The Gender Wage Gap in Turkey's ICT Sector

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Abstract

This thesis examines the extent, nature, causes and implications of the gender wage gap in the growing and value-creating ICT sector in Turkey. Although gender wage gap studies have focused on various levels of aggregation in Turkey – from the economy as a whole to particular sectoral and occupational settings – the ICT sector in Turkey remains largely understudied.

This thesis undertakes a primary quantitative and qualitative data collection approach and utilises a unique database as part of its mixed methods approach. In particular, the workforce of Turkey's top 500 ICT companies (based on turnover) in 2015 was targeted for both quantitative and qualitative data collection with employees and owners of these companies approached via LinkedIn. Online questionnaires and in-person semi-structured interviews with employees were carried out during the data collection process.

The most commonly used gender wage gap decomposition, both the simple and extended Blinder-Oaxaca models, was employed to calculate the gender wage gap in the Turkish ICT sector. The results of the decomposition indicated that the gender wage gap is *relatively* low (23 percent) within the Turkish ICT sector compared to other wage gap studies conducted on the overall Turkish economy. The most striking result from the decomposition analysis is that the gender wage gap in technical positions is much lower than in non-technical positions within the sector. The thesis demonstrates that the causes of this difference in the gender wage gap between technical and non-technical occupations are linked to the conventional causes of the gender wage gap, not least labour market discrimination and occupational segregation, while traditional explanations, such as human capital supply-side theories, cannot explain the gaps observed.

The thesis further analyses the causes of the gender wage gap within the sector by utilising both quantitative and qualitative data collected during fieldwork, revealing that women are wage-discriminated against as a result of discriminatory practices during hiring, motherhood and occupational segregation. Perceived direct or indirect costs of hiring women with and without children are found to be one of the major reasons for discrimination. The current marriage compensation law is another reason women are assessed not only on the basis of their qualifications, skills and experience but also their personal characteristics such as age, marital status, having children and so on. These factors decrease women's bargaining power during wage negotiations. Moreover, occupational segregation exists in the sector with technical fields predominantly occupied by male professionals. Women who do work in the technical areas tend to fill jobs with lower technical skill requirements, such as consultancy, as opposed to engineering or software development.

Finally, the thesis investigates the Turkish state's role in relation to development of the ICT sector, women's employment and gender equality while considering Turkey's industrial strategies and how the gender pay gap in the sector may be perceived and addressed in policy terms. The thesis highlights that, despite the recent rhetoric stating support for the production of technological knowledge and innovation via various projects, increased R&D funding, and newly established technology development zones and incentive schemes, the role of the state in relation to ICT sector development, employment and gender equality remains neglected in reality.

Overall, the thesis makes an important contribution to research on gender equality and economic growth in rapidly industrialising countries and sectors such as Turkey and its ICT industry. It reveals that gender pay gaps need to be understood and analysed alongside a country's growth strategy and at the sectoral and occupational level. Thereby, the thesis contributes to the literature in three ways: *(1)* conducting a gender wage gap analysis in a currently understudied labour market setting, the Turkish ICT sector, which is a value-adding and fast-growing sector; *(2)* using mixed methods and collecting and analysing a novel quantitative and qualitative database, generated from nearly 2000 respondents; and *(3)* developing a richer understanding of the causes of the pay gap and how these need to be understood alongside sectoral and economy-wide developments rather than treated in isolation.

To my father and my mother

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LIST OF ABBREVIATIONS

ABAP	Advanced Business Application Programming
AKP	Justice and Development Party
ANT	Actor-Network Theory
ANZSIC	Australian and New Zealand Standard Industrial Classification
ASEAN	The Association of Southeast Asian Nations
BERD	Business Expenditure in R&D
BMO	Chamber of Computer Engineers of Turkey
BTK	Information and Communication Technologies Authority
CEO	Chief Executive Officer
CERN	European Organization for Nuclear Research Organisation
COO	Chief Operating Officer
CPC	Central Product Classification
CSO	Chief Security Officer
CTO	Chief Technology Officer
DARPA	Defense Advanced Research Projects Agency
DHS	Demographic and Health Surveys Program
DI	Index of Dissimilarity
DİSK	Confederation of Progressive Trade Unions of Turkey
DİSK -AR	Confederation of Progressive Trade Unions of Turkey Research Department
DTM	Turkish Directorate General for Migration
ELI	Export-Led Industrialisation
ERP	Enterprise Resource Planning
EU	European Union
FDI	Foreign Direct Investment
FLFP	Female Labour Force Participation
FLFPR	Female Labour Force Participation Rates
FTE	Full-Time Equivalent
GAD	Gender and Development
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure On R&D
HR	Human Resources
HLFS	Household Labour Force Surveys
ICT	Information and Communication Technologies
IDI	ICT Development Index
İGEME	Export Development Centre
ILO	International Labour Organization
IMF	The International Monetary Fund
IOS	iPhone Operating System
IP	Internet Protocol
ISCO	International Standard Classification of Occupations
ISI	Import-Substituting Industrialisation
ISIC	The International Standard Industrial Classification of All Economic Activities
İŞKUR:	Turkish Employment Agency
IT	Information Technologies

KESK	The Confederation of Public Employees' Trade Unions
KOSGEB	Small and Medium Enterprises Development Organization of Turkey
LFP	Labour Force Participation
LFPR	Labour Force Participation Rate(s)
MENA	Middle East and North Africa
MP	Member of Parliament
MÜSİAD	Independent Industrialists' and Businessmen's Association
NACE	General Industrial Classification of Economic Activities within the European Communities
NASA	The National Aeronautics and Space Administration
NATO	The North Atlantic Treaty Organization
NHE	New Home Economics
NRI	Networked Readiness Index
OECD	Organisation for Economic Co-Operation and Development
OLS	Ordinary Least Squares
PCT	The Patent Cooperation Treaty
SAP	Systems, Applications and Products
SBIR	Small Business Innovation Research
SCO	Social Construction Theory
SD	Standard Deviation
SGK	Social Security Institution of Turkey
SIDA	Swedish International Development Cooperation Agency
STEM	Science, Technology, Engineering and Mathematics
STI	Science, Technology and Innovation
TİSK	Turkish Confederation of Employer Associations
TOBB	Union of Chambers and Commodity Exchanges of Turkey
TRL (₺)	Turkish Liras
TTGV	Technology Development Foundation of Turkey
TÜBİDER	Turkish Chamber of ICT Sector
TÜBİSAD	Informatics Industry Association of Turkey
TÜBİTAK	Scientific and Technological Research Council of Turkey
TÜRKSTAT/TÜİK	Turkish Statistical Institute
UIF	Unemployment Insurance Fund
UIS	National Employment Strategy of Turkey
UN	United Nations
UNESCO	The United Nations Educational, Scientific and Cultural Organization
US	United States of America
WAD	Women and Development
WDI	World Bank's World Development Indicators
WID	Women in Development
WPIIS	Working Party on Indicators for The Information Society
WWW	World Wide Web
YASED	International Investors Association in Turkey
YÖK	Council of Higher Education in Turkey

CHAPTER I

INTRODUCTION

1.1 Introduction

Gender inequality is one of the phenomena most frequently studied by social scientists, yet it remains a major barrier to human development. Despite a significant advancement in gender equality over recent decades, women are still disadvantaged in relation to educational access, health and survival, political empowerment and labour market participation and employment. Girls are more likely to be illiterate than boys, worldwide, with two-thirds of the world's 774 million illiterate adults being women (UNESCO, 2014). Sixty-three million girls are currently missing out on education and 130 million girls are absent from secondary school (Orenstein, 2016). According to UNESCO (2014), wide gender disparities still exist in youth, adult literacy, post-primary and higher education levels in some regions and countries. In relation to health and survival, women have higher mortality rates than men, as extensively observed in North Africa and in Asia, including China and South Asia (Sen, 2001). Women also receive less health care and support than men. Furthermore, 20 percent of women and girls (aged 15-49) have reported experiencing physical and sexual violence from an intimate partner, and, according to UN Women (2015), 49 countries offer no legal protection regarding violence against women. In the context of political representation, as of 2019, globally, there were only 21 women who served either as head of state or head of government. Likewise, the proportion of women in all national parliaments was only 24.3 percent (ibid.). With regards to labour force participation, female labour force participation rates (FLFPR) remain far below male participation for a variety of reasons, including strictly defined gender roles, gender stereotypes and biases, and patriarchal structures, traditions and customs. For instance, in 18 countries[1], women still cannot work legally without the approval of their husbands (World Economic Forum, 2015). Women spend three times as many hours on unpaid household/care work than men (UN, 2019). Furthermore, only in seven countries[2] are women given equal rights in work as men by law (World Bank, 2020). In the case of employment, women in many countries continue to experience gender bias in hiring, promotion, performance evaluation, training and pay, occupational segregation and discrimination in the workplace. Similarly, women earn less,

[1] Bahrain, Bolivia, Cameron, Chad, Congo Democratic Republic, Gabon, Guinea, Iran, Jordan, Kuwait, Mauritania, Niger, Qatar, Sudan, Syria, UAB, West Bank and Gaza, and Yemen (World Economic Forum, 2015).

[2] "Eight economies—Belgium, Canada, Denmark, France, Iceland, Latvia, Luxembourg, and Sweden—score 100, meaning that women are on an equal legal standing with men across all eight indicators." (World Bank, 2020, p.6)

on average, than men in both urban and rural areas worldwide, leading to a persistent gender wage gap around the world, regardless of the level of development countries experience.

The gender wage gap is one of the most significant forms of gender inequality at work. It persists as a globally significant issue not only in terms of fairness and equality grounds or due to the legal requirements in many EU countries but predominantly because of four primary negative consequences, discussed here. One argument is that the gender wage gap is *detrimental to economic growth*[3] (Klasen and Lamanna, 2008; Cassells et al., 2009; Schober and Winter-Ebmer, 2011; AAUW, 2012; Wolszczak-Derlacz, 2013). As a result of gender inequality, women are globally less likely to be educated, to participate in the labour markets or to perform paid work (World Bank, 2018). The loss of earnings due to gender discrimination limits women's choices and their ability to consume and invest in human capital such as education and training, compared to men. Lack of human capital lowers labour productivity and may lead to exclusion from labour markets and labour supply shortages. When the gap between male and female earnings is higher, productivity growth rates slow down (Wolszczak-Derlacz, 2013). To demonstrate, if the female labour force participation rate (FLFPR) was equal to that of men, the US economy would be 8.7 percent larger than today, the French economy 17 percent larger and the Japanese economy 14 percent (Tyson, 2019). As women receive just 82 percent of what men earn for full-time work, the individual loss would be $1.2 billion for a college graduate over the course of 47 years in the US.[4] Closing the gender wage gap would stimulate economic grow in the US economy by at least 3-4 percent (Bassett, 2012). Similarly, a report published by Cassells et al. (2009) for the Australian Department of Families, Housing, Community Services and Indigenous Affairs, demonstrated that the existence of a constant gender wage gap in Australia (15-17 percent between 1989-2009), had a substantial negative impact on Australia's economic performance. They estimated that the Australian GDP would have been $93 billion greater in the full absence of a gender wage gap. The second argument is that empirical studies report an *inverse relationship between increased earnings for women and domestic violence against women* (Tauchen et al., 1991; Farmer and Tiefenthaler, 2003; Bowlus and Seitz, 2006; Aizer, 2010; Heath, 2013; Munyo and Rossi, 2015; Anderberg, et al., 2015; Hsu, n.d; Alonso-Borrego and Carrasco, 2016; Paul, 2016). Lack

[3] Although Seguino (2000)'s influential paper demonstrates how gender wage differentials can boast economic growth, Schober and Winter-Ebmer (2011) provide evidence that Seguino's analysis only concentrates on a small sample of export-oriented countries during early industrialisation. Overall, they find a gender wage gap is detrimental to economic growth.

[4] "This study provides nationally representative information on the lives of students who received a bachelor's degree between July 1, 2007, and June 30, 2008, one year after college graduation." (AAUW, 2012, p. 35)

of labour market opportunities or lower wages for women compared to men, reduce women's bargaining power in the household. Limited economic resources decrease women's ability to escape a bad marriage, hence intimate partner violence becomes a tool for men to control both women's actions/behaviours and household resources, and also undermine women's autonomy in the household. (Bowlus and Seitz, 2006; Eswaran and Malhotra, 2011; Heath, 2013). With the increased employment opportunities and wages, her ability to end violent marriage enhances and she becomes far less tolerant of domestic violence (Hsu, n.d). Furthermore, abusive males may abstain from abusive behaviour against their intimate partners if they lost or fear to lose their jobs in order to avoid divorce or spousal insurance (Anderberg, et al., 2015).

The third argument for closing the gender wage gap is that doing so would reduce household debt, which is constantly increasing. According to AAUW (2019), women accounted for nearly two-thirds of the outstanding student debt in the United States, as of early-2019. Furthermore, full-time working women who graduated university in 2007/08 in the US were able to pay 33% of their student loan compared to 44% for that of men (Whaley, 2018). *The fourth argument,* the existence of gender wage gap primarily through gender discrimination, undervaluation of women's work, career breaks, occupational segregation and part-time work, not only limits women's choices and abilities to consume and invest during their working lives, but also jeopardizes their earnings in retirement both via state and occupational pensions. Women who, in fact, live longer than men are more likely to live in poverty, dependant on their husbands and adult children, and more likely to claim state welfare benefits in retirement. Indicatively, a report published by The U.S. Congress Joint Economic Committee (2011), found that the social security benefits for US women was 29% less than that of men in 2009. According to the Department for Work and Pensions for UK (2019), single women's net pension income per week was 88% of that of single men in 2017/18. Single women received 23% of their total gross income from occupational pensions and single men 28% for the same period. As a result, single women's 65% of total income came from state pensions compared to 49% for single men. Milli et al. (2017) who published a report for Institute for Policy Research by analysing 2014-2016 data, found that closing the gender wage gap in the US, would cut the poverty rate for all the working women from 8% to 3.8%, and from 28.9% to 14.5% for single women.

This thesis aims to explore gender inequality in relation to the gender wage gap in the Turkish context for the Information and Communication Technology (ICT) sector. ICT is considered as backbone for knowledge economies due to its significant contribution to productivity, economic development and global competitiveness. As the importance of ICT has become more and more visible during the last few decades, scholars (Papastergiou, 2008; Bandias and Warne, 2009; Khreisat, 2009; Griffiths and Moore, 2010; Castano and Webster, 2011) questioned women's presence in this speedily technological transformation of modern society through ICT. It has been found that women's participation in ICT is limited. For instance, Castano and Webster (2011) showed that in most OECD countries, the share of women in computing-related degree courses was below 30 percent and that women's ICT employment was between 15-40 percent in 2007. Only 25 percent of the ICT specialists in the US, 20 percent in northern European countries and 10-15 percent in the OECD countries were women. In the Turkish context, the share of women in ICT employment increased from 27 percent (2013) to 32 percent (2018) due to the rapid demand for ICT goods and services and technically-skilled labour shortages in recent years. With regards to the female enrolment in ICT-related degree and vocational courses, the share of female new admissions in both vocational schools and bachelor degrees decreased. It went from 6,021 (2013) to 5,758 (2018) females for vocational schools and from 540 to 470 females for the same years in bachelor's level.

The gender wage gap has been intensively studied in the literature for several decades both in developed and developing countries. There are a wide range of neoclassical, heterodox and feminist theories that attempt to bring different perspectives and explanations to the gender wage gap issue. There are also abundant number of empirical studies delving into gender differences in labour market outcomes in various levels of aggregation, e.g., country, sector, industry, region, firm and occupation. The theoretical and empirical literature reviewed in Chapter II. However, there is a very limited research both at the national and international level that focuses on the gender wage gap in a high labour-demand and a high-growth sector setting such as the ICT sector in Turkey. The findings of gender wage gap studies in Turkey ranges between 3-38% depending on the model and the secondary data used, these studies only provide country-specific rather than ICT sector-specific gender wage gap analysis. Similarly, the limited number of cross-national studies does not provide a detailed analysis of gender wage gap in the ICT sector (Belgorodskiy et al., 2012; Chamberlain, 2016; World Economic Forum, 2016; WageIndex Report, 2018). This gap is picked up and explored in Chapters VI and VII.

The ICT sector is particularly significant in Turkey, as it is relatively new, growing rapidly and facing a talent shortage. Its value more than doubled in nominal terms (from ₺61.6 billion to ₺131.7 billion during the period 2013-2018). The number of ICT firms increased from 31,434 (2013) to 44,718 (2018) and the number of employees in the sector almost doubled from 117,420 (2013) to 210,384 (2018). Therefore, the Turkish ICT sector has potential to transform the economy from an industrial to a knowledge-based economy. This thesis attempts to explore the role of the female labour force within the sector.

In particular, the primary objective of this thesis is to determine the gender wage gap in Turkey's ICT sector and the implications of this gap for the sector and for ICT women professionals. In order to achieve this objective, three questions are raised:

- *What is the extent and nature of the gender pay gap in Turkey's ICT sector?*
- *What is the distinction between the technical and non-technical gender pay gaps? What is the role of labour market distortions in explaining this distinction?*
- *What is the role of the state and state policies in shaping the gender pay gap?*

Existing studies of the gender pay gap at the national level tend to use secondary data and analyse the gender wage gap on a national or regional level due to the lack of micro-level data required for a sectoral and industry-level analysis. This thesis uses primary quantitative wage data obtained from online questionnaires and applies the Blinder-Oaxaca decomposition technique to estimate the size of the gender wage gap in the ICT sector (Chapter VI). It further complements the empirical results with qualitative data gathered through semi-structured in-depth interviews in 2018 (Chapter VII).

The thesis contributes to the literature by *first* conducting a gender wage gap analysis in a currently understudied labour market setting: that is, a sector high in labour-demand and growth that is relatively new, rapidly growing, evolving and the backbone of the knowledge economy, within the context of an emerging market, Turkey. Although the gender wage gap has been studied widely in the Turkish context, research has not been applied to the ICT sector. This in itself a significant blind spot, considering the role of ICT in Turkey's current and future growth and development. *Second,* the thesis uses a wealth of unique data from nearly 2000 respondents and employs a combined quantitative and qualitative methodology that offers a more thorough analytical grounding for tackling the research questions, by using mixed methods and the primary quantitative data collected via online questionnaires in 2018. *Third*, and most importantly, the thesis contributes to the literature by developing a richer understanding of the causes of the pay gap. The current literature treats gender wage gap issues in isolation; however, this thesis analyses the phenomenon alongside sectoral and economy-wide developments by looking at the labour market distortions in a growth sector.

In particular, as demonstrated in the analysis in Chapters VI and VII, it is clear that labour market distortions (labour supply shortages and unusually rapid sectoral growth) strongly influence gender wage gap outcomes. The technical gender wage gap in the Turkish ICT sector almost disappears because there are labour supply shortages for technically-skilled workers in a rapidly growing sector. Employers cannot afford to discriminate against women who have the skills and qualifications that the sector constantly requires. However, the non-technical gender wage gap remains a persistent issue as a result of discriminatory practices during hiring in relation to motherhood and as a result of occupational segregation. Women are associated with direct and indirect costs during hiring processes regardless whether or not they have children. Therefore, as opposed to conventional supply-side theories of gender wage differentials which neglect labour market distortions, this study demonstrates that demand-side factors (demand for technical talent and products in the sector) shape the nature and extent of the gender wage gap. Women working as technically skilled ICT professionals are paid premium rates for their technical skills, while women who are technically unskilled are penalised with lower wages. Similarly, the current marriage compensation law leads to discrimination, which may prevent them being hired by employers who fear that the law might be enacted during their employment. Men are assessed primarily based on their qualifications, skills and experience, while women are also assessed on the basis of characteristics such as age, marital status, having children and so on. Therefore, women are relatively weaker in wage negotiations during both the hiring and employment processes. Finally, occupational segregation is also visible, since technical fields in the sector are occupied mostly by male professionals and women continue to occupy roles that are considered ‘feminine’, e.g., HR and sales and marketing. Finally, looking specifically at the role of the state in the ICT sector’s development, employment and gender equality, the thesis highlights that although the Turkish state has implemented various projects, established more TDZs and increased incentives and funding for R&D, it has failed to create a link between ICT sector policies, employment policies and gender equality issues. Furthermore, the various state policies (discussed in Chapter VIII in more detail) regarding increasing women’s employment in the sector have made a positive impact on women's employment. However, the increase in women's employment has been achieved by providing subsidies at the cost of exhausting Unemployment Insurance Funds; therefore, it is not sustainable in the long term.

The rest of the thesis proceeds as follows. Chapter II starts by surveying the literature on gender and development and labour market trends in global and Turkish contexts. It surveys and critically assesses traditional and newer explanations for the existence of gender wage gaps. The thesis then defines the ICT sector in Chapter III, providing an overview of the global and national ICT trends. Chapter IV moves on to methodology in order to discuss the sampling framework, survey design and data collection techniques, representativeness of the survey sample and potential methodological limitations. Chapter V presents the descriptive survey results. In Chapter VI, a decomposition technique is employed to determine the characteristics of the existing gender wage gap in the Turkish ICT sector, followed by an analysis of several causes of the higher gender wage gap in the non-technical fields (Chapter VII) by consulting the results of the questionnaire and semi-structured interviews. Chapter VIII investigates the role of the state and policies and Chapter IX concludes.

CHAPTER II

This chapter offers a review of gender inequality phenomena found predominantly in labour markets and how these have been analysed in the theoretical and empirical literature and in the context of Turkey in particular. The chapter is divided into three parts. The first part (2.1) presents the historical evolution of the Turkish labour markets by looking at the past and current gender and development trends, labour force participation rates and more broadly the role of women within the various processes of development. The second part (2.2) provides a critical review of the mainstream and heterodoxical theories addressing gender wage gap issues as well as exploring the empirical knowledge, with the aim of preparing the ground for the methodological framework that will be discussed in Chapter IV. The third part (2.3) demonstrates the role of state and state policies in shaping gender wage gap outcomes that will be further delved into in Chapter VIII.

This chapter is essential for the remaining parts of this thesis for several reasons. *First*, it serves as a guide and justification for the theoretical framework offered in the next chapter (Chapter IV). *Second*, it helps us to better understand the Turkish ICT sector (Chapter III) by locating it within the general labour market trends and outcomes in Turkey, which are discussed below. *Third*, along with driving some of the questions from the questionnaire (e.g., Q28, Q33) gender wage gap theories enable us to anchor and interpret the findings of this research (Chapter VI) and the potential causes of gender inequalities (Chapter VII). *Fourth*, it provides a broader umbrella for Chapter VIII in this thesis, which explores the role of the state in gender equality, employment and ICT development. *Last*, this chapter evidences the relevance and contribution of this thesis by demonstrating an awareness and deep understanding of the wide range of literature, and then embedding and expanding it, thereby stressing its originality and significance for the existing literature.

2.1 GENDER, DEVELOPMENT AND LABOUR MARKETS

2.1.1 Gender and Development Trends in Turkey

Women's movements in Turkey go way back to the Ottoman Empire (1299-1918) during the second half of the nineteenth century. Movements for suffrage rights, most notably in the US and the UK, started during this period and suffrage rights in some European countries such as Norway, Finland, Iceland and Denmark in the early twentieth century. The Tanzimat era,[5] a period of reform from 1839 to 1876 aiming at modernisation, centralisation and reorganisation of the Ottoman Empire, implemented changes in various aspects of life – e.g., legal, military, political, economic, educational and social – also influencing the lives of Ottoman women. During the Tanzimat era, girls were allowed to participate in secondary and vocational schools, train as midwives in medical schools, and enrol in teacher training colleges; daughters were given inheritance rights equal to sons'; formal marriage in a civil court rather than in the presence of a Muslim scholar or religious leader, *ulema*, was introduced; and the purchase and sale of women slaves (*cariye*[6] in Ottoman Turkish) were banned (Kandiyoti, 1991; Bodur, 2005; Bakan, 2012; Çaha, 2013; Tomen, 2016). Various women's journals were published during the Ottoman era to report issues that women faced and to present new ideas and perspectives, e.g., *Terakki-i Muhadderat* (*Progress of Women*, 1869-70), *Hanımlara Mahsus Gazete* (*Newspaper Particularly for Women*, 1895-1909), *Kadınlar Dünyası* (*Women's World*, 1913-21) and *Türk Kadını* (*Turkish Women*, 1918-19) to name only a few (Altınöz, 2003). Women publicly questioned polygamy and repudiation rights that were given to men by sharia law (Tekeli, 2010), their unequal access to education and citizenship and their participation in politics; they also disseminated their ideas concerning marriage, family, childcare, work, domestic duties and women's clothing in these journals (Hanioğlu, 2010; Altınbaş, 2014). Several women's organisations were also established during the Second Constitutional Period (1908–1919) alongside journals to promote participation in the labour force, women's paid employment and working conditions, e.g., Teali-i Nisvan Cemiyeti (the Society for the Elevation of Women, 1908), Müdafaa-i Hukuk-i Nisvan Cemiyeti (the Society for the Defence of Women's Rights, 1913) and the Islamic Association for the Employment of Ottoman Women

[5] 'The Tanzimat, a series of reforms during 1839-1876, denotes a period of social and political reform that transformed the Ottoman Empire by integrating institutions deliberately copied from Western Europe; a response to both internal and external political pressures… The Edict of Reforms (1856) guaranteed Muslims and non-Muslims equal rights and obligations regarding military service, the administration of justice, taxation, education, and employment.' (Oxford Reference, 2019).

[6] *Cariyes* were young women, women slaves, who were abducted from foreign countries as war booty, deprived of liberty and sold at the slave markets.

in 1916 (Kandiyoti, 1991; Altınbaş, 2014; Biçer-Deveci, 2014; Tomen, 2016). With the fall of the Ottoman Empire in 1918 after over 600 years, the Republic of Turkey was established after a long battle – the Turkish Independence War (1919-1923) – by Mustafa Kemal Atatürk in 1923.

