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GENDER AND BEING A MINING ENGINEER: THE CASE OF TURKEY

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ABSTRACT

The examination of the mining engineering profession from the perspective of both female and male engineers and the investigation of the profession in terms of gender equality constitute the main scope of this study. This study also aims to define and recommend solutions to the issues based on sexist roles faced by mining engineers who had studied mining engineering and are currently practicing their profession in Turkey. In this regard, fieldwork was performed on the basis of the views of 160 participants. In the study, a digital questionnaire consisting of two parts was scattered to the participants. In the first part of the questionnaire, demographic information was asked, and in the second part, questions about the gender-based evaluation of female and male engineers' professions were asked. Solution suggestions were presented by evaluating and interpreting the data obtained from the study.

Keywords: Mining Engineering, Gender, Male-dominated professions, Descriptive case study, Quantitative analysis

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TOPLUMSAL CİNSİYET VE MADEN MÜHENDİSİ OLMAK: TÜRKİYE ÖRNEĞİ

ÖZET

Maden mühendisliği mesleğinin hem kadın hem de erkek mühendisler açısından incelenmesi ve mesleğin toplumsal cinsiyet eşitliği açısından irdelenmesi bu çalışmanın ana kapsamını oluşturmaktadır. Bu çalışma aynı zamanda Türkiye'de maden mühendisliği eğitimi almış ve hali hazırda mesleğini icra eden maden mühendislerinin cinsiyetçi rollere dayalı olarak karşılaştıkları sorunları tespit etmeyi ve bunlara çözüm getirmeyi amaçlamaktadır. Bu kapsamda 160 katılımcının görüşlerine dayalı olarak bir saha çalışması yapılmıştır. Çalışmada katılımcılara iki bölümden oluşan dijital bir anket dağıtılmıştır. Anketin ilk kısmında demografik bilgiler, ikinci kısmında ise kadın ve erkek mühendislerin mesleklerini toplumsal cinsiyete dayalı olarak değerlendirmelerine ilişkin sorular sorulmuştur. Çalışmadan elde edilen veriler değerlendirilerek ve yorumlanarak çözüm önerileri sunulmuştur.

Anahtar kelimeler: Maden Mühendisliği, Toplumsal Cinsiyet, Erkek Egemen Meslekler, Betimleyici Vaka Çalışması, Kantitatif (Nicel) Analiz

INTRODUCTION

When a human does not accord the ideal type of occupation based on gender stereotypes and the occupation's culture, being the "wrong" gender may intervene in one's career and status. The use of tags for instance "women engineers", in which a determiner is placed on professional status, attends to consolidate the belief that attributes a different meaning to women from men in the same profession. In androcentric professions with a masculine culture, professional identity is not usually gender-neutral (Hatmaker, 2013: 383). Due to both the inequality of opportunity and the difficulty of accessing competent engineers of both genders, many companies have started to focus primarily on female engineer employment. However, there are also direct benefits to employing more women engineers. Engineering culture is defined as a culture in which rationality, technology, and control of the work to be carried out generally prevail over personal relationships, social skills, and emotions. The occupational culture of engineering has been labeled masculine, manly, and male-centered (Hersh, 2000: 346).

Looking at the last 30 years, it is observed that the proportion of women who have received bachelor's, master's, and doctorate degrees in science and engineering has increased remarkably. Women's presence has grown across the sciences

(TNAP, 2010: 154). While the proportion of women who have received science and engineering diplomas is increasing, complementary studies are needed for more women to receive these diplomas (Herman et al., 2013: 468). Unlike women's presence in other sectors, women still make up a minority among scientists and engineers (TNAP, 2006: XII). Moreover, the sexist culture ingrained in the science, engineering, and technology sectors hinders career advancement for female employees. Despite considerable work to encourage women to start the profession, the engineering profession continues to be predominantly androcentric, and this situation has negative effects on both quality and gender equality (Avre et al., 2013: 216). One of the main reasons for this remaining condition is the responsibilities that women have in their domestic life much the same as in their work life, due to the roles of "woman" and "man" constructed by society. This situation hinders the career advancement of female engineers.

Gender inequality in science and engineering programs remains a cause for concern for educators and academics around the world. Unlike other historically male-dominated occupations that have seen achievements in providing gender equity, many science, math, and engineering professions have dropped behind peculiarly imbalanced in terms of gender. When statistical data are examined, it is seen that women do not prefer fields such as computer science and engineering, despite their talents and opportunities. Since the early 1990s, the "pipeline theory" has been the prominent conceptual framework used to describe science, mathematics, and engineering gender inequality. According to this theory, the gender gap occurs because very few women prefer science and engineering programs and/or because they are lost at various leakage points in the school-to-work pipeline (Gill et al., 2008: 392; Schreuders et al., 2009: 97). Women's 'hardship' in science and engineering isn't just about recruiting. The "leaky pipeline" continues to be a primary issue as women candidates are lost disproportionately and often get surpassed by men peers in their careers (Faulkner, 2009a: 15). It is obvious that the hold and advancement of women in the engineering profession is hampered by various structural obstacles. When compared with other professions, it has been observed that the resistance to gender reassignment in the engineering profession is quite high (Faulkner, 2009b: 181).

