative Workplace*. Unwin Hyman: Boston.

Hagström, T. and Kjellberg, A. (2007). "Stability and change in work values among male and female nurses and engineers. *Scandinavian Journal of Psychology*, 48, pp. 143 –151.

Haraway, D. (1988). Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspectives", *Feminist Studies*, pp. 575–599.

Haines ,V. A. & Wallace, J. E. (2003). "Benefits for Mentoring Engineering Students". *Journal of Women and Minorities in Science and Engineering.* 10.1615/JWomenMinorScienEng.v10.i4.60 pages 377-391

Harding, S. and Hintikka, M. B. (eds.) (1983).*Discovering reality: feminist perspectives on epistemology, metaphysics, methodology, and philosophy of science*. Dordrecht, Holland; Boston: D. Reidel; Hingham, MA: Sold and distributed in the USA and Canada by Kluwer Boston.

Harding, S. (1986). *The Science Question in Feminism*. Cornell University Press: USA.

Harding, S. (ed.) (1987). *Feminism and Methodology: Social Science Issues*. Indiana University Press: USA.

Harding, S. &O'Barr, J. (ed.).(1987). *Sex and Scientific Inquiry*. Chicago University Press: Chicago.

Harding, S. G. (1991). *Whose science? Whose knowledge?: Thinking from women's lives*. Cornell University Press.

Harding, S. G. (Ed.). (2004). *The feminist standpoint theory reader: Intellectual and political controversies*. Psychology Press.

Harding, S. (2008). *Sciences from Below: Feminims, Postcolonialism, and Modernities.* Duke University Press: USA.

Hartman, H. (1981), "The Unhappy Marriage of Marxism and Feminism", in L.Sargent (ed.), *The Unhappy Marriage of Marxism and Feminism: A Debate*, Pluto Pres, London, Sidney.

Hartmann, H. (1976). Patriarchy, Capitalism and Job Segregation by Sex.*Signs*, I/3, 137-168.

Hartman, H., & Hartman, M. (2008). How undergraduate engineering students perceive women's (and men's) problems in science, math and engineering. *Sex roles*, *58*(3-4), 251-265.

Hartsock, N. (1983). "The Feminist Standpoint: Developing the Ground for a Specifically Feminist Historical Materialism" in Sandra Harding & Merrill B. Hintikka (eds.), *Discovering Reality: Feminist Perspectives on Epistemology, Methodology, Methaphysics and Philosophy of Science*, 283-310, Reidel Publishing Company.

Hartsock, N. (2006). "Experience, Embodiment, and Epistemologies". *Hypatia*, Vol 21/2, pp. 187-183.

Heidegger, M. (1997). The Question Concerning Technology and Other Essays. New York : Harper & Row.

Higgins, A. and Koucky, S. (2000), "The absence of estrogen", *Machine Design*, Vol. 72 No. 14, pp. S36-S54.

Hirschmann, N. J. (2004). "Feminist Standpoint as Postmodern Strategy" Sandra Harding (ed.) in *Feminist Standpoint Theory Reader Intellectual and Political Controversies*, Routledge, pp. 317-332.

Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments*. Psychological Assessment Resources.

Hoh, Y. K. (2009). Using Notable Women in Environmental Engineering to Dispel Misperceptions of Engineers. *International Journal of Environmental and Science Education*, *4*(2), 117-131.

Hoh, Y. K. (2009). Using Biographies of Outstanding Women in Bioengineering to Dispel Biology Teachers' Misperceptions of Engineers. *The American Biology Teacher*, *71*(8), 458-463.

Holth, L., & Mellstrom, U. (2011). Revisiting engineering, masculinity and technology studies: Old structures with new openings. *International Journal of Gender, Science and Technology*, *3*(2), 313-329.

hooks, b. (1984). *Feminist Theory: From Margin to Center*. Boston: South End Press.

Hutchins, B.L. (1978). *Women in Modern Industry*. E.P. publishing. Ltd. (first publ. 1915.).

İlkkaracan, İ. (1998).“Kentli Kadınlar ve Çalışma Yaşamı” in Berktay-Hacımirzaoğlu, A. (Eds.).*75 Yılda Kadınlar ve Erkekler*. İstanbul: Tarih Vakfı Yayınları.

İlkkaracan, İ. (ed.), 2010. *Emek Piyasasında Toplumsal Cinsiyet Eşitliğine Doğru İş ve Aile Yaşamını Uzlaştırma Politikaları*, Mega Basım: İstanbul.

İlkkaracan, İ. (2012). Why so few women in the labor market in Turkey?.*Feminist Economics*, *18*(1), 1-37.

Isaacs, B. (2001). Mystery of the missing women engineers: A solution. *Journal of Professional Issues in Engineering Education and Practice*, *127*(2), 85-91.
Ismail, M. (2003). Men and women engineers in a large industrial organization: interpretation of career progression based on subjective-career experience.*Women in management review*, *18*(1/2), 60-67.

Jagacinski, C. M. (1987). Engineering Careers: Women in a Male-Dominated Field. *Psychology of Women Quarterly*, *11*(1), 97-110.

Jagacinski, C. M. (1987). Androgyny in a male-dominated field: The relationship of sex-typed traits to performance and satisfaction in engineering. *Sex Roles*,*17*(9-10), 529-547.

Johnson, D. G., & Wetmore, J. M. (2009). *Technology and society building our sociotechnical future*.

Kabasakal, H. (1998). “Türkiye’de Üst Düzey Kadın Yöneticilerin Profili” in Berktay-Hacımirzaoğlu, A. (Eds.).*75 Yılda Kadınlar ve Erkekler*. İstanbul: Tarih Vakfı Yayınları.

Kandiyoti, D. (2007). *Cariyeler, Bacılar, Yurttaşlar: Kimlikler ve Toplumsal Dönüşümler*. İstanbul: Metis Yayınları.

Kanter, R. M. (1977). *Men and Women of the Corporation*. New York. Basic Books.

Keig Platformu. (2009). *Türkiye’de Kadın Emeği ve İstihdamı Sorun Alanları ve Politika Önerileri*. İstanbul: Ayhan Matbaası.

Kent, P. & Noss, R. (2002). "The Mathematical Components of Engineering Expertise: The Relationship Between Doing and Understanding Mathematics". *IET*,pp:39.

Kleif, T., & Faulkner, W. (2003). "I'm No Athlete [but] I Can Make This Thing Dance!" Men's Pleasures in Technology. *Science, Technology & Human Values*, *28*(2), 296-325.

Kocabıçak, E. (2004). Teknolojik Değişimin Toplumsal Cinsiyet Üzerindeki Etkileri, İstanbul Üniversitesi Sosyal Bilimler Enstitüsü Kadın Çalışmaları Anabilim Dalı, yayınlanmamış Yüksek Lisans Tezi, (No. 2501000020).

Kozanoğlu, H. (1993) *Yuppieler, Prensler ve Bizim Kuşak*. İstanbul: İletişim

Köse, A. H. & Öncü, A. (2000).*Kapitalizm, İnsanlık ve Mühendislik: Türkiye'de Mühendisler Mimarlar*. Ankara: TMMOB.

Köse, A. H. & Öncü, A. (2000)."Türkiye'de Mühendis ve Mimarların Sınıfları ve İdeolojileri".*Toplum ve Bilim*, 85 Yaz: 8-36.

Küskü, F., Özbilgin, M. and Özkale, L. (2007). Against the Tide: Gendered Prejudice and Disadvantage in Engineering. *Gender, Work and Organization*, 14/ 2, pp.109-129.

Landström, C. 2007. Queering Feminist Technology Studies. *Feminist Theory*, 8/1, pp.7–26.

Levis, E.E. (2005). *Master Works of Technology: The story of Creative Engineering, Architecture and Design*. Prometheus Books.

Lennon, K. (1995). "Gender and Knowledge". *Journal of Gender Studies* 4/2, pp. 133-143.

Logel, C., Walton, G. M., Spencer, S. J., Iserman, E. C., von Hippel, W., & Bell, A. E. (2009). Interacting with sexist men triggers social identity threat among female engineers. *Journal of personality and social psychology*, *96*(6), 1089.

Lüküslü, D. (2009) *Türkiye'de "Gençlik Miti": 1980 Sonrası Türkiye Gençliği*.İstanbul: İletişim.

Jolly, L. (2007). Women, Men and the practice of Engineering. In *Australasian Association for Engineering Education (AAEE) Annual Conference*.

Kohlstedt, S. G., Longino, H., & Hammonds, E. (1996). *Gender and scientific authority* (pp. 1-17). B. Laslett (Ed.). Chicago: University of Chicago Press.

Lederman, M & Bartsch, I. (eds.) (2001).*The Gender and Science Reader*. Routledge: London and New York.

Lennon, K. & Whitford, M. (1994).*Knowing the Difference: Feminist Perspective in Epistemology*. Routledge: London, New York.

Lerman, N. E. , Oldenziel, R. & Mohun, A. P. (eds.) (2003). *Gender and Technology: A Reader*. The Johns Hopkins University Press: Baltimore and London.

Letherby, G. (2003). *Feminist Research in Theory and Practice.*Buckingham ; Philadelphia : Open University Press.

Lüküslü, D. (2009) *Türkiye'de "Gençlik Miti": 1980 Sonrası Türkiye Gençliği*. İstanbul: İletişim.

Moghadam, M. (2001). "Female labor force participation in Turkey". 2001. "Women, Work, and Economic Restructuring: A Regional Overview," in Mine Çınar, ed. *The Economics of Women and Men in the Middle East and North Africa*, *Vol. 4 of Research in Middle East Economics*, pp. 93–116. Amsterdam: JAI Press.

Male, S. A. , Bush, M. B. and Murray, K. (2009). 'Think engineer, think male?',*European Journal of Engineering Education*, 34/5, pp. 455-464.

Mardin, Ş. (1992) *Türk Modernleşmesi.* İstanbul: İletişim.

Marx, K. 1954. *The Communist Manifesto*. Gateway ed. Henry Regnery Company.: Chicago.

Massey, D. (1995). Masculinity, Dualisms and High Technology.*Transactions of the Institute of British Geographers*. Vol. 20, No. 4, pp. 487-499

Mellström, U. (2002). Patriarchal machines and masculine embodiment.*Science, Technology & Human Values*, *27*(4), 460-478.

Mellström, U. (2004). Machines and Masculine Subjectivity Technology as an Integral Part of Men's Life Experiences. *Men and masculinities*, *6*(4), 368-382.

Mckenzie, D. & Wacjman, J. (Eds.).(1985). *The Social Shaping of Technology*. Berkshire: Open University Press.

McKee, L. & O'Brien, M. (1983) 'Interviewing Men: 'taking gender seriously'', in E. Gamarnikow, D. Morgan, J. Purvis & T. Taylorson (eds) *The Public and the Private*. London: Heinemann.