Democratisation, modernisation and civilisation of the Turkish state from the remains of the Ottoman sharia system was a radical transition and beneficial for women. 'Women's emancipation in the early Turkish Republic was a state project' – rather than a result of the women's movement – which perceived women as the delegates of secularism and modernism, and signalled the 'disappearance of religion and tradition from the public sphere' (Tomen, 2016, p. 20). Diner and Toktaş (2010) argue that the first wave of feminist movements in Turkey took place in the early twentieth century despite its small size and short life. A large number of progressive reforms were initiated in a very short time to engender a radical break from the rules of Ottoman Islam and its institutions,[7] (Kandiyoti, 1987, 1991). Ayata (1997) believes that 'women were the primary benefactors of the Republican reforms' (p.60). These reforms were enriched with a new constitution based on secular principles rather than religion, which was to be considered as a private matter and separated from state affairs (Özçetin, 2009). The Turkish Civil Code, a slightly modified version of a secular Swiss Civil Code, was adopted in 1926 (Kandiyoti, 1991), and Turkish women were granted crucial civil and political rights with the birth of the new republic. Polygamy was banned, women were seen equals to men by law and granted equal rights for divorce and child custody, and the modern style of women's clothing was promoted instead of veiling (Kandiyoti, 1987, 1991; Gündüz, 2004). There was even an attempt to establish a political party for women's rights in 1923, the Women's People Party, though it was refused. The single-party regime of the new republic aimed at ensuring the state's superiority over society, arguing that there was no real need for the emancipation of women, since they were granted 'equal' rights as men; thus, the Women's People Party was transformed into a women's association, Türk Kadın Birliği (Turkish Woman's Union) in 1924 and completely dissolved in 1935 (Bodur, 2005; Tekeli, 2010; Diner and Toktaş, 2010; Çaha, 2013). The new republic had a clear mission with regards to women's emancipation, that is, women should have had equal rights as men; however, all of these rights would need to be

[7] 'In a single day, on 3 March 1924, the Caliphate was abolished, education was made a monopoly of the state, and the medrese (religious education) system was terminated. Religious affairs and the administration of the vakif (pious foundations) were henceforth allocated to directorates attached to the office of the prime minister. This was followed by the elimination of religious courts in April of the same year. The tarikats (mystic religious orders) were banned in 1925. The constitutional provision accepting Islam as the religion of the state was finally abrogated in 1928.' (Kandiyoti, 1991, p.22).

within the boundaries of the state (Hamzaoğlu, 2017). Women were given rights to vote in local elections in 1930 and granted universal suffrage in 1934, much earlier than most of the developed countries of today[8], e.g., France, Italy and Switzerland. In 1935, 18 women, 13 of them teachers, were elected to the national parliament, accounting for 4.5 percent of the parliament, one of the highest shares of its time compared to other countries (Bodur, 2005; Tekeli, 2010; Hamzaoğlu, 2017). The percentage of women in the parliament for the first time passed this rate in 2007 with 9.1 percent (Tomen, 2016). Turkey had seen the first woman doctor and dentist (1924), lawyer (1927), judge (1930), mayor (1930), pilot (1932), midwife and an MP by 1935 (Bakan, 2012; Saygın, n.d.). Despite all these reforms and initiatives, some scholars argue (Bodur, 2005; Tekeli, 2010; Çaha, 2013) that the women's movement went into silence for nearly half a century from 1935 until the 1980s.

The second wave of feminist movements in Turkey started from 1980 onwards. In September 1980, Turkey experienced a military coup as a response to the polarisation, political violence and terrorism of the previous years, which transformed the economic, political and social landscape of the country (Tekeli, 1995; Müftüler-Bac, 1999; Sayari, 2010). Paradoxically, feminist movements, primarily led by the 'new generation of the middle-class, left wing, intellectual women' (Tekeli, 2010, p. 120) who were well informed about the new ideas surrounding feminist movements in Western societies (Tekeli, 2010), gained leverage and became active again post-1980. To mention a few achievements of the time: legalisation of abortion in 1983[9]; protests against domestic violence at home and sexual harassment in the public sphere; opening of various women's shelters in the late 1980s; establishment of several women's institutions in the 1990s such as Women's Library and Information Centres (Müftüler-Bac, 1999, p.311) and Women's Research Centres at universities so as to enable women to share information on women's issues (Öztürkmen, 2013); and the establishment of the Ministry of Women's Affairs in 1991 (Müftüler-Bac, 1999). Article 159 of the Civil Code, which required married women to get their husbands approval to work, was abolished in 1992 on the grounds that it damaged the principle of equality (Gündüz, 2004). The second wave of feminist movements sought autonomy and highlighted how issues around women's sexuality

[8] New Zealand (1893), Australia (1902), Finland (1906), Norway (1913), Denmark (1915), Canada (1917), Austria, Germany, Poland, Russia (1918), Netherlands (1919), United States (1920), Sweden (1921), UK (1928), Spain (1931), Turkey (1934), France (1944), Italy (1945) and Switzerland (1971).

[9] Although abortion, which is subject to husband's approval in case of marriage and can be practiced until the tenth week of pregnancy, was legalised in 1983, women's access to abortion is limited due to the conservative patriarchal values in Turkey regardless of urban or rural locations (Gürsoy, 1996; Cavallo, 2015).

were used as a means for male dominance, sex discrimination, male aggression and assault against women, regardless of private or public spheres (Bodur, 2005; Diner and Toktaş, 2010) in addition to virginity testing[10] (Tekeli, 2010) that was 'discriminatory, highly invasive, and often involuntary' (Lasco, 2002, p.10). They also challenged the idea of 'egalitarianism' as family arrangements enacted in the 1926 Civil Law dictated that the husband was the head of the household, thereby, according to some (Müftüler-Bac, 1999; Tekeli, 2010), establishing a hierarchy between husband and wife. In 2001, with the reforms of the Civil Law, the husband lost the status of head of the family. Furthermore, the old property rights legislation, which dictated that a wife should not have an equal share of the family's income and wealth in cases of divorce, was replaced with a new regime which entitled the wife to an equal share of the income and wealth acquired during the marriage, applicable from January 2002 onwards. Similarly, as Tekeli (2010) explains, various forms of activism through lobbying, public discourse, petition campaigns and so on, finally led to a state recognition of the need for protection of women's bodies against their husband's violence by adopting the Protection of the Family Act in 1998. However, Müftüler-Bac (1999) argues that 'one common denominator for all social groups in Turkey' (p.311) is the concept of sexual purity of women, which is used as a medium to determine their value and is not a personal choice, that is, being a non-virgin may lead to social alienation and marginalisation.

Two new feminist paradigms, Islamic and Kurdish, also emerged in Turkey in the late twentieth century with the rise of identity politics[11], as an alternative to the secular feminism which had started a century before (Ayata, 1997; Badran, 2005; Diner and Toktaş, 2010). Privatisation of media channels and other liberal economic reforms allowed women from all walks of life to voice their views on identity, patriarchal gender roles and family values, and the role of the state, which eventually led to the emergence of political Islam (Dorroll, 2016). With the history of political violence and terrorism in the late 1970s and resurgence of Islam in the 1980s (O'Neil, 2010), public clothing regulations came into force after the 1980 coup on the grounds that Islamic dress jeopardised the order of a secular society. With these regulations, Turkey banned the Islamic headscarf at schools and universities, public institutions and

[10] 'These tests involve the physical examination of a woman's hymen for tears to determine whether the woman is still "a girl" (the term Turkish doctors use to refer to a virgin). Underlying the practice of virginity testing are cultural norms, which dictate that women who are not virgins may not be considered eligible for marriage and could bring dishonor to their families. This is especially true in rural areas of predominately Muslim Turkey… In February 2002, Turkey issued a decree banning forced virginity testing.' (Lasco, 2002, p.10).

[11] Identity politics is 'a tendency for people of a particular religion, race, social background, etc., to form exclusive political alliances, moving away from traditional broad-based party politics' (Oxford Lexico Dictionary, 2019).

hospitals, and violation of the law resulted in exclusion from universities, loss of public employment, stigmatisation and discrimination (White, 2002; O'Neil, 2010; Dorroll, 2016). With Islam being the largest religion in Turkish society, Islamist feminism was initiated as a response to the existing broad-based party politics and included street protests, sit-in protests at university gates (primarily against the headscarf ban), alternative journal and periodical publishing and the establishment of various associations (Ayata and Tütüncü, 2008; Diner and Toktaş, 2010). While secular feminism attempted to adopt the principles of Western democracy and did not involve itself in religious-based gender-roles (i.e., full equality of men and women in all aspects of life), Islamist feminists, some argued (Moghadam, 2002; Badran, 2005; Diner and Toktaş, 2010), challenged the hierarchal gender roles and fought for gender equality within the Islamic framework in areas, e.g., religious freedom. Similarly, Kurdish women's movements, despite the existing political activism of the 1960s and 1970s (Çaha, 2011), re-emerged in the 1980s as a criticism of the Turkish state for its unitary, nationalistic forced assimilation policies and lack of recognition of identity and cultural rights (Çaha, 2011; Tomen, 2016; Al-Ali and Taş, 2017). Kurdish women have become more conscious of ethnicity, gender and their rights over recent decades, making their voices heard through similar channels to those employed by secular and Islamist feminists, such as publications, associations and protests (Gökalp, 2010; Çaha, 2011). Both the Islamist and Kurdish feminist movements strongly criticised mainstream secular feminism in Turkey for its neglect of other ethnic and religious identities (Diner and Toktaş, 2010).

This analysis of the historical evolution of women's rights in Turkey reveals that the first and most significant transformation of women's position in society was led primarily by a secular state, as part of a radical break from the Ottoman Islamic system in a transition to a modern and civilised state, rather than the changes in Western societies, where such rights were granted to women as a response to strong women's movements. Kandiyoti (1987) persuasively states that Turkish women were 'emancipated, but unliberated' within the new republic. They were emancipated 'early, explicitly, and extensively' (p.320) with various progressive reforms and equal rights granted from education, marriage, divorce and child custody to participation in politics and the workplace, yet they remain unliberated within the existing patriarchal order and strictly defined gender roles (e.g., women's sexuality, sex segregation and domestic roles that are untouched by the Turkish state), a situation worsened by the lack of women presence in the political sphere. Unlike the relative invisibility of the first wave of women's movements until the 1980s, Turkish women were granted further rights (e.g., abortion rights, protection against domestic violence and lifting of the headscarf ban) thanks to the second wave of women's movements, as well as to the emergence of Kurdish and Islamic women's movements. However, there remained discriminatory practices against women: abortion was not legal until 1983; until 1992, women were required to seek the permission of their husbands before working; the law on domestic violence against women was passed in 1998; and women were unequally treated during divorce processes with regards to income, wealth and property rights until 2002. This suggests that both the lack of laws and legislation and the patriarchal mentality have contributed to gender inequality in Turkey.

Despite the aforementioned constitutional reforms, women's rights activism in Turkey has been reshaped following the coming to power of the Justice and Development Party (AKP) in 2002 with the help of Islamist feminists. The AKP gender-equality reforms were mainly pushed forward by the efforts of Islamist feminists. The new Penal Code that abolished the most discriminatory practices against women and levied heavy penalties for honour killings and marital rape was introduced by the AKP government in 2004 (Negrón-Gonzales, 2016), followed by the lifting the decades-old 'headscarf ban' in 2013, which prohibited headscarved women from accessing public institutions on the basis of religious freedom, and these are only two of the reforms undertaken by the conservative government. Given that policies such as the 'headscarf ban' or the need to seek a husband's permission for a woman to work have limited participation of particular groups of women in the labour market or in particular employment sectors in the past, the state's efforts to amend such laws and policies should have positive implications for women's access to the labour market and for potentially narrowing gender wage gaps. However, the role of Islamist feminism has been limited to the 'regeneration' of traditional gender roles. The ruling party has continuously promoted traditional gender roles and patriarchal family values in society that define the primary role of women as mothers and housewives and the primary role of men as breadwinners and heads of households. The conservative government's discourse on the reproductive role of women – that is, to have at least three children, 'childless women are deficient, incomplete' (The Guardian, 2016) – on rape, abortion, domestic violence, work and so on, a discourse embedded within patriarchal and religious contexts, has narrowed women's private and public spheres. The ruling party has favoured a 'pro-family approach which subsumes women's issues under family issues' (Negrón-Gonzales, 2016, p.201). There has been an increase in the number of women's organisations over the past decade, as a consequence of political, economic, demographic and technological changes in Turkey (ibid.), and a rise in the visibility of conservative and Islamist women in the public sphere thanks to AKP policies, e.g., Islamist women began writing in pro-government newspapers as columnists (Arat, 2016). However, Ayata and Tütüncü (2008) state that women in the AKP have not made any significant impact on increasing women's representation, changing the rhetoric and political programme or occupying higher positions within the organisational structure. Women are still perceived as 'transmitters and protectors of dominant social values and norms' (Müftüler-Bac, 1999, p.305). The more women's reproductive role remains at the centre of public discussion, the higher the level of constraints that women experience in private and public arenas as a result of a defined gender hierarchy that places men above women. On one hand, they are supposed to play a conventional reproductive role, while being productive in the labour market on the other.

Overall, the primary obstacle for achieving gender equality in Turkey, Bozkurt (2013) argues, has never been the lack of legislation but the existence of patriarchal mentality. Turkish laws have always criminalised gender inequality and various international agreements have been ratified to protect women from violence and prevent discrimination. However, even if 'the best, most progressive laws with excellent protection mechanisms' (p.36) are enacted, Bozkurt continues, these laws do not bring any change to women's situation in the country unless authorities are also fully committed to gender equality. Despite laws, legislation and conventions promoting gender equality, the current state of gender equality in Turkey supports Bozkurt (2013)'s argument. Regardless of their ethnic, religious or sexual identities, women continue to experience high levels of domestic violence and honour killings both in urban and rural areas; underage pregnancy and economic dependency remain as a result of low female LFP and employment, and limited political representation and decision making continue as well as gender disparities in income and wealth (İlkkaracan, 1998; Kocacık et al., 2007; Ege et al., 2014). Turkey was ranked 130th out of 149 countries in the *Global Gender Gap Report* in 2018, scoring particularly low in the categories of economic participation and opportunity, and political empowerment. As a nation with a diverse spectrum of ideologies, values and beliefs across various facets of life, Turkey has fluctuated between secular and religious framings, which often clash in relation to women's position in society. However, regardless of which political party is in power, the state upholds patriarchy, albeit to differing degrees, by promoting strictly defined gender roles, gender stereotypes and biases: e.g., men continue to be seen as the primary breadwinners and heads of the family; only a husband's surname is used as the family name, while women remain the primary carers within families. As a result, since patriarchal norms and structures are privileged, reforms in policies and regulations do not bring substantial weight to bear on gender inequality and gender-based discrimination. Keeping this in mind, this thesis will analyse the role of the state in promoting women's employment and gender equality in the historically male-dominated ICT sector (Chapter VIII), both of which have an impact on the gender wage gap outcomes. The section below will now look into the implications of these often unwritten but deeply entrenched patriarchal norms on women's development and progress in Turkey.

2.1.2 Women in Global Labour Markets and in Turkey

Women's labour force participation is a much-debated issue in the literature, particularly in developing countries due to its perceived significance to economic development. One stream of analysis within this literature uses the term '*feminization of employment'* (p.517) to emphasise the gender dimension to the issue (Buğra and Yakut-Çakar, 2010). According to the Turkish Statistical Institute, the labour force comprises all employed and unemployed persons. Labour force participation rate (LFPR) can then be defined as the ratio of the labour force to the non-institutional working age population.[12] Employment rate represents the ratio of employed persons within the non-institutional working age population and the unemployment rate is the ratio of unemployed persons within the labour force. The graphs for labour force participation, employment and unemployment rates in the section below are provided based on Household Labour Force Survey implemented regularly by the Turkish Statistical Institute.

In a report by the ILO (2019b), *World Employment Social Outlook Trends in 2018*, the global gap in labour force participation between men and women that year was 27 percentage points, that is, only 48 percent of all working-age women and 75 percent of all working-age men participated in the labour markets, globally. Although the global LFPR is higher for men than for women, the FLFPR has risen rapidly from an average of 54 percent in 1980 to 71 percent in 2010 in most OECD countries over the last few decades (Fullerton, 1999; Standing, 1999; Lim, 2002; Jaumotte, 2003; Lisaniler and Bhatti, 2005; Thevenon, 2013; Verick, 2014). The timing and speed of this increase have varied in these countries. For instance, female employment rates were persistently high (over 70 percent) in Nordic countries and constantly low (around 30 percent) in Turkey (Tansel, 2001; Buğra and Yakut-Çakar, 2010; Uraz et al.,

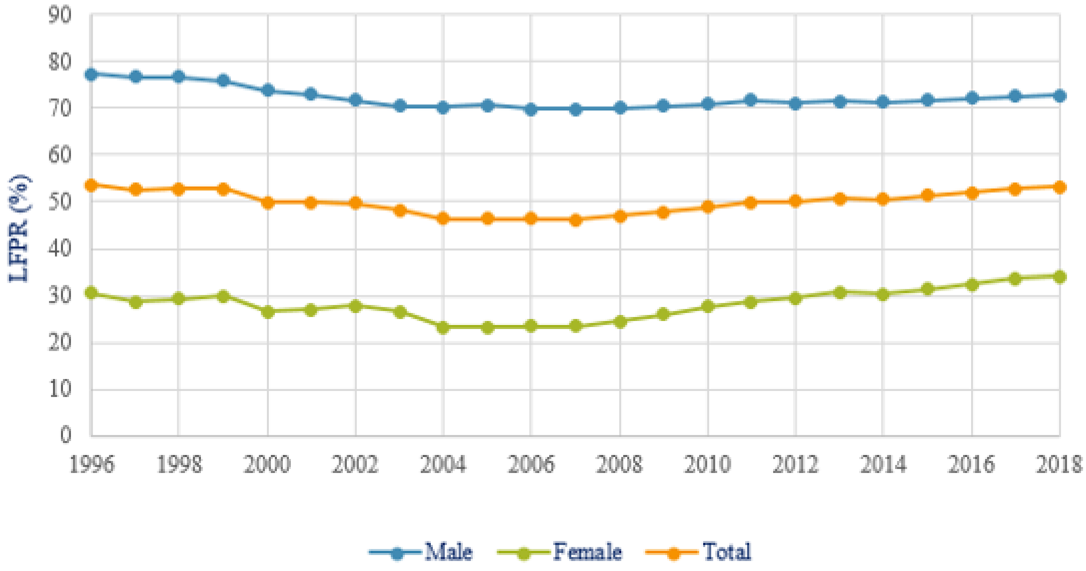
[12] Non-institutional population: comprises the whole population excluding the residents of university dormitories, orphanages, rest homes for elderly persons, special hospitals, prisons and military barracks etc. Non-institutional working age population indicates the population aged 15 years and over within the non-institutional civilian population (Turkish Statistical Institute, 2020).

2010; Thevenon, 2013; OECD, 2016a). The FLFPR in Turkey dropped from 72 percent in 1955 to 48 percent in 1980 to about 29 percent in 2014[13] (Tansel, 2001; Uraz et al., 2010; WDI, 2017) and it had the lowest rate (26.6 percent) among OECD countries in 2010 (Dildar, 2015). Furthermore, gender bias in official statistics, which is the result of negligence when collecting data on women, is still a serious issue in the literature. Standing (1999) argues that the globally recorded participation rates are affected by conceptual and statistical practices that have neglected and undervalued much of women's work. Bearing this in mind, Turkey's exceptionally low FLFPR should be investigated in terms of its relationship to gender wage gap outcomes. For instance, Blau and Kahn (2017) argue that LFPR is a key component in understanding developments in women's wages, since employment (experience) is the condition for the receipt of wages. Furthermore, women's lower attachment in the labour market is the crucial factor influencing the gender wage gap (section 2.2). In our study (Chapter VI) we also found that the experience variable is the most important driver of wage disparities between men and women in the Turkish ICT sector. Therefore, it is necessary to examine labour market participation and the factors affecting it to have a better understanding of the gender wage gap in the sector.

Figure 2.1 reveals that in recent years, the FLFPR (15+) in Turkey has increased from 30.3 percent (2014) to 33.1 percent (2020). Although this is a positive improvement for women and the Turkish economy for the reasons discussed below, it is still too little compared to the male LFPR which has stayed, on average, at 73 percent since the 1990s when women's LFPR has been only 29 percent on average.

[13] The data on TÜRKSTAT has been constantly updated. FLFPR is recorded as 30.3 percent in 2014, as of December 2019.

FIGURE 2.1: Labour Force Participation Rate (%, 15+) by Sex, 1996-2018



Source: TurkStat, Labour Force Statistics (2019)

Women's participation in the labour force is desirable for several reasons, both at macro and micro levels. At the macro level, the FLFPR is a substantial driver of growth and development; hence, participation rates signify the potential for a country's rapid growth (Çağatay and Özler, 1995; Bloom et al., 2009; Verick, 2014; Dildar, 2015). Bloom et al. (2009) connect the *'miracle'* economic growth in Asia and Ireland to the rising FLFPR owing to reductions in the birth rate. In addition, women's employment is also positively correlated with their economic independence and empowerment. Working women are found to be more involved in the decision-making process of family matters such as wellbeing of children, family budget, education and health than non-working women (Dildar, 2015). The higher the labour market participation, the better women's social and economic position in society (Mammen and Paxon, 2008; Lahoti and Swaminathan, 2013). Finally, women's engagement with economic activities reduces poverty risks. Verick (2014) claims that in many developing countries, women join the labour market as a coping mechanism in response to economic shocks.

The inclusion of women in the labour force is also beneficial at the micro level. Under-utilisation of female labour diminishes the utilisation of human capital. Becker (1985) argues that specialised human capital creates a division of labour in the allocation of time and investment. Non-participation of women in the labour markets indicates a waste of human resources, thus deteriorating human capital and potential future earnings for individual workers (Schultz, 1961; Topel, 1990; Argy, 2005). However, women are disadvantaged in the job market for three reasons, according to Kanji and Menon-Sen (2001). *First,* women workers are perceived as chiefly responsible for reproductive and domestic work and this perception creates structural barriers that prevent women from education, training, land and productive assets. *Second*, reproduction and domestic work restrict women's time and mobility for productive work. Men are also favoured for paid employment in the labour force since women are seen as secondary earners. *Finally,* women do not have the same access to productive resources and services as men, since they are seen inherently less productive relative to men.

Turkey's distinctly low FLFPR and the factors found to be influencing Turkish women's engagement in the labour markets have been explored by many scholars (Dayıoğlu and Kasnakoğlu, 1997; Tansel, 2001; Jaumotte, 2003; İnce, 2010; Dayıoğlu and Kırdar, 2010; Taymaz, 2010; Uraz et al., 2010; Gedikli, 2014; Dildar, 2015). Among these scholars, there is a consensus that *education, urbanisation, fertility, social norms and culture, general labour market conditions,* and *policy stances* remain the major determinants of women's roles in the world of work. The section below attempts to analyse each factor affecting the Turkish FLFPR in more detail, while presenting the overall picture, and recent trends, of women's position in the labour market for Turkey.

2.1.3 Factors Affecting Female Labour Force Participation in Turkey

(i) Education

There is a consensus among scholars that education is one of the major determinants of women's access to the Turkish labour markets (Psacharopoulos and Tzannatos, 1989; Dayıoğlu and Kasnakoğlu, 1997; Tansel, 2001; Uraz et al., 2010; Buğra and Yakut-Çakar, 2010; Taymaz, 2010; Dayıoğlu and Kırdar, 2010; İnce, 2010; Gedikli, 2014; Dildar, 2015). Education may have a strong positive impact on the LFPR for a number of reasons. *First*, education is seen as an investment in human capital that requires a cost according to human capital theory, which will be picked up in section 2.2 in this chapter. If the cost is not paid back later in life through employment, no financial benefit has been gained from it. *Second*, the higher the expenditure on education, the higher the opportunity cost of not working due to non-utilised future potential earnings (Tansel, 2001; Dildar, 2015). As a result, the higher the educational attainment of women, the higher the level of their labour force participation in Turkey, which is also evidenced in Figure 2.2. *Third*, the level of education has been linked to lower fertility rates which has a consequence of higher LFP (İnce, 2010; Dayıoğlu and Kırdar, 2010; Göksel, 2012). However, Başlevent and Onaran (2004) suggest that the increased years of schooling in Turkey partially caused the withdrawal of the younger population from the labour force.[14] *Finally*, education is seen as a door to labour markets, which is the argument of human capital theory. For instance, Dayıoğlu and Kırdar (2010) assert that the urban labour market is practically closed for non-educated women in Turkey, noting that the urban female LFP there was only 5.6 percent in 2006 for illiterate individuals as opposed to 36.4 percent for illiterate men.

Some scholars (Uraz et al., 2010; Göksel, 2012, Gedikli, 2014; Dildar, 2015) challenged the idea of lower educational attainment being the sole cause for Turkey's persistently low female LFP. Turkey has made a gradual but continuous progress in women's schooling (Buğra and Yakut-Çakar, 2010; İnce, 2010; Gedikli, 2014). Women adult literacy rates increased from 45.1 percent (1975), then 68.5 percent (1990) to 93.5 percent (2016). According to the World Bank WDI Database (2020), primary (91.2 percent), secondary (15.1 percent) and tertiary (1.91 percent) gross female enrolment ratios in 1971 increased to 92.7 percent (2017), 103.4 percent (2017) and 19 percent (1999), respectively.[15] Despite a significant increase from 61.6 percent (1975) to 96.2 percent (2017) in overall adult literacy levels, the female adult literacy rate in 2017 still remained low at 93.5 percent compared to men's (98.8 percent). Smits and Hoşgör (2006) state that non-enrolment among girls is especially high in the countryside and eastern part of the country. Despite mass schooling and the state-sponsored education system and policies (Smits and Hoşgör, 2006), the majority of women only have a primary level education (Dayıoğlu and Kırdar, 2010).[16] Low participation in the labour force is particularly prevalent among low-skilled urban women (Uraz et al., 2010). However, Göksel (2010) expresses that the educational attainment gap between men and women is closing in recent years, but

[14] The duration of compulsory education in Turkey was five years until 1997. Eight years of compulsory schooling was introduced with 1997 reforms. In 2012, it was increased to 12 years.

[15] The gross enrolment ratio for primary (secondary, tertiary) schools is calculated by dividing the number of students enrolled in primary education (secondary, tertiary education) regardless of age by the population of the age group which officially corresponds to primary (secondary, tertiary) education, and multiplying by 100.