In Turkey, the pattern of engineering as a male-dominated field repeats. Engineering departments have the lowest percentage of women both as students and professors (Zengin Arslan, 2002: 401). When the number of students currently en-

rolled in the mining engineering departments of universities is taken into consideration, it is conferred that the ratio of female students is about 17% (CHE Atlas, 2022). When the ratio of academics in Mining Engineering departments of universities is investigated, it is conferred that the ratio of female academics is 18% (HEIMS, 2022). Nevertheless, in comparison with the representation of women in this field in Western countries, it can be argued that women have a relatively high representation in engineering in Turkey. However, there has been segregation concerning their participation in engineering programs that corresponds to differing gender roles: some engineering fields appear to be “masculine” and others “feminine” (Zengin Arslan, 2002: 401). Mining is a complex process that starts with the extraction of ore from underground/surface pits and extends the ore to concentrate through processes such as crushing, grinding, separation, dewatering, and drying. A closer look at this process reveals that, contrary to popular belief, women play a more active role (Romano, 2020: 194). Mining was a family activity, including women and children, all over the world in early modern times. The tasks undertaken by women in underground and surface mines were of great importance for the existence of mining communities in Europe. Due to the gender-based division of labor, while men were mainly hewers (as in the coal industry), women were breaking, rinsing, sorting, washing, and moving metals and ores. In addition to these, women were also performing jobs such as carrying wood and coal for use in furnaces, and carrying iron. Despite all this, women received half the wages paid to men. In the past, it has been difficult for women to work in male-dominated jobs, because of historical restrictions such as the exclusion of women from mining, and cultural and legal restrictions such as shift work. In the mining industry, women face a wide variety of problems. Some of these challenges are being unrespected, not taken seriously, and not being seen as equals by opposite-sex colleagues (Benya, 2009: 37; Mayes-Pini, 2010: 237). For this reason, although women have to campaign against these gender stereotypes while taking a chance to work in the world of mining men., it is observed that more women turn to “male-dominated” engineering departments such as geology and mining engineering compared to previous years (Lahiri-Dutt, 2012: 200; Lahiri-Dutt, 2015: 526; Mears, 2020).

Although women’s orientation towards the mining engineering profession has increased compared to previous years, it is observed that they cannot fully reveal their professional potential due to existing social prejudices. The purpose of this study, consequently, is to define and offer solutions to the issues based on sexist

roles faced by both female and male mining engineers who had studied mining engineering in Turkey and are currently practicing their profession. It is anticipated that the result of this study will light the way for both the mining sector and researchers who do academic studies.

THE AIM, IMPORTANCE, AND METHOD OF THE STUDY

Although various institutions and organizations are working to destroy the perception of women's profession/men's profession, which has been accepted by society, it is obvious that this perception still continues and cannot be destroyed in an instant. One of the professions classified as "men's profession" is mining engineering. Although there seems to be an increase in favor of female engineers in both the rate of university entrance and the rate of working in the mining sector, the belief that this profession can also be a "women's profession" is not at the desired level; due to the reasons such as the fact that the mining industry is a masculine sector, that mining is carried out in places far from the city and under difficult conditions due to its nature, that it is a profession that requires a body load as well as a brain load, and that it has adopted the form of working in shifts. It is thought that this situation also feeds the perception of the female profession/male profession since the society does not find it strange that the woman takes on all the work and responsibilities in the home despite working outside the home. For this reason, mining engineering is not a profession suitable for women in the eyes of society.

The aim of this study is to identify the problems faced by female mining engineers who have studied mining engineering in Turkey and are currently practicing their profession, based on sexist roles, and to offer solutions. It is not possible for this study to find a solution to all the problems mentioned, but it is expected that the result of the study will shed light on both the mining sector and researchers doing academic studies.

Since this study is based on the participation and opinions of female mining engineers who have received mining engineering education in Turkey and are currently working in the mining industry, the "descriptive case study" method was preferred as the method in this study. All of the questions were prepared as a result of detailed research and studies, and were finalized by consulting experts' opinions. This study was approved by Adana Alparslan Türkeş Science and Technology University, and was conducted in line with their recommendations for safe and ethical research. Since the study focuses on Mining Engineers in Turkey whose

mother language was Turkish, there was an additional ethical responsibility to correctly translate all data from Turkish to English while preserving the entity of their emotions and recountments. The consent forms were translated into Turkish to make probable the collection of informed consent from every attendant.

The universe of the research is mining engineers who had received mining engineering education in Turkey and are currently practicing their professions. While the total number of mining engineers in Turkey is 19.240, only 12.9 percent of them are women. The ratio of female and male total mining engineers working in the mining sector is 72.3 percent (Coskun, 2021: 3). The study was carried out with 160 participants. The questionnaire prepared for data collection consists of two parts. The first part of the questionnaire includes such demographic information as gender, age range, marital status, child information, education level, professional experience, professional position, and institution information while the second part is inclusive of questions about the gender-based assessment of the profession of engineers. Questionnaires were distributed to engineers digitally. Engineers participating in the questionnaire were reached through the Chamber of Mining Engineers. Quantitative statistical analyzes were made using the SPSS22 program with the data obtained from the questionnaire and the findings were interpreted according to the results of the analysis. There are 9 questions in the second part, which includes evaluation questions and forms the basis of the questionnaire. The answers to the following questions were sought:

1. How did you decide to study mining engineering?
2. Do you think Mining Engineering is both spiritually and materially a profession you dreamed of when you were a university student?
3. Would you prefer Mining Engineering again if you had the chance to re-establish your career?
4. Do you think your profession is androcentric?
5. Should the employer specify whether they are looking for a “female” or “male” mining engineer on job adverts?
6. Do you feel gender-based discrimination in your workplace?
7. Do you think your income is equal to that of your colleague's in the same position from the opposite sex?
8. Do you think you have equal social rights with your colleague in the same position from the opposite sex?
9. Have you come across any sexist comments about your profession in your private life before?