Mies, M. (1986).*Patriarchy and Accumulation on a World Scale: Women in te International Division of Labor*. Zed Books: USA.

Miller, G. (2002). The frontier, entrepreneurialism, and engineers: Women coping with a web of masculinities in an organizational culture. *Culture and organization*, *8*(2), 145-160.

Miller, G. E. (2004). Frontier masculinity in the oil industry: The experience of women engineers. *Gender, Work & Organization*, *11*(1), 47-73.

Nauta, M. M., Epperson, D. L., Waggoner, K. M. (1999). Perceived Causes of Success and Failure: Are Women's Attributions Related to Persistence in Engineering Majors? *Journal of Research in Science Teaching*, 36/6, pp. 663–676.

Naymansoy, G. (2010). *Atatürk'ün Mühendis Kızları*. Eskişehir: Eskişehir Sanayi Odası Yayınları.

NICHOLSON, P. (1996), *Gender, Power and Organizations*, Routledge, London, N.Y.

Nicholson, L. (eds.) (1997). *The Second Wave: A Reader in Feminist Theory*. Routledge: London.

Oakley, Ann. (1972) *Sex, Gender and Society*, Temple Smith.

Oldenziel, R. (1999). *Making Technology Masculine*. Amsterdam: Amsterdam University Press.

Oldenziel, R. (2010). Decoding the silence: Women engineers and male culture in the U.S., 1878-1951.*History and Technology*, 14/ 1, pp.65 -95.

Onaral, B. (1985). A Faculty Woman's Observations on Women in Engineering.*Education, IEEE Transactions on*, *28*(4), 236-241.

Onaran, Ö. (2004) Emek Piyasasına Dayalı Yapısal Uyum: Katılık Miti. İçinde Balkan, N. & Savran, S. (Eds.) *Neoliberalizmin Tahribatı: 2000'li Yıllarda Türkiye*. İstanbul: Metis Yayınları. 211-233.

Öncü, A. (1982), "Uzman Mesleklerde Türk Kadını", N.Abadan-Unat, Türk Toplumunda Kadın, Türk Sosyal Bilimler Derneği Yayını, 2nd Edition, Ankara.

Öncü, A. (2003). Political identity as structure and agency: an institutional analysis of the organization of engineers in Turkey. *International Review of Sociology/Revue Internationale de Sociologie*, *13*(2), 303-319.

Öngen, T. (2000). "Teknik Emek Gücünün Sınıfsal Profili". *Toplum ve Bilim*, 85 Yaz: 60-77.

Padavic, I. & Reskin, B. (2002). *Women and Men at Work*. California: Sage Publications.

Peterson, E. (2010). Women Engineers Fought Hard to Get There but See too few Following Their Path. *COLORAOOSIZ*, pp. 52-54.

Peterson, H. (2010). The gendered construction of technical self-confidence: Women's negotiated positions in male-dominated, technical work settings. *International Journal of Gender, Science and Technology*, *2*(1).

Ramazanoğlu, C. & Holland, J. (2002).*Feminist Methodology: Challenges and Choices. Sage Publications*: London, Thousand Oaks, New Delhi.

Ranson, G. and Reeves, W. J. (1996). Gender, Earnings, and Proportions of Women: Lessons from a High- Tech Occupation, *Gender and Society*, 10/ 2, pp. 168-184.

Ranson, G. (2003). Beyond 'Gender Differences': A Canadian Study of Women's and Men's Careers in Engineering. *Gender Work Organization*, 10/1, pp. 22-41.

Rapoport, R., Bailyn, L., Fletcher, J.K. and Pruitt, B.H. (2002) *Beyond Work–Family Balance*. San Francisco, CA: Jossey-Bass.

Roberts, P. & Ayre, M. (2002). *The Careers Review of Engineering Women: an investigation of women's retention in the Australian engineering workforce*. National Women in Engineering Committee Engineers: Australia

Robinson, J. G. and McIlwee, J. S. (1991).Women, Men and the Culture of Engineering. *Sociological Quarterly*, 32/3, pp. 403-421.

Rowbotham, S. (1973; 2006). *Women's Consciousness, Man's World*. Pengiun Books.

Sagebiel, F. and Dahmen, J. (2006). Masculinities in organizational cultures in engineeringeducation in Europe: results of the European Union project WomEng. *European Journal of Engineering Education*, 31/1, pp. 5–14.

Sengers, J. L. Shanahan, B. and Castillo, S. P. (2008). Global Efforts for Local Empowerment of Women Engineers. *AIChE Journal*, 54/4, pp. 836-843.

Siann, G. and Callaghan, M. (2001). Choices and Barriers: factors influencing women's choice of higher education in science, engineering and technology. *Journal of Further and Higher Education*, 25/1, pp.85-95.

Shenhav, Y. (1992). Entrance of Blacks and Women into Managerial Positions in Scientific and Engineering Occupations: A longitudinal Analysis. *The Academy of Management Journal*, 35/4, pp. 889-901.

Smith, D. (1992). Sociology from women's experience: A reaffirmation. *Sociological Theory*, 10, pp. 88-98.

Smith, D. (1997). "Comment on Hekman's "Truth and Method: Feminist Standpoint Theory Revisited", *Signs,* 22 (21):392-7.

Smitha, A. E. and Dengiz, B. (2010).Women in Engineering in Turkey - a large scale quantitative and qualitative examination. *European Journal of Engineering Education*, 35/1, pp. 45-57.

Sonnert, G., Fox, M. F. and Adkins, K. (2007). Undergraduate Women in Science and Engineering: Effects of Faculty, Fields, and Institutions over Time, *Social Science Quarterly*, 88/5, pp. 1333-1356.

Spelman, E. (1988). *Inessential Woman: Problems of Exclusion in Feminist Thought*. Boston: Beacon Press.

Tantekin-Ersolmaz, B. Ş., Ekinci, E. & Sağlamer, G. (2006). Engineering Education and Practice in Turkey. *IEEE Technology and Society Magazine, Summer*, pp. 26-35.

Taylor, F. W. (2004). *Scientific management*. Routledge.

TMMOB (1976;1998;2006). *TMMOB Üye Profil Araştırması*. Ankara: TMMOB.

TMMOB.(2009). *TMMOB Kadın Kurultayı Sonuç Bildirgesi ve Kararları*. TMMOB: Ankara.

Tong, R. (1989). "Socialist Feminism", in Feminist Thought: A Comprehensive Introduction, Unwin Hyman, London, pp.11-38.

Tonso, L. K. (2006). Teams that Work: Campus Culture, Engineer Identity, and Social Interactions. *Journal of Engineering Education*, January, pp. 25-37.

Turkle, S. (1984).*The second Self*. New York.

Udén, M. (2009, June). A located realism: Recent development within feminist science studies and the present options for feminist engineering. In *Women's Studies International Forum* (Vol. 32, No. 3, pp. 219-226). Pergamon.

Uluçay, M. Ç. & Kartekin, E. (1958).*Yüksek Mühendis Okulu: Yüksek Mühendis ve Yüksek Mümar Yetiştiren Müesseselerin Tarihi*. Berksoy Matbaası.

Xie, Y., Shauman, K. A. (2006). *Women in Science: Career Processes and Outcomes*. Harvard University Press. USA.

Wacjman, J. (1991), *Feminism Confronts Technology*, The Pennsylvania State University Press, Pennsylvania.

Wacjman, J. (1994). "Technology as Masculine Culture", in *The Polity Reader in Gender Studies*. Polity Press in association with Blackwell Publishers: Cambridge.

Wajcman, J. (1998). *Managing Like a Man*. Oxford: Polity Press.

Walby, S. (1986).*Patriarchy at Work*. University of Minnesota Press: Great Britain.

Walby, S. (1989).Theorising Patriarchy. *Sociology*, 23/2, pp. 213-234.

Watts, J. H. (2009). 'Allowed into a Man's World' Meanings of Work–Life Balance: Perspectives of Women Civil Engineers as 'Minority' Workers in Construction. *Gender, Work and Organization*. 16/1, pp. 37-57.

Webster, J. (1996). *Shaping women's work: gender, employment, and information technology*.London; New York: Longman.

White, M., Hill, S., McGovern, P., Mills, C., & Smeaton, D. (2003). 'High-performance'Management Practices, Working Hours and Work–Life Balance.*British Journal of Industrial Relations*, *41*(2), 175-195.

Wilson, E. M. (2002). Family Man or Conqueror?- Contested Meanings in an Engineering Company. *Culture and Organization*, 8/2, pp. 81-100.

Veblen, T. (1963). *The engineers and the price system* (Vol. 31). Transaction Publishers.

Vetter, B. M. (1980).Working Women Scientists and Engineers. *Science, New Series*, 207/4426, pp.28-34.

Young, I. (1981). "Beyond the Unhappy Marriage: A critique of the Dual Systems Theory" in *Women and Revolution,* Sargent, L. (Ed.). (1981). *Women and revolution: A discussion of the unhappy marriage of Marxism and feminism* (Vol. 66). Black Rose Books Ltd.. Southend Press: Boston.

Yoder, B. L. (2012). Engineering by the numbers. *American Society for Engineering Education, Washington,* DC. http://www. asee. org/papers-and-publications/publications/collegeprofiles/2011-profile-engineering-statistics. pdf.

Zengin, B. (2000). "Women Engineers in Turkey: Gender, education and professional life, a case study on Metu." (Master of Science Thesis, Middle East Technical University, 2000).

Zengin-Arslan, B. (2002). Women in engineering education in Turkey: Understanding the gendered distribution. *International Journal of Engineering Education*, *18*(4), 400-408.

Zola, E. (2003). First pub. 1885. *Germinal*, Penguin Books: England.

Zürcher, E. J. (1997). *Turkey: A Modern History*. London: I.B. Tauris.

Retrieved on May 2013 from
http://www.tmmob.org.tr/genel/bizden_detay.php?kod=2802&tipi=2

http://www.kadinmuhendisler.org/

Retrieved on 06.08.2012 from
http://www.kadinmuhendisler.org/ayrimci_ilanlar asp

European Commision Labour Market Participation for women Retrieved on January 2015 from http://ec.europa.eu/europe2020/pdf/themes/31_labour_market_participation_for_women_2.pdf

APPENDICES

Appendix I: HD Mutfakları


1995
HD
İSKENDER
HD
Mutfakları,
Gıda
Mühendislerimizin
Koruması
Altında
Anne gibi titiz, özenli ve
dikkatli gıda mühendislerimiz
size en iyi hizmeti verebilmemiz için
şubelerimizi sürekli olarak denetliyor.
Böylece, HD İskender
restoranlarında hizmetin kalitesi
her zaman korunuyor.