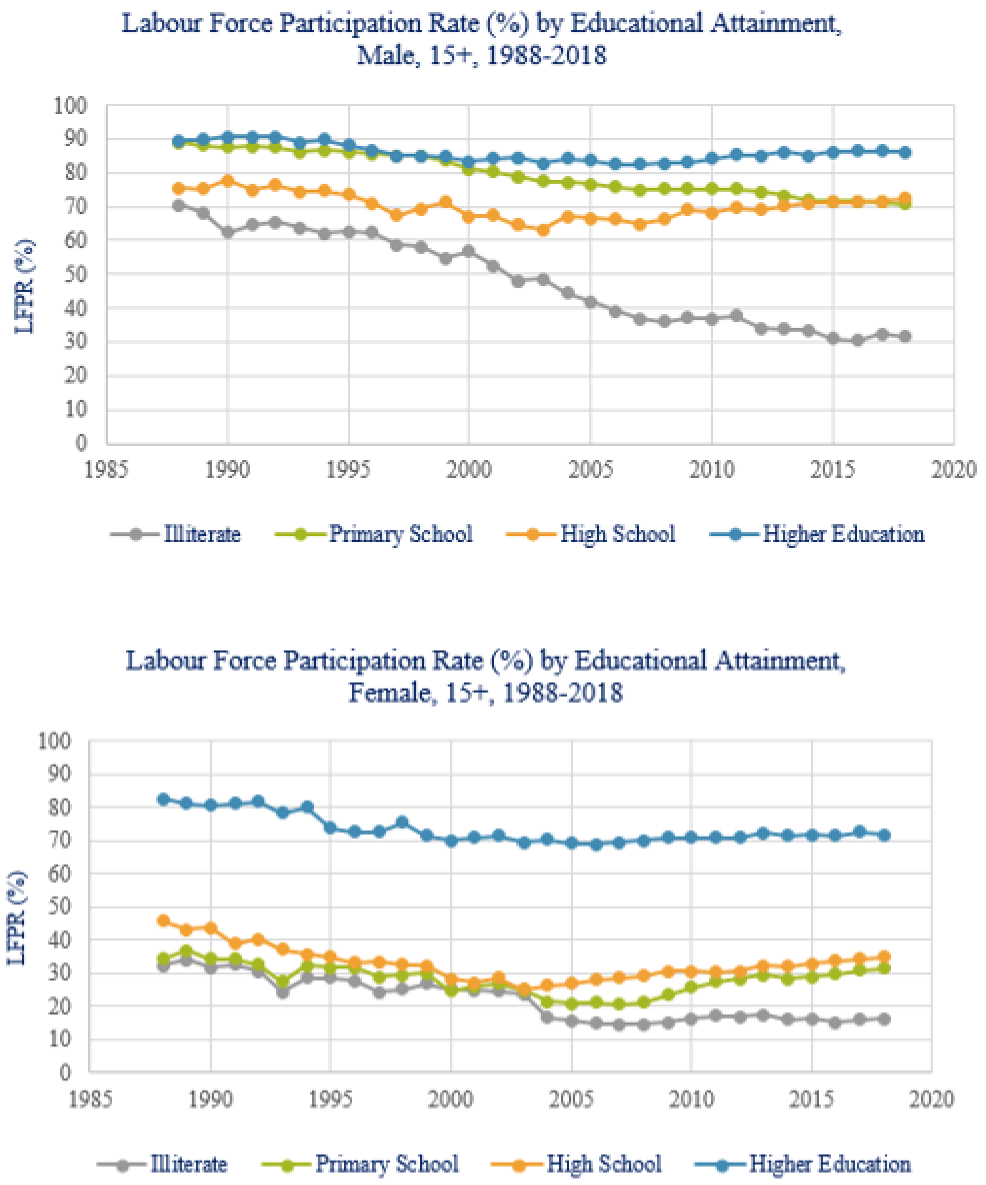
[16] A decade after the study of Dayıoğlu and Kırdar (2010), according to National Education Statistics Database, 2018, population by attained education level (six years and above) indicates that the share of females with primary education was highest by 38 percent, followed by high school (18 percent), secondary school (12 percent), university (12 percent), illiterate (5 percent) and master's and a doctorate (<2 percent).

women's LFP remains low. Thereby, a low level of education cannot be the only reason for women's underrepresentation in the labour force.

On the other hand, a considerable number of studies (Tansel, 2001; Buğra and Yakut-Çakar, 2010; Uraz et al., 2010; Dayıoğlu and Kırdar, 2010; Dildar, 2015) report that educational attainment has a stronger impact on participation for women. Figure 2.2 points out that the LFPR was highest, on average, among people with higher educational degrees for both men (86 percent) and women (73 percent) since 1988. The LFPR dropped from 70.5 percent (1988) to 31.4 percent (2018) for illiterate men and from 32.3 percent (1988) to 16.1 percent (2018) for illiterate women. Labour force participation rates were consistently higher for illiterate men (48.2 percent, on average) than that for women (22 percent). This may be explained by the significant discrepancies between men and women in their positions and social status in society, such as men being primary breadwinners and women being primary carers, and the consequences thereby for availability of job opportunities and wages on the job market. There are also striking disparities between university graduates and other educational levels for women. Although there is a gap between the LFPRs for higher education and lower education for men, the gap is immense for women. For instance, as shown in Figure 2.2, FLFPR was 73.4 percent, on average, among highly-educated women during 1988-2018, considerably higher than those without university degrees: e.g., FLFPR was just 32.9 percent among high school graduates, 28.1 percent for primary school graduates and 21.9 percent for illiterates. These figures imply that FLFPR increases with greater educational attainment, and it is notable that FLFPR is particularly high (74 percent, on average) among those college graduates. One way of increasing women's participation in the labour markets is not simply to increase their educational attainment but taking it up to university level. This is also a compelling point for a sector like ICT that needs highly qualified, skilled professionals. Given that the state delivers the bulk of higher education in Turkey (YÖK, 2019)[17], state policies and regulations have considerable impact on gendered outcomes such as the LFR and gender pay gap.

[17] Turkey had 202 universities in 2018, 129 (63.9 perfect) of which were state universities (YÖK, 2019).

FIGURE 2.2: Labour Force Participation Rate by Educational Level, 1988-2018

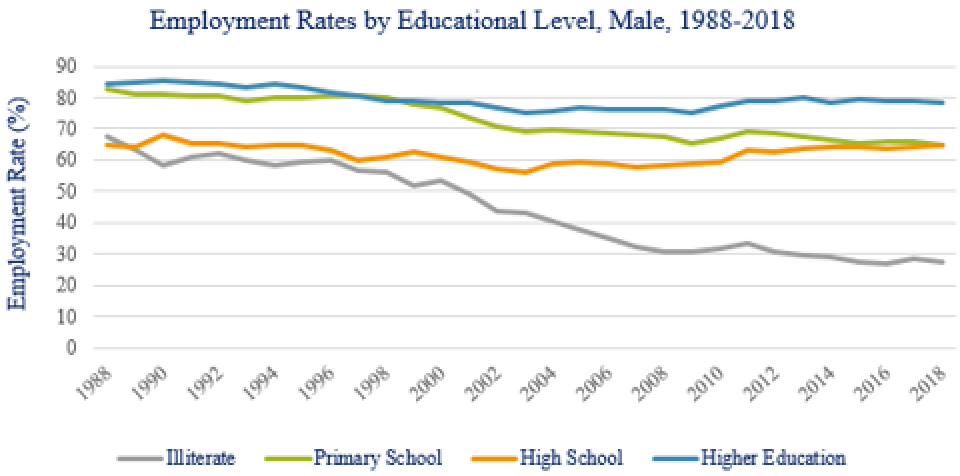


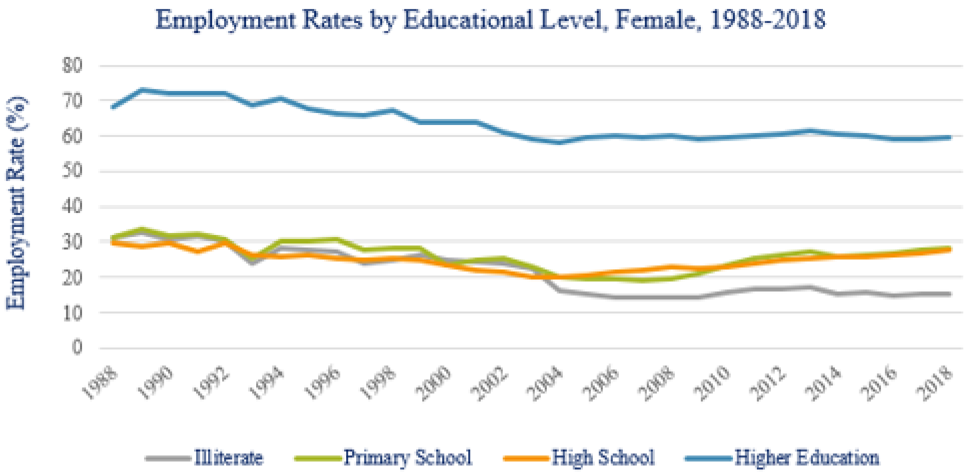
Source: TurkStat Labour Force Statistics (2019)

Looking at the LFPR alone in order to analyse gender differences may be misleading, since participation in the labour markets does not necessarily create an employment outcome. For that reason, we turn the focus onto the employment patterns by educational levels for both sexes. Figure 2.3 reveals that a university degree had a major positive impact on women's employment during 1988-2018. That is, despite mixed trends in other educational levels, employment rates continue to be the highest among women college graduates. Dayıoğlu and Kırdar (2010) also found that this trend was valid for urban women's employment. The female employment rates jumped drastically from less than 10 percent among illiterates to just over 70 percent for university graduates in urban areas. Surprisingly, in rural areas, secondary and high school graduates have a lower likelihood of entering to the labour market than illiterate women. Dayıoğlu and Kırdar (2010) explains this in terms of demand-side factors such as unavailability of ‘socially appropriate’ jobs and the shift from an agrarian to an industrialised society. İlkkaracan (2010) emphasises that the presence of highly educated women in the job market not only increases the LFPR but also shifts preferences from unpaid, informal or care work towards paid formal work.[18] This choice empowers women’s access to relatively higher wages than in the informal sector. It eases the access to childcare services and enables women to benefit from labour law rights such as retirement, maternal leave, equal pay, job safety and safe working conditions.

[18] One third of the 30 percent of adult women who participated in the labour force (FLFPR) were unpaid family workers in 2013 (Mirzaie, 2015). In 2006, informality rates for urban women were highest among those who have lower educational degrees: 86.9 percent (illiterate), 46.5 percent (primary), 26.1 percent (high school) and 8.6 percent (university) (World Bank, 2009).

FIGURE 2.3: Employment Rates by Educational Level, 1988-2018

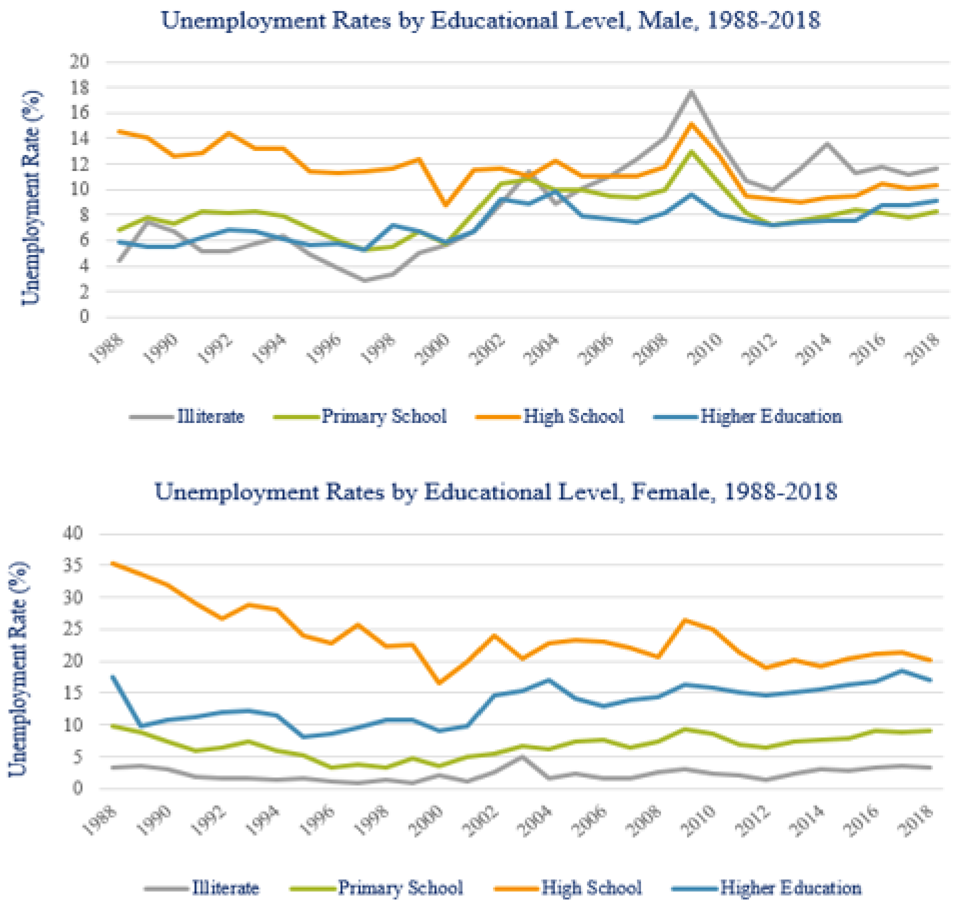




Source: TurkStat, Labour Force Statistics (2019)

Looking at the unemployment rates by educational level for both men and women, we do not necessarily observe the lowest level of unemployment among college graduates. Figure 2.4 shows that the unemployment rate from 2006 onwards was highest for illiterate males, followed by high-school, primary and college educational levels. However, investigating the female unemployment rates from 1988-2018, it is evident that the highest unemployment rates were observed among high school graduates, followed by university graduates, primary school graduates and illiterates. As a comparison, female unemployment rates stood at 8 to 18 percent among highly educated women, but less than 5 percent for illiterate women. Given that the labour markets are different for illiterate and highly-educated workers in terms of the types of jobs (white collar vs blue collar), work environments (office vs factory) or types of employment (full-time vs part-time), one of the reasons for this difference could be the wage and work expectations of well-educated women combined with unfavourable labour market conditions. For instance, an illiterate worker may be more likely to accept already lower wages for a given job out of necessity than well-educated workers would be. In contrast, unemployment rates among illiterate men increased from below 5 percent (1988) to 11.7 percent (2018) over the last three decades. Up until the 2000s, illiterate men had the lowest unemployment rates, but this trend has since changed.

FIGURE 2.4: Unemployment Rates by Educational Level, 1988-2018

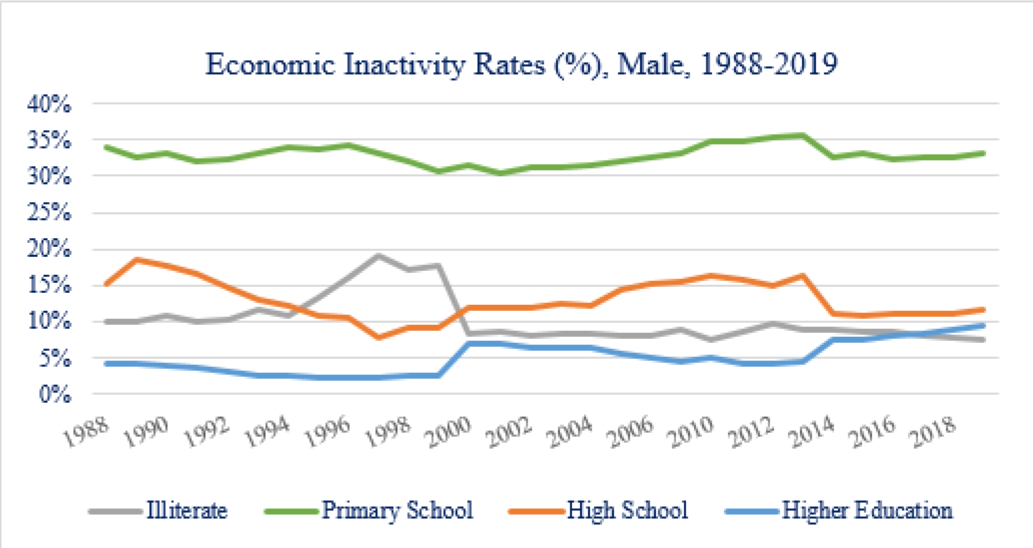


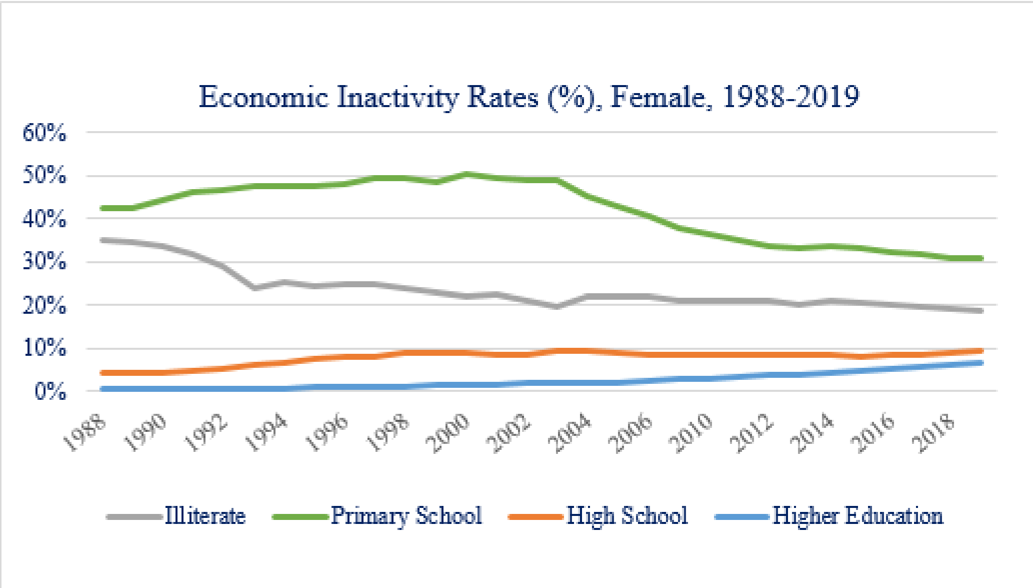
Source: TurkStat, Labour Force Statistics (2019)

Besides women's own educational level, their husband's educational attainment is also found to be relevant and associated with a decline in the probability of women's LFP in Turkey. Gündüz-Hoşgör and Smits (2008) find that the chances of being a housewife is higher if a woman has an educated husband. If the husband has primary or higher education, the possibility of her being employed in the formal sector is substantially lower. The researchers explained this by the necessity of additional income that leads women to the informal job market when the husband is unschooled. If he is schooled, then he generates more human capital (Gündüz-Hoşgör and Smits, 2008) leading to higher wages (Tansel, 2001). The higher the wage of the husband, the less likely the need for additional income and therefore for the wife's participation in the labour market. However, this inverse relationship is particularly strong in urban areas for low-skilled women (Ural et al., 2010; Göksel, 2012). For high-skilled women in urban areas, the educational levels of their husbands are not a significant factor, but their own level of education is. Similarly, the education level of husbands in rural areas does not significantly affect the probability of rural women's access to the labour market.

Economic inactivity rates sorted by educational level for both men and women (Figure 2.5) demonstrate that women showed higher rates of economic inactivity than men during 1988-2019. The educational breakdown reveals that economic inactivity was lowest for university graduates and highest for primary school graduates among both men and women. Furthermore, men experienced lower levels of economic inactivity than women at every educational level, except higher education. Inactivity rates were realised at 3 percent, on average, for women with higher educational degrees compared to those of men (5 percent) during the same period.

FIGURE 2.5: Economic Inactivity Rates by Educational Level, 1988-2019





Finally, in order to raise a more accurate point, it is also necessary to look at the informal (unregistered) employment rates. Informal employment is a significant factor in explaining low FLFPR, gender inequality and gender wage gap in the Turkish labour markets. For instance, Tansel and Acar (2016) investigated the formal/informal employment earnings gap in Turkey. Using the Income and Living Conditions Survey (SILC) for the 2006-2009 period, after controlling for individual, household and job characteristics, they found a 21.5-percent wage penalty for informal workers compared to their formal counterparts. However, no significant differences were found between men and women's informal wages. The author's study demonstrates that informal employment can be one of the reasons for low FLFPR in Turkey.

TÜRKSTAT (2019) defines informal employment as 'persons who are not registered to any social security institution due to main job worked in reference week'. Perry et al. (2007) argue (cited in Acar and Tansel, 2014, p.2) that informal employment is mostly associated with 'unprotected workers, excessive regulation, low productivity, unfair competition, evasion of the rule of law…'. Young workers, women and migrants are predominantly overrepresented in informal employment. Table 2.1 reports that informal employment in 2019 was highest in agriculture (87 percent), that is, only 13 percent of total agricultural employment was formal, and lowest in the services sector (23 percent). According to SGK (2020), with regards to economic activity, higher informal employment rates were observed in agricultural activities (87 percent), other services activities (47 percent) and culture, art and entertainment activities (40 percent) in 2019. Lower informal employment was seen in public administration and defence (1 percent), educational services (4 percent), mining and quarrying (5 percent), financial and insurance activities (6 percent) and information and communication activities (12 percent) for same period. Rural workers were more prone to unregistered employment than workers in urban areas.

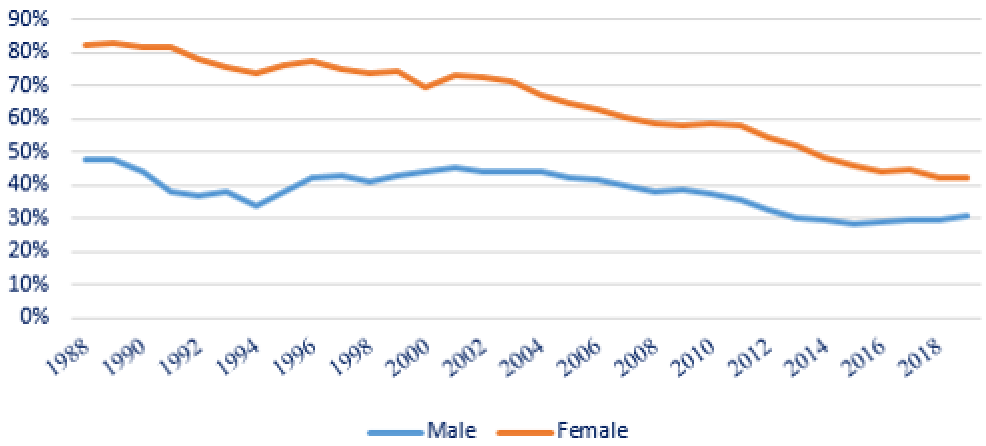
TABLE 2.1: Informal Employment Rates (%) by Sector, 2003-2019, Selected Years

Sectors	2003	2006	2009	2012	2015	2018	2019	Average
Agriculture	91.2	87.8	85.8	83.6	81.2	82.7	86.6	**85.6**
Non-Agriculture	31.6	34.1	30.1	24.5	21.2	22.3	23.0	**26.7**
Industry	36.4	38.1	33.4	27.9	19.1	20.3	20.0	**27.9**
Services	29.0	31.9	28.4	22.7	20.1	21.5	22.6	**25.2**
Construction	-	-	-	-	35.6	34.4	37.7	**35.9**
Total	**51.8**	**47.0**	**43.8**	**39.0**	**33.6**	**33.4**	**34.5**	

Source: SGK (2020)

Once we look at the gender dimension of the informal employment in Turkey, Figure 2.6 indicates that there were nearly 30 percent more women in unregistered employment than men, on average, during 1988-2019. Although the gap narrowed in the last decade to nearly 20 percent, women in informal employment (42 percent) were recorded at a higher rate than that of men (31 percent) in 2019.

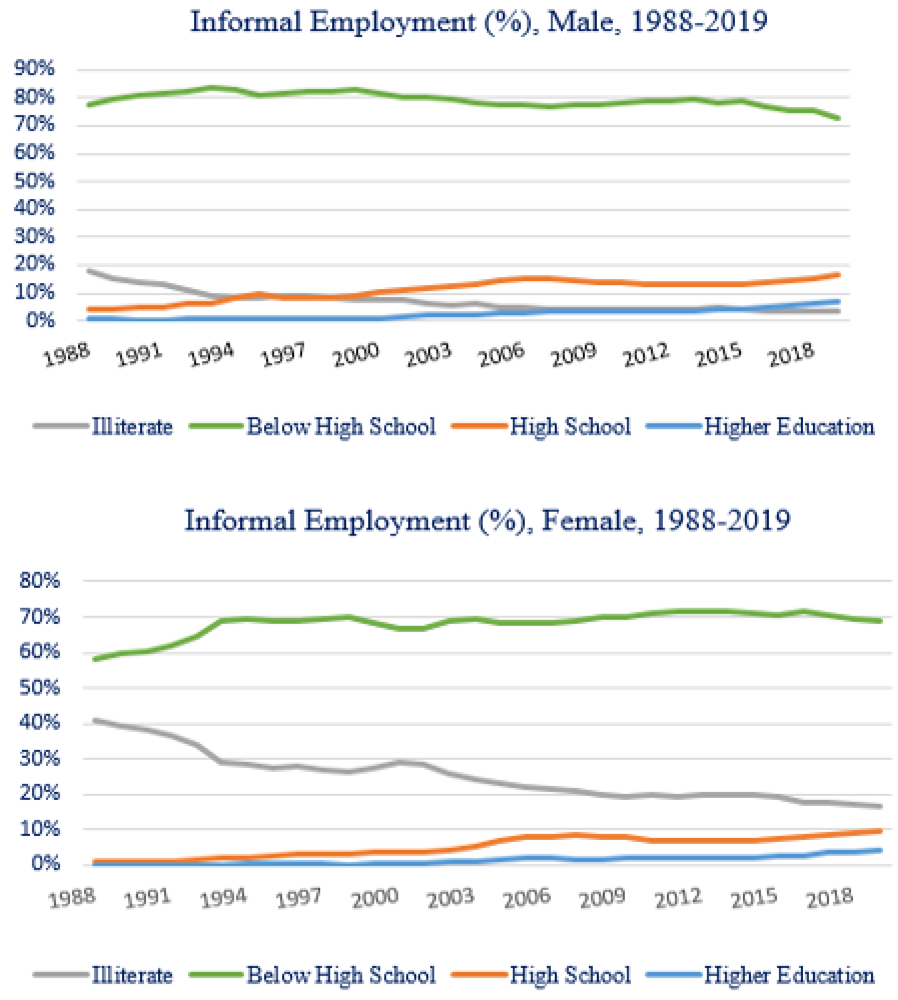
FIGURE 2.6: Informal Employment by Sex, 1988-2019



Source: TUIK, Household Labour Force Survey

Similarly, Acar and Tansel (2014) suggest that informality is closely tied to education and that low-skilled workers are the most vulnerable to unregistered employment. Figure 2.7 reveals that this is, in fact, the case in Turkey. During 1988-2019, the highest informal employment records for both men and women were observed among workers with qualifications below high-school level. Workers with higher educational degrees were the least exposed to informal employment. It is also worth mentioning that informal employment rates have been on the rise during the last decade for both higher education and high school graduates. This may be due to the high unemployment rates in the country. Some employees may have to choose unregistered employment to get hired.