In some of the evaluation questions, using a five-point Likert scale, the participants were asked to mark one of the options (1) Strongly disagree, (2) Disagree, (3) Indecisive, (4) Agree, (5) Strongly Agree. The other part of the evaluation questions required open answers. The distribution of the data regarding the answers given to the questions is given as frequency and percentage.

RESULTS

A total of 160 mining engineers, including 49 women, 109 men, and 2 of indeterminate gender, participated in the study. Participants who did not specify gender were not included in the results, they were only expressed in total numbers. Although there are participants from every age group, the participants between 26-30 and 31-35 are in the majority. 45 percent of the participants are single and 60.6 percent do not have children. 68.8 percent of the participants have a bachelor's degree, 48.8 percent have 0-5 years of work experience, and 88.1 percent work in the private sector. Although 32.5 percent of the participants concentrated on permanent supervisors and 21.9 percent of them in mid-level manager positions, all positions attended the questionnaire. When demographic data are examined, it is seen that the existence of a "leaky pipe" in mining engineering is also observed. As Caha and Turgunali (2016: 68) stated, among women who have undergraduate degrees in engineering, the rate of those who continue their postgraduate education is very low. As they move to the next level, their numbers dwindle and they continue to leak through the pipeline. As many scientists have pointed out, the lack of representation of female students in engineering faculties means that there would be fewer female lecturers. This can have negative effects on female students, such as the feeling of loneliness, and may lead to leaving education at the very beginning. The demographic characteristics of the participating engineers are given in Table 1.

Table 1. Demographic characteristics of the participating engineers.

Feature	Grade	Frequency (f)			Percentage (%)		
Gender	Female	49			30.6		
	Male	109			68.1		
	Not specified	2			1.3		
	Total	160			100.0		
		F	M	T	F	M	T
Age Group	20-25	6	5	11	12.2	4.6	6.9
	26-30	14	43	57	28.6	39.4	35.6
	31-35	11	20	31	22.4	18.3	19.4
	36-40	9	4	13	18.4	3.7	8.1
	41-45	5	10	15	10.2	9.2	9.4
	46-50	1	3	4	2.0	2.8	2.5
	51-55	1	1	3	2.0	0.9	1.9
	56 and above	2	23	26	4.1	21.1	16.3
	Total	49	109	160	100.0	100.0	100.0
Marital Status	Single	26	46	72	53.1	42.2	45.0
	Married	21	62	85	42.9	56.9	53.1
	Not specified	2	1	3	4.1	0.9	1.9
	Total	49	109	160	100.0	100.0	100.0
Number of children	None	33	64	97	67.3	58.7	60.6
	1	8	18	27	16.3	16.5	16.9
	2	8	23	32	16.3	21.1	20.0
	3	0	3	3	0.0	2.8	1.9
	4 and above	0	1	1	0.0	0.9	0.6

	Total	49	109	160	100. 0	100. 0	100 .0
Graduation	Bachelor's Degree	31	77	110	63.3	70.6	68. 8
	Master's Degree	14	27	41	28.6	24.8	25. 6
	Doctor of Philoso- phy	4	3	7	8.2	2.8	4.4
	Not specified	0	2	2	0.0	1.8	1.3
	Total	49	109	160	100. 0	100. 0	100 .0
Professional Ex- perience	0-5 years	28	50	78	57.1	45.9	48. 8
	6-10 years	8	15	23	16.3	13.8	14. 4
	11-15 years	4	10	14	8.2	9.2	8.8
	16-20 years	6	5	11	12.2	4.6	6.9
	21-25 years	1	5	6	2.0	4.6	3.8
	26 and above	2	24	28	4.1	22.0	17. 5
	Total	49	109	160	100. 0	100. 0	100 .0
Profession	Process Engineer	5	5	10	10.2	4.6	6.3
	Shift Engineer	2	14	16	4.1	12.8	10. 0
	Permanent Supervi- sor	16	36	52	32.7	33.0	32. 5
	OHS Specialist	6	5	12	12.2	4.6	7.5
	Mid-level Manager	9	25	35	18.4	22.9	21. 9
	Senior Manager	0	11	11	0.0	10.1	6.9
	Employer	0	6	6	0.0	5.5	3.8
	Other	7	3	10	14.3	2.8	6.3
	Not specified	4	4	8	8.2	3.7	5.0

	Total	49	109	160	100.0	100.0	100.0
Workplace	Public Institution	8	9	18	16.3	8.3	11.3
	Private Institution	41	99	141	83.7	90.8	88.1
	Not specified	0	1	1	0.0	0.9	0.6
	Total	49	109	160	100.0	100.0	100.0

*F: Female, M: Male, T: Total

Distributions of answers of participating engineers to questions are given in Table 2.

Table 2. Distributions of answers of participating engineers to questions.