Appendix II: Profile of Participants

Name	Gender	Age	Father's Occupation	Mother's Occupation	Education Status	High School	Employment Status	Sector	Engineering Field	Marital Status
Aslı	Woman	33	Engineer	Teacher	Bachelor	Anatolian High School	Full Time Engineer	Private	Mechanical Engineering	Married
Nevin	Woman	33	Director/tv sector	Housewife	Bachelor	Anatolian High School	Full Time Engineer	Private	Mechanical Engineering	Single
Nevriye	Woman	55	Engineer	Housewife	PhD	Private High School	Academician	Private	Chemical Engineering	Married
Ayşe	Woman	28	Accountant	Teacher	Bachelor	State High School	Full Time Engineer	Public	Geological Enginering	Single
Serpil	Woman	30	Engineer	Teacher	Bachelor	Anatolian High School	Full Time Engineer	Public	Metalurgy and Materials Engineering	Single
Derya	Woman	32	Engineer	Housewife	PhD	Anatolian High School	Academician	Public	Civil Engineering	Married
Pınar	Woman	31	Soldier	Teacher	Bachelor	State High School	Full Time Engineer	Public	Geological Engineering	Married
Berrin	Woman	32	Soldier	Teacher	Bachelor	Anatolian High School	Full Time Engineer	Private	Geological Engineering	Single

Name	Gender	Age	Father's Occupation	Mother's Occupation	Education Status	High School	Employment Status	Sector	Engineering Field	Marital Status
Emine	Woman	45	Engineer	Housewife	Masters	State High School	Full Time Engineer	Private	Metalurgy and Materials Engineering	Married
Fulya	Woman	35	Accountant	Accountant	Bachelor	Anatolian High School	Full Time Engineer	Private	Electrics and Electronical Engineering	Single
Mine	Woman	50	Soldier	Teacher	PhD	State High School	Academician	Public	Civil Engineering	Married
Gonca	Woman	60	Public Officer	Housewife	Bachelor	State High School	Full Time Engineer	Public	Geological Engineering	Single
Çiğdem	Woman	28	Doctor	Teacher	Bachelor	State High School	Full Time Engineer	Private	Mining Enginering	Single
Elçin	Woman	36	Worker	Housewife	Bachelor	Anatolian High School	Full Time Engineer	Private	Metalurgy and Materials Engineering	Single
Rüya	Woman	43	Worker	Housewife	Bachelor	State High School	Full Time Engineer	Private	Environmental Engineering	Married
Fatma	Woman	40	Engineer	Teacher	PhD	Private High School	Academician	Public	Computer Engineering	Married

Name	Gender	Age	Father's Occupation	Mother's Occupation	Education Status	High School	Employment Status	Sector	Engineering Field	Marital Status
Ebru	Woman	34	Policeman	Teacher	Bachelor	Anatolian High School	Full Time Engineer	Private	Mining Enginering	Single
Birgül	Woman	33	Engineer	Housewife	Bachelor	Anatolian High School	Full Time Engineer	Private	Mechanical Engineering	Married
Esra	Woman	55	Bank employee	Teacher	Bachelor	Private High School	Full Time Engineer	Private	Mechanical Engineering	Married
Zeynep	Woman	45	Bank employee	Housewife	Bachelor	State High School	Full Time Engineer	Self Employed	Geological Engineering	Married
Elif	Woman	33	Attorney	Teacher	Bachelor	Anatolian High School	Full Time Engineer	Private	Mining Enginering	Single
İrem	Woman	55	Academician	Housewife	Masters	State High School	Full Time Engineer	Private	Chemical Engineering	Married
Serap	Woman	33	Public Officer	Public Officer	Bachelor	Anatolian High School	Full Time Engineer	Private	Geological Engineering	Married
Esin	Woman	34	Engineer	Teacher	Bachelor	Anatolian High School	Full Time Engineer	Private	Metalurgy and Materials Engineering	Married

Name	Gender	Age	Father's Occupation	Mother's Occupation	Education Status	High School	Employment Status	Sector	Engineering Field	Marital Status
Akın	Man	60	Public Officer	Teacher	Bachelor	State High School	Self Employed	Public	Mechanical Engineering	Married
Yavuz	Man	32	Worker	Housewife	Bachelor	Private High School	Full Time Engineer	Private	Mining Enginering	Married
Vural	Man	40	Engineer	Engineer	Bachelor	Private High School	Full Time Engineer	Private	Mechanical Engineering	Married
Yiğit	Man	33	Unemployed	Teacher	Bachelor	State High School	Full Time Engineer	Private	Mechanical Engineering	Single
Göker	Man	34	Engineer	Housewife	Bachelor	Science High School	Full Time Engineer	Private	Aerospace Engineering	Single
Mustafa	Man	67	Worker	Housewife	PhD	State High School	Retired Academician	Public	Mechanical Engineering	Married
Burak	Man	29	Technician	Housewife	Bachelor	State High School	Full Time Engineer	Private	Civil Engineering	Married
Bahadır	Man	34	Public Officer	Nurse	Bachelor	State High School	Full Time Engineer	Private	Environmental Engineering	Married

Name	Gender	Age	Father's Occupation	Mother's Occupation	Education Status	High School	Employment Status	Sector	Engineering Field	Marital Status
Ömer	Man	62	Bank employee	Housewife	Bachelor	State High School	Full Time Engineer	Self Employed	Electrics and Electronical Engineering	Married
Tolga	Man	35	Pharmacist	Housewife	Bachelor	Science High School	Full Time Engineer	Private	Food Engineering	Married
Emrah	Man	33	Self-employed	Teacher	Bachelor	Anatolian High School	Full Time Engineer	Private	Mechanical Engineering	Single
Volkan	Man	38	Self-employed	Teacher	Masters	Anatolian High School	Full Time Engineer	Private	Mechanical Engineering	Married
Murat	Man	54	Public Officer	Housewife	Bachelor	Private High School	Full Time Engineer	Private	Civil Engineering	Married
Kerem	Man	42	Engineer	Housewife	PhD	Science High School	Academician	Private	Computer Engineering	Single
Can	Man	34	Self-employed	Teacher	Masters	Anatolian High School	Full Time Engineer	Private	Computer Engineering	Single
Barış	Man	72	Farmer	Housewife	Bachelor	State High School	Retired	Public	Electrics and Electronical Engineering	Married

APPENDIX.3 INTERVIEW QUESTIONS

MÜHENDİSLİK MESLEĞİ HAKKINDAKİ GÖRÜŞLER:

Mühendislik mesleği hakkında Türkiye'deki algı sizce nasıldır? Anlatır mısınız? Türkiye'de mühendislik mesleğinin saygınlığından söz edilebilir mi? Sizce bu imaj kadın erkek tüm mühendisler için geçerli midir? Bu algı bütün mühendislik dalları için söz konusu mudur? Mühendislik dalları arasında toplumun bakış açısından bir hiyerarşiden söz edilebilir mi? Sizin bakış açınızla böyle bir hiyerarşi var mıdır? Mühendislik dallarına ilişkin yapılan hard/soft dallar ayrımına katılıyor musnuz? Katılıyorsanız, neden? Türkiye'de bazı mühendislik alanlarının kadınlarca daha çok tercih edildiği söylenebilir mi? Sizce bu durumun sebebi(leri) nelerdir?

Size bazı kavramlar okuyacağım. Bunların içinden mühendislik mesleğine en uygun 3 kavramı seçmenizi isteyeceğim.

Analitik düşünce	Dikkat
Matematik	Özenli iş yapmak
Problem çözme yeteneği	Sabır
Yaratıcılık	Organizasyon

Teknoloji

Sizce mühendisin görevi nedir? Anlatır mısınız? Mühendisin toplumsal sorumlulukları var mıdır? Varsa bahseder misiniz? Türkiye'de toplumun mühendisten beklentisi nedir?

Sizce mühendisin cinsiyeti var mıdır? Toplumda mühendisin cinsiyetine dair bir algi var mıdır? Bu konuyla ilgili karşılaştığınız bir olay/durum varsa anlatır mısınız? Bu imaj başka cinsiyetleri dışlar mı? Bu imajın oluşmasının sebebi sizce nedir? Bu imaj işyerinde baskın mıdır? İş yerinde söz konusu imaja uymayanlar dışlanabilir mi?

Bir meslek olarak mühendisliği çalışan ve bu konuda araştırmalar yapan sosyal bilimciler "mühendislik kültürü" dedikleri bir kavram kullanıyorlar. Bu kavramı duymuş veya duymamış olabilirsiniz. Şimdi size "bana mühendislik kültürünü tanımlayabilir misiniz?" desem, neler söylersiniz? Aklınıza neler gelir?

TMMOB'a üye misiniz? Organizasyonlarını, yayınlarını takip eder misiniz? Sizce meslek odaları Türkiye'de mühendisleri temsil etmekte midir? TMMOB'un bir meslek odası olarak çıkarlarınızı koruduğunu düşünür müsünüz?

ÇOCUKLUK YILLARI AİLE VE SOSYALLEŞME:

Çocukluğunuzu ve o dönemdeki aile yaşamınızı anlatır mısınız? Ev içinde anne ve babaya düşen görevler ve bu görevlerin niteliği neydi? Çocukken en çok hangi aktivite ile vakit geçirirdiniz? en çok oynadığınız oyunlar hangileriydi?, Hangi tür oyuncaklarla oynamayı severdiniz? Anne ve babanız sizinle oynar mıydı? Anne ve babanız size ne tür oyuncaklar alırdı?

ilkokulda en sevdiğiniz ders hangisiydi?, derslerdeki başarıyı cinsiyete göre sınıflandırabilir miyiz? Lisede MF seçmenizdeki etken neydi?

MESLEK SEÇİMİ: Mühendisliği meslek olarak seçmenizin nedenlerini anlatır mısınız?

Kişisel sebepler: Yetiştirilme biçiminizin bu mesleği seçmekteki katkısı nedir? Meslek seçiminizi etkileyen kişisel deneyimleriniz nedir? Mühendisliği seçmenizde bazı derslerde başarılı olmanızın etkisi var mıdır? Bu mesleği seçerken cinsiyetinizin olumlu veya olumsuz bir etken oluşturabileceğini söyleyen oldu mu? Bu mesleği seçmeden önce mühendislik mesleğinin ve çalışma koşullarının nasıl olacağını düşünürdünüz? Aileniz veya akrabalarınız arasında mühendis var mıydı? O Kişiden(lerden) nasıl etkilendiniz/ etkilenmiş olduğunuzu düşünüyor musunuz?

Maddi ve ekonomik koşullar: Ekonomik koşulların bu mesleği seçmenizde etkisi var mıdır?

Mühendislik mesleğini seçmeniz ile ilgili olarak ilginç (unutamadığınız) bir hikayeniz var mı? Biraz anlatır mısınız?

