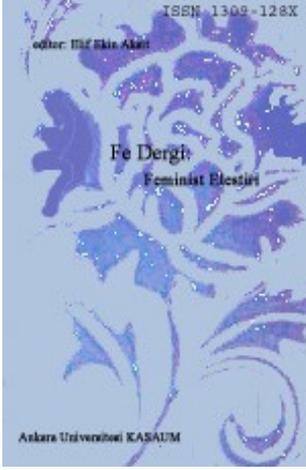


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Transformation of Gendered Engineering Culture in Turkey

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*Ezgi Pehlivanli Kadayifci **

This article aims to understand the factors creating gendered aspects in professional culture of engineering and its transformation in contemporary Turkey by using a theoretical tool called "Gendered Engineering Culture". The results of this study showed that engineering profession has a prestigious image in Turkey's society which is based on gendered codes and ideals. Mentioned codes mainly address male engineer as the ideal type whose characteristics have certain limits peculiar to Turkey. The results of this study also address engineer's fading image due to its changing role in the global economy. In addition, a slight change is also noted in gendered image of engineering on the social level, due to the increasing number of women participating in the profession.

Keywords: Gendered Engineering Culture; Construction; Transformation; Engineering; Turkey

Türkiye'de Toplumsal Cinsiyet Temelli Mühendislik Kültürünün Dönüşümü

Bu çalışmada, "Toplumsal Cinsiyet Temelli Mühendislik Kültürü" kavramsal aracını kullanarak, yakın zaman Türkiye'sinde toplumsal cinsiyet temelli mühendislik kültürünün inşasını anlamaya çalıştım. Mühendislik mesleği toplumsal olarak saygın bir meslek olarak inşa edilmiştir ve fakat bu mesleği icra edenler ile ilgili idealize edilen imge toplumsal cinsiyet temellidir. 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 grubu ise söz konusu iki konu üzerinde farklı görüş bildirmiş; mühendisliğin hala saygınlığını koruduğunu belirtmiş ve toplumsal cinsiyet temelli yapıda önemli bir değişiklikten bahsetmemiştir. Yukardaki önermeler ve kuramsal araç doğrultusunda, 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 hakkında algıları, toplumdan aldıkları tepkiler, okul ve iş hayatı deneyimleri kapsamında değerlendirilmiştir.

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

Giriş

This study is about gendered construction of engineering and its transformation in contemporary Turkey. It focuses 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" (Hacker, 1981). To do so, a theoretical tool called "gendered engineering culture" which is a modified version of the concept of "engineering culture" (Robinson & McIlwee, 1992) was introduced by adding a gender dimension to highlight the gendered features in engineering culture. Main arguments that triggers this study were originated from the feminist tradition which questions the gendered dimensions of scientific inquiry and technology. Mentioned tradition questions the 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. (Hacker, 1981; Fox-Keller, 1985; Harding, 1986; 1991)

In their critique of the existing system of scientific examination, feminist theorists (Fox-Keller, 1985, 1996; Harding, 1986, 1987, 1994, 2008; Haraway, 1988; Wacjman, 1991) 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,

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cannot be removed from the value systems and implicit biases and ideologies of its practitioners (Harding, 1991, 1989).

Gendered aspects of engineering culture are mainly determined by male 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). Such 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, 1991). It is reproduced in the socialization processes by imputing rational, analytical features with men, and emotional, illogical aspects with women. Although there have been women engineers globally since the 1930s, they have been accepted for only the past 30 years; women engineers have been able to earn a place in the labor market only recently. As a result of this historical formation, men have always outnumbered women in engineering in the world and also in Turkey. Women in Turkey found the opportunity to take place in engineering profession during the Republican era. It is a possibility that women's entering in engineering might have followed a similar path with other countries. However, contrary to the USA for instance, there are no sources telling women's productive role in wartime technologies in case of Turkey (Oldenziel, 2010) Yet it is reported that women began to take part in engineering sectors in the second half of 20th century (Naymansoy, 2010). Despite the visible efforts of Republican ideology encouraging women to enter engineering schools, the ratio of women engineers in Turkey reached up to %30's in 1950's and stayed stagnant until today (Smitha & Dengiz 2010).