FIGURE 2.7: Informal Employment by Educational Level, 1988-2019

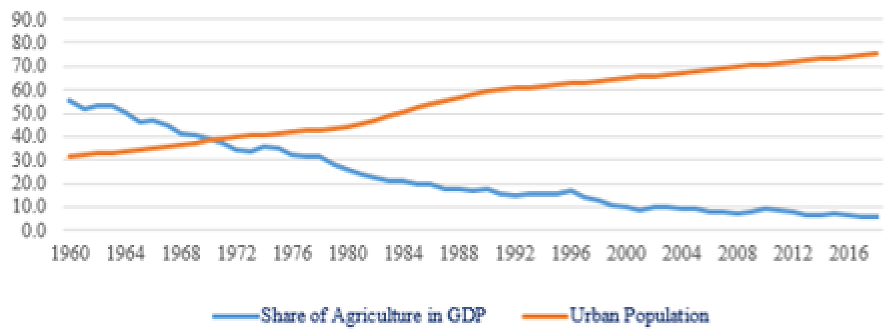


Source: TUIK, Household Labour Force Survey

(ii) Urbanisation

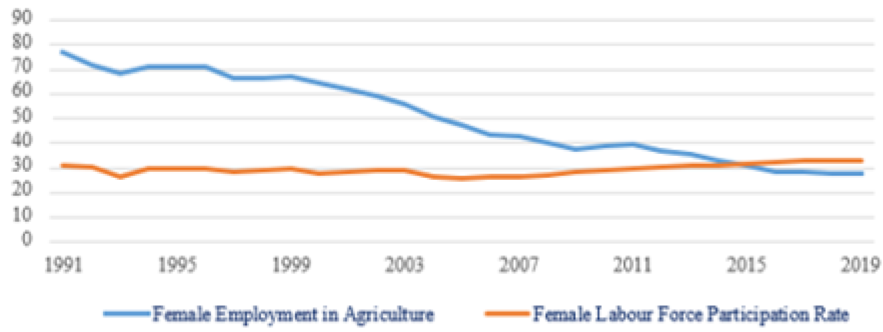
It has conclusively been shown that urbanisation is another major factor influencing Turkish women's labour participation. Several scholars (Boserup, 1970; Psacharopoulos and Tzannatos, 1989; Kottis, 1990; Schultz, 1991; Goldin, 1994) refer to a U-shaped female labour force function that illustrates a long-term relationship between economic development and FLFPR. Goldin (1994) explains this relationship as follows. Under the conditions of extremely low income levels and the dominance of certain types of agriculture such as poultry, dairy, cotton and peanuts, women participate in the labour market out of necessity to a greater extent, mostly as unpaid workers who work on family farms or in household businesses. As economic development progresses through expansion of the market or technological innovations, economic activity shifts from agrarian to industrial and from industrial to service-based production, eventually leading to increased income levels. Rising urbanisation and structural transformation cause labour movements from rural to urban areas, resulting in a withdrawal of women from the labour market. At later stages of economic development, the FLFPR increases as a result of improvements in women's schooling, declines in fertility rates, weakening social stigma and changes in occupational structure reflected in the rising portion of the U-shaped curve. Boserup (1970) argues that during the early stages of development, women are displaced from the labour force due to men's privilege access to education and new technologies, but at the later stages of development, female LFP increases owing to women's growing access to education and technologies (Tam, 2011). Çağatay and Özler (1995) also find that the relationship between long-term economic development and women's share in the labour force is U-shaped using a pool of cross-country data from 1985 and 1990.

FIGURE 2.8: Share of Agriculture in GDP and Urban Population, %, 1960-2018



Source: World Bank, WDI Database (2019)

FIGURE 2.9: Female Employment in Agriculture and Female LFPR, %, 1991-2019



Source: World Bank, WDI Database (2019)

The low LFPR has gone hand-in-hand with a large counter-urbanisation stream and the rural-urban migration in Turkey since the 1950s (Standing, 1999; Tunalı, 2003; Uraz et al., 2010; Göksel, 2012; Gedikli, 2014). Figures 2.8 and 2.9 demonstrate that during the process of modernisation and urbanisation, the urban population rose from 31.5 percent (1960) to 75.1 percent (2018); the share of agriculture in GDP fell substantially from 54.9 percent (1960) to 5.8 percent (2018) and the share of women working in agriculture decreased from 79 percent (1985) to 77 percent (1991) to 27.6 percent (2019). Turkish women's withdrawal from agriculture was partially compensated through employment in the modern sectors of urban cities in the second half of the last century causing a decline in the female LFP (Gündüz-Hoşgör and Smits, 2008). Formerly employed rural women were not able to compete with men for work in the modern sectors of urban areas due to educational, skills and traditional constraints and productivity differences (Çağatay and Özler, 1995; Tansel, 2001; Verick, 2014). Gündüz-Hoşgör and Smits (2008) observe that the longer women stay in cities, the higher the possibility of working in the formal economy and doing upper non-manual jobs, as opposed to newcomers who are mostly employed in manual occupations. As the Turkish agricultural sector was dominated in rural areas by small-scale, family-run establishments with unpaid family workers[19], the changes in agricultural activities had a strong influence on women's employment (Dayıoğlu and Kırdar, 2010). This process is in line with the downward portion of the U-shaped hypothesis. Additionally, the OECD's (2004) *Economic Survey on Turkey* points out that the fall in female LFP (overall) in 2004 was due to increasing urbanisation and problems with entry into the labour market. Finally, although it requires further investigation, Buğra and Yakut-Çakar (2010) state that public statements of government officials may have a significant effect on the labour market position and status of women. Women are seen as an untapped pool of labour to be used when needed.[20]

A growing body of literature (Tansel, 2001; Gündüz-Hoşgör and Smits, 2008; Dildar, 2015) has noticed that Turkey does not conform to the FLFPR U-shaped pattern. Despite significant progress in women's educational attainment, low fertility rates, weakening social and cultural stigmas, fewer discriminatory practices in the labour market and economic

[19] Bahçe and Memiş (2014) suggest that agriculture is still a female-dominated sector in many developing countries and in Turkey, 42 percent of women worked in the agriculture sector and 77 percent of it were unpaid family workers.

20 'One such statement, still vividly remembered by Turkish feminists, was made in 2003 by the Minister of the Economy during the first JDP government who said that he was happy to announce that economic crisis of 2001 was over and that women no longer needed to work to support their families. A more recent example came from the Prime Minister who expressed his desire — not once, but on several occasions — to see all Turkish families have at least three children.' (Buğra and Yakut-Çakar, 2010, pp.530-531)

development, women's employment figures stay low in Turkey. Durand (1975) acknowledges that although economic development initially decreases female LFP, a U-shaped relationship of female participation is not a general pattern in developing countries. Gündüz-Hoşgör and Smits (2008) suggest other factors such as cultural attitudes and specific labour market circumstances in order to explain this inconsistency in female LFP for Turkey. Standing (1999) states that female employment tends to rise very sharply with industrialisation based on 'light' industries such as textiles, garments and electronics. Considering that Turkey is one of the key players and an exporter in the world's textile industry (Öztürk, 2005; Cebeci, 2009), the women's share of manufacturing employment in Turkey has not increased dramatically since the 1990s, rising gradually from 20 percent (1992) and 20.4 percent (2005) to 24.3 percent (2015).

In order to better examine the LFP trends in Turkey, we look at the educational attainment and urban-rural distinction during 1988-2013, employing the most up-to-date data available from TÜRKSTAT. Table 2.2 reveals that the higher the educational attainment, the higher the LFPR, on average, for both men and women regardless of urban or rural distinctions. In fact, LFPR is higher in rural than urban areas regardless of the education levels of both men and women. The most striking result from the table is that the LFPRs for illiterate women are far lower in urban areas (6 percent, on average) than in rural ones (36.5 percent), leading to a 30 percent urban-rural gap in favour of rural areas. However, the urban-rural gap is small (around 10 percent) for illiterate men, e.g., the LFP of illiterate men in urban areas is 44.4 percent on average, and 55.6 percent in rural areas. Therefore, illiterate rural women are more likely to participate in the labour markets than illiterate urban women. This may be explained by the differences in the labour market conditions in rural and urban areas; for instance, illiterate women in urban areas may not find jobs easily due to the higher supply of labour by educated women and higher competition for jobs, and as a result they may be discouraged from participating. The nature of the jobs may also be different in urban and rural areas. Jobs in urban areas may be more service-based such as financial and technological services requiring qualifications, technical skills and training. In contrast, in rural areas the primary sectors are agriculture, mining and forestry, all of which may require more physical ability. Therefore, it is likely not the case that illiterate rural women are merely hesitant to participate in the labour markets. Once we look at the college graduate women LFP in rural and urban areas, we observe a similar trend: i.e., highly educated women more likely to participate in labour markets if they live in rural (77.6 percent) rather than urban areas (73.1 percent). This may also be due to the limited share of highly educated women in rural areas, leading to higher labour demand from employers and higher wages and thus higher LFP among educated women. Overall, although the men's LFP increases by educational level, it is nevertheless higher in both rural and urban areas, which may imply that men's role as heads of households persists in society and leads them to participate in the labour markets more often.

TABLE 2.2: Labour Force Participation Rates by Educational Level, 1988-2013

Labour Force Participation Rate by Educational Status, %, 15+, 1988-2013												
	URBAN						RURAL					
	Male			Female			Male			Female		
Year	Illiterate	High School	University	Illiterate	High School	University	Illiterate	High School	University	Illiterate	High School	University
1988	63.3	73.9	87.4	8.5	44.3	80.3	74.1	79.2	96.4	47.1	50.3	89.8
1989	58.3	72.1	88.5	7.8	40.3	78.8	73.2	82.1	94.3	50.5	55.4	92.6
1990	55.1	74.0	88.8	6.9	40.4	78.5	66.2	87.7	96.4	47.6	55.9	92.3
1991	56.3	72.7	89.5	5.3	37.0	79.5	68.2	81.4	95.3	50.1	50.4	89.8
1992	55.5	73.5	89.4	6.7	38.8	80.5	70.4	84.1	95.8	47.3	47.8	88.1
1993	58.0	73.1	88.2	4.9	35.8	76.9	66.5	77.9	92.4	37.3	44.7	88.7
1994	53.1	71.9	88.9	6.5	33.3	78.9	66.8	82.4	94.1	42.7	50.9	88.1
1995	51.7	69.3	87.5	6.8	32.7	73.1	68.1	83.5	91.5	43.9	46.4	80.7
1996	50.6	67.5	86.5	5.9	30.8	72.7	68.4	80.8	87.2	43.7	44.0	71.0
1997	49.1	63.3	84.3	5.2	30.6	72.5	64.0	78.9	90.1	39.0	47.4	75.5
1998	50.8	65.3	84.6	5.4	30.8	75.1	62.9	80.3	88.1	41.2	41.9	76.9
1999	43.6	68.4	84.0	5.5	29.3	71.4	61.0	80.8	88.8	42.5	45.7	71.5
2000	44.7	64.7	82.1	5.1	27.5	69.6	62.4	75.3	89.9	38.2	32.4	75.5
2001	41.6	64.7	83.1	5.4	26.1	70.2	57.5	76.4	91.3	37.5	34.5	77.8
2002	39.6	62.1	83.5	5.8	27.9	70.6	52.8	72.5	89.7	37.8	31.9	78.8
2003	41.5	61.3	82.4	5.5	24.6	69.3	53.1	68.9	84.3	37.6	28.4	71.4
2004	36.3	65.9	84.0	5.4	25.7	70.2	51.6	73.4	86.0	30.5	29.5	71.7
2005	38.0	65.3	83.1	6.1	26.3	69.0	45.9	72.1	85.9	27.3	30.4	70.1
2006	34.7	64.7	82.1	5.4	27.5	68.8	43.7	72.8	86.8	25.5	30.0	68.6
2007	33.0	63.4	82.2	5.1	28.0	69.2	40.3	71.6	85.7	24.5	30.6	72.0
2008	34.0	64.6	82.3	5.4	28.9	69.8	37.9	73.5	85.6	24.4	30.7	72.1
2009	35.1	66.8	82.7	5.7	29.6	70.4	38.8	79.2	86.3	24.8	35.2	74.9
2010	33.0	66.2	83.8	6.2	29.7	70.9	40.1	76.1	88.0	26.6	34.6	71.9
2011	34.0	68.1	84.9	6.5	29.7	71.0	41.0	75.9	87.8	27.8	34.3	69.0
2012	31.8	67.7	85.0	6.1	30.1	71.1	35.7	75.0	85.7	26.6	33.7	68.2
2013	32.3	68.7	86.1	7.3	31.7	72.4	34.9	75.2	86.0	26.3	33.8	70.1
Average	44.4	67.7	85.2	6.0	31.4	73.1	55.6	77.6	89.6	36.5	39.6	77.6

Source: TurkStat, Labour Force Statistics (2019)

Comparing the rates of LFP by educational status and rural-urban distinctions discussed above, we examine the relationship between employment rates and educational attainment in rural and urban areas. Table 2.3 tells a similar story. Employment rates increase with higher educational level for both men and women regardless of urban and rural employment. Although the employment rates dropped for both illiterate men and women during 1988-2013 in rural and urban areas, both illiterate men and women were more likely to be employed in rural than urban areas in Turkey. The employment gap (~30 percent, on average) between illiterate women in urban and rural areas remained large (5.3 percent and 36.2 percent, urban and rural, respectively), while employment rates for highly educated women were similar in urban (63.9 percent) and rural (66.4 percent) areas over this period.

TABLE 2.3: Employment Rates by Educational Level, 1988-2013

Employment Rates by Educational Status, %, 15+, 1988-2013												
	URBAN						RURAL					
	Male			Female			Male			Female		
Year	Illiterate	High School	University	Illiterate	High School	University	Illiterate	High School	University	Illiterate	High School	University
1988	57.2	62.6	81.8	6.9	28.2	66.5	72.5	69.0	92.2	46.4	34.0	72.9
1989	49.8	62.9	83.3	6.0	27.1	70.3	69.8	68.3	90.2	49.7	35.5	86.7
1990	46.7	64.8	84.0	5.5	27.9	69.5	64.3	76.3	90.9	46.9	36.6	86.0
1991	48.1	64.1	84.1	4.2	26.2	71.2	66.9	69.0	88.5	49.8	36.1	75.9
1992	48.7	63.1	83.0	5.9	28.5	71.2	68.8	71.3	91.0	47.0	35.1	75.5
1993	50.7	63.6	82.1	4.2	25.4	66.7	64.9	67.5	87.1	37.2	32.1	83.8
1994	45.4	63.6	84.0	5.8	23.2	70.4	64.9	67.9	85.5	42.5	40.9	73.8
1995	46.0	62.3	83.0	6.1	24.7	67.0	66.4	71.7	83.9	43.6	36.2	76.6
1996	46.6	59.4	82.0	5.3	23.6	66.3	66.9	73.2	80.1	43.5	35.0	65.5
1997	45.6	56.1	79.7	4.9	22.9	65.6	63.2	70.1	85.3	38.9	33.9	67.0
1998	47.3	57.6	78.4	4.7	23.7	67.0	62.0	70.9	81.9	41.1	33.8	68.3
1999	38.2	60.0	78.1	5.2	22.1	64.4	59.9	70.8	84.1	42.3	37.8	57.7
2000	39.7	59.6	77.3	4.8	23.0	63.1	60.1	67.0	84.0	37.5	26.0	70.8
2001	35.9	57.5	77.4	5.1	20.5	63.2	55.0	66.8	86.3	37.3	29.9	70.5
2002	31.3	54.7	75.6	5.0	21.0	60.4	50.7	64.6	82.8	37.3	25.1	66.3
2003	30.2	54.3	74.8	4.6	19.1	58.8	50.9	61.8	78.7	36.2	24.9	59.0
2004	29.4	57.6	75.9	5.0	19.7	58.6	50.4	65.3	76.3	30.4	23.2	55.2
2005	31.3	58.1	76.7	5.6	20.2	59.5	44.2	64.1	78.3	27.1	23.4	57.7
2006	28.3	57.5	75.8	5.0	21.1	60.0	41.7	64.5	79.9	25.5	23.8	58.8
2007	25.8	56.4	76.0	4.7	21.6	59.7	38.0	63.5	79.3	24.4	24.7	60.1
2008	26.9	56.9	75.8	4.9	23.0	60.2	34.6	65.1	78.1	24.2	23.9	58.2
2009	25.5	56.4	74.6	5.0	21.6	59.4	35.1	68.5	78.5	24.5	27.6	58.6
2010	25.6	57.5	76.9	5.6	22.1	59.9	37.1	67.7	81.4	26.5	26.8	57.4
2011	28.0	61.4	78.6	6.0	23.0	60.7	38.6	69.6	80.1	27.6	28.9	54.5
2012	26.3	61.1	79.0	5.7	24.0	60.9	34.1	69.4	78.5	26.5	29.3	55.2
2013	25.9	62.3	79.9	6.6	25.0	61.9	32.9	69.4	79.0	26.1	28.9	55.6
Average	37.7	59.7	79.1	5.3	23.4	63.9	53.6	68.2	83.2	36.2	30.5	66.4

Source: TurkStat, Labour Force Statistics (2019)

In order to investigate the sectors in which the Turkish labour force is employed, sectoral employment decomposition is undertaken, using data from the Labour Force Statistics of 2019. Table 2.4 demonstrates a significant shift in employment patterns in the Turkish economy. For instance, the rate of employment in agriculture dropped dramatically to 19.1 percent (2019) from 47.8 percent (1991), while the services section increased sharply from 32 percent (1991) to 54.8 percent (2019) over the last three decades. Gender patterns were similar; i.e., the share of agricultural employment declined and the share of employment in the services sector rose significantly for both sexes. Declining employment in agriculture for both sexes can be explained by urbanisation and post-industrialisation movements, while higher employment in services can be related to the significant growth in the services sector. Similarly, there were only four sub-sections under the services sector until the 2000s, but this has since jumped to 13[21] due to advancements and innovations – especially in information, communications and business services. Finally, there was almost no significant change in either the construction or industrial sectors for men's and women's employment over the whole period.

TABLE 2.4: Employment Rates by Sectors, 1991-2019

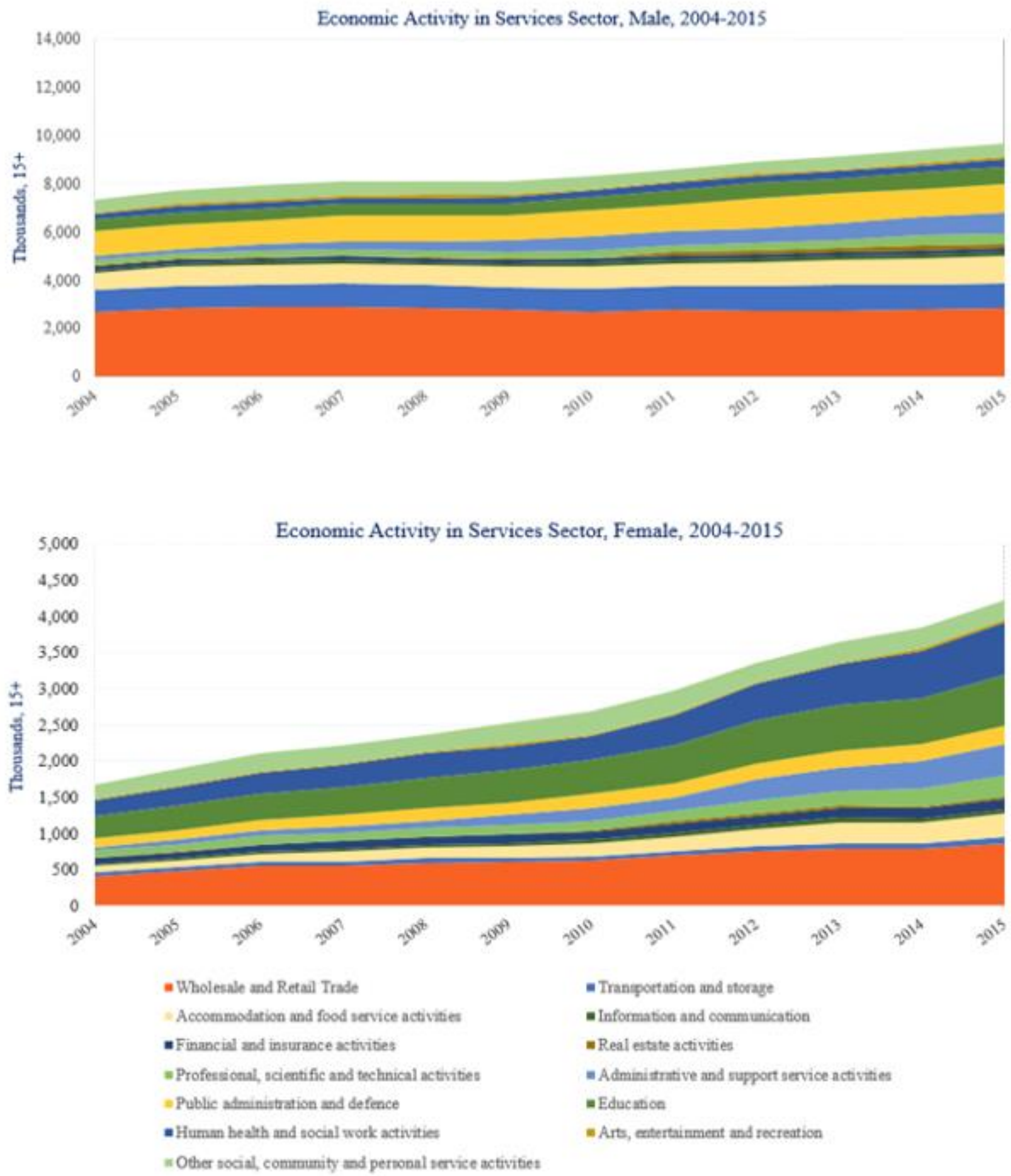
Employment Rates by Sectors									
	Agriculture			Industry			Services		
Year	Male	Female	Total	Male	Female	Total	Male	Female	Total
1991	34.5	77.0	47.8	25.5	8.4	20.2	40.0	14.5	32.0
1992	32.9	71.8	44.7	26.0	11.3	21.5	41.1	16.9	33.8
1993	32.7	68.5	42.2	26.5	11.8	22.6	40.7	19.8	35.2
1994	32.0	70.8	43.5	27.7	10.8	22.6	40.3	18.4	33.8
1995	31.9	70.8	43.4	27.4	10.0	22.3	40.7	19.2	34.3
1996	31.0	71.1	42.8	28.2	10.3	22.9	40.9	18.6	34.3
1997	30.6	66.7	40.8	28.9	12.1	24.1	40.6	21.2	35.1
1998	30.0	66.5	40.5	28.5	11.5	23.6	41.4	22.0	35.8
1999	30.5	67.3	41.4	27.7	11.0	22.8	41.8	21.7	35.8
2000	28.8	64.7	38.8	27.7	11.6	23.2	43.5	23.7	38.0
2001	26.9	62.0	37.0	27.4	12.3	23.0	45.7	25.7	40.0
2002	24.1	59.1	34.5	27.8	13.9	23.7	48.1	27.0	41.9
2003	22.2	55.7	31.9	28.5	14.6	24.5	49.4	29.6	43.7
2004	21.4	50.7	29.1	28.7	16.0	25.4	49.9	33.3	45.6
2005	19.2	47.4	26.5	29.5	16.1	26.1	51.3	36.5	47.4
2006	17.1	43.5	24.1	30.4	16.4	26.8	52.4	40.0	49.2
2007	16.7	42.6	23.5	30.5	16.2	26.7	52.8	41.2	49.8
2008	16.8	40.1	23.1	30.2	15.8	26.3	53.0	44.0	50.6
2009	17.1	37.8	22.9	29.2	15.3	25.3	53.7	46.9	51.8
2010	17.4	39.2	23.7	30.4	16.0	26.2	52.2	44.8	50.1
2011	17.8	39.3	24.2	31.2	15.2	26.5	51.0	45.5	49.4
2012	17.7	37.1	23.6	30.8	15.0	26.0	51.5	48.0	50.4
2013	17.4	35.6	22.9	31.2	15.4	26.4	51.4	49.1	50.7
2014	16.0	32.8	21.1	32.5	17.2	27.9	51.5	50.1	51.1
2015	15.7	31.0	20.4	32.1	16.3	27.2	52.2	52.8	52.4
2016	15.4	28.6	19.5	31.7	16.0	26.8	52.9	55.4	53.7
2017	15.3	28.2	19.4	31.6	15.7	26.5	53.1	56.1	54.1
2018	15.2	27.9	19.2	31.4	15.5	26.3	53.5	56.6	54.5
2019	15.1	27.6	19.1	31.1	15.3	26.1	53.8	57.0	54.8

Source: World Bank, WDI Database (2019)

[21] New economic activities included services such as information and communication, accommodation and food services, human health and social work activities, arts, entertainment and recreation (TÜRKSTAT Household Labour Surveys).

Looking at the breakdown of economic activities in services sector by sex during 2005-2015, Figure 2.10 reveals that, despite a slight decrease in the number of workers employed, the highest employment rates, on average, for both men (33.0 percent) and women (23.4 percent) were observed in the wholesale and retail trade sub-section of services. Men were generally preferred for public administration and defence (13.0 percent), transportation and storage (11.5 percent) and accommodation and food service activities (10.9 percent), while women were employed, on average, mostly in education (17.4 percent), human health and social work activities (14.5 percent) and other social community and personal service activities (10.0 percent). The lowest employment rate was found, on average, for both men and women, in real estate activities (1.1 percent and 0.6 percent, respectively) and the arts, environment and recreation (1.2 percent and 0.8 percent, respectively).

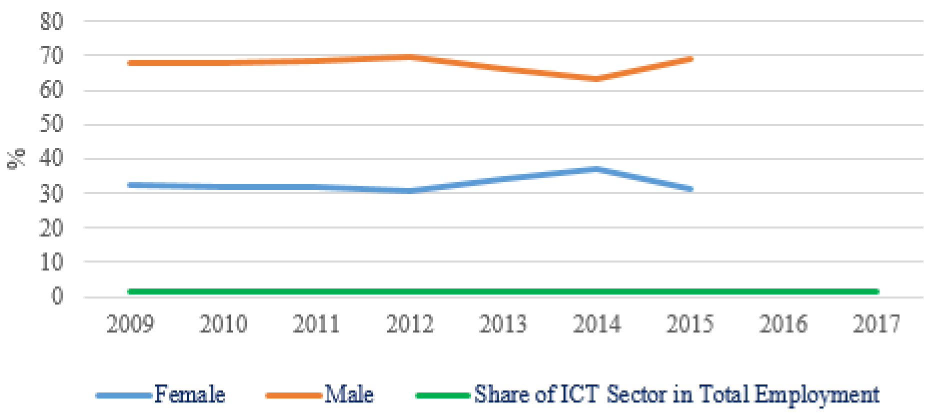
FIGURE 2.10: Employment in Services Sector, Sex, 2004-2015



Source: Turkstat, Labour Force Surveys (2019)

Finally, we look at the ICT sector breakdown of employment within the Turkish economy, as this is central to this thesis. Figure 2.11 shows that the share of women employed in the ICT sector[22] was, on average, 33 percent during 2009-2015. The ICT sector's share of total employment stayed below 2 percent during 2009-2017 and the ICT sector's share of the services sector was around 9 percent in 2015.[23] The graph indicates that female employment is low within the growing and value-added ICT sector. Although value-added can be defined in general as the contribution of a specific sector, in percentage terms, to a country's gross domestic product (GDP), the ICT sector does not only contribute to GDP but also to other sectors by increasing productivity through innovation, research and development, and eventually driving economic growth.