1. **MÜHENDİSLİK EĞİTİMİ**: **ÜNİVERSİTE YAŞAMINIZI ANLATIR MISINIZ?**

Koşullar: Sınıfınızda cinsiyet dağılımı nasıldı? Bu dağılıma göre azınlıkta idiyseniz, kendinizi nasıl hissettiniz? Az sayıda kız öğrenci olmanızdan dolayı karşılaştığınız olumsuzluklar oldu mu? Hatırladıklarınızdan biraz bahseder misiniz?

Dersler: Lise eğitiminin ya da önceki eğitimlerinizin mühendislik öğrenimde faydası oldu mu? Hangi dersler daha çok ilginizi çekerdi, teorik, pratik? Sizce hangi dersler mühendislik mesleğinin temelini oluşturur? Sizce hangi dersler mühendislik mesleğinin temelini oluşturur? Üniversitedeki derslerinizde hocalarınızın ayrımcı davranışları oldu mu? Erkek arkadaşlarınızdan mühendislik mesleğini seçmiş olmanızla ilgili manidar sözler duydunuz mu?

İŞ YAŞAMI: İŞ YAŞAMINIZI ANLATIR MISINIZ?

Görev alanı ve kariyer rotası: Hangi pozisyonda çalışmaktasınız? Şu an çalıştığınız pozisyona mı başvurmuştunuz? Bu pozisyonu nasıl elde ettiniz? Sizi davet mi ettiler? Kişisel olarak başvuru mu yaptınız? Yarışmadan (sınavdan) sonra mı seçildiniz? Şu an çalıştığınız pozisyon mesleki deneyiminizle örtüşüyor mu? Sizce bir mühendis için en ideal kariyer rotası nasıldır? Mesleki açıdan ideallerinize ulaşabileceğinizi düşünüyor musunuz? Henüz ulaşamadınızsa ulaşmak istediğiniz mesleki pozisyon neresidir? (Nereye ulaşmak istersiniz?)

İşiniz iş makineleri ile zaman geçirmenizi gerektirir mi?

Mühendislik İşinin Tabiatı Hakkındaki Görüşler: Mühendisliğin temelini oluşturan işlerin tabiatı sizce nasıldır? Şu an çalıştığınız şirkette hangi pozisyonlardakiler mühendislik işinin temelini oluşturan işleri yürütürler? İşiniz rekabetçi midir? Şirket içinde ve dışında rekabet yaşanır mı?

İş yerinde Sosyal Ağlar: İşe ilk başladığınızda arkadaş edinmekte güçlük çektiniz mi? İş yerinizde arkadaşlıklar nasıl kurulur? İş yerinde kurulan sosyal ilişkilerinizi iş dışında da sürdürdüğünüz olur mu? İş arkadaşlarınızın aileleriyle/arkadaşlarıyla iş yaşamı dışında görüşür müsünüz? Kendinizi şirketin ya da çalışanların bir parçası olarak görür müsünüz? Nasıl? Biraz anlatır mısınız?

2. **MÜHENDİSLİK EĞİTİMİ**: **ÜNİVERSİTE YAŞAMINIZI ANLATIR MISINIZ?**

Öğretim Elemanlarının Tavırları: Üniversitede hocalarınızın cinsiyet dağılımı nasıldı? Mesleğiniz hakkındaki düşüncelerinizin oluşmasında hocalarınızın etkisi nedir?

Üniversitede Sosyal Ağlar: üniversitede sosyal hayatınızdan bahseder misiniz? Okul arkadaşlarınızla mı vakit geçirirdiniz?

İŞ BULMA: İŞ ARAMA SÜRECİNİZDEN BAHSEDER MİSİNİZ?

İş arama: Ne kadar süreyle iş aradınız? İş ararken başkalarının sizden öne geçtiğini veya geçebileceğini düşündüğünüz oldu mu? Kadın olmanız (cinsiyetiniz) iş arama sürecinizde olumsuz bir etki yarattı mı? Kadın mühendis adaylarına daha az güven duyulduğunu fark ettiniz mi? Şu an çalışmakta olduğunuz işe kabul sürecinizi anlatabilir misiniz? Başvuru sürecinde kadın mühendislere cinsiyetlerinden dolayı önyargı ile yaklaşıldığını fark ettiniz mi?

İŞ YAŞAMI: İŞ YAŞAMINIZI ANLATIR MISINIZ?

Çalışma Koşulları: Çalışma saatleriniz nasıldır? Mesai saatlerinin dışında çalıştığınız olur mu? Bunu siz isteyerek mi yaparsınız yoksa zorunlu mu tutulursunuz? Hafta sonları çalıştığınız olur mu? İş – seyahatlerine katılır mısınız? İş ”seyahatlerine katılmak hangi departmanlar/pozisyonlar için zorunludur? Cinsiyetiniz çalışma saatleri ve iş seyahatleri konusunda olumsuz bir etki yaratır mı?

Başka cinsiyetten meslektaşlarınız ile aynı ücreti alıyor musunuz? Yaptığınız işe göre ücret eşitsizliği yaşadığınız oldu mu? Sizce bu ayrım neden kaynaklanmaktadır?

Aile ve iş yaşamı dengesi: Çalıştığınız iş yerinde kreş var mıdır? Doğum izni konusunda sıkıntı yaşandığına şahit oldunuz mu? Çocuk sahibi olmanızın kariyerinizi etkileyeceği fikrine kapıldığınız oldu mu?

Çocuğu olanlara: Doğum izninizi kullanabildiniz mi? Emzirme izninizi kullanabildiniz mi? kullanamadınızsa neden? Siz işteyken çocuğunuza kim baktı? Şimdi kim bakıyor**? (Çocuk büyükse geçmişte kimin baktığı sorulabilir).**

Ev işlerini kendiniz mi yapıyorsunuz, bir yardımcınız var mı? Evli ise, ev işlerini eşinizle paylaşıyor musunuz? Aranızda nasıl bir işbölümü var? Anlatır mısınız?

Görevde yükselme: Çalıştığınız yerde görevde yükselme konusunda nesnel (objektif**)** kriterler var mıdır? Bu kriterlerin her zaman kullanıldığını düşünüyor musunuz? Kullanılmıyorsa sizce neden? Tüm yükselme kriterlerini yerine getirmiş dahi olsa yükselememe durumu yaşanabilir mi? Bunun nedeni ne olabilir? Kendinizi mesleki anlamda yetkin hissediyor olmanıza rağmen cinsiyetinizin bu iş yerinde yükselmenizi etkileyecek bir faktör olabileceğini düşündüğünüz oldu mu? ' Beni kadın olduğum için ciddiye almıyorlar ' gibi bir düşünceye sahip misiniz (sahip oldunuz mu?)

Kılık kıyafet: İşe giderken kılık kıyafetinize dikkat etmeniz beklenir mi? İş yerinde ve sahada farklı kıyafet giymeniz gerekir mi? Kıyafetleriniz sebebiyle iş yerinde sorun yaşadığınız olur mu?

Denge stratejileri: Mesleğinizi yaparken veya iş yerinde olduğunuz gibi mi davranır sınız? Mesleğinizi yaparken veya iş yerinde gerçekte hissettiklerinizi veya düşündüklerinizi dışa vurmakta güçlük çeker misiniz? Bunun sebebi ne olabilir?

3. **MÜHENDİSLİK MESLEĞİ HAKKINDAKİ GÖRÜŞLERİNİZ NELERDİR? BU GÖRÜŞLER ZAMAN İÇİNDE DEĞİŞİME UĞRADI MI?**

Mühendislik hakkındaki görüşler: Üniversitedeki öğreniminiz, mühendislik mesleği ve çalışma koşulları hakkındaki fikrinizi nasıl etkiledi? Sizce gerçek mühendislik işinin tabiatı nasıldır? Sizce işini iyi yapan mühendis nasıl birisidir? Doğru mesleği seçtiğinizi düşünür müsünüz? Mezun olduğunuzda iş bulma konusunda sorun yaşayacağınızı düşündüğünüz oldu mu?

Teknoloji hakkındaki görüşler: Teknolojideki yenilikleri takip etmenin mesleğiniz açısından önemli olabileceğini düşünür müsünüz? İyi bir mühendisin teknolojiyi takip etmesi gerektiğini düşünür müsünüz?

Meslek hakkındaki fikirler: Mühendislik mesleği hakkındaki düşünceleriniz üniversite ve lise yıllarından beri değişti mi? Değiştiyse ne şekilde değişti? Bugünün bakış açısıyla toplumda

mühendise verilen anlam sizce zaman içinde değişti mi? Mühendisin cinsiyetine dair algı mühendisliği ilk seçtiğiniz zaman kıyasla değişti mi?

APPENDIX 4. CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name: Pehlivanlı Kadayifci, Ezgi
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EDUCATION

Degree	Institution	Year of Graduation
MS	METU Sociology	2008
BS	METU Sociology	2004
High School	Kılıçarslan High School, Ankara	1999

WORK EXPERIENCE

Year	Place	Enrollment
2011-Present	METU Organizational and Developmental Planning Office	Research Assistant
2007-2011	METU, Academic Evaluation and Quality Assurance Commitee	
2006-2007	METU, Presidents' Office	Research Assistant

FOREIGN LANGUAGES

Advanced English

PUBLICATIONS

Pehlivanlı Kadayifci, Ezgi, "Foucauldian Analysis of the impact of Neo-liberal Policies in Women's Movement in Turkey" in International Women Conference Proceedings, 2013.

Esra Gedik, Ezgi P. Kadayifci, 2012, "Feminist Mücadelede Mikro Dayanışmalar-Kız Kardeşliklerin Önemi", içinde *Amargi, Kızkardeşim, Ne Seninle Ne Sensiz,* sayı 23.

Ezgi P. Kadayifci, Esra Gedik, 2012, "Gerçeklikle Masal Arasında", içinde *Amargi, Bir Varmış Bir Yokmuş,* Sayı, 24.

APPENDIX 5. TURKISH SUMMARY

Bu çalışmada, "Toplumsal Cinsiyet Temelli Mühendislik Kültürü" kavramsal aracını kullanarak, yakın zaman Türkiye'sinde toplumsal cinsiyet temelli mühendislik kültürünün inşası ve dönüşümünü anlamaya çalıştım.

Ankara'da bir fabrika ve iki atölyede katılımcı gözlem metoduyla etnografik çalışmalara ek olarak, kırk üç adet kadın ve erkek mühendis ile derinlemesine mülakat yapılmıştır. Cevaplayıcılar, esas olarak 40 yaş ve üstü ve 40 yaş ve altı olmak üzere iki yaş grubundan gelmektedir. Mülakatlar, katılımcıların meslekleri hakkındaki algıları, toplumdan aldıkları tepkiler, okul ve iş hayatı deneyimleri kapsamında değerlendirilmiştir.