	Frequency (f)			Percentage (%)		
	F	M	T	F	M	T
How did you decide to study mining engineering?						
I made a choice based on the score I got as a result of the university exam.	27	62	91	55.1	56.9	56.9
I made up my mind by doing research about the department.	7	16	23	14.3	14.7	14.4
I preferred it due to the engineering title.	0	1	1	0.0	0.9	0.6
I was guided by my family/relatives/close friends whose profession was mining engineering.	12	21	33	24.5	19.3	20.6
I was informed by my teachers.	1	4	5	2.0	3.7	3.1
Not Specified	2	5	7	4.1	4.6	4.4
Total	49	109	160	100.0	100.0	100.0
Do you think Mining Engineering is both spiritually and materially a profession you dreamed of when you were a university student?						
Yes	10	30	40	20.4	27.5	25.0
No	24	54	80	49.0	49.5	50.0
Indecisive	15	25	40	30.6	22.9	25.0
Total	49	109	160	100.0	100.0	100.0

Would you prefer Mining Engineering again if you had the chance to re-establish your career?						
Yes	21	44	65	42.9	40.4	40.6
No	19	53	72	38.8	48.6	45.0
Indecisive	9	12	23	18.4	11.0	14.4
Total	49	109	160	100.0	100.0	100.0
Do you think your profession is androcentric?						
Strongly Disagree	8	10	18	16.3	9.2	11.3
Disagree	5	19	24	10.2	17.4	15.0
Indecisive	1	8	9	2.0	7.3	5.6
Agree	20	51	73	40.8	46.8	45.6
Strongly Agree	15	21	36	30.6	19.3	22.5
Total	49	109	160	100.0	100.0	100.0
Should the employer specify whether they are looking for a “female” or “male” mining engineer on job adverts?						
Yes	4	25	29	8.2	22.9	18.1
No	40	77	118	81.6	70.6	73.8
Indecisive	5	7	13	10.2	6.4	8.1
Total	49	109	160	100.0	100.0	100.0
Do you feel gender-based discrimination in your workplace?						
Strongly Disagree	8	23	31	16.3	21.1	19.4
Disagree	3	36	39	6.1	33.0	24.4
Indecisive	7	10	18	14.3	9.2	11.3
Agree	20	30	51	40.8	27.5	31.9
Strongly Agree	11	10	21	22.4	9.2	13.1
Total	49	109	160	100.0	100.0	100.0
Do you think your income is equal to that of your colleague’s in the same position from the opposite sex?						
Yes	23	53	77	46.9	48.6	48.1
No	23	44	68	46.9	40.4	42.5
Indecisive	3	12	15	6.1	11.0	9.4
Total	49	109	160	100.0	100.0	100.0
Do you think you have equal social rights with your colleague in the same position from the opposite sex?						
Yes	25	64	91	51.0	58.7	56.9

No	24	40	64	49.0	36.7	40.0
Indecisive	0	5	5	0.0	4.6	3.1
Total	49	109	160	100.0	100.0	100.0
Have you come across any sexist comments about your profession in your private life before?						
Yes	42	53	97	85.7	48.6	60.6
No	7	56	63	14.3	51.4	39.4
Total	49	109	160	100.0	100.0	100.0

*F: Female, M: Male, T: Total

When the answers given to the question “How did you decide to study mining engineering?” were examined, it was noted that the rate of participants who gave the answer “I made a choice based on the score I got as a result of the university exam” was 56.9 percent. It was monitored that 40.8 percent of the female participants and 37.7 percent of the male participants chose the Mining Engineering profession with knowledge before making a choice. 24.5 percent of female and 19.3 percent of male participants said that they were guided by their family/relative/close friends whose profession was mining engineering. 14.3 percent of female and 14.7 percent of male participants stated that they had knowledge about the department by doing previous research. 2.0 percent of female and 3.7 percent of male participants also stated that they were informed by their teachers. In the second question, they were asked if they thought mining engineering was both spiritually and materially a profession they dreamed of when they were university students. 50.0 percent of the participants indicated that mining engineering wasn’t a profession they dreamed of. While 20.4 percent of the female participants answered “yes”, this rate was 27.5 percent for the male participants. 30.6 percent of female and 22.9 percent of male participants stated that they were indecisive. One of the participants expressed his opinion as follows:

Mining is a suitable occupation for a single person. I work in shifts and my wife works as well. Most importantly, our workplaces are in different locations. I can’t go home every day. My wife and I have different weekend holidays, so the situation we are in is really difficult.

In the third question, they were asked if they would prefer mining engineering again if they had the chance to re-establish their career, and 45.0 percent of the participants gave the answer “no” to the question. While 42.9 percent of female and 40.4 percent of male participants answered “yes”, 38.8 percent of female

and 48.6 percent of male participants gave the answer “no”. One participant stated as follows:

Preferring such a male-oriented department and continuing to work under male domination is like committing suicide.

When it comes to questions about the gender-based evaluation of the professions of the participants, it was observed that 45.6 percent of the participants agreed with the idea that their profession was androcentric, and 22.5 percent of them strongly agreed. It was observed that approximately 70 percent of the participants thought that their profession was male-dominated. When the answers given by the male and female participants to the question were analyzed separately, it was observed that the distribution was more or less the same for both genders. Some participants expressed their opinions regarding this question as below:

Although it is a difficult field and profession, it is important for our female engineers to relentlessly pursue wrongs and injustices in line with their rights and not to give up, in terms of preserving the rights they have won. I believe that although sexist discrimination continues, it has decreased over time. 30-40 years ago, it was considered bad luck for a female employee to go underground.