FIGURE 2.11: ICT Sector Employment by Sex, 2009-2017



Source: Author's own calculations according to NACE Rev.2, TurkStat, Annual Industry and Service Statistics (2018)

(iii) Fertility Rates

One of the primary foci of previous studies on the female labour force was upon fertility rates. The world has witnessed a remarkable decline in fertility rates since the 1960s due to postponed family formation and child-bearing and an increasing desire to have a nuclear family (OECD, 2016a). The number of births per woman, on average, decreased from 4.98 in 1962 to 2.43 children in 2017 (World Bank, 2019a). Turkey is not an exception to this growing trend. Figure 2.12 shows that the birth rate per woman in Turkey dramatically decreased from 6.3 in 1960 to 2.1 children in 2017. Fertility as one of the elements of population growth along with

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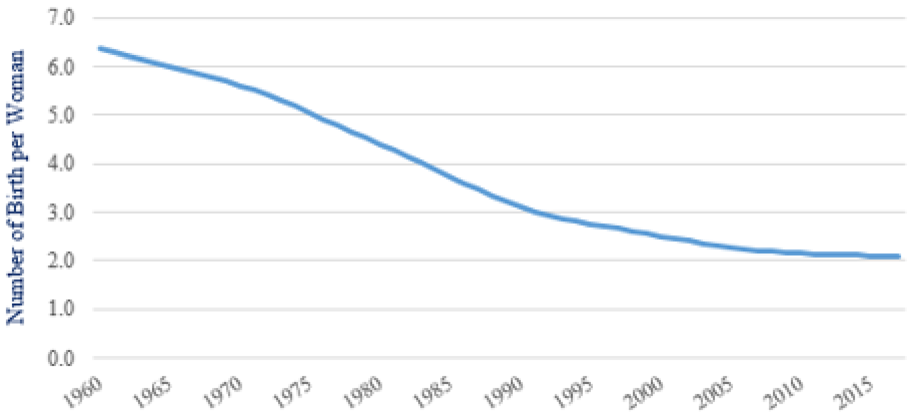
[22] 'ICT sector is defined as "the combination of manufacturing and services industries that capture, transmit and display data and information electronically"' (OECD, 2002, p.81). ICT sector definition will be examined in more detail in Chapter III.

[23] TÜRKSTAT states that they cannot share female and male employment figures anymore. The gender figures above were downloaded in Jan 2017. Currently, there is no such gender information available.

mortality and migration is paramount as it reflects both the causes and impacts of social and economic development (OECD, 2016a).

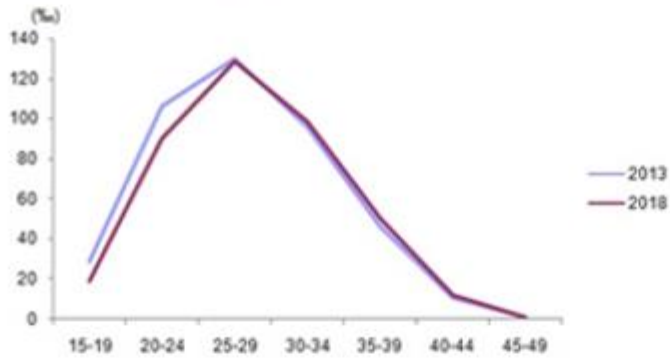
FIGURE 2.12: Fertility Rates in Turkey (births per woman), 1960-2019



Source: World Bank, WDI Database (2019)

Dayıoğlu and Kırdar (2010) compared fertility rates in Turkey from 1993 to 2003, using DHS data and revealed that the fertility rates were in decline both in urban and rural areas. They found that the Turkish women expected to be married with one child before the age of 25, give birth to a first child within less than two years following their marriage and have a second child before the age of 30. This rigid sequence, they claim, has not changed despite an increase in marriage age. Furthermore, less than 2 percent of married women fail to have a child by the end of their productive years. Figure 2.13 is also consistent with the researchers' findings for the years 2013 and 2018. The highest age-specific fertility rates were seen among 25-29 age group in both years.

FIGURE 2.13: Age-Specific Fertility Rates in Turkey, %, 2013 and 2018



Source: Turkish Statistical Institute, 2018 Press Release

A significant number of empirical studies (Becker et al., 1994; Adsera, 2004; Bloom et al., 2009; Dayıoğlu and Kırdar, 2010) suggest that fertility rates and female labour supply are negatively correlated. Bloom et al. (2009) use country-level abortion legislation as an instrument for fertility to examine the effects of fertility on FLFPR. They estimate that in their sample each additional child reduces women's LFP by 5-10 percent for the 20-44 age group. In aggregate terms, each birth decreases total labour supply by about 1.9 years per woman during her productive life. Correspondingly, the lower the fertility rates, the higher the female labour supply. However, Turkey puzzles scholars with its rare exception of low fertility rates and low FLFPR. To that end, it is necessary to look at the effects of other factors on women's employment, such as patriarchy, which is promoted by a state that emphasises women's reproductive, child-bearing and caring roles.

(iv) Family Structure, Social Norms and Culture

The family structure in Turkey has been characterised as a classical patriarchy that prevails in the Muslim Middle East, in South and East Asia (specifically, in China and India) and in North Africa (Kandiyoti, 1988; Moghadam, 2004). Kandiyoti (1988) coined the term '*classical patriarchy'* to explain women's subordinate position within the family and society as a whole. Labour market discrimination theories based on such structures are analysed in section 2.2. There is a rigorous hierarchy in the family structure in which men are the primary breadwinners and women are the primary carers and economically dependent. However, Turkey has managed to distinguish itself among Middle East and North Africa (MENA) nations with regards to the emancipation of women as reflected by gender-egalitarian family law. The comprehensive reforms initiated by Mustafa Kemal Atatürk were a radical break with Ottoman Islam and its institutions in order to convert the new republic into a secular, modern nation-state (Kandiyoti, 2003; İlkkaracan, 2012); however, these modernisation attempts, following the establishment of the Republic of Turkey, were not welcomed by religious and ethnic tribal leaders, particularly in the eastern part of the country. Significant obstacles such as limited access to schooling due to inadequate infrastructure, lack of industrialisation, and language barriers for Kurdish and Arabic women[24], who cannot attend school to learn Turkish and are dependent on their male households[25] for information about society and their legal rights, along with religious and tribal values, sabotaged the widespread process of transformation from a

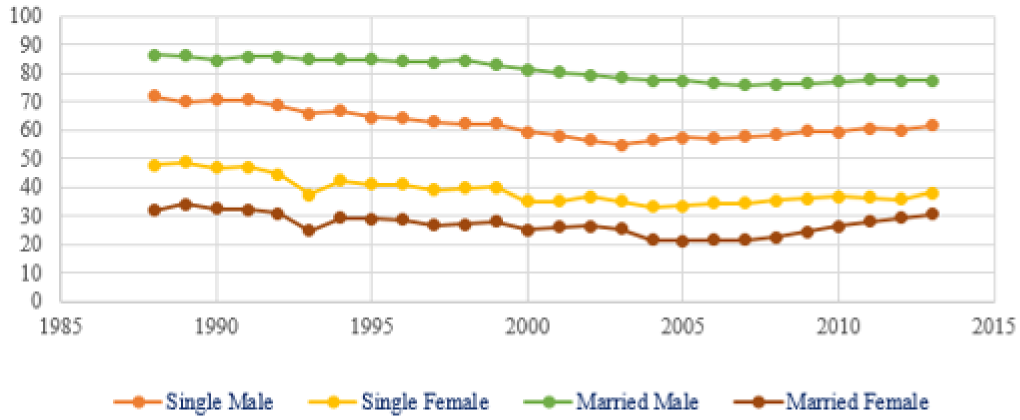
[24] 'One in every 25 women in Turkey cannot speak Turkish.' (Smits & Gündüz-Hoşgör, 2003: 840).
[25] "Almost all men speak Turkish." (Smits & Gündüz-Hoşgör, 2008: 106).

religion-based political community to a secular nation-state. As a result, the strong influence of patriarchal ideology has overshadowed the effects of modernisation visible until today, and gender-discriminatory practices such as honour killings, arranged marriages, marrying only in a religious ceremony, bride price, greater condemnation of pre-marital sex and women's limited freedom of movement have remained strong, especially in rural areas (İlkkaracan, 1998; Gündüz-Hoşgör and Smits, 2008; Uraz et al., 2010).

Surprisingly, the notion of *'male headship'* – that is, the discriminatory clause relating to the gendered division of labour – was maintained in the Turkish Civil Code and reflected in the legal and social security framework up until the reforms of 2003.[26] Although it was not a legal obligation to ask for husbands' approval to participate in the labour force, İlkkaracan (2012) suggests that women had to get their husbands' approval for their choice of occupation, or whether they work or not, etc., until 2003. Gündüz-Hoşgör and Smits (2008) investigated the very low female LFP in Turkey using data from the *1998 Turkish Demographic and Health Survey*. When all unemployed married women (aged 15-49) in Turkey were asked about the main reasons for their unemployment, 37.7 percent gave childcare and household duties as a reason, while 27.4 percent indicated disapproval of them accessing the job market from their husbands or elderly people. It is also notable from the Figure 2.14, single women's LFP was higher than that of married women during 1988-2013 – the most up-to-date data – as opposed to that of men; i.e., married men participated more in the labour markets than single men. Figure 2.14 clearly indicates the role of the man as the primary breadwinner and the role of the woman as the primary carer in Turkish society, as the LFPR is highest amongst married men and lowest amongst married women.

[26] 'Discriminatory items were eliminated from the Civil Code in 2003 due to strong and persistent advocacy of the women's movement and pressure for compliance with EU norms, as well as the Convention on the Elimination of All Forms of Discrimination against women (CEDAW), to which Turkey has been a party since 1985.' (İlkkaracan, 2012, p.32).

FIGURE 2.14: Labour Force Participation Rate by Marital Status, %, 15+, 1988-2013



Source: TurkStat, Labour Force Statistics (2019)

On the other hand, another line of research (Gündüz-Hoşgör and Smits, 2008; Buğra and Yakut-Çakar, 2010; İlkkaracan, 2012; Göksel, 2012; Gedikli, 2014) has investigated the role of religion and conservatism in shaping women's LFP decisions and found that religion and the rise of conservative values demonstrate a strong influence on women's LFP. İlkkaracan (2012 p.17) suggests that the rise of conservative political discourses on gender issues provides in return further justification for sustained institutionalisation of gender-based division of labour. The orthodox interpretation of religion restricts women's opportunities (Spierings and Smits, 2007). In contrast, O'Neil and Bilgin (2013) argue that religion has no direct influence on women's employment decision, but rather patriarchal mentalities, that describe women first and foremost as mothers and caregivers. Boserup (1970) concludes that the basic common picture of the world, that 'men bring the food and women prepare it', can be changed and the changes offer evidence that the pattern itself is not profoundly biological.

(v) Labour Market Conditions

A strand of the empirical literature has focused on the employment implications of economic and financial crises and considered their temporary or long-lasting effects. Although urbanisation and education, as discussed above, change labour market conditions over the long run, cyclical changes also affect labour market outcomes, mostly in the short term. Turkey experienced a severe economic and political downturn from November 2000 to February 2001. The official stance was that 'the crisis was the result of the failure of the public sector to maintain the austerity targets and the failure to fully implement the free market rationale of globalization' (Yeldan, 2001, p.1). The country witnessed an unstable economy during the

1990s with a 'boom-bust' cycle of annual growth rates[27], high inflation rates[28], exorbitant interest rates[29], currency crashes[30], soaring trade deficits[31], increasing national debt[32], severe liquidity shortage[33] and weak demand for labour (Ertuğrul and Yeldan, 2003; Gencay and Selçuk, 2006; Dufour and Orhangazi, 2009; Ekinci and Ertürk, 2007; Temiz and Gökmen, 2009; Dildar, 2015). In 2001, February 21 saw the biggest financial downturn since the 1950s – referred to as 'Black Wednesday' – hit the public sector first before quickly spreading to the financial and real estate sectors, resulting in a collapse of 23 private banks due to liquidity problems caused by sudden capital outflows, an intervention of the state through taking over some of these banks and a replacement of the fixed with the floating exchange rate system (Olgu et al., 2015).

A considerable number of researchers have investigated the effects of financial crises on women's LFP decisions. Most of them (Fallon and Lucas, 2002; Lee and Cho, 2005; Gündüz-Hoşgör and Smits, 2008; Kızılırmak, 2008; İlkkaracan, 2012, Göksel, 2012; Signorelli et al., 2012; Bahçe and Memiş, 2014; Chaudhary and Verick, 2014; Yücel, 2015) concentrated on the '*added worker effect*' and '*discouraged worker effect*' hypotheses. 'Added worker effect' holds that when the primary earner (head of household) experiences job loss or under-employment during the financial crisis and economic recessions, other members of the household (mainly, wives) enter the labour market to compensate for the loss in the household income. These 'added' workers leave the labour force once the economic conditions are favourable once more (Lee and Cho, 2005). Female LFP is counter-cyclical, particularly for less educated workers in low-income economies (Cho and Newhouse, 2013). Women join the labour force as a coping mechanism in response to shocks, argue Chaudhary and Verick (2014). Large numbers of women entering the labour market may not always be a favourable result, as this decision may be driven by distress and might not result in access to the desirable market

[27] Annual GDP growth rates oscillated between 9.2 percent (1990), -4.67 percent (1994) and 7.58 percent (1997). It was -5.7 percent in 2001 (World Bank WDI Database on 21/10/16).
[28] Average yearly inflation rates were 75.2 percent during 1990-2000 (World Bank WDI Database on 21/10/16).
[29] Overnight interest rates reached their peak at 873 percent on Friday 1 December 2000. The daily average overnight interest rates rocketed up to (a simple annual) 2000 percent on 20 February 2001 and 4000 percent on 21 February (Gencay and Selçuk, 2006, p.549).
[30] After the implementation of the floating exchange rate system, ₺depreciated by over 45 percent (Akçağlayan, 2007).
[31] Trade deficit rocketed from $9.3m (1990) through $22.3m (1997) to $23.8m (2000) (Turkish Statistical Institute, 2016).
[32] Central government debt (% of GDP) increased from 30 percent (1990) to 44 percent (1997) (World Bank WDI Database on 21/10/16).
[33] More than $6bn of short-term capital fled the country in Nov 2000 (Ertuğrul and Yeldan, 2003:53). In December 1999, Turkey implemented a stabilisation programme backed by the IMF and was granted $7.5bn in additional support (Yeldan, 2002).

opportunities. Moreover, Gong (2010) suggests that after the job loss of a breadwinner, it may take some time for women to adjust their supply behaviours. Thus, any effect may take time to materialise in the short run. Conversely, the 'discouraged worker effect' hypothesis states that during unfavourable market conditions such as high levels of unemployment due to crisis and recession, employees become discouraged and withdraw their supply from the labour market leading to a hidden employment (Lee and Cho, 2005; Khitarishvili, 2013).

Many studies (Başlevent and Onaran, 2004; World Bank, 2009; Karaoğlan and Ökten, 2012; Bahçe and Memiş, 2014) argue that the 'added workers effect' is prevalent. İlkkaracan (2012) found that the labour participation of married women increased during the 2008 global financial crisis. She revealed that almost half a million urban women who were previously homemakers entered the labour market during the 2008 financial crisis, 276,000 of whom were employed and 157,000 unemployed. Her finding raises a question of whether the '*substitution effect*' exists in Turkey, as women who join the labour market only during economic contraction manage to find employment. Hence, during the economic deterioration period, demand for women workers increased due to the relatively cheap supply of labour ready to take up the slack (Milkman, 1976; Göksel, 2014). Additionally, Başlevent and Onaran (2004) examined the labour market outcomes of married couples in urban families using data from 1988 and 1994 to find out whether the 'added worker effect' dominated the 'discouraged worker effect'. However, their results were contradicted by Kızılırmak (2005), who suggested that when the extent of recession increases, the 'added workers effect' becomes invisible and 'discourage workers effect' dominant.

Once we look at the data on the LFP and employment rates for women during the financial crises of 2000/01 and 2007/08 to observe any anomalies, it is apparent that the FLFPR and employment rates, regardless of marital status, declined during and after the financial crises in the 2000s; e.g., FLFPR for singles gradually dropped from 39.9 percent (1999) to 34.4 percent (2007) and employment rates for single women from 34.1 percent (1999) to 27.6 percent (2007). Similarly, LFPR for married women steadily decreased from 27.9 percent (1999) to 21.6 percent (2007) and employment rates from 26.8 percent (1999) to 20.3 percent (2007). This result is not consistent with the 'added labour effect', whereby women tend to attempt to maintain the household income during the financial crisis. However, once we break down for urban population, the added labour effect emerges with an increase in urban FLFPR for both single and married women from 2001 onwards. Gong (2010) suggests, married women in Turkey may have taken some time to adjust their labour supply behaviours, since they did not join the labour force at the beginning of the cyclical downturn in 2000. Similar patterns were also observed for urban women during the 2008 financial crisis. What is striking is that urban women did not leave the labour markets after both financial crises.

Some studies (Assaad and Arntz, 2005; Gündüz-Hoşgör and Smits, 2008) suggest that women favour public over the private sector because of the equal pay, non-discriminatory policies, and shorter and more regular hours it involves. Likewise, they may be shielded against job losses during crises (Yücel, 2015). However, 87.8 percent of Turkish women were employed in the private sector in 2000 with only 12.2 percent employed in the public. Moreover, by 2001, women's employment in the private sector had increased to 88.8 percent, while women's public sector employment dropped to 11.2 percent (TÜRKSTAT, 2016). For instance, women's participation in the banking sector almost doubled from 24 percent to 42 percent between 1988 and 2001 (Gündüz-Hoşgör and Smits, 2008). Therefore, the public sector was not a safe harbour for Turkish women during the 2000-2001 downturn. Chapter VIII will look further into the role of the state in public sector employment in relation to employment and gender equality in the ICT sector.

(vi) Women's Access to Childcare: The Role of Policy

Having access to appropriate childcare facilities has become more of a necessity for women's employment in modern times, particularly in most developed countries where single parenting and the number of nuclear families, in which other relatives such as grandparents, aunties, uncles and cousins do not live in close proximity, are on rise. The issue of childcare, childcare policies, childcare costs and its efficacy in terms of the women's labour supply have aroused many scholars' attention. Empirical studies have found that childcare subsidies raise the supply of women's labour. For instance, Baker et al. (2008) conducted research into the introduction of highly subsidised childcare in Quebec and their findings demonstrated that the introduction of universal childcare subsidies led to an extensive rise in childcare use. This increase in childcare was associated with a sizeable 7.7-percent growth in the married women's LFP. Likewise, Gustafsson and Stafford (1992) analysed childcare subsidies and labour supply in Sweden and they conclude that high quality public care encourages labour market activity among Swedish women with pre-schoolers even if their spouse's income is high. In another study, Connelly (1992) examines the effects of childcare costs on married women's LFP, estimating the costs using a generalised tobit specification corrected for selection. Her findings provided evidence that increased childcare costs reduce the probability of women's participation. Furthermore, she claimed that the lower FLFP among mothers of pre-schoolers was entirely the results of the higher childcare costs. However, Jaumotte (2003) examined the determinants of female LFP in 17 OECD countries during 1985-1999 and concludes that, unlike childcare subsidies, childcare benefits decrease women's labour supply due to an income effect and their lump-sum character.

Connelly (1992) argues that the presence of children in the household lowers the probability of LFP as a result of the costs of childcare, women's continuous role in home production and the lack of childcare facilities. There are hardly any provisions in Turkish law for work-family reconciliation measures, and to the extent that they exist, they are based on an inherent patriarchal assumption that reconciliation is a problem that pertains to women only (İlkkaracan, 2012, p.15). Maternity benefits and childcare issues were covered in the 2003 Labour Law and amended in 2008 and 2011. According to the notices published in the *Official Gazette of Turkey* (2016), women who work under a service contract in either public or private sectors are granted fully paid maternity leave for a total of 16 weeks including eight weeks before and after the birth. Civil servants (and private sector workers) may extend the duration of their maternity leave up to 24 months (six months for the private sector) as unpaid. However, considering the high level of informal employment among women[34], the majority miss out on the benefits of maternity leave. (This will be discussed in Chapter VII.) Furthermore, the sole legal obligation that was integrated into labour law in 1953 was that employers who employ more than 150 women in their organisations must facilitate childcare services such as nursing rooms or childcare centres (İlkkaracan, 2012) and this was cancelled in 2008 by the employment subsidy package (Kuzgun, 2010) due to its impracticality. The majority of firms managed to bypass this obligation as they employed less than 150 women. Even in large companies, employers either chose to keep the number of women workers below this limit or they did not fulfil their legal obligation knowing that there was hardly any legal enforcement (Acar et al., 2007; İlkkaracan, 2012). However, with the regulations came into force in 2013, the same obligation of childcare services provision for firms with more than 150 women employees was brought back to life, although the obligation would have no effect on women's

[34] Informal employment was 38.4% as of January 2012. Informality was 82.8% in agricultural employment and 25.8% for non-agricultural employment in the same year (Acar and Tansel, 2014, p. 4).

LFPR (Bülbül, 2014).[35] Additionally, even if women were able to access childcare services more easily, low levels of education and income discourage women from participating in labour market activities and increase their dependency on other family members such as mothers, mothers-in-law and older daughters (Dildar, 2015). Rubery and Koukiadaki (2016) argue that state policies concerned with gender-specific social policies such as maternity leave, childcare, access to flexible work arrangements, and benefits in social security for unpaid care work have direct impacts on gender wage gap outcomes, the most common being the motherhood penalty. However, these policies have implications too for employment continuity, hours of work, occupational status and promotion opportunities. These gender-specific social policies will be examined throughout the thesis; however, Chapter VIII will specifically look at the role of the state in employment and gender equality, both of which have impact on gender wage gaps.

2.1.4 Conclusion

This section, Part 2.1 of the Chapter, presented the historical and empirical evolution of the Turkish labour markets by looking at the past and current gender and development trends. The history of women's movements in Turkey demonstrates that the most significant transformation for women's status was an outcome of a secular state, which sought to have been a radical break from the Ottoman era and granted Turkish women various rights. The section then examined more recent labour force participation and employment rates in the Turkish economy. FLFPR still remains low compared to both international standards and to that of Turkish men, but it has increased steadily since 2008. FLFPR and employment rates were much higher for those with university degrees compared to illiterate people, and primary and high school graduates. That is, education has a significant positive impact on the FLFPR in Turkey as long as women study all the way up to a university level. The share of women employment in the ICT sector also shows similar patterns to that of the national average and follows a similar trajectory over time. Finally, the state has a direct effect on gendered outcomes through policies and practices in areas such as education, fertility, labour market conditions and childcare, all of which have impact on earning disparities between men and women.

[35] 1,579,000 of 1,593,000 firms had less than 100 female employees in 2014, i.e., less than 1% of total companies were obliged to open childcare services in their premises (Bülbül, 2014).

2.2 GENDER WAGE GAP LITERATURE

The gender wage gap phenomenon has been intensively studied worldwide, since it is one of the most significant indicators of gender inequality in labour markets (Becker, 1962; Oaxaca, 1973; Mincer and Polachek, 1974; Bergmann, 1974; Reskin, 1993; England, 2010; Blau and Kahn, 2017). The literature focuses on demonstrating the existence of gender wage discrimination, its extent, causes and consequences in the labour markets up to some extent, consequently helping to shape social policies around the labour markets. Blau and Kahn (2017) argue that there has been a substantial reduction in the gender wage gap, not only in the US, but also in other developed economies. As the study of gender wage gap phenomena both has a long tradition and is still topical, new themes and explanations emerge in addition to more conventional approaches on how and why gender wage gap occurs in the first place.

Broadly speaking, two major streams of economic thought can provide explanations for gender wage discriminations in labour markets: neoclassical (mainstream or orthodox), and non-neoclassical (heterodox or unorthodox). The neoclassical paradigm holds the view that observed economic outcomes are determined by decentralised, individualistic decision-makers who are capable of individual optimisation and rational choice in order to maximise utility or profits (MacDonald, 1984). It focuses on supply-side explanations (human capital and psychological attributes/non-cognitive skills) and places individual level differences at the centre. There are also institutional approaches (demand-side theories) – such as the crowding hypothesis, labour market discriminations such as taste and statistical discrimination, and the motherhood penalty – that take into account the constraints of the labour markets such as employers' preferences and tastes or economic restraints to explain the gender wage differentials. On the other hand, non-neoclassical explanations approach the issue from a structurally based view, as seen, for example, in patriarchal theory or segmented labour markets. Thereby, while the neoclassical approach questions whether gender wage differentials are the outcome of the differences between the productivity of men and women, the non-neoclassical approach investigates whether it is an outcome of patriarchal hierarchies which serve the dominance of one sex (say, men) *or* whether segmented labour markets, which create the separation of labour force by the characteristics of the labour, are the reason for the observed unequal outcomes.

This research fits into the literature by examining the wage disparity between men and women in the rapidly growing ICT sector, which is experiencing high-skilled labour shortages. It modifies Barbara Bergmann's crowding hypothesis by offering an alternate explanation for the gender wage disparity in the ICT sector: labour market distortions. The rest of Chapter II attempts to account for both neoclassical and non-neoclassical approaches in order to acknowledge how different theories reflect and explain how labour markets operate with unequal wage treatment for women and/or other segments. The section first provides the rationale behind these explanations and then moves on to the critiques in order to provide a better, all-encompassing picture of understanding gaps in the literature. It will conclude with the contribution of this thesis to the gender wage gap literature.

It is worth noting that although it is challenging to generate a 'straightforward' categorisation of these explanations (whether they are neoclassical, institutional or non-neoclassical), it is, however, a fair practice to help readers better understand and connect the similarities and contrasts between these theories, so that valid conclusions can be made accordingly.