1.GİRİŞ

> **Ben:** Sende Nevin'nin telefonu var mı? Kadın mühendislerle ilgili bir araştırma yapıyorum da onunla konuşmam lazım.
>
> **Erkek Makine Mühendisi:** Ne yapacaksın Nevin'i? O kadın sayılmaz (gülüyor)
>
> **Ben:** Ne demek Nevin kadın sayılmaz?
>
> **Erkek Makine Mühendisi:** Yani diğer kadınlar gibi değildir. Bizim gibi içer, küfür eder de o yüzden söyledim.
>
> **Ben:** Yani o da sizden biri mi? Onu da erkek gibi mi görüyor sunuz?
>
> **Erkek Makine Mühendisi:** Yok yani bizden biri değil de, okuldan arkadaş işte.
>
> **Ben:** Peki sence Nevin iyi bir mühendis mi?

Erkek Makine Mühendisi: Mühendiiiis?... hmmm... yani evet belki.

Bu konuşma ve bu konuşmayla benzer içerikte bir başkası ben ve iki erkek makine mühendisi arasında, birbirinden farklı zamanlarda geçti. Konuşmada sözü elden Nevin de makine mühendisi ve konuşan kişilerin üniversiteden sınıf arkadaşıydı. Konuştuğum iki erkek mühendis de Nevin'nin diğer kadınlara benzemediğini söylediler. "Diğer kadınlar" derken, belli ki küfürsüz konuşan, erkek muhabbetine alışkın olmayan ve çok içki içmeyen kadınları kastediyorlardı. Nevin, bu sözü edilen davranışlara alışkın olduğu için kadın olarak kabul edilmiyordu. Öte yandan, Nevin "onlardan" biri de değildi, çünkü "kadın"dı. Nevin'nin bu durumu onun iyi mühendis kabul edilmesinde de sorun yaratıyordu, çünkü maalesef kadındı.

Eurostat 2009 verilerine göre doğa bilimleri ve mühendislik alanlarında tam zamanlı kadın çalışan sayısı Avrupa Birliği ülkelerinde % 30,2. Türkiye'de bu oran % 33,4. Amerika Birleşik devletlerinde mühendislik mezunlarının iş gücüne katılım oranı erkeklerde 132.300, kadınlarda ise 35.100. ayrıca, mühendislik bölümlerinden mezun olan erkeklerin sayısı 66.500 iken kadın mezunların sayısı 20.000'dir (NSF, 2006). Kadınların doğa bilimleri ve mühendislik ile ilgili alanlarda sayısal olarak az yer almalarının sebepleri pek çok araştırmaya konu olmuştur. Sayısal azlık meselesi, son yıllarda Birleşmiş Milletler ve Avrupa Birliği'nin de gündemine girmiş, kadınların çalışma koşullarının iyileştirilmesi ve söz konusu mesleklere yönlendirilmesi ile ilgili araştırmalara bütçe ayrılmıştır.

Ancak, girişteki diyalogtan da görüleceği üzere kadın mühendislerin mesleki sıkıntıları sadece sayısal azlıktan ibaret değildir ve altta

yatan sebepler yalnız istatistiksel verilerle açıklanamamaktadır. Sayısal azlığın sebepleri çok boyutlu olup bu meslekte yer etmiş günlük ifadelerde, önyargılarda ve iletişim biçimlerinde saklanmıştır. Bu durum ataerkil ilişkileri içselleştirmemizden kaynaklanır, aynı zamanda kapitalist dinamikler ataerkil bağların devamlılığını sağlar ve onları kuvvetlendirir. Bu ilişkiler mühendisliğin toplumsal cinsiyet temelli yapısını oluşturur.

Bu çalışma mühendislik mesleğinin cinsiyetçi yapısını feminist bakış açısıyla irdelemeyi amaçlamaktadır. Geleneksel kuramlar toplumsal cinsiyeti açıklayıcı bir kategori olarak ihmal ederler. Feminist yaklaşımlar ise kadınların deneyimlerini bilgi kaynağı olarak kabul eder ve ataerkil sisteme tabi kılınmak bakımından egemen ataerkil söylemden kısmen uzak kalabildiklerini varsayar. Bunlara dayanarak, bu çalışma feministtir çünkü mühendislik mesleğinin yapılanmasında erkekleri kadınlardan daha rahat ettiren cinsiyetçi öğeleri bulmak ve bunları açıklamayı dert edinmiştir. Bunu yaparken, kadınların mühendislik mesleğini seçerken ve bu meslekte çalışırken karşılaştıkları yapısal engellerin altını çizmektedir. Aynı zamanda, kadın mühendislerin deneyimlerini kendilerinden dinleyerek, çalışma koşullarının daha iyiye gitmesi için katkıda bulunmayı amaçlamaktadır.

Feminist araştırma yapmanın başka bir sebebi de feminizmin öznelliği araştırma sürecinin bir parçası kabul etmesidir. Bu çalışma konusunun belirlenmesinde benim toplumsal olarak yapılandırılmış öznelliğimin büyük payı bulunmaktadır. Şöyle ki; kadın olmak, ortaokul ve lise döneminde matematik ve fen derslerinde başarılı olanlar hakkındaki pozitif önyargıları gözlemlemiş olmak, bir makine mühendisi ile evli olmak ve mühendisler ile zaman geçirmek bu konuyu seçmede rol oynamıştır. Araştırmacının ve katılımcının öznelliğini araştırma sürecinin bir parçası olarak görmesi

bakımından, feminist kuram ve metodoloji bu çalışmaya en uygun bakış açısıdır.

Bu çalışma mühendislik mesleğinin toplumsal cinisyet temelli yapısını açıklamayı amaçlarken, esas olarak üç soru üzerinde durmaktadır:

Toplumsal cinsiyet temelli mühendislik kültürü Türkiye'de hangi yollarla inşa edilmektedir ve değişimi nasıl olmuştur? Söz konusu kültür hangi vesilelerle tezahür etmektedir ve hangi yollarla erkek mühendislere kadın mühendislerden daha çok kolaylık sağlamaktadır? Bu soruların cevabını ararken, kuramsal araç olarak "Toplumsal Cinsiyet Temelli Mühendislik Kültürü" kavramına başvurulacaktır. (Hacker, 1981; Robinson & McIlwee, 1991). Bu çalışmada ele alındığı haliyle mühendislik kültürü, mühendisler arasında toplumsal olarak tanımlanan davranış ve iletişim biçimleri olarak ele alınmaktadır. Mühendislik kültürünün ideolojik olarak üç ayrı dayanağı vardır. Bunlar "gerçek mühendis imgesi", "mühendislik işinin tabiatı" ve "ideal mühendislik kariyeri"dir. Bu ideolojik altyapıda gerçek mühendis imgesi erildir; modellediği imaja uymadığı için kadın mühendisleri ve söz konusu modele uymayan erkeklikleri de dışlamaktadır. (Robinson & McIlwee, 1991). İlerde bahsedileceği üzere mühendislik işinin tabiatı ve ideal mühendislik kariyeri de eril kabul edilen özellikler taşımakta; kadınları ve bu modele uymayan erkeklikleri dışlamaktadır.

Ek olarak toplumsal cinsiyet temelli mühendislik kültürü bu çalışmada çocukluk, meslek seçimine kadarki süreçte tohumları atılmış, üniversite ve çalışma yaşamında da kültürel kodların öğrenilip uygulandığı bir süreç olarak ele alınmaktadır. Bu sebeple katılımcıların kendi deneyimlerini kendi sözcükleriyle anlatmaları

mühendislik kültürü ve bu kültürde ataerkil kapitalizmin tezahürlerini anlamada önemli rol oynamaktadır.

Bu çalışmanın Türkiye'de yapılması önemlidir. Çünkü istatistiksel olarak ele alındığında Türkiye'de mühendislik mesleğini seçen ve sürdüren kadın sayısı Avrupa ve Amerika'ya göre fazladır. Bu durum, konunun Türkiye kadın emeği çalışmaları açısından tali kalmasını sağlamıştır. Konu ile ilgili kısıtlı sayıda çalışma vardır ve sayısal avantajdan ötürü bu alanda sorun yaşanmadığına dair yüzeysel bir algı mevcuttur.

2. Bilimin Toplumsal Cinsiyeti, Mühendisliğin Toplumsal Cinsiyeti

Bu çalışmada feminizmin ana sorunlarından birinden yola çıkmaktayım. "Bilimin cinsiyeti var mıdır?" Bu soru 1980'lerin başından beri feminist kuram ve metodolojinin tartıştığı bir konudur. Bu tartışmalar, tarafsız olduğunu sandığımız bilimsel bilginin yaratılmasında çalışanların erkek olması dolayısıyla, sorulan soruların, bu soruları sorma biçimlerinin, seçilen araştırma tekniğinin de eril özellikler taşıdığını anlatır. Tarihsel olarak erkeklerce domine edilmiş olan bilimsel bilgi yaratımı, iddia ettiğinin aksine tarafsız değildir. Öncelikle iş gücünün cinsiyeti bakımından tarafsız değildir. İkinci olarak, bilim insanları da diğer insanlar giib toplumsal olarak yaratılmış bireylerdir ve içimde oluştukları değer sistemlerinden ve ideolojilerden arınamazlar. Eril hakimiyetindeki bilim de eril değerlerden ayrı tutulamaz (Harding, 1986). Harding'e göre kadınlar tarhisel olarak bilim ile ilgili mesleklerden uzak tutulmuşlardır. Erkeklere ait görülen akılcılık, analitik düşünme yetisi, erkekliği tanımlayan özellikler olarak kabul görürken, konu kadınlara geldiğinde duygusallık ve irrasyonellik asli özellikleri oluyor.

Bilimsel bilginin uygulanışı ve teknolojiye baktığımızda, kadınların teknoloji yaratmaktan ziyade kullanıcı ve tüketici tarafında olduğunu görürüz. Aile içinde bile böyledir. Erkek eline tornavida yakışan kişidir; evde bozulan aletler erkeğin tamir etmesi için bekletilir. Kadın teknik beceriden ve anlayıştan yoksun varsayılır. Elektirik süpürgesini en çok kullanan kişi belki kadındır ama iş tamire geldiğinde, bu erkeğe bırakılır. Çocuklar büyürken de toplumsal cinsiyetlerin belirlenmesinde teknoloji ve oyunlar büyük rol oynar. Erkek çocukları babalarının yaptığı işlere benzer oyuncaklarla oynar. Tamir çantaları, arabalar, kamyonlar gibi. Kızlara ise bebekler, oyuncak makyaj malzemeleri, mutfak malzemelerinin minyatürleri alınır. Aile kurumunda teknolojiler toplumsal cinsiyete göre paylaşılır; erkeklere bozup yapabilecekleri oyuncaklar alınır, kız çocukları yapımda ziyade tüketime yönelik yetiştirilir. Bu yönlendirme, ileride çocukların meslek seçimlerinden hayata bakış açılarına kadar pek çok alanı etkiler.