I have experienced that the organization and order in the construction sites with female engineers are in a much better condition compared to the construction sites with male engineers.

The shyness of my female colleagues who prefer the profession (not going to the vehicles in case of breakdown, low sense of curiosity, etc.) causes a male-dominated situation to emerge.

It is thought that the participants claimed Mining Engineering is a male-dominated profession since it is currently perceived as male-dominated by society. Correspondingly, although the opinions are very diverse, it cannot be put forward that there is no female engineer who thinks that it is a male-dominated profession from her point of view. However, because there are a wide variety of subjects that are traditionally “accepted” or “embraced” by society, the perception of the female profession/male profession invocations is mostly based on their “social acceptance”. Laplonge (2017: 307) stated in his study that the mining industry is defined as a particularly masculinized industry that prefers extreme masculinity and rejects femininity. According to Lahiri-Dutt (2011: 329), there is not only clear visibility of men in mining but an inherently accepted combination of men

with institutionalized authority expertise and prestige, institutions, laws, and governance structures. One of the most obvious examples that the perception of the male/female profession is not limited to mining engineering is the perception that teaching is the most appropriate occupation for women in society. This perception essentially gathers all the distortions in the women's issue in a single body as a chain. The woman, who is positioned as the owner of the house, should manage the house, give birth to children and be responsible for their care, fulfill their wife-hood duties and contribute to the household economy. Teaching has emerged as the “easiest” profession in which all these can be accomplished within the framework of the roles imposed on society. Considering the opposite, since the roles listed above in general engineering professions will be completely or partially disrupted, women in this profession are considered to be deprived of regular life in terms of society. Although the main reason for the disruption of these roles is the fact that women work outside the home, it is obvious that the main reason is socially overlooked. The reason why these roles are stuck on women is that men take the role of bringing home the bacon and withdrawing from everything else, and this habit is accepted by society and is not found strange. The fact that household chores or responsibilities are only up to women prevents men from sharing these responsibilities, and in addition, men who share these obligations are considered self-sacrificing individuals in the eyes of society. Since the distribution of roles and duties in the family, which is the core of society, is based on gender, the consequences of this are also observed in the business world, and women are given far fewer opportunities than men because these burdens are assigned to women. Although the issue is not limited to hiring, priority between two genders is often given to men, even for a promotion position, although both participants of different genders do the same job in the same way. Accordingly, it is observed that gender assignments of men/women are equally effective in occupations. Examining the answers to the question “Should the employer specify whether they are looking for a “female” or “male” mining engineer on job adverts?”, it was observed that 73.8 percent of the participants gave the answer “no”. While 81.6 percent of female participants said “no” to this question, this rate was 70.6 percent for male participants. Some participants added the following ideas regarding this question:

Except for the administrative part, most of the workers in the mining sector come from rural and have an opinion against women’s working in any area.

They had requested only 2 female engineers in a marble factory. I couldn't get a job where I could find a chance to show my talent because of a gender-related post. So, it's such a bad feeling. I think it is more appropriate for them to keep the gender they want in their own minds.

The reason for the higher rate of female participants in this question is that the distinction in job postings is generally made to exclude them. However, the search for "male engineers" also causes discrimination against male employees. The answers that the participants focused on in this question underline the notion that what is demanded by the employees should actually be a natural norm of the society and the business world; however, societies and employers have not apparently come a long way for gender-neutral occupations on the basis of neither social nor individual thought. The fact that the employer indicates gender in the recruitment announcement is not only specific to a particular profession but is a general problem encountered in almost every occupational group. In male-dominated professions, it is generally women who are castrated from almost all recruitment announcements. At the beginning of the problems that female mining engineers voiced because of not being able to do their job is that they are not given an opportunity from the very beginning due to the employer's gender statement. Ozkan (2020: 53) reached the following conclusions by interviewing female mining engineers in her study: First of all, she stated that there are two main discriminatory practices for the employer. The first is that women are not preferred because it is a male job, and the second is that familiar men act as intermediaries so that a female engineer can get the job. One of the engineers she interviewed stated that she was not invited to most job interviews, and when she was called, particularly challenging questions were asked. Another engineer indicated that although they stated that they were looking for a male engineer in the job posting, she applied to these postings and found the job she was currently working for in this way. However, even though the employer stated that it was wrong to think that she could not do the job because of her gender and thought that women should also do their job, she also stated that he employed a male engineer as a supervisor to her despite the same job was done by one male engineer before. Another engineer mentioned that during the job interviews she went to, she was asked why she chose mining engineering which men prefer more rather than another engineering. She also stated that it was more difficult to be a woman and find a job as a woman compared to other sectors.

While 31.9 percent of the participants answered “Agree” to the question “Do you feel gender-based discrimination in your workplace?”, 13.1 percent said, “Strongly agree”. In this question, the factor that increased the rate for both options was the answers given by the female participants. While approximately 38 percent of male participants reported that they felt discrimination based on gender in their workplace, this rate was approximately 63 percent for female participants. Some of the participants’ ideas for this question are as follows:

I worked in a public institution for 15 years until 1998. I saw very clearly that women engineers were ignored. We were still not hired. Colleagues were speaking to us without regarding us. We couldn’t be promoted.

I think that there is positive discrimination by senior managers and negative discrimination by colleagues and employees (blue collars).