2.2.1 Supply-Side Explanations

(i) Human Capital Theory

Human capital theory was formulated in the early 1960s by Gary S. Becker as a tool to measure the quality of the labour force (Becker, 1962; Tan, 2014; Weiss, 2015; Gillies, 2017). Although the basis for human capital theory goes way back to Adam Smith's *The Wealth of Nations* (1776), human capital theory did not originally focus on labour market inequalities and gender aspects of labour. Capital acquisitions of labour regardless of sex, race or ethnicity through education, health, apprenticeship and training are referred to by Adam Smith as fortune both for labour and society (Goldin, 2016). The gender aspect of human capital theory entered into the equation in the 1960s with Gary Becker's work on household and family – otherwise known as New Home Economics (NHE) – that observed household decision-making in the allocation of time with respect to human capital formation of family members (Calkin, 2018).

Human capital is defined as ‘the knowledge, skills, competencies and other attributes embodied in individuals or groups of individuals acquired during their life and used to produce goods, services or ideas in market circumstances’ (OECD, 1999, p.10). In essence, the theory suggests that education and learning on the job can be seen as investments that ultimately increase productivity at work. Employers then reward their workers with higher earnings for their increased productivity, itself the outcome of human capital improvement through schooling and training. This process implies that the older the worker gets, the higher their earnings as a result of increased time on-the-job training; however, the relationship is non-monotonic, as there is an age threshold when additional units of human capital results in less earnings. According to this theory, individuals become more inclined to invest in themselves in expectation of higher future earnings. This implies that investment in human capital not only has a primary positive impact on the future wellbeing of individuals but also on economic growth due to increased aggregate productivity, since an economy made up of labour with an increased productivity level overall, enjoys higher economic growth. Based on utility theory, which long predates human capital theory, with roots going back to the eighteenth century and concerns about individual preferences, values and decision-making (Fisburn, 1970), individuals have a choice over the allocation of their time between paid work and leisure (MacDonald, 1984). According to human capital theorists, Walby (1990) argues, women have less human capital accumulation than men as a result of their position in the family in which women’s work as carers hinders them from gaining as many qualifications and as much labour market experience as men can.

Human capital theory states that education and learning on-the-job investments positively influence the earnings of an individual at work, and that human life is finite and human capital is non-transferable, implying a decreasing rate of return on human capital investments over the lifespan of an individual. Education primarily take place early in life and lifetime earnings profiles become concave, since increasing age means a decline in human capital investments (Weiss, 2015). As a result, human capital investments increase earnings for older workers and lower it for younger ones, since individuals need to forgo current income in anticipation of higher labour earnings in the future; i.e., returns are added when people age and costs are deducted when they are young (Becker, 1962). Becker also makes a clear distinction between general and specific training on the job. The skills and knowledge obtained via general training can be utilised not only in the present firm, but also in other firms or industries; e.g., a trainee doctor at one hospital can utilise their skills in another. In contrast, training specific to a firm increases the marginal productivity of the worker for the firm which provides the training. Employers then would not be willing to invest in general training, which increases the marginal productivity of the trainee in their present firm by the same amount as in other firms. Therefore, the costs/returns from general training would not be borne by the firms but by the trainees themselves. Employees then need to pay the costs of general training they receive by agreeing to lower wages: i.e., below the market wage. However, firms would not be reluctant to pay the market wage to trained personnel. That encourages trained employees who work for below the market-rate wage to switch jobs to receive higher wages at other firms. Although most on-the-job training is a combination of both general and specifics, it primarily increases the marginal productivity of the worker at the firm providing the training; as a result, on-the-job training can be considered to be mostly specific training.

Mincer and Polachek (1974) applied human capital theory for the first time, using data from the 1967 *National Longitudinal Survey of Work Experience* in the US, to estimate the wage differentials between men and women as a result of human capital accumulation in schooling and job training. In their study, they found that workers who are strongly attached to labour markets tend to invest more in human capital activities such as schooling and continuous time on the job in the US; therefore, they tend to have higher potential earnings. Women, on the other hand, experience career interruptions in their labour force participation due to childbearing and housework duties, which are the outcome of an unequal division of labour at home. Thus, this division of labour creates different lifetime work patterns for men and women, which could be explained by Becker's ideas about family and household work with relation to human capital theory, stating that women and men allocate their time differently and they have different human capital accumulation behaviours and outcomes. In other words, the job skills and abilities of those who are strongly attached to the labour markets (say, men) are much more appreciated then the skills of women whose labour market attachment is weaker; therefore, their skills depreciate as a result of obsolescence in terms of knowledge and aging. Therefore, women choose specific jobs, in what is known as occupational segregation, that penalise them the least during these work interruptions, even if they have reached the same educational level as men. Even in the absence of discrimination by employers, occupational sex segregation will exist because of women's economically rational choice of jobs (Polachek, 1979). Consequently, LFP patterns become different for married men and women, single men and women and also men and women with/out children. To illustrate, Mincer and Polachek (1974) find that the average wage rate among white married men ($3.18) was much higher than the wages for white married women ($2.09) and white single women ($2.73), implying that men earn more. However, the authors explain that the men were more experienced than the women, which could explain part of the gender wage gap found in their study. They are hesitant to attribute the remaining gender wage gap to discrimination but do not deny that unexplained parts may also be affected by discrimination. Instead, they conclude that 'lesser job investments and greater depreciation of women's market earning power' (p.104) due to interruptions aforementioned, may be affected by the expectations of discrimination to some extent.

Human capital theory still remains the most influential and dominant of theories in the realm of economics for its claimed ability to measure the properties of labour decisions and for allowing the study of wage structure. It is also significant to explore this theory for the purpose of our study, since in Chapter VI, we will utilise human and workplace characteristics in our regression analysis to measure the gender wage gap in the ICT sector. In Chapter VII, we will find out that the experience variable is, indeed, the most significant driver of the gender wage gap in the ICT sector. However, this theory has been subject to extensive criticism for its deficiencies. Bowles and Gintis (1975) acknowledge that human capital theory rejects the simplistic assumption of homogenous labour and brings social institutions into the equation (schooling and the family); they criticise the theory for considering labour a commodity and eliminating 'labour' from the equation as an explanatory category, instead merging it into capital; i.e., 'the operation was successful, but the patient vanished!' (p.74). In fact, labour is not a commodity but an active agent and the wage structure is not exogenous to the firm, it is one of the tools used to maximise the firm's profits. Similarly, even if two people have the same level of education and training in quantity, they may be of the same quality (Strober, 1990). Human capital theory also assumes that human beings act rationally in freely competitive markets, thereby investing in themselves in order to maximise their self-interest. If they do not, then other forms of behaviours should be treated as distortion to identify the core dynamics of an economy (Fitzsimons, 2017). However, in real life, human beings do not always act rationally for the sake of utility maximisation due to the costs associated with gaining the knowledge that may deter individuals from following their desired occupational choices. To put it another way, unlike capital, labour cannot be used as collateral for loans; therefore, individuals may be credit-constrained due to poverty, as well as opportunity-constrained as a result of unequal opportunities. Similarly, they may not necessarily know if they will succeed in the training they pay for. This would eventually discourage risk-averse trainees from accumulating human capital as the outcome of the lack of confidence in their capabilities (Stevens, 1999). The markets are not perfect or self-regulating: e.g., monopolies and unions.

Bowles and Gintis (1975) further criticise the theory for its failure to include the relevance of class and class conflict to the explication of the labour market phenomena, stating that wage structure as the outcome of schooling and job training can only be explained by explicit class analysis. Hence, they conclude, the theory fully ignores the theory of reproduction and only partially presents the theory of production. England (1982) raises another criticism of Becker's human capital theory through the findings of Polachek (1979) in relation to occupational segregation. England (1982) objects to Polachek's induced explanation stating that there is no evidence in the dataset used by Polachek (1979) that women choose traditionally female occupations due to planned employment interruptions, in an economically rational manner. Blaug (1976) also challenges the theory's falsifiable predictions stating that the theory fails to take labour demand into account but mainly focuses on the supply of human capital; i.e., it is a supply-side theory, since the wage structure is the outcome of supply and demand interactions within the labour markets. Finally, Booth and Bryan (2005) question human capital theory for its classification of general and specific training. They find that recipients consider most training they receive general training, even though the training may comprise both specific and general features. This contradicts with the theory, since the firm finance the training costs but the skills gained by the employees are transferable across firms.

To reiterate, traditional economic theory was concerned with the observable characteristics of the household in an aggregate manner – e.g., demand for goods and services and supply of labour – therefore, the household was treated as a 'black box' (Pollak, 1985). It did not include home production, family dynamics, home-based decision-making and time allocation of the family members between work, leisure and home production. However, NHE brought intra-household and family dynamics into the equation by examining the decision-making behaviours of the family unit regarding consumption, labour supply, education of children, transportation, fertility or health, eventually transforming household economics by widening its applications in labour, health, transportation and public economics (Pollak, 1985; Grossbard, 2006). NHE is concerned with individual preferences, interests and differences in the family unit in an effort to understand the allocation of resources, human capital and economics of family formation. However, the critics of NHE (Ferber and Birnbaum, 1977) argue that the model has two fundamental flaws. The first one is that although the simple models used to investigate any phenomena are crucial in the development of theory, they fail to understand and fully reflect the complexity of the real world. For instance, NHE assumes that time allocation behaviour of husband and wife between work and home production is the outcome of comparative advantage. Husbands should be specialising in market labour, while household work and childbearing should be considered the wives' responsibilities, and they should then ignore productivity. Secondly, the basic assumption that individuals always behave rationally is too simplistic and in some sense leads all outcomes to be optimal.

To summarise, human capital theory explains that the earning differentials between men and women are primarily an outcome of differentiation in human capital investments; that is, women invest less in human capital, and therefore they earn less than men. NHE assumes that a maximising family makes rational decisions about time allocation for the family members; e.g., market labour is a man's job and household/childbearing duties are women's work. As a result, Ferber and Birnbaum (1977, p.20) state 'Thus we come full circle: women specialize in housework because they earn less in the labor market, and they earn less in the labor market because they specialize in housework'. Despite the increase in women's participation in the labour markets globally, 60 years on from the development of NHE, women still earn less than men; the majority of the household/childbearing duties are done by women and household work is undervalued, indicating that vicious circle is still far from being broken. This indicates that human capital theory fails to fully explain the gender wage differentials using human capital factors and assumptions about rational individuals and freely competitive markets; it also ignores the existence of discrimination, patriarchy and segmented markets, to name a few obstacles. Therefore, researchers continue to explore alternative explanations for gender wage differentials. In this study, we will explore the impacts of human capital factors (education and experience) as well as workplace characteristics on gender wage gap outcomes in the Turkish ICT sector. Our study will provide an alternative explanation to gender wage gap outcomes – that is, labour market distortions which will be discussed in Chapter III and VII.

(ii) Psychological Attributes and Non-cognitive Skills

There has been a growing interest in the study of psychological attributes or non-cognitive skills[36] and their relevance to the gender-based wage differentials in labour market outcomes over the last 10 years. This is not a new strand compared with existing gender inequality theories; it is, in fact, a continuation of human capital theory rather than a break from it. It still focuses on the supply of labour and attempts to explain gender differences in terms of earnings from a psychological and non-cognitive perspective; i.e., gender differences in these attributes are the reason for women earning less than men. The most significant rationale behind this interest is that, as Blau and Kahn (2017) explain, although traditional economic variables such as schooling, experience, sector and so on, have their own importance in explaining the labour market behaviours and outcomes, a sizeable component of these behaviours and outcomes are still left unexplained, leading researchers to search for other explanations in attempt to fully understand the gender differences in the labour market outcomes and bring a new perspective to the gender wage gap phenomenon. It is also relevant for our study to examine psychological strengths and non-cognitive skills, as we will see in Chapter VII. The chapter will explore how the widespread beliefs and perceptions of ICT sector employers on gender differences influence their recruitment decisions, wage negotiations, types of positions offered to men and women (technical vs non-technical) and promotion, thereby influencing gender wage gap outcomes.

Current research, which focuses mostly on laboratory-based experiments, and on the psychological attributes or non-cognitive skills (risk appetites, attitudes towards competition, negotiation and promotion), suggest that there are, indeed, significant psychological differences between men and women regarding these skills and abilities (Fortin, 2006; Eckel and Grossman, 2008; Bertrand, 2011; Blau and Kahn, 2017). Due to differences in psychological traits, some occupations may appeal more to one sex than the other. Women may intentionally choose specific occupations such as child/healthcare, education, social services, secretarial services and domestic care that are primarily considered feminine, to secure social acceptance by society (Blades and Pearson, n.d.). The differences in psychological traits – e.g., taking lower risks by choosing occupations with stable or low earnings (Bonin et al., 2007) with less competitive environments and 'shying away' from the 'winner-take-all environments'

[36] Basic cognitive skills are defined as 'the reading, writing, and math skills, along with vocabulary and background knowledge, measured by tests' (Tyler et al., 2000, p.2), while non-cognitive skills are personality traits that are defined as patterns of thought, feelings and behaviour (Borghans et al., 2008b, p.974).

(Niederle and Vesterlund, 2010; Bertrand, 2011) – and the existence of social norms leave women with a narrower range of occupations than men, thereby leading to gender wage differences in the latter's favour.

Women are found to be less competitive and less ambitious, tend to negotiate less and choose low/no risk options and more altruistic relative to men. Croson and Gneezy (2009) suggest three reasons for such gender differences in risk taking: differences in the emotional reactions to risky situations, confidence level and perception of risk. Women are found to experience emotions more strongly than men; hence, the presence of negative situations produce higher levels of nervousness and fear for women than for men, which eventually lead to increased risk-aversion. These different appetites for risk may be influenced by the confidence levels of both men and women. Although both are often found to be overconfident, men demonstrate more overconfidence in their decisions or performances in uncertain situations than women do (Croson and Gneezy, 2008; Bertrant, 2011). Finally, the authors argue, gender differences in the interpretation of risk have an impact on labour market behaviours. Men tend to see risk as a challenge as opposed to women who perceive it as a threat. Thereby, men often participate in risk and competition, which are associated with higher expected returns, while women are more likely to avoid it. Eckel and Fullbrunn (2015) further support this argument by providing experimental evidence from the financial markets. The researchers report an inverse relationship between the magnitudes of price bubbles and the frequency of women traders. Comparing all-male and all-female markets, the former generates significant price bubbles as opposed to the latter which produces prices that are below fundamental values. As the nature of financial crisis is primarily associated with overconfidence, higher risk-taking and competition, which are personal traits mostly observed in men, they conclude that more women traders on the financial markets might have a dampening effect on the magnitude and the likelihood of price bubbles.

However, Nelson (2015, 2017) persuasively challenges the widespread belief of significant gender differences in risk-taking and risk-perception; that is, women are being more risk-averse than men 'in some substantially important and essential way, by virtue of their sex' (2015, p.580). By reviewing 35 empirical studies from the literature reporting strong evidence on gender differences on risk-taking, with an attention to statistical results, the magnitude of similarities and differences and the cultural context, she reports some cases of greater-than-average risk preference among women, along with very many cases in which gender difference in average risk-taking behaviour lacked statistical significance. Furthermore, she finds similar gender responses to risk in contrast to the reviewed studies reporting substantial gender differences in risk-taking. Referring to the reviewed literature that associates risk-taking with masculinity and risk-aversion with femininity, she argues that using average instead of actual differences could be misleading for three reasons. *First*, mean differences do not identify the actual *degree* of gender difference that exists, even if statistically significant. *Second*, observed 'essential' or 'natural' gender differences could be, partially or fully, the result of other confounding variables, including the upbringing of the research participants, the wider cultural context and the framing of the study itself. *Third*, too much emphasis on statistical significance may lead to publication bias which priorities studies with statistical difference and neglects others. Thereby, the belief, she (2017) adds, is not reinforced by high quality empirical evidence. Nelson (2015) states that 'if the beliefs are *not* true' (p.567), permitting sex-stereotypes to inform choices will more likely result in unequal treatment and inefficient outcomes such as women not being rewarded for their abilities and not being best placed according to their human capital and workplace characteristics. Therefore, the 'erroneous belief' that men and women have distinct natures in essence, leading to divergent preferences and behaviours in risk-taking, she (2017) concludes, has important implications for policy makers in areas such as financial market stability, labour market, business and investment success and environmental policy.

Researchers also examined whether men and women differ in altruistic attitudes, but no consensus has been reached on gender differences. To illustrate, some scholars reported women as more selfless (socially-oriented), donating an anonymous partner twice as much as men do on average, and men more selfish (individually-oriented) (Eckel and Grossman, 1998). Women demonstrate the patterns of charitable giving more than men; they are more responsive to philanthropic activities (Andreoni and Vesterlund, 2001) and more cooperative (Nowell and Tinkler, 1994). Men tended to stay on the extreme end of the scale – e.g., being perfectly selfish or perfectly selfless – while women preferred to share evenly (Andreoni and Vesterlund, 2001). However, other scholars either found men to be more generous (Brown-Kruse and Hummels, 1993) and more cooperative (Kahn et al. 1971) or found no gender differences (Bolton and Katok, 1995). These contradictory results concerning gender differences in altruism support Nelson (2017)'s argument above, which is framing of the study may lead to lack of external validity and/or misleading or incorrect interpretation of the phenomena: e.g., laboratory experiments, where its artificial environment often leads to failure to control for all significant factors.

Women are believed to take part in bargaining much less than men. Bowles et al. (2005) find that the representation of roles during negotiations, such as negotiating for self or others, represents a gender trigger, which itself creates gender differences in negotiation performance. The authors report that women's performance during negotiations significantly increases when they represent others rather than themselves, whereas men's negotiation performance is only slightly affected by this aspect. The rationale behind the gender differences in negotiation performance may lie with perception among women that they do not deserve as much or they may simply be constrained by gender roles and stereotypes that may prevent them from advocating freely and effectively for themselves. Fortin (2006) examines the gender differences in the soft factors such as 'greed, ambition, altruism, leadership and locus of control' (p.23) that are believed to explain the gender wage differentials. Women hold more altruistic values and volunteer in philanthropic organisations – e.g., showing a strong preference for redistribution (Bertrant, 2011) – as opposed to men, who are likely to be more ambitious, more money-oriented and more active in leadership organisations such as sport clubs, unions and political parties. The gender differences regarding these soft factors, Fortin (2006) concludes, have a significant role in the gender wage differentials between men and women.

On the other hand, although the amount of research into psychological traits and non-cognitive skills has increased dramatically in recent years, the theory itself is not new. It traces its roots back to e*ssentialism*, which is a view that categorises certain groups, e.g., women and blacks, as sharing an underlying reality, an essence that makes them what they are (Trauth, 2002; Gelman, 2003; Prentice and Miller, 2007; Philips, 2010). It is the assertion of fixed, unified and opposed female and male natures (Wajcman, 1991, p.9). Prentice and Miller (2007) state,

> If asked to identify this essence, most people would point to genetics, hormones, or some combination of the two. The existence and nature of this essence gives the category woman a number of defining properties: The category is discrete, with sharp boundaries; it is natural and has always existed in more or less its present form; membership in the category is involuntary and immutable; and many of the category's observable features reflect the workings of the essence. Of course, this representation of the category woman reflects perception and not necessarily reality; nonetheless, people hold it with considerable conviction. (p.202)

In the context of ICT, the essentialist argument suggests the existence of significant inherent differences between men and women. These presumed differences in the bio-psychological characteristics of both sexes determine their presence in the field. In other words, the bio-psychological essence or temperament found among males is considered a much better fit with the technological world than that of females, who are perceived as different and inferior and incapable of carrying out such work (Wajcman, 1991). From the psychological essentialism point of view, the poor representation of women in the ICT sector may be ascribed to inherent, fixed and group level differences, thus women and men should be treated differently (Trauth et al., 2004). Venkatesh and Morris (2000) investigated gender differences in decisions by individuals in the workplace regarding adoption and sustained use of technology through applying the technology acceptance model. The study claims that gender plays a vital role in forming the initial and sustained decisions about adopting technology. Men are more driven by instrumental factors (perceived usefulness), while women are more motivated by process (perceived ease of use) and social (subjective norm) factors (p.129). The authors recommend that technology training programmes and advertising campaigns ought to appeal to both genders separately based on these instrumental, process and social differences.

However, Venkatesh and Morris (2000)'s analysis of gender differentiations has been criticised heavily by other scholars (Adam et al., 2001; Trauth et al., 2004). Trauth et al. (2004) believe that this line of thinking leads to two different workforces: a 'women in IT' workforce and a 'men in IT' workforce. In this way, they think, in order to solve the gender imbalance in the IT sector, policies would focus on differences between men and women. Similarly, Adam et al. (2001, 2004) criticise the work of Venkatesh and Morris (2000), stating that using only psychology literature without including theories on gender and technology to identify gender differences makes the whole process of technology acceptance and usage emerge as a product of individual psychology. Therefore, all psychological characteristics may be perceived as 'essential' features of men's and women's characters in society. Thus, excessive emphasis on the individual gender characteristics alone – an essentialist approach – may lead to a further detachment of women from technical professions, considering the fact that the field is comparatively new and the issue of gender in information systems is largely under-theorised. This is also in line with Prentice and Miller (2007, p.202)'s statement above that gender focus in the field 'reflects perception and not necessarily reality; nonetheless people hold it with considerable conviction'.

Some scholars respond to the essentialist approach with the theory of *social construction of technology* (SCOT), which developed by Pinch and Bijker (1984) and concentrated on societal rather than bio-psychological forces (Wajcman, 1991; Trauth et al., 2004; Bray, 2007; Webster, 2014). Pinch and Bijker (1984) reject the idea of technology being deterministic but rather flexible in its nature, open to social modifications depending on the social circumstances of its development (Klein and Kleinman, 2002; Triastuti, 2013), and thereby providing a theoretical framework for explaining the technological development as a socially-constructed process (Bray, 2007; Webster, 2014). Technology is a product of intergroup negotiations and of society that is influenced by social norms and values (Klein and Kleinman, 2002; Triastuti, 2013) and its users are the agents of technological change (Kline and Pinch, 1996). The social analysis of technological artefacts not only emerge from their use but also in their design and technical contents (Pinch and Bijker, 1984; Wajcman, 2000). The relevant social groups, e.g., engineers, manufacturers, government, advertisers, customers who have different understandings of that technology and its technical characteristics based on their needs, values (Kline and Pinch, 1996; Wajcman, 2000; Jones and Bissell, 2011; Webster, 2014) can dramatically change the meaning and deployment of technologies over time (Wajcman, 2000). Considering that women are usually not present in these groups, Wajcman (2000) argues that the gender analysis of technology was neglected. Information technology has been recognised socially as a 'masculine' profession and the role of women has been degraded to reproduction, childbearing and nursing. The construction and character of feminine identity and behaviour encouraged by culture have channelled women away from studying science and mathematics (Wajcman, 1991, p.2); as a result, non-traditional, male-dominated fields have remained outside the women's sphere, excluding them from shaping and designing information technologies (Marini, 1990; Trauth et al., 2006; Webster, 2014). Some scholars (Wajcman, 1991; Trauth et al., 2004; Adam et al., 2004, Webster, 2014), however, have concentrated on the necessity of reconstructing the technologies and social shaping approach to women's identity. For instance, Wajcman (1991) asked the question *'Does the problem lie in men's monopoly of technology or is technology itself in some sense inherently patriarchal?'* and criticised the literature, proposing different socialisation, equal education and employment opportunities for women in order to accommodate more of them in technical fields:

> *The equal opportunity recommendations, moreover, ask women to exchange major aspects of their gender identity for a masculine version without prescribing a similar 'degendering' process for men. (p.3)*

Her example of the career structure of a professional scientist that requires long and unbroken periods of study and research, which is not compatible with childcare and domestic duties, indicates a clear picture of the dilemma women face. For women to succeed in such fields, she argues, they would have to model themselves on men who have traditionally neglected such commitments. Thus, the equal opportunities proposal has seen only limited success due to its failure in challenging the division of labour by gender in wider society. Similarly, Webster (2014) analyses the relationship between technology and gender as a two-way relationship, in which each assists in constituting the other. She emphasises the involvement of gender and social relations in the evolution of technology but admits that studies on social shaping have not focused enough on gender-aware technology analysis.

One line of research has explored whether significant gender differences exist in attitudes towards ICT professions at high school and university levels. Some researchers (Anderson et al., 2008; Papastergiou, 2008; Meelissen and Drent, 2007) found that secondary and high school girls held less positive attitudes towards computers than boys did. Others (Varma, 2002; Michie and Nelson, 2006; Mbarika et al., 2007) found that male graduates had higher levels of self-efficacy and passion for computing than their female counterparts at university level but less positive attitudes toward women's ICT capabilities than female participants did (Michie and Nelson, 2006). Conversely, Mbarika et al. (2007) interviewed 32 female university students in Kenya and found a highly optimistic attitude towards the ICT professions. However, the participants found the sector challenging owing to barriers such as insufficient education and employment opportunities, when compared to men's experiences. The examination of these sets of empirical studies on educational settings relates to the sector on which this thesis focuses. These studies make clear that the evidence is mixed with regards to gender differences in student attitudes towards the ICT professions; therefore, gender differences should be assessed with caution. Similar to Mbarika et al. (2007), our study found no gender differences in attitudes towards computers, technology and the ICT profession (discussed in Chapter V).