Erkek ve kadına toplumsal olarak etfedilen özelliklerden bahsetmiştik. Erkek akılcı kadın duygusal kabul edilir demiştik. Toplumsal cinsiyetlere yüklenen anlamlar sadece akılcılıkla ilgili değildir. Erkek biyolojik olarak kadından güçlü görüldüğü için sert işler erkeğin işidir. Avcılık, savaşçılık, ağır, pis ve risk taşıyan işler erkeğindir. Buna karşın kadınlar, daha yumuşak işlere uygun görülür. Ev işleri ve çocuk bakımı gibi. Ne tesadüftür ki, “sert” özellikli erkeklerin uğraştığı “sert” işler ekonomik olarak daha çok değer görürler çünkü kamusal alanda gerçekleşirler.

Toplumsal cinsiyetlerin özelliklerine ve işlere atfedilen bu “sert/yumuşak” ayrımı bilimsel bilgi ve teknolojinin çeşitleri için de geçerli olup sert dallar erkeklere, yumuşak dallar kadınlara uygun

görülür. Örneğin, fizik, kimya, matematik "sert" bilimler, sosyoloji, psikoloji de yumuşak bilimlerdir. Bu bilim dallarındaki çoğunluk bilim insanlarının cinsiyetleri de sırasıyla erkek ve kadındır. Aynı şekilde, Berna Zengin'in (2000) doktora tezi bulgularında bahsettiği gibi, mühendislik bölümleri de "sert/eril", "yumuşak/kadınsı" dallar olarak ayrılır. Makine, inşaat, metalürji, petrol, jeoloji mühendislikleri matematik yoğun ve ağır/pis iş odaklı olduğundan erkeklerce daha çok tercih edilmekte ve eril mühendislik dalları olarak kabul edilmektedir. Öte yandan, gıda, çevre, kimya mühendislikleri kadına uygun bulunmaktadır, zira bu dallar görece daha hafif iş gerektirir. (Edwards in Lerman et al., 2003: 180). Sert/ yumuşak ayrımının cinsiyetçi ve cinsel iması da bu karmaşık ideolojinin bir parçasıdır.

"Sert/yumuşak" ayrımının toplumsal cinsiyetleri uygun dallara ayırmasından başka bir işlevi de söz konusu işin değerini belirlemesidir. Mühendislik ele alınırsa, "sert" işler teknik beceri gerektiren, risk içeren, bedensel kuvvete dayalı, matematiksel bilginin kullanıldığı teknik işlerdir. Örneğin, üretim alanında çalışan mühendislerin işi "sert" iş sayılırken, satış veya kalite alanlında çalışan mühendislerin işi yumuşak "sayılmaktadır". Bu durum, mühendislik işi içinde işin tabiatı bakımından bir hiyerarşi oluşturur. Tahmin edilebileceği gibi, erkekler "sert" mühendislik işinde yoğunlaştığı için bu alan gerçek mühendislik işinin ideal tabiatını oluşturur. Kadınlar da "yumuşak" işlerde yoğunlaşırlar (Cockburn, 1981; 1983; 1987; 1993; 2009).

3. Kuramsal Araç olarak "Toplumsal Cinsiyet Temelli Mühendislik Kültürü"

Bu çalışmada ele alındığı haliyle mühendislik kültürü, mühendisler arasında toplumsal olarak tanımlanan davranış ve iletişim biçimleri olarak ele alınmaktadır (Hacker, 1981; Robinson & McIlwee, 1991).. İlerde bahsedileceği üzere mühendislik işinin tabiatı ve ideal mühendislik kariyeri de eril kabul edilen özellikler taşımakta; kadınları ve bu modele uymayan erkeklikleri dışlamaktadır.

Mühendislik kültürünün ideolojik olarak üç ayrı dayanağı vardır. Bunlar "gerçek mühendis imgesi", "mühendislik işinin tabiatı" ve "ideal mühendislik kariyeri"dir.

3.1 Gerçek Mühendis İmgesi

Bu ideolojik altyapıda gerçek mühendis imgesi erildir; modellediği imaja uymadığı için kadın mühendisleri ve söz konusu modele uymayan erkeklikleri de dışlamaktadır. (Robinson & McIlwee, 1991). Gerçek mühendis imajında kişi akılcı, problem çözmeye odaklı, mekanik araçlar konusunda teknik beceriye sahip, teknoloji ile iş ve normal yaşamda uğraşmaktan keyif alan biridir (Robinson & McIlwee, 1991; Brand & Kvande, 2001; Bond et al, 2002; Rapoport et al., 2002; White et al. 2003; Bastalich et al., 2007; Küskü et al., 2007; Watts, 2009)

Bu çerçevede gerçek mühendis hem kadın hem erkek olabilir ancak söz konusu kişi uzun çalışma saatlerine katılabilmeli ve işi her zaman öncelikli tutmalıdır. Bu açıdan kadınlardan toplumsal olarak beklenen diğer rolleri aksatacağından veya yerine getiremeyeceğinden rekabetçi piyasada erkeklerce daha kolay üstelenebilir bir roldür.

3.2 Mühendislik İşinin Tabiatı

Mühendislik işi önceden belirtildiği gibi pis, ağır, fiziksel risklere açık, iş merkezliliğin norm olduğu, çalışanların tüm zamanlarını işe vermeleri ve iş seyahatlerine sorunsuz gitmeleri beklenen bir yapıya sahiptir. (Robinson & McIlwee, 1991; Brand & Kvande, 2001; Bond et al, 2002; Rapoport et al., 2002; White et al. 2003; Bastalich et al., 2007; Küskü et al., 2007; Watts, 2009).

3.3 İdeal Mühendislik Kariyeri

İdeal mühendislik kariyeri teknik beceriye sahip olan mühendisin gün geldiğinde idari işte çalışmaya başlamasıdır. Kıdemlilik önemli olduğu kadar, teknik konularda kişinin becerisini ispatlaması saygı kazanması için önemli bir unsur kabul edilir. (Miller, 2004).

Bu kültürü araştırırken çocuklukta sosyalleşirken öğrenilen toplumsal cinsiyet rollerine (oyuncaklar, oyunlar, anne babanın evdeki işleri, teknşk beceri geliştirme) , okul hayatında meslek seçimine kadarki döneme (ilgili olunan dersler, mühendislik seçmenin nedenleri, mühendisliğin kişi ve toplum gözündeki imajı), üniversite hayatına (mühendislik eğitiminin koşulları, sayısal azlık, gerçek mühendis ve gerçek iş kavramlarının öğrenilmesi, mühendislik kültürü kodlarının öğrenilmesi, fakülte elemanlarının etkisi, arkadaşlık ilişkileri) ve son olarak çalışma hayatına (iş yerinde ilişkiler, görevlerin dağlımı, kılık kıyafet, sosyal ağlar, şakalar, baş etme statejileri) bakılarak, ataerkil kapitalizmin cinsiyetçi mühendislik kültüründeki tezahürleri aranacaktır. (Hacker, 1983; McIlwee & Robinson, 1992; Nauta et al., 1999; Siann & Callaghan, 2001; Zengin-Arslan, 2001; Baker et al. ,2002; Kent & Noss, 2002;

Bradley & Charles, 2003; Cech, 2005; Hartman & Hartman, 2007; Sonnert et al. 2007; Amelink & Creamer, 2010).

Toplumsal cinsiyet ve mühendislik literatüründen yola çıkılarak bu süreçlerde mühendislik kültürünün cinsiyetçi yapısına dair belli başlı pratiklere bakılacaktır. Bu pratikler: cinsiyetçi konuşma ve iletişim biçimleri, cinsiyete dayalı önyargılar, şakalar, sosyal ağlarım kurulumu ve iş yaşamına etkileri, kılık kıyafet, dış görünümün etkileri söz konusu cinsiyetçi kültür ile baş etme stratejileri.(Robinson & McIlwee, 1991; Cockburn, 1987; 2009; Cockburn & Ormrod, 1993; Oldenziel, 1997; Brand & Kvande, 2001; Bond et al, 2002; Rapoport et al., 2002; Mellstrom, 2002; 2004; White et al. 2003; Bastalich et al., 2007; Küskü et al., 2007; Tonso, 2007; Watts, 2009; Faulkner, 2000; 2007; 2009).

4. Türkiye'de Toplumsal Cinsiyet Temelli Mühendislik Kültürü

Buna göre, Batıya dönük modernleşmenin öncüsü olacağı düşünülen mühendislik, Türkiye'de verili eril kodlarıyla Cumhuriyet reformları esnasında profesyonelleşti. Bu kodlar zaman içinde Türkiye'nin ataerkil yapısına eklemlendi. 1965 ve sonrasında Türkiye, erkek mühendislerin politikada yükselişine tanıklık etti (Göle, 2007: 8). 1965'ten 2000'lere kadar mühendis kökenli erkek politikacılar siyasi dünyanın yönlendiricileri oldular. Dönemin siyasi söylemine uygun olarak siyasetlerini *kalkınma* üzerine kuran bu figürler, toplum tarafından tanınıp benimsendikçe, mühendislik erkekler için saygın bir meslek olarak kabul edilir oldu. Mühendisliğin toplumsal itibarının popüler kültürde yanısması; bir mühendisle evlenmek hatta biri veya birkaçından evlenme teklifi almış olmanın kadınlar için statü göstergesi haline gelmesiyle görüldü[179].

[179] "Beni ne doktorlar ne mühendisler istedi"

İkinci bölümde, Nilüfer Göle'nin[180] doktora tezinde, sonrasında Köse ve Öncü'nün[181] çeşitli çalışmalarda tartıştığı "Mühendislik İdeolojisi" kavramına yoğunlaştım. Mühendislik ideolojisi, mühendislerin aldıkları eğitimin özelliğinden kaynaklı olarak toplumsal olaylara belli ve ortak bir şekilde baktıkları, pragmatist ve sonuç alıcı oldukları, toplumsal süreçleri de teknik süreçler gibi çözebilecekleri inancı üzerine kuruludur. Başka bir deyişle, mühendislerin toplumsal sorunları tartışmaktan çok bilimsel ve rasyonel olarak 'bir uzman' öngörüsüyle bu sorunları çözebileceği inancını taşımalarıdır. Bu anlamda mühendislik, toplumsal mühendisliği de içermektedir. Bu görüş, toplumsal düzeyde mühendislik hakkında yaygın olduğu kadar, mühendisler arasında da kabul görmektedir.

Türkiye'de cinsiyetçi mühendislik kültürünü anlamaya çalışırken, mühendislik ideolojisi kavramından yararlanarak, Türkiye'deki modernleşme hareketlerini şekillendiren pozitivist geleneğin ağırlığı; 1970'lerde solcu düşüncenin toplumsal mühendisliğe öykünmesi; 1980'lerde liberal siyasetin mühendis pragmatizmiyle siyasete damgasını vurmasının, tezim açısından önemli olduğunu düşünüyorum.