We are the mining company with the highest number of female employees in Turkey. When our company has to choose between two candidates on equal terms in recruitment, it uses its right in favor of the female candidate. This is our rule. Our general manager is also a woman.

Compared to other sectors, there is more resistance to female employment in senior positions in the mining sector.

In my workplace, female engineers can take as much time off work as they want. Their salaries are good. I don’t think there is any discrimination. But I would not employ my wife in this sector when there are swearer bosses. I think the problem with women is rude bosses.

I think the biggest problem experienced by female employees in this sector and in general (especially in workplaces where they are in minority) is that they are considered inadequate by their employers and colleagues due to their gender (even if they are adequate and good). It is also the attitude of other employees towards women (slang in conversations, molestation, etc.). In our country, in sectors where male dominance is high, unfortunately, women make extra efforts in every sense. We can say that making decisions on our behalf at the point of doing business is where the grievance begins. Be sure, if we women had done the same mobbing, a weaker picture would have been encountered. Although discrimination is a concept that I absolutely do not want and do not approve of, unfortunately, we live within this concept.

When gender-based discrimination in the workplace is mentioned, job sharing according to gender roles comes to mind. Generally, jobs that require physical

strength or that are carried out in a shift system are canalized to male employees. While performing the mining engineering profession, these two types of work are encountered at almost all levels. This is one of the most important reasons why the profession is regarded as “male-dominated”. However, it has been observed that under equal conditions, female employees can also be successful in these mentioned jobs. When the other side of the medallion is turned, it should be stated that this situation creates a disadvantage not only for female employees but also for male employees. The fact that a male employee is the first to come to mind in situations that require physical strength or work in a shift system also creates an inequality of opportunity for men. The fact that there is no such gender discrimination among healthcare workers who have a similar working style, especially in the shift system, stands out as one of the most important proofs that there is no difference between men and women in terms of being competent, and that preference should be given priority over participation in the profession. Tiwari et al. (2018: 1) stated that women are discriminated against on the basis of their preferences such as work, health, and fertility in the workplace. He argued that only making and implementing laws would not be the solution and that there should be various practices adopted by the institutions in order to ensure social awakening and attitude change in the minds of male colleagues. Kansake et al. (2021: 1), according to the results of their study, stated that discrimination based on gender is widespread in the mining sector and that 53% of the respondents are victims of discrimination based on gender.

When asked whether they think they have equal income with their colleagues of the opposite sex in the same position, it was seen that 42.5 percent of the participants gave the answer “no”. When the answers given by the male and female participants to this question were examined, it was observed that the ratios were close to each other. Some participants said the following about this issue:

I have not come across such a situation at my workplace. Everyone is given a standard salary based on the work they do. However, I know that this is not the case in every company.

At the workplace where I worked, a female engineer learned by chance that the salary of a male engineer doing the same job was more than her own salary, and she was very upset. I witnessed this event.

The general perception is that when the person doing the same job is a woman, even if she spends equal time and effort, that job is worth less. This idea always keeps the question of the position of women in business life up-to-date.

While it is unacceptable to arrange the price for the labor given to the detriment of the female employee depending on gender, it is also an attitude that is completely against human rights. Article 23, paragraph 2 of the Universal Declaration of Human Rights stipulates the principle that everyone has the right to equal pay for equal work, without any discrimination (Kaplan, 2017: 227). For sure, not all female employees face this situation. However, judging from the answers given to the question, the table is a bit underwhelming. Kansake et al. (2021: 9), to show the income/salary inequality for women in the mining industry, put forth that 29 percent of respondents reported receiving lower salaries than their male counterparts, while only 4 percent reported higher salaries. These results further highlight the importance of providing mining stakeholders with an equal and gendered career path, salary/income, and workload. Reeson et al. (2012: 302), based on the data they obtained in their study examining mining activity, income inequality, and gender, stated that while income inequality among men increases at the initial levels, it decreases at higher levels; among women, however, it continued to increase with the proportion of the population employed in mining. While income inequality among white-collar workers does not stand out much, it is an undeniable fact that the gap in income inequality in blue-collar jobs such as agricultural work, house helping and patient care has widened considerably. The main reason why this inequality cannot be eliminated or reduced, especially in the blue-collar group where economic concerns are at the forefront, is the thought that women's labor is less valuable than men's, or that the work performed by women is more inexperienced than men's. As a result, it should be stated that the level of economic welfare is also a determining factor in the choice of the person, and the economic structure as one of the main problems of gender inequality is a steady reality.

Moreover, when asked whether they have equal social rights with their colleagues of the opposite sex in the same position, 40.0 percent of the participants gave the answer "no"; when the female and male participants were analyzed separately, it was seen that 49.0 percent of the female participants and 36.7 percent of the male participants answered "no". One participant replied on the subject as follows:

As far as I have observed, not only in the mining sector but also in almost every male-dominated sector, women lag behind in terms of defending their rights. The reason for this is that from the very beginning, starting from the difficulties they have experienced during the recruitment process, they want to own their job and think that they should not stand out too much.