Overall, despite the heavy criticism of Venkatesh and Morris (2000)'s work in the early 2000s, nearly twenty years later, a growing number of researchers seem to be in agreement with the new perspective on the gender wage gap issue which asserts that the psychological traits and non-cognitive skills of men and women differ, on average, and that results in gender wage differentials in labour market outcomes. However, further cautions must be taken into account both regarding gender differences in psychological traits and non-cognitive skills as well as in attitudes towards technology to avoid blindly accepting or rejecting ideas on the basis of how frequent such studies are. The *first* caveat concerns the debate of nature versus nurture. There is still no consensus on the role of nature versus nurture (Blau and Kahn, 2017). This argument is valid, since we are still unable to explain whether these differences are the direct results of women's nature (i.e., biological, innate and the powerful presence of biological evolution) *or* of socially structured societies (i.e., societal, learned and the existence of culture, social roles, stereotypes and social settings) (Lippa, 2005; Bertrant, 2011). Regardless of whether the labour market behaviour is a result of nature or nurture, Blau and Kahn (2017) argue, it can still be malleable; women can be encouraged to improve their negotiation skills. Furthermore, Gneezy et al. (2008) disprove the belief that men's tendency to compete is purely nature-driven, by demonstrating that women are found to be more competitive than men in a matrilineal society, the Khasi Society in India, while men present more competitive attitudes than women in a patriarchal society, the Maasai Society in Tanzania. The *second* caveat is that gender differences not only favour men with the aforementioned non-cognitive skills but also women with interpersonal or people skills *or* that men's tendency towards higher risk may be a benefit in one setting but not in the other. The authors argue, therefore, that neither exaggerating nor minimising these tendencies helps with explaining the gender differences in the labour markets (Lippa, 2005). The *third* caveat is that even if men and women share the same personal characteristics, they may be rewarded differently, *or* women may be penalised for them while men are rewarded (Connolly and Holdcroft, 2009; Azmat and Petrongolo, 2014; Blau and Kahn, 2017). The *fourth* point is that the majority of studies on psychological traits are derived from lab-based experiments, meaning that the findings may not be necessarily applicable across the general population, since field experiments differ from the lab experiments in various ways (Harrison and List, 2004; Blau and Kahn, 2017). The *fifth* point sees Wajcman (1991) challenge the idea of essentialism, stating that the values attributed to women have emerged from the historical subordination of women. The concept of the unchanging nature of women and their relationship with reproduction, nurturance, warmth and creativity has derived from the traditional and oppressive conceptions of womanhood. Furthermore, nature itself is culturally constructed and has been subject to change throughout the history of humankind. There is no universally or cross-culturally accepted definition of feminine or masculine behaviour, i.e., what is considered as a masculine attitude in some societies may be interpreted as feminine or gender-neutral in others. Hence, addressing the gender gap in ICT employment based upon an assumed 'woman's perspective' is problematic (Trauth et al., 2004, p.115). The *sixth* point highlights that the properties of essentialism create strong social consequences. They form the way in which involuntary and immutable members of essentialised categories such as women are perceived, approached and evaluated (Prentice and Miller, 2007). Essentialism promotes a belief that every member in a particular category shares common characteristics (Prentice and Miller, 2007; Philips, 2010). Applying this to the ICT realm, every woman in society is assumed to share common bio-psychological essences that are not as suitable for IT jobs as those of men. Categorisation may also privilege one kind of group over another (Philips, 2010). Categorising women in the ICT sector unconsciously serves men's dominance in the sector, creating an assumption that 'men are better groups than women'. *Finally*, Blau and Kahn (2017) conclude that, based on their empirical work, psychological attributes and non-cognitive skills account for a considerably smaller portion of the gender wage gap than the effects of occupation and industry.

2.2.2 Institutional Approaches

Although human capital theory and psychological traits and non-cognitive skills have received much attention in explaining the properties of labour and the wage differentials between individuals as a consequence of human capital accumulation or of innate traits, they do not provide a full explanation for all the components of the persistent gender wage differentials due to the weaknesses discussed in the previous section. Instead, the focus was primarily on supply-side factors. Although we still utilise the neoclassical approach, here we account for the development of theories that pertain to the demand-side to explain observed gender differentials and inequalities.

(i) Crowding Hypothesis

The first demand-side theory here is the crowding hypothesis that, although it was originated in the 1920s by F.Y. Edgeworth (Bergmann, 1974), became popular in the 1970s following Barbara Bergmann (1971)'s well-received paper, which demonstrated that occupational 'crowding' created wage differentials between whites and blacks in the US labour markets. The work is based on data from the 1960 census on income by race and education. She suggested that in the absence of employment discrimination, the majority of whites would only have a minor change in their earnings, but whites who were in the lowest educational brackets could bear the burden of between 10 and 20 percent losses in their earnings. Bergmann (1971) proposed four reasons for discrimination against blacks: *(1)* a white employer might prefer not to be associated with blacks due to the fear of loss of status or self-esteem; *(2)* he might presume that blacks display lower productivity and less reliability; *(3)* he might fear that he will be penalised by his white workers or by white customers for hiring a black worker; or *(4)* he might expect that hiring black employees will lower his status or reduce his approval from other whites.

Bergmann (1974) then developed her crowding hypothesis by sex and observed the same phenomenon: occupational crowding by sex. In considering sex, she assumed only two types of occupation (high- and low-paid) across the economy and that all workers had identical qualifications and skills. There would then be a movement from low-paid to high-paid occupations by both male and female labour. In the presence of discrimination against women by employers, however, women will not be able to freely enter any occupation they desire across the economy, meaning that they will experience restricted access to all the available occupations due to discriminatory forces, but to a relatively narrow range of occupations, i.e., they are 'crowded out' of the high-paying occupations and 'crowded into' the low-paying ones, rather than competing with men for all the occupations available in the labour market (Hori, 2009), thereby leading to a segregated workforce. This will result in a higher labour supply for the low-paid occupations, even lower wages than if women also had access to all occupations due to the demand and supply factors in the female-dominated occupations; another result will be underrepresentation of women in certain occupations or differences in the male and female unemployment rates, the latter being the higher. Therefore, limited mobility of one group (say, women) across occupations causes gender wage differentials as a result of male-dominated occupations receiving higher wages than female-dominated occupations (Marshall, 1974; Ferber and Lowry, 1976; Cotter et al., 1997; Gibson et al., 1998; de Ruijter et al., 2003; Holder, 2015; Blau and Kahn, 2017). The issue is not that 'different jobs yield different occupations', Kemp (1983, p.198) argues, but that women are primarily employed in lower-paid jobs as a result of employment discrimination in the labour markets. Finally, Reich (1978) rejects Becker (1957)'s argument regarding racial discrimination against black workers, which states that discrimination would hurt capitalists and benefit white workers, but suggests that a racial earnings gap weakens the overall solidarity and bargaining strength of workers; thus, racial discrimination only benefits capitalists and high-income whites.

Some researchers (Ferber and Lowry, 1976; Cotter et al., 1997; de Ruijter et al., 2003) then explored how the labour markets would react to the absence of occupational segregation. Cotter et al. (1997) point out the empirical analysis in the literature is mostly inconsistent and mixed, implying that the occupational segregation has an insignificant role in explaining the wage differentials between men and women. However, the authors suggest, occupational gender segregation accounts for most of the gender wage inequality in the labour markets, but the association is primarily at a macro-level; i.e., the relative earnings of all women decrease and not just those of women in female-dominated, low-paid occupations. Consequently, occupational gender segregation benefits all men, while all women are better off with occupational integration. In occupational integration, women integrate into male-dominated occupations that are relatively well-paid and hold positions of greater authority and complexity, and the traditionally oversupplied female occupations become relatively less overloaded, also leading to higher earnings. On the other hand, de Ruijter et al. (2003)'s research in the context of the Netherlands using data from the 1997 *Structure of Earning Survey* with 140,000 observations finds that if men were integrated into female-dominated occupations, both men and women would experience a wage penalty; women who work in male jobs earn much higher than women in female jobs (Winter-Ebmer and Zweimuller, 1992), since society undervalues the work done by women and overvalues that of men (Kemp, 1983). Moreover, the effect of working in a traditionally female occupation is small in the Netherlands compared to in the US. Not only would men experience lower wage rates but also higher unemployment rates in occupations predominantly occupied by women, and women would only fare a little better in male-dominated occupations, since they would be considered less of an acceptable substitute for men in occupations with a greater male presence, thereby women would be attracted to certain occupations as a rational response to equally (or even more) unfavourable treatment in the male-dominated occupations (Ferber and Lowry, 1976). Although the crowding hypothesis is mostly considered as a demand-side explanation for the gender wage gap, since the labour market outcomes emerge as a result of demand for one group by employers, whites or males, it may also be applicable as a supply-side explanation due to the fact that crowding into certain occupations creates a supply surplus, which eventually leads to lower wages for women or black workers and occupational segregation by sex or race.

Our study will modify Barbara Bergmann's crowding hypothesis by bringing labour demand and social norms into play as external factors contributing to gender earning differentials in the ICT sector. This modification of the hypothesis will demonstrate how conventional explanations of the gender wage gap can, indeed, be resolved in circumstances of high sectoral growth and labour demand, as in the Turkish ICT sector.

(ii) Labour Market Discriminations

Labour market discrimination is one of the most prevalent forms of discrimination and an ongoing concern for labour market participants and policymakers. Despite a relative increase in women's presence in various male-dominated positions, continuing discriminatory practices across global labour markets indicate that discrimination is still a significant barrier to women's employment, promotion, leadership and earnings. Discrimination occurs when workers with identical characteristics such as abilities and skills, education, experience and training receive inferior treatment during hiring, promotion, performance evaluation and wages as a result of personal characteristics such as age, race, ethnicity, sex or disability, which are irrelevant to their productivity but meaningful to the employer (Aigner and Cain, 1977; King, 1990; Palaz, 2002; Bobbitt-Zeher, 2011). It is expected that different groups of employees receive different wages according to how their characteristics are valued on the market. However, Arrow (1971) argues these differences should be derived from differences in productivity levels and not on the basis of personal characteristics that are unrelated to productivity.

Taste discrimination is one type of labour market discrimination modelled by Gary Becker (1957), who states that individuals may have a taste for discrimination. They may prefer one group (white) over another (black) unless black workers willingly accept much lower wages than the wages received by white workers in order to offset the disutility of white employers interacting and hiring blacks (England and Lewin, 1989; Baert and de Pauw, 2014). Taste discrimination against one group (by race or sex) occurs partially because the discriminator (white or male) regards themselves as superior and the other group (black or female) as inferior and therefore a threat to their status. Thus, the discriminatory employer would be willing to pay a price in order to discriminate. Some discriminators practice taste discrimination in response to their customers' or employees' discriminatory tendencies rather than their own preference. However, some scholars (England and Lewin, 1989; Palaz, 2002; England, 2006) argue that competition in the labour and product markets diminishes labour market discrimination, since those who do not hire women need to pay higher for the remaining male labour force. This may lead to a lower market share for the firm; i.e., the lower share of employment or the discrimination itself mean non-discriminatory competitors put the discriminating employer out of business. Marshall (1974) objects to the neoclassical explanation of taste discrimination, which considers discrimination as a 'physical' phenomenon, but instead suggests it is a 'status or caste' phenomenon. Taste discrimination is not a physical issue, since whites are in reality closely physically associated with black people. Additionally, he explains, a physical phenomenon also could not explain sex discrimination for the same reason.

The second discrimination model, *statistical discrimination*, occurs when decisions are made on the basis of the average productivity indicators (such as time-efficiency and profit maximisation) of a certain race or sex to extrapolate unobserved information about actual individual productivity (England and Lewin, 1989; Azmat and Petrongolo, 2014; Baert and de Pauw, 2014). Discriminatory employers use race or sex as a filter to fulfil jobs in the labour markets. For instance, discriminatory employers who presume differences in groups (white vs black workers *or* men vs women) with regards to their strengths or tolerance levels within adverse working conditions may believe that a specific group (blacks or women) is less productive in certain tasks in the long run than other groups *or* may associate certain occupations with a certain race or sex. An employer who is unable to obtain individual information about the productivity of a prospective employee due to the labour market's uncertainties might then assume that the minority group is more likely to be less productive (Reskin, 1993). The actual productivity performance of a minority group (black or female) becomes tied to the mean performance of that minority group (Welch, 1975). To illustrate, if an employer assumes that women are 10 percent less productive than men at a certain job, then she or he will not be willing to hire her unless she agrees to work for 10 percent less reward. In this case, individuals who are atypical of their groups will be paid higher or lower than their productivities as individual might merit. Thus, individuals who display greater productivity than the average productivity of the group they belong to will become victims of the distortion caused by statistical discrimination (England and Lewin, 1989). Consequently, these presumed differences and beliefs will lead employers to statistically discriminate against certain groups by assigning these individual men and women different occupations, offering a lower wage or not hiring them at all (Strober, 1990; Reskin, 1993).

Ridgeway and England (2007) argue that stereotypes and gender status beliefs, which occur in the behaviours and judgments of individuals in organisations and are driven by cultural beliefs, are the primary causes of gender discrimination. The secondary cause is organisational structures, policies and practices. Therefore, they argue, organisational rules, structures and cultural beliefs determine labour market outcomes with regards to gender, since these institutional arrangements and procedures themselves become a tool for discrimination in labour markets and contribute to gender inequality (Nelson and Bridges, 1999). For instance, when veterans are favoured during hiring practices, this itself is discriminatory, the authors argue, since women are barred from military service; therefore, such organisational practices have an adverse impact on women, even though these practices might appear neutral and unbiased. Ridgeway and Correll (2004) add that key behaviours of individual men and women are socially constructed and constrained by gender beliefs in socially relational contexts. Hence, hegemonic beliefs containing assumptions about men, women and suitable work for each group might become embedded into the organisational structures, rules and procedures, authority lines and job classifications.

Discrimination can be observed in various forms such as hiring, promotion, performance evaluations, and wage differentials in the labour markets (Bobbit-Zeher, 2011). Gorman (2005) examines the links between hiring selection criteria and decision makers' same-gender preferences in large US law firms. She finds that more stereotypically masculine (or stereotypically feminine) traits in the selection criteria lead to a smaller (or larger) portion of new women hires. She also finds that women decision-makers tend to hire more women than the male decision-makers. Similarly, Goldin and Rouse (2000) explore, using data from the late 1950s through to the mid-1990s, the effects of 'blind' auditioning procedures in US symphony orchestras on the recruitment of women musicians. They found using tabulations and regression results that the blind auditioning procedures fosters impartiality in hiring and prevents sex-biased decisions. The procedure increased the likelihood of women advancing from preliminary rounds by 50 percent and increased the likelihood of women getting hired in the final round severalfold. Olson and Becker (1983) study sex discrimination during the promotion process in the US, finding that women were subject to higher promotion standards than men and also received fewer promotions on the basis of equal promotional standards. Stewart and Gudykunst (1982), however, report that women received more promotions than men but primarily occupy lower-level positions in the organisational hierarchy. Greenhaus et al. (1990) investigate the relationship between race and job performance evaluations and find that black workers receive lower performance ratings from their supervisors than white workers against the job performance evaluations.

Taste and preference-based discrimination theories tend to focus on the occupational segregation issue, while empirical analysis of discrimination primarily explores gender/race wage differentials (Welch, 1975). Empirical studies of earning differentials between groups primarily focus on *race* (Oaxaca, 1973; Blinder, 1973; Cotton, 1988; Neal and Johnson, 1996; Oaxaca and Ransom, 1999; Montenegro, 2001) and *gender* (Daymont and Andrisani, 1984; Neumark, 1988; Newell and Reilly, 1996; Jarrell and Stanley, 2004; Weichselbaumer and Winter-Ebmer, 2005; Aldashev et al., 2008; de Carvalho, 2017). Wage gap studies report that after controlling for observable productivity characteristics, women still earn less than men and black workers earn less than whites. Blau and Kahn (1997) further add that economists tend to examine earning differentials through gender-specific factors, such as gender divergences in terms of skills and the relative treatment of women in the labour markets (discrimination); however, they suggest, wage structure may also have an influence on labour market outcomes. For instance, if women have less professional experience than men, the gender wage gap would widen, as the labour market values experience and offers more in return. Other studies examine the wage gaps between other divisions: immigrants vs natives (Meng and Zhang, 2001; Nielsen et al., 2004; Aldashev et al., 2008); urban vs rural (Mazumdar, 1976; Agesa and Agesa, 1999; Magnani and Zhu, 2012); and public vs private (Nielsen and Rosholm, 2002; Panizza and Qiang, 2005; Melly, 2005; de Castro et al., 2013). Although the findings of these studies vary, the studies on earning differentials between immigrants and natives show consistently that migrants earn less than natives.

One of the most widely applied methods in empirical literature for testing disparities in earnings between groups in labour markets is the Blinder-Oaxaca decomposition approach, developed in 1973. The technique divides the total gender wage gap into two components (explained and unexplained) and states that the 'explained' component of the gender wage gap include the explanatory variables used in the model, and the remaining 'unexplained' component refers to the labour market discrimination against women. However, Azmat and Petrongolo (2014) argue that the technique suffers from some drawbacks. One of which is that even the most carefully observed data lacks information about the determinants of a worker's productivity to some extent, but employers still observe and value this information. Hence, the unexplained component of the gender wage gap is contaminated by unobserved differences in the productivity. Secondly, as human capital investments influence the return on earnings of an employee, if one group's human capital investment decisions are affected by anticipated discrimination, then the calculated unexplained gender wage component will be under- or overestimated. The second most popular method of measuring wage differentials between groups is the Quantile regression approach. The primary difference between Quantile regression and Blinder-Oaxaca decomposition approach is that the latter analyses the gender wage gap at the conditional mean in squared terms: i.e., assuming a constant wage gap and explanatory factors across the whole wage distribution. However, the Quantile regression approach decomposes the gender wage gap at each percentile of the earnings distribution; i.e., estimating the median regressions in absolute terms in order to observe the differences in the size and the explanatory factors at each percentile of wage distribution, since the effects of these factors often varies at different percentiles. The Blinder-Oaxaca approach provides better results with normally distributed wage data; therefore, it is less effective with extreme values and outliners, unlike the more robust Quantile regression approach since it can handle non-normal errors (Montenegro, 2001; Heinze, 2006; Hyder and Reilly, 2005; Baum, 2013; Waldmann, 2018). The Quantile regression model also suffers from some drawbacks. The *first* one, is limited to the case of time–invariant covariates, which cannot change over time, such as race, gender, place of birth, etc. The *second* is that it ignores the fact that a correlation may exist between observed and unobserved variables (Fitzenberger and Wilke, 2006).

Our study (Chapter VII) will demonstrate the extent and the nature of labour market discrimination in the Turkish ICT sector. It will provide evidence of discrimination during recruitment processes as a result of perceived direct and indirect costs of hiring women and hierarchies of discrimination, not only against men but also among women themselves, whether they are single, married, and with or without children. It will also examine the impact of discrimination on bargaining power, wage negotiations, and occupational segregation.

(iii) Theory of Segmented Labour Markets

Neoclassical economists have primarily and initially focused on supply-side factors to explain gender wage differentials between various groups, with human capital theory as the exemplar. However, various studies (Reich et al., 1973; Peck, 1989; Hudson, 2007; Jakstiene, 2010) revealed that labour markets are, indeed, segmented into divisions by gender, sex, ethnicity, industry, occupation, geography and so forth as a consequence of economic, political and social forces and processes. According to this theory, these separate submarkets or segments lead to differences in working conditions, promotional opportunities, performance evaluation practices, unemployment trends, earning disparities and different market institutions. Thus, the perceived discriminations are the outcome of segmentations. Our study will indicate that despite a relative rise in the participation of women in the ICT sector over the years, the sector has remained mostly male-dominated. Chapter VII will reveal how the sector employers' perceptions of gender will influence their choices during recruitment for technical (higher wages) and non-technical (lower wages) roles, thereby contributing to segmented labour markets by gender in the sector and differences in gender wage gap outcomes for occupational groups.

Labour market segmentation theory was developed in the early 1960s, partially as an outcome of a political necessity to understand and fight against urban poverty and underemployment in ghetto labour markets of the US, and partially as an alternative explanation to human capital theory (Cassim, 1982; Bispo, 2007). In relation to the former, despite the anti-poverty programmes the US government undertook through education and training (i.e., investment in human capital), Bispo (2007) argues that minority groups (women and black people) were trapped in low-paid jobs with poor working conditions and poverty continued to be widespread. This implies that differences in the human capital investment of labour cannot fully explain segmented labour markets. With respect to the latter, the neoclassical individualistic and supply-focused approach has been heavily criticised over its failure to explain the continued anomalies posed by segmented labour markets. Human capital theory assumes that 'jobs are allocated through a process of free and fair competition' so that individuals are confident in their understanding of a free and fair competitive system and are incentivised to make human capital investments for forthcoming returns, e.g., better-quality and better-paid jobs (Peck, 1989, p.119). Labour is allocated to individuals according to their quality, taste and preferences in a free and fair competition environment; i.e., labour with richer human capital stock is expected to be more productive and thereby more likely to get better quality, better-paid jobs (Leontaridi, 1998; Bispo, 2007). Therefore, according to neoclassical thought, the existence of poverty can be explained as the outcome of 'individual failures' and can be eliminated with 'individual adaptation' through the human capital stock (Cassim, 1982). However, labour markets are not always free and competition is not necessarily fair. Even 'successful individuals' may find themselves in a poverty trap in the lower segment of the labour market. Therefore, segmented labour market economists argue, poverty may not be merely explained by human capital endowments of labour. Labour markets are segmented; each segment operates and adjusts separately (Jakstiene, 2010) and has different characteristics and behavioural rules (Reich et al., 1973); moreover, they do not correspond to differences in labour skills (Leontaridi, 1998). Labour market segmentation theory puts emphasis on the demand-side and institutional factors (e.g., minimum wage and tax), while human capital theory focuses on the supply-side factors such as acquisition of human capital.

One of the significant segmentations originally identified in this literature in the 1970s, what is known as the dual labour market, represents a division of labour markets between primary and secondary. The notion of primary and secondary sectors was developed by Doeringer and Piore (1971). *Primary segment* requires on-the-job training to gain skills and stable working habits. The segment consists of highly skilled professionals with higher status and good professional knowledge, who tend to earn higher wages. They work at improving working conditions with existing career opportunities and employment stability. On the other hand, the *secondary segment*, which is mostly occupied by minority groups (e.g., women, and black and young people), comprises mostly low-skilled professionals with broad skillsets, relatively low wages and few benefits with unfavourable working conditions and fewer job ladders. Higher level of unemployment and high labour turnover can also be observed in the secondary markets (Doeringer and Piore, 1971; Reich et al., 1973; Hudson, 2007; Jakstiene, 2010). This stream of labour market segmentation theory was only influential within the field of informal labour, which was omnipresent in many developing countries at the time, and still is.

Labour markets can also be segmented by gender or race in order to allocate workers into certain jobs. In gender-segmented labour markets, men (or women) may be strictly restricted from feminine (or masculine) types of jobs (Reich et al., 1973; Hudson, 2007). Jobs offered in the female segment promote a ‘serving mentality’ (p.360) to others, and particularly to men, which is encouraged by schooling and family (Reich et al., 1973). Wages in this segment are much lower than those in the male segment. Similarly, in the race-segmented labour markets, certain jobs can be ‘race-typed’ (p.360) as a result of prejudice and labour market institutions. Black workers are hired for low-paying jobs and earn less wages than white counterparts. Geographic separation carries significance in the division of labour by race. Underemployment can also be observed in the labour markets segmented by sex and race. Workplace discrimination takes various forms, not only by race and gender, but also other protective characteristics (age, disability, sexual orientation, marital status, pregnancy, religious and so on). Tolerating any form of discrimination (e.g., residence status) while emphasising others (race or gender) only adds another cause of discriminatory markets. It is found in Chapter VII that discriminatory practices during hiring are drivers for non-technical gender wage gap in

ICT sector, in particular; thus, it should not be less worthy of attention because it does not take place at 'workplace' yet.

Labour market segmentation may also be derived from and influenced by the actions of the state owing to its regulatory role in the labour markets to ensure necessary conditions for reproduction of labour power (Peck, 1989). The state may interfere in the labour markets via various mechanisms, e.g., child-labour laws, compulsory education policies, military service laws, minimum/equal wage legislations, existence of trade unions and policies around health and safety at work and number of working hours per week. The state has a crucial function in preparing the labour force for the labour market via the above mechanisms; therefore, the author argues, even those with alternative roles outside the labour market should be regulated in order to prevent labour market disequilibrium from a completely unregulated labour supply. As a result, labour market segmentation analysis should provide a detailed theoretical overview of the interrelationships between labour supply/demand and the state, since each of these spheres has different characteristics and such dynamics have an impact on labour market outcomes.

In a broader sense, theories of labour market discrimination, already discussed under the neoclassical stream in this chapter, can be seen as an orthodox 'spin-off' of labour market segmentation theory. Bispo (2007) states that economists studying labour market segmentation acknowledge, as opposed to their neoclassical counterparts, the fact that labour markets can be discriminatory against certain groups (e.g., women and blacks) despite their otherwise equal human and workplace characteristics. This indicates that labour markets can be segregated as a result of discriminatory practices, leading to minority groups occupying specific occupations, jobs and roles in specific industries and working for relatively lower wages. In addition to its links with discrimination, some argue (Cassim, 1982; Leontaridi, 1998; Frazer and Marlier, 2010) that labour market segmentation theory also provides a strong ground for understanding the issues of poverty, low pay, unemployment and limited upward mobility. Frazer and Marlier (2010) report[37] that highly segmented labour markets and low upward mobility determine the extent of 'in-work poverty'.[38] Overcoming poverty, despite employment, becomes challenging

[37] The synthesis report was prepared by Frazer and Marlier (2010) using national reports prepared by the EU Network of Independent Experts on Social Inclusion, published on behalf of EU commission and covering many EU countries.
[38] 'In-work poor as those individuals who are employed and whose household equivalised disposable income is below 60% of national median equivalised income.' (Bardone and Guio, 2005, p.2)

in a highly segmented labour market. Thus, social institutions and structural forces are the primary sources of segmented markets, which ultimately lead to discrimination, poverty, lower pay and low social mobility (Cassim, 1982).

2.2.3 Non-Neoclassical Approaches

(i) Patriarchal Theory

Patriarchal theory[39] has been conceptualised by feminist economists as a response to the explanations of gender inequality in the neoclassical stream, which is predominantly based on supply-side factors. Mainstream economists strongly emphasise the significance of individualism in the supply-side of labour, such as individual choice in investments and time allocation, as well as traits and attitudes towards risk, competition and so on in observed labour market outcomes, as well as on the demand-side, where it is usually assumed that the employers may have a preference for a particular segment of the labour supply.

Non-neoclassical economic thought proposes other factors that are beyond the control of labour market participants and, one way or another, pertain to systematic and social factors that manifest in the labour market in particular ways. These theories also transcend the supply-demand dichotomy and analyse labour market inequalities as part of the broader social organisation and reproduction structures of economies. One structure is patriarchy. Walby (1990) defines patriarchy as 'the system of social structures and practices in which men dominate, oppress, and exploit women' (p.20). These social structures possess strictly defined sex roles which enforce masculine control over women's sexuality and labour power, in which women are subordinated not only to all men but also to more senior women, e.g., mothers-in-law (Boris and Bardaglio, 1983; Kandiyoti, 1988; Moghadam, 1993). Kandiyoti (1988) calls this *classical patriarchy* and it can be found predominantly in North Africa, the Muslim Middle East (including Turkey, Pakistan and Iran) and South and East Asia (specifically in India and China). Under classical patriarchy, the author continues, girls are given away in marriage at a young age, dowry is required pre-marriage and women are expected to produce male offspring during the marriage to establish their place in a patrilineal descent system. Therefore, there are close links between the subordination of women in kinship-ordered or agrarian societies, the

[39] "The origins of patriarchy lie far back in time, long before the development of agriculture, civilization, capitalism, or other similarly recent (i.e., within the past 10,000 years or so) phenomena normally invoked by feminists to explain patriarchy (e.g., Lerner 1986)." (Smuts, 1995).

reproduction of the kin group or of the peasantry, and the sexual division of labour (Moghadam, 1993). However, the way in which subordination occurs and the extent to which it manifests itself (and in which areas of life) differs substantially across space, cultures and time. Patriarchal theory offers a solution to this explanatory dilemma (Duncan, 1995).