There are a very limited number of studies concerning gender and engineering in Turkey. These studies were conducted particularly in the 2000s and consider women's underrepresentation in engineering occupations and their coping strategies. It has been 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 being one with a relatively higher participation than the USA or Europe (Tantekin-Ersolmaz et al., 2006; Bayrakçeken-Tüzel, 2004), yet many of the studies they produced have highlighted the discrimination women faced in male-dominated occupations (Zengin, 2000; Bayrakçeken-Tüzel, 2004; Smitha & Dengiz, 2010).

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 internalized gendered social structures, 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. On this basis, this article tries to answer two questions: *What are the social factors creating gendered engineering culture in Turkey?, and Is there a possible transformation of this culture in time and if so, how?*

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 engineers own narratives of the profession's image on the social level and on the factors in its creation.

I take gendered culture of engineering is a discursive formation based on patriarchal ideology that equates males with rationality, objectivity and assigns them as the ultimate producers of objective knowledge. (Faulkner, 2000, 2007, 2009; Brandth & Kvande, 2001; Cockburn, 1981; 1983; 1985; 1993; Mellström, 2002; 2004; Faulkner, 2009) Engineers 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 suitable for the socially imagined male characteristics that the socially idealized women characteristics usually do not fit in.

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.

Methodology

In this research, I deploy a feminist analysis of the gendered culture of engineering framed by qualitative research methods. At the beginning 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.

The data set of this research was collected via forty-three in-depth interviews. Interviews were conducted with 25 women and 18 men engineers¹ who were full time employed during the time of the fieldwork. Respondents were purposefully selected to constitute two main cohorts who were under and over age forty. Interviews were interpreted in regard to respondents' professional perceptions, reactions they get from the society, education and work life experiences.

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.

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, asserted that the common type of masculinity in engineering might be oppressive over some men engineers as well (Cech, 2005; Cech & Waidzun, 2011). Within the frame of this study, I accept that there are several masculinities and femininities and men as well as women might be affected by the operations of gender in engineering. Thus, I aim to address experiences of both women and men engineers by using feminist approach.

Gendered Engineering Culture in Turkey

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 due to Republican reforms (Öncü, 1982; 2003, Smith & Dengiz, 2010) According to the findings, 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 constructed in Turkey's society then I will examine the transformation in the mentioned culture.

Becoming the "big guy": the impact of male role models

Professional engineering was brought to Turkey in the early period of Republican reforms with its pre-given masculine codes. The profession was addressed as the engine of Turkish modernization. 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). From 1965 until the 2000s engineer-originated politicians became ruling figures of Turkey's politics. Turgut Özal², Necmettin Erbakan³ and Süleyman Demirel⁴ 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, and they contributed to the country's development by building dams, bridges and

buildings. 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.

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 country's expectations. Smart students also have the psychology of "becoming a big guy" because we have Özal, Demirel, Erbakan.. (Ömer, Man, Electric and Electronics Engineer, 62 years old)

Male 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 Demirel⁵. 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 (2008) suggests, engineers were the technical elites of Turkish politics.

Male participants of the elder cohort have grown up by watching and hearing engineer politicians. 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". 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 indicate any pursuit towards engineer politicians.

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.

Same group of participants argued they believe in the "Engineers' Ideology"; referring to the belief that engineers do also have social responsibility because of their ability of deduction (Göle, 2008). According to ten male participants in this study, by definition, an engineer is the one who has the potential for deduction. An engineer knows the logic of deduction by heart, in regard to his relationship with mathematics. Some think 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 Islamist, 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).

Another participant, Metin gave a parallel definition for engineering and its power of deduction:

An 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. (Metin, Man, Mechanical Engineer, 62 years old)

Women participants of this study stated by referencing their confrontation with male classmates and employees that engineering is always accepted to be a male-dominated occupation. Although engineering was thought to be a gender-free in Republican years because it was a new occupation in Turkey (Öncü, 1981), in fact, masculine aspects were already part of the engineering culture (Naymansoy, 2010) 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 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.

On the basis of these, the existence of this figures might be influential on especially elder male engineers in this study. As one participant 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. Thus, it can be argued that engineering had gained the mentioned legacy and respect with regard to these public figures.

Prestige of Engineering

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 prestigious image of engineering. This aspect fitted both women and men participants.