In the European Community Social Charter, which is one of the conventions accepted by the European Union, the principles regarding the basic social rights of the employees are regulated. Article 16 of the Charter stipulates the need to provide equal treatment for men and women as well as the development of equal opportunities for male and female employees. In particular, it was stated that the work should be increased in order to ensure equality between women and men in the fields of employment, wages, working conditions, social security, education, vocational training, and development. It was also stated that necessary measures would be taken to balance the better fulfillment of professional and family obligations by women and men (Kaplan, 2017: 235). When the answers given by the participants to this question are examined, it is important that the studies on these principles should be implemented immediately. Candir and Islamoglu (2014: 49) explained the social rights under the titles of the right to work, the right to fair wages, the right to social security, the right to unionize, the right to collective bargaining, and the right to strike; and examined the current situation in terms of these titles in their study examining the situation of female workers in Turkey in terms of social rights. Accordingly, they stated that the rate of women who are not included in the labor force is approximately 72 percent, that male employees earn more wages than female employees at all levels of education, and that women's representation is much less than men's in terms of union rights.

When posed the question of whether they have come across any sexist comments about their profession in their private lives, 60.6 percent of the participants answered "yes". 85.7 percent of female participants and 48.6 percent of male participants were exposed to sexist comments about their profession in their private lives. Some participants stated as follows:

I can also work as a mother. I don't want to hear the question "is it not difficult with the child?"

The most common reaction I get is what I am doing among so many men. But I still have hope that one day everyone will realize that professions do not have a gender.

The main reason why there is such a big difference between the female and male participant ratios is, of course, that the mining engineering profession is seen as a "male job" by society. As in many subjects, there are various "taught" perceptions in society about professions. One of the most important perceptions, which is the subject of this study, is the distribution of occupations according to gender roles. The individual receives the first teaching from her/his family, then

from the schools where she/he is educated, and then from the society in which she/he actively participates, and as a result, she/he adopts a worldview. If the subject is examined specifically, professional prejudices are also formed within this framework. It is obvious that these “taught” perceptions cannot change in a very short time. This perception exists not only in our country but also in other societies. Parlaktuna (2010: 1226), in her study titled *Analysis of Occupational Discrimination Based on Gender in Turkey*, commented that Turkey accepts the traditional structure and has a male-dominated society structure, basing her argument on the data from the Turkish Statistical Institute where 64.7 percent of women and 60.7 percent of men stated that the main duty of women was childcare and housework. She stated that women’s education choices are negatively affected by the traditional sexist prejudices and values of society.

DISCUSSION

Although the employment of female engineers in professional working life in the mining sector tends to increase from past to present, various difficulties faced by female engineers in working life still exist. Although the visibility of women is increasing day by day in engineering fields, which are mostly identified with men such as mining engineering, it is still difficult to talk about gender equality even in today’s conditions. Of course, every profession has responsibilities and difficulties that come with its operation, and mining engineer women have common problems with women working in other different sectors. However, it is observed that women especially experience gender-based problems in mining engineering, which is one of the branches with the highest emphasis on “male-dominated” even among engineering branches. As a result of this study, which was carried out to identify the problems experienced by female mining engineers in terms of gender equality and to offer solutions; in the distribution of the answers to the nine questions directed to the participants, it was seen that both in the public and private sectors, female engineers struggled with gender-based prejudices and discrimination, and they had to perform their profession under these conditions.

Undoubtedly, the first thing to be done in order for women to have a greater presence in the mining sector is to abandon gender-specific adverts in job advertisements. Although specifying gender in recruitment advertisements is both unethical and illegal, such advertisements are occasionally encountered. Thus, women who are exposed to inequality of opportunity from the very beginning will be able to participate in the interviews and will not have to fight the biggest obstacle in

front of them while trying to establish themselves in the sector. Women, who are very few in undergraduate education, tend to different sectors as they cannot find a place in the sector. Women engineers, who are already few in number, cannot find a place in the sector because they are not given an opportunity at the bottom of the ladder. In addition, it is extremely important to end gender discrimination in the industry so that more women can prefer to study mining engineering. Being exposed to sexist discrimination even during the job search process prevents women from choosing these departments, which are considered male-dominated from the very beginning, and this leads to the strengthening of the male-dominated stance of the relevant professions.

Participants also talked about the sexist discrimination they experience in their workplaces, the inability to have equal income and social rights with their colleagues of the opposite sex in the same position, and the sexist attitudes directed towards them in their private lives. Based on all these statements, if women who had already studied mining engineering are not forced to turn to different sectors and if it is desired to establish a balance in terms of female/male employment in the sector by directing more women to mining engineering education, it is essential to make new regulations independent of gender roles. In order for a profession to be respected, cared about, and preferred by society, working conditions, personal rights, social rights, income, and most importantly, equality in all these conditions regardless of gender are very important. It is also thought that the gender-based direction of horizontal and vertical segregation, which frequently comes up both in public and private sectors, should be urgently prevented. Considering the European Social Charter and the Universal Declaration of Human Rights, it would be appropriate to determine social policies in accordance with these articles and in a contemporary manner.

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REFERENCES

Ayre, Mary, Mills, Julie and Gill, Judith. *“Yes, I Do Belong”: The Women Who Stay in Engineering*” Engineering Studies 5, no. 3(2013): 216-232.

Benya, Asanda P. *“Women in Mining: A Challenge to Occupational Culture in Mines”*. 2009. University of the Witwatersrand, Master’s Thesis.

Caha, Havva and Turgunali, Jarkynay. “*Women Engineering in Turkey: Case of Istanbul*” *Procedia Economics and Finance* 38, (2016): 60-69.