Bu eksende, Türkiye Mimarlar ve Mühendisler Odaları Birliği'nin, politik yapılanmasına ek olarak, barındırdığı cinsiyetçi öğelerin de Türkiye'de cinsiyetçi mühendislik kültürün bir parçasını oluşturduğu görüşündeyim.

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[180] Göle, N. (2008). *Mühendisler ve İdeoloji: Öncü Devrimcilerden Yenilikçi Seçkinlere*. 4th Edition. İstanbul: Metis Yayınları.

[181] Köse, A. H. & Öncü, A. (2000). "Türkiye'de Mühendis ve Mimarların Sınıfları ve İdeolojileri". *Toplum ve Bilim*, 85 Yaz: 8-36.

Köse, A. H. & Öncü, A. (2000). *Kapitalizm, İnsanlık ve Mühendislik: Türkiye'de Mühendisler Mimarlar*. Ankara: TMMOB.

Son olarak, Türkiye'de işgücü piyasası yapısını, mühendisliğe bağlı sektörler düzeyinde cinsiyetçi mühendislik kültürünü yaratan faktörlerden biri olduğu düşüncesiyle tartıştım. Buna göre, mühendislik alanları dahilinde cinsiyete dayalı ayrışmayı ele aldım. Berna Zengin'in[182] çalışmalarından yola çıkarak, bazı mühendislik sektörlerinin kadınlara daha uygun bulunduğu bazılarınınsa, erkek sektörleri olarak görüldüğü üzerine yoğunlaştım. Öyle ki bu durum, mühendislik fakültelerinde bölüm seçiminden, sektörel çalışmaya kadar kendini göstermekteydi. Bu çerçevede, temel mühendislik kabul edilen alanların erkek egemen kodlarını sürdürdüklerini ve bu sektörlerde çalışan kadın mühendisler açısından, iş hayatında istenilen görevde çalıştırılma, eşit ücret, terfi gibi konularda erkek meslektaşlarıyla eşit koşullarda olmayabileceklerini tartıştım.

5. Çalışmanın Sonuçları

Bu çalışmada topladığım veriler üç ana bulguya işaret etmektedir. Söz konusu bulgular farklı yaş gruplarının ve cinsiyetlerin mühendislik ve toplumsal cinsiyete ilişkin değişen tutum ve deneyimlerinde ortaya çıkmıştır. Buna göre mühendislik mesleği Türkiye'de saygın bir meslek olarak kurgulan ve fakat saugınlığını yitirmektedir. İkinci olarak mühendislik mesleğinin toplumsal cinsiyet temelli yapısı yıllar içinde değişmiş ve kadın mühendisle için daha olumlu bir atmosfer ortaya çıkmıştır. Son olarak, çalışmaya katılan kadın ve erkek mühendislerin deneymlerinde toplumsal cinsiyet temelli mühendislik kültürünü farklı deneyimledikleri ve okul, işe alınma ve iş hayatı süreçlerinde kadın mühendislerin erkeklere kıyasla bu kültürün içinde var olabilmek için daha çok çaba harcamak zorunda oldukları anlaşılmıştır.

[182] Zengin, B. (2000). **"**Women Engineers in Turkey: Gender, education and professional life, a case study on Metu." (Master of Science Thesis, Middle East Technical University, 2000).

5.1 Mühendislik ve Toplumsal Saygınlık

Mühendislik mesleği toplumsal açıdan saygın bir meslek olarak inşa edilmiştir ve fakat bu mesleği icra edenler ile ilgili idealize edilen imge toplumsal cinsiyet temellidir. Batıya dönük modernleşmenin öncüsü olacağı düşünüldüğünden, Cumhuriyet döneminde ve ilerleyen yıllarda mühendisler Türkiye politikasında önemli konumlarda yer almışlar, sonuçta mühendislik mesleği toplumsal düzeyde belli bir saygınlık kazanmıştır. Ayrıca, reform döneminde, özellikle orta sınıftan kadın öğrencilerin mühendislik okulları için cesaretlendirilmeleri, Türkiye'de azımsanmayacak oranda kadın mühendis bulunmasına yol açmıştır. Geçen yıllar içinde, hem mühendisliğin rolü neoliberal ekonomiye bağlı olarak değişmiş hem de verili eril kodları ile Türkiye'nin ataerkil yapısına eklemlenmiştir.

Çalışmanın cevaplayıcılarının oluşturduğu iki ana yaş grubu da bu mesleği sosyal alanda saygın bir meslek olarak tanımlamıştır. İleri yaş grubu bu saygınlığın dünyada ve Türkiye'de yaşanan ekonomik ve politik değişimlere bağlı olarak dönüştüğünü ve günümüzde eskisi kadar saygın olmadığını belirtti. Genç yaş grubu için halen saygın olan mühendislik, mühendislik okulları ve kontenjanların artması buna bağlı olarak mühendisliğe katılımın kolaylaşması sonucu meslekte belli bir saygınlık kaybı yaşandığını belirtmişlerdir.

Mühendisliğin sağladığı toplumsal saygınlık kadın ve erkek mühendislerin ortak deneyimidir. İki grup da bu mesleğin toplumsal düzeyde belli bir prestij kazandırdığını hatta bu prestijin kadınlar için daha çok hissedildiği belirtilmiştir. Eril bir meslek olarak kabul edilen mühendislik, bir kadın tarafından yapılabildiği taktirde, kişiye toplumsal düzeyde büyük saygınlık kazandırmaktadır.

5.2 Toplumsal Cinsiyet Temelli Mühendislik Kültürü'nün Kadın ve Erkek Mühendis Deneyimlerinde Farklılaşan Tezahürleri

Türkiye'de kadın mühendis oranları düşük olmamasına rağmen, sayısal veriler toplumsal cinsiyet temelli niteliksel bilgileri yansıtmamaktadır. Bu çalışmanın bulguları Türkiye'deki kadın mühendislerin üniversite ve çalışma hayatında; toplumsal cinsiyet temelli beklentiler, şakalar, iş ilanları, görmezlikten gelinme, toplumsal ağlardan dışlanma ile karşı karşıya geldiklerini göstermektedir. Kadın mühendislerin, sanayinin saha görevi gerektiren ve mavi yakalı işçilerle yakın çalışma zorunluluğu olan alanlarında varlıkları tartışmaya açıktır. Ek olarak, erkek mühendisler de gerçek mühendis sayılabilmek için belli erkeklik tanımlarına uymalıdırlar. Söz konusu durum ve değişimler, bu çalışmada ele alınan iki ayrı yaş grubundan mühendisler arasında iki ayrı algı farklılığı yaratmaktadır. İlki, geç yaş grubu mühendisler için mühendislik mesleği Türkiye'de saygınlığını kaybetmiş, ancak yıllar içinde kadın mühendislerin mücadelesi sayesinde mesleğin toplumsal cinsiyet temelli yapısında iyileşme olmuştur. Genç yaş grubuna göre ise mühendislik mesleğinin toplumsal cinsiyet temelli yapısında önemli bir değişiklik gerçekleşmemiştir ve bu grup mesleki ve politik mücadeleye mesafeli durmaktadır.

5.2.1 Üniversite Eğitimi ve Mühendislik Kariyeri

Türkiye'deki eğitim sistemi, üniversiteye gitmek isteyen öğrencileri dershanelere yönlendirmektedir. Aileler için oldukça masraflı olan bu sistem, öğrencilerin rekabet etmesini ve üniversite giriş sınavında mümkün olduğunca çok soru yanıtlamasını gerektiriyor. Tıp ve mühendislik tercihleri yapmak isteyen öğrenciler lisede matematik-fen alanına yönlendiriliyor.

Cevaplayıcıların tümü, lisede matematik-fen bölümünden mezun olarak mühendislik mesleğine adım atmışlardı. Meslek seçimine ilişkin verilen cevaplar; matematiğe olan yatkınlık, toplumsal ve ailevi düzeyde rol modellerin varlığı, ailelerin ve öğretmenlerin yönlendirmesi olarak sıralandı. Tüm katılımcılar mühendisliğin saygı değer bir meslek olduğunda hemfikirdi. Aynı zamanda başarılı olmanın ve aklın göstergesi olduğundan, mühendisliğin tavsiye edilmesi beklenen bir davranıştı.

Katılımcılar meslek tercihlerini nasıl yaptıklarını anlattıktan sonra, onlara üniversitede mühendislik öğrencisi olmanın nasıl bir deneyim olduğunu sordum. Üniversitede mühendislik öğrencisi olmak ile ilgili çoğu katılımcı bölümlerinde erkek öğrencilerin ağırlıkta olduğunu belirttiler.

Katılımcılardan bölümlerinde eşit ya da eşite yakın kadın öğrenci olduğunu belirten katılımcılar, Berna Zengin'in (2000) yılında belirttiği kadınsı mühendisliklerden gelmekteydi. Onlara göre, çevre ve bilgisayar mühendisliği bölümleri kadınların daha çok tercih ettiği "kadın mühendisliği" olarak kabul edilen alanlardı. Ayrıca, tüm katılımcılar mühendislik bölümlerinin erkek egemen olmasını doğal karşıladıklarını belirttiler. Bunun sebebini, erkeklerin teknolojiye ve makinelere daha çok yönlendirilmelerine bağladılar.

5.3 İşe Alınma Süreci

Katılımcıların bahsettiği ayrımcılık yaşanan ikinci süreç işe alınma süreciydi. Cevaplayıcılardan geç yaş grubu, DSİ ve MTA gibi mühendis istihdam eden devlet kuruluşlarının bir süre önceye kadar erkek mühendis tercih ettiklerine dair iş ilanı yayınladıklarından bahsettiler. Bu ilanlar, açıkça kadın mühendisliğini dışladığı gibi, saha işi gerektiren dallarda kadınların bu emek komposizyonu oluşturan işlerin en az yarısında bulunamamalarını beraberinde

getirmektedir. Söz konusu ilanlara karşı çıkan bazı kadın mühendislerin mücadelesi ile bu kurumlar iş ilanlarını geri çekmiş ve bu olaydan sonra benzer iş ilanı vermemiştir.

Sözü edilen mücadele, geç yaş grubu tarafından yürütülmüştür. Genç yaş grubu bu olaya benzer durumlar ile ilk elden karşılaşmamış bu sebeple mesleğe dair toplumsal cinsiyet temelli kültür hakkında daha eşitlikçi bir algıya sahip olmuştur.