In addition to the successful student image, the unspoken hierarchy between engineering departments also determines the level of prestige. Respected departments were argued to be mechanical, civil and electrical engineering whose practice constitute the fundamentals of engineering. Mentioned fields 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 is perceived as a professional path to become middle-class in terms of income. In addition, engineering 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.

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 in McKenzie & Wacjman, 1987).

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... (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, mimics also determines the occupational class. Engineering in Turkey is mainly defined as a middle/upper middle-class occupation. However heterogeneous, many engineers also work with enough income to sustain middle/upper middle-class lifestyle.

Köse and Öncü (2000a; 2000b) 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 all cases, engineers have higher rank since they are conceived to be technical experts (Köse & Öncü, 2000a; 2000b).

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 independent technical group between administrators and blue-collar workers (Köse & Öncü, 2000b). Their 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 defined 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. (Zeynep, Woman, Geological 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 could (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. (Elçin, Woman, Metallurgy and Materials Engineer)

As it can be seen from the quotations, 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 think, social class was not noticed by some participants.

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.

The findings of this research showed 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.

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 thought to be a person who combines mathematical ability with the ability to cope with manual requirements of engineering.

Transformation of Gendered Engineering Culture in Turkey

In terms of differences among cohorts, a 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 engineer 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" (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. (Akın, Man, Mechanical Engineer, 60 years old)

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 entrance 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. (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 cannot. 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 before, engineer originated politicians were leading actors of 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 seem to be influential on the profession's image in the eyes of society.

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 engineers worked closer to blue collar workers within production. With Post-Fordist production, engineer and worker has physically separated and engineers became controllers of other engineers working for tasks other than production such as design, research, development and quality assurance (Ansal, 2000). Artun (1999) perceive this specialization as alienation from integrity of production processes and also from the product itself. According to Artun (1999), engineer lost its value as production is characterized by digital technologies. Machines have taken place of human power in factories now, cybernetics are employed instead of engineers' mental labor. Since digital technologies are tools of capitalist interests, engineer's role in this hierarchy is under pressure.

Concluding Discussion

In this article, I attempted to understand gendered construction of engineering occupation and its transformation in contemporary Turkey. Respondents 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. 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.

Findings of this study show that engineering profession had been conceived as a prestigious occupation on the social level. Findings 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*. Therefore, being addressed as the engine of modernization, professional engineering was brought to Turkey in earlier times of Republican reforms with its pre-given masculine codes. These codes articulated with Turkey's strictly patriarchal structure.

Understanding the dynamics behind the social prestige of engineering profession also helps exploring creation of gendered engineering culture in Turkey. Prestige were argued to be the most important feature of the profession's social image. According to 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 achieve becoming an engineer for both cohorts. 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, not welcomed.

In this study, participants of all age groups fulfilled the expectations of their social environment when they chose a path to engineering. Men felt it was natural, women decided out of causation. They both benefited from this choice to some degree. The findings show that engineering profession 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.

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.

These transformations made reflections on engineers in 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. 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 this 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 examined different worldviews among engineers in regard to Taylor's and Veblen's conceptualizations (Haşim & Köse, 2000). Their research is mainly about explaining the variety of class positioning 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.

Some findings of this research confirmed Haşim & Köse's (2000) 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 entrance into engineering profession is also asserted to be a factor for transformations in the global economy. 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, can be argued 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 led to a change in the social image.

It is also 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. If I go back to what I have argued in the beginning, I claimed that engineering profession was brought to Turkey with its pre-given masculine codes and it well suited to Turkey's patriarchal 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.

¹See, Appendix 1. Table of Participants

²The 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. Turgut Özal directed Turkey's politics after his party had firstly been elected in 1983 until his death in 1993 as a prime minister (Zürcher, 1993).

³Necmettin 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

⁴ Süleyman Demirel is 9th President of Turkey was born in 1 November 1942. He also served as Prime 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).

⁵The 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. Turgut Özal directed Turkey's politics after his party had firstly been elected in 1983 until his death in 1993 as a prime minister (Zürcher, 1993).

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References

Gluck, Sherna Berger, and Daphne Patai, eds. *Women's words: The feminist practice of oral history*. Routledge, 2013.