Candir, Hanife and Islamoglu, Emel. “*Status of Female Employees in Turkey in Terms of Social Rights*” *Bilgi* 29, (2014): 39-68.

Coskun, Mustafa Kemal. *Member Profile Research Report*. Chamber of Mining Engineers of Turkey, Ankara, Turkey, 2021.

Council of Higher Education Programme Atlas (CHE Atlas). “*All universities with mining engineering program.*” Yokatlas, <https://yokatlas.yok.gov.tr/lisans-bolum.php?b=10140>. (Accessed 22.02.2022).

Faulkner, Wendy. “*Doing Gender in Engineering Workplace Cultures. I. Observations from the Field*” *Engineering Studies* 1, no. 1(2009-a): 3-18.

Faulkner, Wendy. “*Doing Gender in Engineering Workplace Cultures. II. Gender in/authenticity and the in/visibility Paradox*” *Engineering Studies* 1, no. 3(2009-b): 169-189.

Gill, Judith, Sharp, Rhonda, Mills, Julie E. and Franzway, Suzanne. “*I Still Wanna be an Engineer! Women, Education and the Engineering Profession*” *European Journal of Engineering Education* 33, no. 4(2008): 391-402.

Hatmaker, Deneen M. “*Engineering Identity: Gender and Professional Identity Negotiation among Women Engineers*” *Gender, Work and Organization* 20, no. 4(2013): 382-396.

Herman, Clem, Lewis, Suzan, Humbert, Anne Laure. “*Women Scientists and Engineers in European Companies: Putting Motherhood under the Microscope*” *Gender, Work and Organization* 20, no. 5(2013): 467-478.

Hersh, Marion. “*The Changing Position of Women in Engineering Worldwide*” *IEEE Transactions of Engineering Management* 47, no. 3(2000): 345-359.

Higher Education Information Management System (HEIMS). “*Statistics of teaching staff*”. Yok, <https://istatistik.yok.gov.tr/>. (Accessed 22.02.2022).

Kansake, Bruno Ayaga, Sakyi-Addo, Georgette Barnes and Dumakor-Dupey, Nelson Kofi. “*Creating a Gender-Inclusive Mining Industry: Uncovering the Challenges of Female Mining Stakeholders*” *Resources Policy* 70, (2021): 1-20.

Kaplan, E. and Tuncay, Senyen. “*Equality Principle and Gender Discrimination in Labor Law*” *Journal of the Union of Turkish Bar Associations Special Issue*, (2017): 225-268.

Lahiri-Dutt, Kuntala. “*The Megaproject of Mining: A Feminist Critique*”. In Brunn S. (eds) *Engineering Earth*. (Springer, Dordrecht. 2011-c).

Lahiri-Dutt, Kuntala. “*Digging Women: Towards a New Agenda for Feminist Critiques of Mining*” *Gender, Place & Culture* 19, no. 2(2012-a): 193-212.

Lahiri-Dutt, Kuntala. “*The Feminisation of Mining*” *Geography Compass* 9, no. 9(2015-b): 523–541.

Laplonge, Dean. “*The “Un-Womanly” Attitudes of Women in Mining Towards the Environment*” *The Extractive Industries and Society* 4, no. 2(2017): 304-309.

Mayes, Robyn and Pini, Barbara. “*The ‘Feminine Revolution in Mining’: a Critique*”. *Australian Geographer* 41, no. 2(2010): 233-245.

Mears, L. “*Mining Equity Gender Perspective Extractive Industries*” *Generatietransitie*, <http://generatietransitie.be/nl/nieuws/mining-equity-gender-perspective-extractive-industries>. (Accessed 20.05.2020).

Ozkan, Ozlem. “*Women’s Labor in the Mining Industry*”. 2020. Ankara University, Master’s thesis.

Parlaktuna, Inci. “*Analysis of Gender-Based Occupational Discrimination in Turkey*” *Ege Academic Review* 10, no. 4(2010): 1217-1230.

Reeson, Andrew F., Measham, Thomas G. and Hosking, Karin. “*Mining Activity, Income Inequality and Gender in Regional Australia*” *The Australian Journal of Agricultural and Resource Economics* 56, (2012): 302–313.

Romano, Rossana Barragan. “*Women and Gender in the Mines: Challenging Masculinity through History: An Introduction*” *International Review of Social History* 65, no. 2(2020): 1-40.

Schreuders, P.D., Mannon, S. E. and Rutherford, B. “*Pipeline or Personal Preference: Women in Engineering*” *European Journal of Engineering Education* 34, no. 1(2009): 97-112.

The National Academies Press (TNAP). “*Beyond Bias and Barriers: Full-filling the Potential of Women in Academic Science and Engineering, Committee on Maximizing the Potential of Women in Academic Science and Engineering*”. (National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 2006).

The National Academies Press (TNAP). “*Gender Differences at Critical Transitions in the Careers of Science, Engineering, and Mathematics Faculty*”. (National Research Council of the National Academies, 2010).

Tiwari, Mansi, Mathur, Garima, Awasthi, Suvijna. “*Gender-based Discrimination Faced by Females at Workplace: A Perceptual Study of Working Females*” *Journal of Entrepreneurship Education* 21, no. 3(2018): 1-7.

Zengin Arslan, Berna. “*Women in Engineering Education in Turkey: Understanding the Gendered Distribution**” *International Journal of Engineering Education* 18, no. 4(2002): 400-408.