Kadın katılımcılar, piyasada iş bulmanın çok zor olduğunu ve özellikle erkek meslektaşları ile yarışmak durumunda kaldıklarını anlattılar. Kadınların hikâyeleri bu konudaki genel önyargıları doğrular nitelikteydi. Kadın mühendisler, mesleklerini yapabilecekleri bir iş bulmakta zorlanıyorlardı. Ayrıca, bazı mühendislik tiplerinin kadın, bazılarının erkek mühendisliği gibi görülmesi, önlerine çıkan bir başka engeldi. Örneğin, çevre mühendisliği "kadın alanı" kabul edilen bir meslek gibi görülüyor. Bilgisayar mühendisliği de çoğunlukla ofis alanında tatbik edildiği için, kadınlara uygun bulunuyor. Öte yandan metalürji ve malzeme mühendisliği "erkek alanlarından" biri kabul ediliyor.

Kadın cevaplayıcılar sanayi tipi işlerde çalışmasının hoş karşılanmadığını belirttiler. Kadın mühendis, hep erkekler ile atölyede ve fabrikada çalışmak durumunda kaldığından, ne erkek çalışanlar ne de işveren açısından tercih edildiğini, iş pis ve ağır olduğundan, kadınlara uygun bulunmadığından söz etiler.

Seyahat edebilmek, işe alınma sürecinde başvuranlar için önemli bir nokta gibi görünüyor. Firmalar seyahat özgürlüğü derken aslında, çocuk bakma sorumluluğu olmayan ve belki evli olmayan kadınları işe alabileceklerini anlatıyorlar. Ev içi sorumluluklar kadınların seyahat etmesi açısından bir problem olarak algılanıyor. Değinilen bir başka konu, kadınların kalite departmanlarında işe başlamaları.

Buradan anlaşılan, kadınların mühendislik pozisyonuna başvurmalarına rağmen kalite ve organizasyona yönelik görevler için işe alındıkları

Anlattıklarından, kadın mühendislerin dallarına bağlı olmaksızın kalite ve ofis işlerinde çalıştırıldığını öğrendim. Bu tip çalışma, genelde fiziksel olarak kapalı alanlarda olup erkek işçiler ile kontağa geçmelerini engellemesi bakınından tercih edilmekte. İş yerinin fiziksel yapısı, çalışma hayatı kısmına daha uygun olmasına rağmen, bu noktayı işe alma sürecinde de belirtmek istedim. Belli ki, demir çelik fabrikaları gibi erkek işçi hâkimiyeti olan firmalarda, kadın mühendisin mekân olarak nerede çalışacağı işe alma sürecinde oldukça etkili olmakta.

Toplumsal cinsiyet temelli iş ilanları konusunda geç katılımcılar hali hazırda iş gücü piyasasında kadınlara karşı bir ayrımcılık olduğunu kabullendikleri için iş ilanlarını ayrımcı olarak değerlendirdiler. Genç yaş katılımcıların çoğu ise, kadınlara yönelik bir önyargı olduğunu fakat bu durumla baş etmek için daha çok çalışmaları gerektiğini belirttiler.

5.4 İş Yerinde Ayrımcılık

İş yerinde toplumsal cinsiyet temelli ayrımcılık, görüşmelerde en çok değinilen konuydu. Anlatılara göre iş yerinde toplumsal cinsiyete dayalı ayrımcılık çeşitli şekiller alıyor ve erkek ve kadın mühendislerce farklı şekilde deneyimleniyor. Bu deneyimler; şakalar/espriler, kadın çalışanların erkeklerin sosyal ağlarından dışlanmaları, umursamazlık, evliliğe cesaretlendirme, doğum iznini terfi için bir engel olarak görme, firmanın/fabrikanın fiziksel tasarımı ve psikolojik şiddet yoluyla günlük pratiklerde tezahür ediyor.

5.4.1 Şakalar/Espriler

Şakalar/espriler daha önce yapılmış çalışmalarda da bir ayrımcılık mekanizması olarak gözlenmişti (Collinson, 1988). Kadın katılımcıların bazıları erkek çalışanların cinsellik içeren şakalarına bazen dayanamadıklarını söylediler.

Anlatılara göre, iş ortamında "erkek şakalarından" kaçmak mümkün olsa da, elektronik ortamda bile bu tür davranışların devam ettiğini gösteriyor. Eğer listeye katılmazsa da, hâlihazırda kurulmuş olan sosyal ağa dâhil olamamış oluyor. Bu tür listeler genelde iş için kullanılıyor olmasına rağmen, erkek çalışanların sosyalleştiği ve kendi dillerini yeniden ürettikleri ortamlar gibi anlatıldı.

Anlatılardan çıkardığıma göre cinsel içerikli şakalar da, küfür etme pratiği de erkeklerin iş ortamında sosyalleşmesinin bir aracı. Collinson'a (1988) göre işyerinde üretilen cinsel içerikli espriler eril üstünlüğü kurmakta bir etken olabiliyor. Özellikle mavi yakalı işçiler evdeki otoritelerini sürdürmek istercesine iş ortamında kadının cinselliğini konu eden şakalar yapıyorlar (Collinson, 1988:198). Bu durum, öyle bir ortam yaratıyor ki eğer kadın iş yerinde tutunacaksa, şakalara, küfürlere ve imalara kulak asmamalı. Bu sebeple kadın mühendislerin çoğu iş yerinde oldukça hakim olan eril dil yüzünden şakaları ve imaları duymazdan geliyor ve bilinçli olarak umursanmamayı seçtiklerini belirttiler.

5.4.2 Sosyal Ağlardan Dışlanma

Anlatılardan alınan bu örnekler, bizi kadın mühendislerin iş yerindeki sosyal ağlardan dışlanması konusuna götürüyor. 10 katılımcı, sigara içmenin sosyal ağ kurma anlamında etkili olduğundan söz etti. Sigara içme odaları bu anlamda sosyalleşme için önemli mekânlar. Erkekler sigara içme odalarında samimi olup,

enformel şekilde iş dışında da görüşmeye başlayabiliyorlar. Çalışanlar arası futbol maçı düzenlemeyi de sosyalleşmenin bunun yollarından biri olarak aktardı. Anlatılara göre, kadın çalışan sigara içmiyorsa ve futbol da oynamıyorsa bu ağlar içinde yer edinmesi imkânsız hale gelebiliyor.

Evlilik konusu özellikle bekâr mühendisler için ciddi bir tartışma konusuydu. Bir kadın mühendis işinde ilerlemek istediği için evlenmeyi tercih etmediğini anlattı. Kalite bölümünden başladığı fabrikada şu an mühendis ve idareci olarak çalışıyor olmasına rağmen, evli olmadığı için iş ortamı dışında görüşen meslektaşlarına katılamadığını belirtti. Bu nokta çok önemli çünkü, kadının sosyal ağ kurmasında anahtar rolü yine erkek oynuyor. Erkek mühendisin eşi ağ kurabiliyor çünkü eşi de bu ağın içinde. Bekâr kadınlar için sosyal ağlara katılabilmenin yolu eş, kardeş veya yakın arkadaş gibi bir erkeğin posizyonu üzerinden dahil olmaktan geçiyor.

5.4.3 Evliliğe Cesaretlendirme

Katılımcıların pek çoğu iş ortamında evliliğin istenen bir şey olduğunu söylediler. Bu durum aslında, iş alma sürecinde seyahat engeli ile potansiyel kadın çalışanları ayrıştırmaya çalışan işveren zihniyeti ile uyuşuyor. Demek ki işverenler, çalışmasını uygun buldukları kadınların evli olmasını tercih ediyorlar. Bu da başka bir ayrıştırma stratejisi olabilir.

Anlatılara göre evli olan kadın çalışanlar bekârlara göre daha çok saygı görüyor.

Tüm bu evliliğe cesaretlendirme söylemine karşın kadınların tümü, doğum iznini terfi için ciddi bir sorun olduğunu dile getirdiler. Bir yandan çocuk sahibi olmayı salık veren aile söylemi, öbür yandan kadınların mesleklerinde ilerlemelerini engelleyen doğum izni, sadece

mühendisleri değil tüm çalışan kadınları bir çıkmaza sokuyor. Bu çıkmazın eril tahakkümün ve onun sürekli yeşerdiği sosyal ağların işine yaradığını düşünüyorum. Bu durum, evli kadınların görece az terfileri az ücret almalarını da beraberinde getiriyor.

5.4.4 Mobbing

Son olarak, kadın katılımcılar iş yerinde psikolojik şiddete maruz kaldıklarını anlattılar. Söz konusu mobbing deneyiminin iş yerinde sorumlulukların geçici olarak azaltılması veya yeni bir bilgiye ulaşımın kesilmesi şeklinde yaşandığı belirtildi. Mobbingden bahseden yalnız kadın katılımcılar olsa da erkek katılımcılarında belli düzeyde mobbingden etkilendiği, ancak bunu dile getirmek için yeterli sosyal esnekliğe sahip olmadıklarını düşünüyorum.

Mobbing ya da psikolojik şiddet, ya da Nicholson'ın adlandırdığı gibi bilinç dışı psikolojik etki, kadınların sorumluluklarını bir süreliğine ellerinden alma ya da, kadın çalışanı hiyerarşide altta tutmayı sağlamak yoluyla yapılıyor. Bu deneyimler bize kadına karşı ayrımcılığın sadece işverenin değil erkek çalışanların da yaptığı birşey olduğunu gösteriyor. Her iki şekilde de bilinçli yapılmış olsun veya olmasın, kadın çalışanın motivasyonunda etkiler bırakıyor.

6. SONUÇ

Bu çalışmanın bulguları ışığında, mühendislik mesleğinin Türkiye'de saygın bir imajı olduğu savunulmaktadır. Söz konusu saygınlık, Türkiye'de geçtiğimiz yıllarda yaşanan ekonomik ve siyasi değişimlere bağlı olarak dönüşmüştür. İkinci olarak bu çalışmada, Türkiye'de mühendislik mesleğinin toplumsal cinsiyet temelli kural ve idealler çerçevesinde inşa edildiği öne sürülmektedir. Bu toplumsal kodlar esasında erkek mühendis imgesini Türkiye'ye has bir erkeklik tanımı çerçevesinde idealize etmektedir. Ek olarak, bu çalışmanın sonuçları

farklı yaş gruplarından gelen kadın katılımcıların toplumsal cinsiyet temelli mühendislik kültürünün değişimi hakkında farklı görüşleri olduğunu ortaya çıkarmıştır. Son olarak bu çalışmada, toplumsal cinsiyet temelli mühendislik kültürünün mühendislerin iletişim biçimlerinde; şakalar, günlük dil, karikatürler, toplumsal cinsiyet temelli iş ilanları ve işyerinde yükselme stratejilerini belirleyen görevlerin dağılımında tezahür ettiği ortaya konulmaktadır. Söz konusu mesleki kültürün tezahür biçimleri, erkek ve kadın mühendisler için farklı etkiler yaratmaktadır. Bu çerçevede, kadınlar mühendislik alanında var olabilmek için erkeklerden daha çok çaba harcamak durumundadır.

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Adı : Ezgi

Bölümü : Sosyoloji

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