Ansal, H. "Dünyada Teknolojik Değişim ve Mühendisler". *Toplum ve Bilim*, 85 Yaz: 36-47, 2000.

Artun, A. *Fordizmin ve mühendisin dönüşümü*. TMMOB; 1999.

Artun, A. "Mühendis, 1975-2000". *Toplum ve Bilim*, 85 Yaz: 47-60. 2000.

Brandth, B., & Kvande, E. Flexible work and flexible fathers. *Work, Employment & Society*, 2001, 15(2), 251-267;

Cech, Erin A. "Understanding the Gender Schema of Female Engineering Students: A Balanced Sex-Type and an Ideal of Autonomy." *Women in Engineering ProActive Network* (2005).

Cech, Erin A., and Tom J. Waidzunus. "Navigating the heteronormativity of engineering: The experiences of lesbian, gay, and bisexual students." *Engineering Studies* 3, no. 1 (2011): 1-24. Cockburn, C. The material of male power. *Feminist Review*, 1981, pp. 41-58.

Cockburn, C. *Brothers: Male Dominance and Technical Change*, 1983, London: Pluto Press;

Cockburn, Cynthia. "Machinery of male dominance: Men, women and technological change." (1985).

Cockburn, Cynthia. "Caught in the wheels." *Marxism today* 27 (1983): 16-20.

Cockburn, C., & Ormrod, S. *Gender and Technology in the Making*. 1983, SAGE Publications Ltd.

Cockburn, C. On the machinery of dominance: Women, men, and technical know-how. *WSQ: Women's Studies Quarterly*, 2009, 37(1), 269-273;

Faulkner, Wendy. "Dualisms, hierarchies and gender in engineering." *Social studies of science* 30, no. 5 (2000): 759-792.

Faulkner, Wendy. "Nuts and Bolts and People' Gender-Troubled Engineering Identities." *Social studies of science* 37, no. 3 (2007): 331-356.

Faulkner, Wendy. "Doing gender in engineering workplace cultures. I. Observations from the field." *Engineering Studies* 1, no. 1 (2009): 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): 169-189.

Fox-Keller, 1982 in Harding & O'Barr, in 1987 Harding, S. & O'Barr, J. (ed.). (1987). *Sex and Scientific Inquiry*. Chicago University Press: Chicago.

Keller, Evelyn Fox, and Gertrude Scharff-Goldhaber. "Reflections on gender and science." (1987): 284-286.

Göle, N. *Mühendisler ve İdeoloji: Öncü Devrimcilerden Yenilikçi Seçkinlere*. 4th Edition. İstanbul: Metis Yayınları. 2008.

- Hacker, S.L. The culture of engineering: Woman, workplace and machine, 1981, pp. 341-353.
- Harding, S. The Science Question in Feminism, 1986; Harding, S. (ed.) Feminism and Methodology: Social Science Issues. 1987.
- Harding, S. G. "Whose science? Whose knowledge?: Thinking from women's lives", 1991;
- Harding, S. Sciences from Below: Feminisms, Postcolonialism, and Modernities, 2008;
- 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
- Mellström, Ulf. "Patriarchal machines and masculine embodiment." *Science, technology, & human values* 27.4 (2002): 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.
- Naymansoy, G. *Atatürk'ün Mühendis Kızları*. Eskişehir: Eskişehir Sanayi Odası Yayınları. 2010.
- Oldenziel, Ruth. "Decoding the silence: Women engineers and male culture in the US, 1878–1951." *History and Technology, an International Journal* 14, no. 1-2 (1997): 65-95.
- Öncü, A. "Uzman Mesleklerde Türk Kadını", N. Abadan-Unat, *Türk Toplumunda Kadın*, 1982
- Öncü, A. 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; 2003.
- Robinson, J.G. and McIlwee, J.S. Women, Men and the Culture of Engineering, 1991, pp. 403-421.
- Smitha, A. E. and Dengiz, B. Women in Engineering in Turkey - a large scale quantitative and qualitative examination. *European Journal of Engineering Education*, 35/1, pp. 45-57, 2010.
- Yeliz Günel GÜNAL, Y. (2013). *Neoliberal Transformation And Professional Middle Classes: Case Of Engineers In Turkey* (Doctoral Dissertation, Middle East Technical University, 2