Walby (1990) suggests six essential structures of patriarchy. The first one is *patriarchal production relations in the household* where women's household labour is expropriated by husbands who see their wives as a producing class. The second is *patriarchal relations in work* where women are excluded from better forms of paid work but segregated into low-skilled and low-paid jobs. The third is *patriarchal relations in the state,* whereby capitalist and racist views reflect a systematic bias towards patriarchal interests. The fourth structure is *male violence* towards women, which is also neglected by the state that systematically condones and legitimates by refusing to intervene against this violence unless in exceptional instances. The fifth is *patriarchal relations in sexuality,* whereby heterosexuality is compelled. The final one is *patriarchal cultural institutions* which create the representation of women within a patriarchal gaze in the public domain. The interactions between these structures enable an understanding of how these patriarchal relations evolve over time and space (Lawrence-Webb et al., 2004). To Engels and many others, Folbre (1983) argues, the primary motive for control over women's sexuality was the desire of men to ensure the legitimacy of their offspring, i.e., his genetic immortality. Men would then gain economic benefits from the labour power of their adult children through their control over women's reproductive capacity. To Marxists feminists, it was the ruling class's desire to ensure the continuous reproduction of a large inexpensive labour force. As a result, patriarchy persists in the presence of limited industrialisation, urbanisation and proletarianisation, and the state may still legislate (Moghadam, 1993). However, considering the fact that patriarchy – primary concentration of social, political and economic power by men – still exists in many modernised and fully industrialised societies today (e.g., the US), means Moghadam (1993)'s suggestion, two decades later, might not be the full answer to the issue of patriarchy.

With regards to more recent empirical and qualitative investigations in the field, Beşpınar (2010) convincingly summarises the urban working-class, middle-class and upper-class women's identities, wages, roles, status challenges and dilemmas in rural society as an extension of patriarchal culture, based on field research (60 in-depth interviews with women) carried out in 2005, in İstanbul, Turkey. She argues that in a patriarchal society in which men are considered primary breadwinners, the urge for women to work for wages decreases with the existence of a steadily employed husband. This is specifically valid for working-class women who have limited job opportunities with low skills and experience and tend to work in low-paid jobs with poor working conditions – if they really need to. For most women, the chief reason behind not working outside the home is down to their husbands' opposition, a position resulting from conservative patriarchal values, religious beliefs, and family opinions being put before women's individualism. In cases of tremendous economic need, the author continues, women are then required to ease their husbands' concerns regarding harassment, gossip and slander by not causing any rumours about their honour or sexuality, damaging the family's reputation or even symbolically demonstrating them modestly to husbands, family and society at large via wearing headscarf or topcoat; Kandiyoti (1988) calls these 'traditional modesty markers' (p.283). Middle-class women pursue various family- and work-related strategies, depending on the benefits and job satisfaction. They tend to work in 'pink-collar' jobs (p.527) and work until retirement, if the retirement and health benefits are encouraging, e.g., in the public sector. In the absence of these benefits, Beşpınar (2010) maintains, working intermittently becomes a prevalent individual and household strategy until the 'household goal' is accomplished such as buying a house/car or a better education for their children. Middle-class women have more control and negotiating power over family financing and household issues. Therefore, the personal and social identity of middle-class women rests on their roles as mothers and wives and motherhood is favoured in the case of family-work dilemma. For upper-middle-class women, working outside home is partly a matter of identity, according to Beşpınar (2010). They are the better skilled and better qualified women who work in white-collar occupations such as engineers, academics and lawyers, for higher wages than the middle- and working-class women earn. However, they also suffer from gender discrimination at work and traditional gender role expectations at home, a result of traditional patriarchal structures. Similar to working-class women, they also need to look 'professional' (p. 529) in order to protect themselves from false accusations, gossip and slander regarding their sexuality. Overall, unequal treatment of men and women in the household and at work creates patriarchal societies as a consequence of strictly defined sex roles, strongly gendered division of labour, male violence and the undervaluation of domestic labour, which all contribute to gender inequality in various forms and spheres. Lerner (1986) concludes that patriarchy is often seen as biological, hence inevitable, yet it is, in fact, socially invented as a result of culture and historical habits.

Beşpınar (2010)'s analysis of the Turkish labour markets is also reflected in the ICT sector, where women's low labour force participation (discussed in 2.1) is in line with the low participation of women in the ICT sector. Given our discussion in the previous parts on patriarchal norms and the paradoxical position of women in Turkey between traditional reproductive roles and being productive in the labour market, our study will look at how women professionals in the ICT sector handle this tension.

ii) Motherhood (Child) Penalty

Motherhood penalty is a more recent, predominantly empirical strand of the literature with a specific focus on women's labour market experiences as mothers. Neyer and Bernardi (2011) state that 'motherhood and reproduction have been at the core of the feminist discourse' (p.162); hence, it is derived from a feminist theory that also suggests human capital theory explanations for the observed differences. Traditional gender ideology, which describes men as breadwinners and women as caregivers, has been in decline since the 1960s as a result of increased economic independence and labour market involvement of women (Avellar and Smock, 2003). However, studies find that working women are penalised in the workplace in relation to earnings and other labour market outcomes due to the perceived conflict between being an 'ideal mother' and an 'ideal worker' when compared with their childless counterparts (Blair-Loy, 2003; Gash, 2009; Benard and Correll, 2010; Lundberg, 2012; Aranda and Glick, 2013), except in Scandinavian and Eastern European countries (Budig et al., 2012); e.g., the motherhood wage penalty declined dramatically over a 18-year period in Norway (Petersen and Penner, 2010).

Some scholars (Budig and England, 2001; Avellar and Smock, 2003; Williams and Cooper, 2004; Correll et al., 2007) coined the term '*motherhood penalty*' or *'child penalty'* to describe how working mothers are systematically disadvantaged in the workplace via lower wages, fewer promotion opportunities, little career progression or even a career loss as a result of direct and indirect costs associated with working mothers, e.g., employment breaks, lower competence and productivity levels, weaker commitment to the employer and limited flexibility and lower attachment to labour markets compared to working women without children and also to men. Conversely, being a father signals greater stability, higher competence and commitment to the employer, since they are considered as breadwinners as opposed to their caregiving partners. They may earn higher wages (Koslowski, 2011) and receive less scrutiny for poor performance compared to working mothers (Hodges and Budig, 2010). Thereby, working mothers face a '*motherhood penalty'* while working fathers benefit from a *'fatherhood bonus'* as a result of gendered division of labour at home and in the workplace. The *motherhood penalty* matters to a great extent in the context of gender inequality. Although fertility rates have been in decline around the world, Budig and England (2001) remind us that a majority of women still become mothers who then provide primary care for the newborns. As a result, childbirth negatively affects working mothers but not necessarily working fathers, who may even benefit from it, thereby contributing further to gender inequality.

Budig and England (2001) convincingly argue that mothers may be subject to lower wages after childbirth, since they may become less experienced as a result of absences such as maternity leave, sudden absences, milk allowance and so on. These absences lower wages, as general and firm-specific skills developed at work depreciate over time as a result of reduction in human capital investments, i.e., experience (Anderson et al., 2002; Correll et al., 2007; Gash, 2009). Their productivity levels may drop due to exhaustion and distraction compared to their childless counterparts, Budig and England (2001) continue, as a result of handling both paid employment and childbearing duties at home, and they may have a tendency to store energy for childbearing and household duties. They may also switch to more mother-friendly jobs with lesser earnings in order to balance their paid employment with parental duties (Budig and England, 2001; Gash, 2009; Gough and Noonan, 2013; Gafni and Siniver, 2015) such as the public sector, working from home, part-time work, flexible jobs or self-employment, leading to lower earnings. Gangl and Ziefle (2009) found that work interruptions and switching to mother-friendly jobs fully accounted for wage losses for mothers in the UK and US. Employers may also discriminate against working mothers on the basis of the above reasons by offering lower wages, excluding them from training and promotional opportunities or not hiring them at all. Benard and Correll (2010) call this type of discrimination 'normative', which occurs when employers discriminate against working mothers on the basis of their perceived abilities and efforts being lower than those of their childless women counterparts and men. Furthermore, they argue, productivity and paid labour are viewed as stereotypically masculine and not in line with women's warm and nurturing nature. Hence, when working mothers violate these normative expectations by demonstrating continued commitment and competence for work, they are found less likeable by the employers, who view them as 'more selfish, cold and devious' (p.617).

Budig and England (2001) using National Longitudinal Survey data from 1982 to 1993 to examine the motherhood penalty for working women, find a 10-percent wage penalty for one child and seven percent for two or more. Two-thirds of the wage penalty cannot be explained by past experience, seniority and part-time work status. They conclude that full-time home-caring for children reduces women's retirement income as well as their bargaining power with their partners. Williams and Cooper (2004) further add that working mothers who opt for employment patterns other than full-time employment may not be entitled to workplace benefits such as unemployment insurance, sick leave or vacation time, which could contribute to the wage penalty for working mothers. Likewise, working mothers may have different career trajectories compared to non-mothers. Hence, the wage penalty not only relates to one occupation in which women with and without children are treated differently but also to the differences in the career trajectories of mothers and non-mothers (Abendroth et al., 2014). Some scholars (Anderson et al., 2003; Kahn et al., 2014) suggest that the effect of the motherhood penalty is stronger when children are younger. As children age, mothers' labour supply may increase in order to meet the financial needs of their children. They may even switch to more demanding and higher-status work (Abendroth et al., 2014), but they are less likely to catch up with their childless counterparts. Finally, Napari (2010) finds a smaller motherhood wage penalty for shorter career breaks in the Finnish labour market as a result of childbirth and vice versa. Furthermore, working mothers in occupations with greater autonomy, fewer teamwork requirements and less competitive environments encounter smaller wage reductions for each child (Yu and Kuo, 2017).

Some researchers (Budig and England, 2001; Anderson et al., 2003; Budig and Hodges, 2010; Wilde et al., 2010) further explore whether the size of the motherhood penalty differs in relation to education, race, skills, pay and also policy support. The motherhood wage penalty was found to be much larger for high-skilled and high-paid women, as higher penalties are associated with higher returns to experience. Highly-skilled women are rewarded with higher wages to compensate their experience and skills, but once they give a birth, they are penalised for the depreciation in their experience and skills as a result of employment breaks (Napari, 2010; Wilde et al., 2010; England et al., 2016). Gamboa and Zuluaga (2013) examine the wage penalty between mothers and non-mothers in Colombia using the 2008 *Living Standards Survey*, finding that schooling was the most significant variable in determining the wage gap between mothers and non-mothers. Once controlled for schooling, the unexplained part of the gap reduced considerably and became insignificant. On the other hand, Budig and Hodges

(2010, 2014) find the motherhood wage penalty is proportionally larger for low-paid workers while consistent, but smaller, among well-paid mothers, which could be largely explained by the loss in human capital. This finding is in contrast with Becker's (1985) 'work effort' hypothesis that suggests the 'effort requirement of work should rise with education' (Anderson et al., 2003 p.287), implying that the motherhood penalty should be higher for well-educated mothers (Correll et al., 2007). Anderson et al. (2003) find that the least-skilled women, who are expected to earn less, did not suffer from a wage penalty after becoming mothers, while high school graduates experienced the largest motherhood penalty rather than college graduates with higher educational levels. This finding, Correll et al. (2007) argue, 'contradicts the productivity explanations of the motherhood wage penalty' (p.1300). In relation to racial differences, black mothers are penalised either the same as (Anderson et al., 2003) or to a lesser extent than white mothers (England et al., 2016). African American and Hispanic mothers also pay smaller wage penalties than their white counterparts (Glauber, 2007). Similarly, among women with three or more children, Budig and England (2001) also report a smaller wage penalty for black and Latino mothers than for white ones. Finally, Gash (2009) suggests that in countries where mothers are supported by maternal employment legislation, such as the UK and West Germany, mothers earned less than their childless counterparts and faced greater motherhood penalties.

The most recent research into the child penalty (Angelov et al., 2016; Adda et al., 2017; Kuziemko et al., 2018; Kleven et al., 2019a/b; Andresen and Nix, 2019; Sieppi and Pehkonen, 2019; Quinto et al., 2020) provides new evidence and insight into gender earning differentials. Kleven et al. (2019a) examine the impact of children on gender inequality at work by using Danish administrative data (1980-2013) and adopting a quasi-experimental approach based on event studies around the birth of their first child. They find that women's careers are significantly affected by having children. The impact is sharper and larger for women than men and has not fallen over time. Although men and women evolve in parallel up until the birth of the first child, researchers argue, they 'diverge sharply immediately after childbirth, and do not converge again.' (p.181). The child penalty, the percentage by which women's earnings fall behind that of men's owing to having children, was about 20 percent of earnings over the period and increased with the number of children. Kleven et al. (2019a) argue that this 20-percent penalty is the outcome of differences in labour force participation, working hours and gender wage differences. Straight after the first child, women start falling behind men in occupational rankings, corporate promotions and wage rates, and they often switch jobs to more family-friendly, flexible career paths. Therefore, childbirth explains most of the remaining gender wage gap in the Danish labour markets. Kleven et al. (2019b) further estimate child penalties in different countries (Denmark, Sweden, Germany, Austria, the UK and US) and found that women experience a sharp and immediate decrease in earnings after the first child in these countries, while men's earnings are unaffected. However, the size of the long-run child penalty is much higher in German-speaking countries (51-61 percent) compared to English-speaking (31-44 percent) and Scandinavian countries (21-26 percent).

Other scholars apply an event study approach to different countries. Sieppi and Pehkonen (2019) use population-based registered data (1987-2017) for Finland and find a 25-percent long-term child penalty in gross earnings for women, which is consistent with the other Nordic countries (Denmark and Sweden) in Kleven et al. (2019a, 2019b)'s study. The authors further suggest that progressive taxation and social security transfers reduced the child penalty considerably over the period. Quinto et al. (2020) estimate long-run child penalties in earnings in Spain by using social security records and find a 28-percent gap, which is similar in magnitude to that of Nordic countries. The study also documented that women were more likely to work part-time or under fixed-term contracts, while men remained unaffected. The reduction in working hours and earnings after the first child were substantially larger for women with no college degree than that of college-graduated mothers. Similarly, Kuziemko et al. (2018) report that women in the UK and US were 30-40 percent more likely to reduce their employment upon motherhood. Andresen and Nix (2019) compared the child penalty of heterosexual couples to same sex couples in Norway. They report that child penalty is both higher (20 percent) regardless of the number of children and more persistent for heterosexual couples than for same sex couples (13 percent). Moreover, the child penalty disappears for both women in lesbian relationships five years after the first childbirth, while it continues for women in heterosexual relationships. Angelov et al. (2016), using Swedish administrative data (1986-2008), found that 15 years after the first child's birth, the percentage difference between the earnings of men and women increased by 32 percent from the pre-child difference. The motherhood wage penalty was 30 percent in Turkey (2018), which was the highest penalty among both upper-middle and lower-middle income countries (ILO, 2019). This section reveals that the motherhood penalty is one of the major causes of income inequality between men and women. As a result, we will look at the effect of children on workplace gender discrimination and income disparities in the Turkish ICT sector (Chapter VII).

2.2.4 Why Study the Gender Wage Gap in the ICT Sector?

A great deal of effort has been devoted to explaining the consequences of a lack of representation in the ICT professions. Rosenbloom et al. (2008, p.544) claim that the lack of women presence in technical fields is part of a larger phenomenon of occupational segregation by gender. In a computer-dominated and highly technological information society, it is critical for each individual to develop competence and understand the computer world in order to be competitive and communicative (Moorman and Johnson, 2003; Papastergiou, 2008). Closing the tech industry's gender gap would also help to solve the major problem of growing shortages of IT professionals (Tan and Igbaria, 1994; Ahuja, 2002; Domberger et al., 2000; Fountain, 2000; Gallivan et al., 2006; Loogma et al., 2004, Ramsay and McCorduck, 2005; Osmangani and Paik, 2016), both globally and in Turkey, which will be discussed in Chapter III. Stronger representation of women in ICT would not only help to manage the problem of human capital deficit but also enlarge the diverse range of technological innovations, applications, creativity and practices and thereby benefit society as a whole. Poor representation of women may prevent them from capitalising on these opportunities and cause a loss of valuable resources (Fountain, 2000; Papastergiou, 2008). Papastergiou (2008) argues that innovations, productions and applications in ICT that are designed and produced by a mainly male-dominated sector might lack a feminine perspective and not best serve the needs of everyone. Gender inequality in the field leads to negative social, economic and scientific consequences. In order to increase women's representation in the field, far more effective policies should be implemented in combination with positive changes in cultural and social attitudes towards women's representation in the ICT professions (Khreisat, 2009).

Although there are an abundant number of studies focusing on the gender wage gap in the literature, a limited number of studies focus on the gender wage gap in a non-traditional or male-dominated sector such as ICT at the international level, and they are almost non-exist, except for some institutional sector reports, at the national level in Turkey. The gender wage gap literature in Turkey (Table 2.5) suggests that no specific study has analysed the ICT sector in isolation; therefore, like-for-like comparison are not possible. There are a select few reports around wage differentials that have been carried out by associations such as TÜBİDER, the Informatics Sector Association and with the coordination of other institutions. These reports are mostly limited to general information about wage differentials and fail to identify the total gender wage differentials and causes of the wage gaps provided in their reports. The majority of the existing literature on the gender wage gaps on Turkey focuses on a number of possible factors – education, experience, tenure, occupation, age, location, form of employment (full-time vs part-time), types of employment (public vs private), region, industry, firm size, social security coverage, collective bargaining power, marital status, having children and so on – as the observable causes of wage differentials between men and women (Table 2.5). These studies primarily focus on the national gender wage gap with regional, industrial, public-private and formal-informal distinctions attached. Despite controlling for some of these variables in their models (İlkkaracan and Selim, 2007; Cudeville and Gurbuzer, 2010; Aktaş and Uysal, 2012), they still reveal that a significant portion of the gender wage gap cannot be observed or explained. The existing wage gap literature in Turkey is also inconsistent – varying from 2 percent to 51 percent – despite most researchers using the same TÜRKSTAT data and almost all performing Blinder-Oaxaca decomposition. These differences may be attributable to various factors. *Firstly*, the period covered (ranging from 1988 to 2015) is different in almost all cases, which may help to explain the general narrowing trend in the gender wage gap. *Secondly*, despite some common human capital and workplace characteristics, the observable parameters differ amongst scholars. *Thirdly*, not all the researchers use gender as the sole group parameter but also other categories such as public vs private, informal vs formal and so on. Given the array of existing literature, it is worth considering how this study compares to existing findings for Turkey.

Similarly, neoclassical, institutional and non-neoclassical arguments (discussed in section 2.2) provide explanations for earning differentials between men and women. However, some theories may have some superiority over others owing to their positive relationship with empirical work (e.g., human capital theory) and do not fully answer the question of gender differences in labour market outcomes. Human capital theory is more complete when demand-side factors (e.g., discrimination, segregation, overcrowding) and systematic factors (e.g., patriarchal structures) are also factored in to explain the puzzles of gender pay inequality in labour markets. The reason for the lack of studies on the gender wage gap in the Turkish ICT sector is not the lack of data availability. Existing Household Labour Force Surveys provide data on the ICT sector, yet the sample is too small to carry out any gender pay gap analysis. The sector may also be overlooked or neglected despite its undeniable significance. This study, thereby, makes a significant contribution with its primary data collection and analysis of the understudied field of gender wage gap studies, both for the ICT sector and also within the Turkish context.

TABLE 2.5: Gender Wage Gap Studies on Turkey

Study	Model	Group	Data	Variables	Coverage	Findings
Dayıoğlu & Kasnakoğlu (1997)	Blinder-Oaxaca decomposition	Male vs. Female	1987 Household Income and Expenditure Survey (Turkstat)	Education Experience Region Occupation Number of hours worked Employment	National	Wage Gap: 38 percent Explained: 36 percent Unexplained: 64 percent
Dayıoğlu & Tunalı (2004)	Standard wage regressions & Blinder-Oaxaca decomposition	Male vs. Female	1988 Household Labor Force Survey and 1994 Household Income Distribution Survey (Turkstat)	Education Experience Region Firm size Sector Industry Tendency for wage employment	National	1988 and 1994, respectively Wage Gap: 2 & 17 percent Explained: 36 & percent Unexplained: 64 percent
Hisarcıklılar & Ercan (2005)	OLS & Blinder-Oaxaca decomposition	Male vs. Female	1988 Household Labor Force Survey (Turkstat)	Education Experience Region Urban Part-time Firm size Tenure	National	Wage Gap: 11.5 percent
Kara (2006)	Blinder-Oaxaca decomposition	Male & Female	1994 Household Expenditure and Income Survey (Turkstat)	Education Experience Household size Non-labour income Unearned income Spouses income if married	National	Gender Wage Gap: 30 percent Occupational wage gap varied between 15-43 percent. Public sector is less discrimination against women than private sector
Özcan et al. (2003)	Blinder-Oaxaca decomposition	Male vs. Female	1994 Household Income Survey (Turkstat)	Education Experience Exp^2 Marital status Working hours Industry Social security coverage	National	Gender difference in wage employment (.4320) and self-employment (1.6942). If male is the based category, unexplained wage difference is 22% in favour of men.

				Employment		
Tansel (2005)	Blinder-Oaxaca decomposition	Public vs. Private	1994 Household Expenditure Survey	Education Experience Exp^2 Location Region Firm size Sector Industry	National	Wage Gap: 27% Explained: 69% Unexplained: 32%
Ilkkaracan & Selim (2007)	Standard wage regression & Blinder-Oaxaca decomposition	Male vs. Female	1994 Employment and Wage Structure Survey (Turkstat)	Education Experience Exp^2 Tenure Location Region Collective Bargaining Sector Industry Occupation Firm size	National	Wage Gap: 35% Explained: 57% Unexplained: 43% Once workplace characteristics added, the unexplained part drops to 22%.
Aydın et al. (2010)	Two-staged estimation & Blinder-Oaxaca decomposition	Formal vs. Informal	1988 and 2007 Household Labour Force Surveys (Turkstat)	Education Age Tenure Sector Rural Region	National	Wage Gap: 51% (1988) and 89% (2007) in favour of formal sector. The unexplained component becomes 62% in 2007.
Cudeville & Gürbüzer (2010)	Mincerian wage equation & Blinder-Oaxaca decomposition	Male vs. Female	2003 Household Budget Surveys (Turkstat)	Age Experience Tenure Education Worked hours Worked contracts Public Social insurance Occupation	National	Wage Gap: 32% Explained: 37% Unexplained: 63%

				Sector Firm size Rural Region		
Akhmedjonov & Izgi (2012)	Mincerian wage equation & Blinder-Oaxaca decomposition	Public vs. Private	2009 Household Budget Surveys (Turkstat)	Age Education Marital status Health condition Sector	National	Public (Private) Wage Gap: 31% (61%) Explained: 14% (0%) Unexplained: 86% (61%)
Aktas & Uysal (2012)	Quantile regression method & Machado-Mata decomposition method	Male vs. Female	2006 Household Labour Force Surveys (Turkstat)	Age Age^2 Education Tenure $Tenure^2$ Industry Occupation Firm size Administrative post Collective bargaining	National	Gender wage gap: 3% No gender wage gap at the lower end and men earn 6.47% more than women at the median. The gender gap widens once controlled for age, education and tenure.
Mercan & Karakaş (2012)	Normalized regressions	Industrial	2009 Household Labour Force Surveys (Turkstat)	Education Tenure Industry	National	Higher negative female wage differentials in human health, educational and financial service activities.
Selim & Kaya (2018)	Blinder-Oaxaca decomposition	Regional	2015 Household Labour Force Surveys (Turkstat)	Education Experience Exp^2 Weekly working hours Region Firm size Occupation	Regional	The highest wage gap in Western Black Sea region (25%), the lowest in Western Anatolia Region (14%). Turkey: 14% and Istanbul 9%.
Kaya (2017)	Quantile regression & Counterfactual decomposition	Male vs. Female	2006 Structure of Earnings Survey (Turkstat)	Education Age Seniority Employment type Company size Collective Agreement	National	Existence of a significant glass ceiling effect in the Turkish labor market which is caused mostly due to differences in rewards between women and men.

Our Study	Simple and Expanded Model Blinder-Oaxaca decomposition	Male vs. Female ICT Sector	2018 ICT Online Sector Survey	Education Experience $Experience^2$ Marital status Children Location Position Employment Firm Ownership Overtime	Sectoral (ICT Sector)	Wage Gap: 23% Explained: 69% Unexplained: 31%

Note: Rounding procedure is applied to the wage differentials reported in the above table.
Source: The author's own elaboration

This thesis does not claim to complete the gender pay gap puzzle but rather to add another missing piece to it so as to have a better understanding of the phenomena. To illustrate, the thesis contributes to the literature by proposing a gender wage gap analysis in a currently understudied labour market setting, i.e., in a high-labour-demand and high-growth sector. High labour-demand and high-growth sectors such as ICT matter for the analysis of the gender wage gap issue for two reasons. *Firstly*, the sector is relatively new, rapidly-growing, ever evolving and considered the backbone of the knowledge economy, as a result of its considerable and relentless impact on society and other sectors via research, development and innovation. *Secondly*, the existence of labour market distortions (labour supply shortages and an unusually rapid sectoral growth) has a strong impact on the size of the gender wage gap (discussed in Chapters III and VII). Our finding reveals that the gender wage gap nearly disappears for technical positions with labour shortages in a growing and value-adding sector, while it still remains high for non-technical positions where labour supply is much greater. This implies that considering that growth is driven by the technical segment of the ICT sector, conventional causes of the gender wage gap such as the motherhood penalty, occupational segregation, marriage compensation, social norms and prejudices are not immutable truths in the Turkish context. On the contrary, they can be overwritten. This is evidenced from the fact that despite being in the same sector, two different populations (e.g., technical and non-technical) were subject to two different wage treatments, which eventually led to totally different gender wage gap figures. Although the gender wage gap has been studied widely in the Turkish context, it has not been applied to the ICT sector, implying a significant gap in the literature, considering the role of ICT in Turkey's current and future growth and development.

The thesis incorporates insights from other strands of the literature, as it uses the Blinder-Oaxaca decomposition technique which requires applying the fundamentals of human capital and discrimination theory. It also demonstrates how the significance and impact of patriarchy discussed above may differ in different segments of the same sector, i.e., technical and non-technical. Finally, it extends the crowding hypothesis by offering another standpoint: labour market distortions. Conventional theories of earnings differentials among groups have long neglected labour market distortions (labour supply shortages and unusual sectoral rapid growth), which are found to be a significant causal element for gender wage gaps in this study. Therefore, the thesis contributes to the literature by developing a richer understanding of the causes of the pay gap and how these need to be understood alongside sectoral and economy-wide developments rather than treated in isolation.

2.2.5 Conclusion

Section 2.2 has explored the contemporary and traditional major gender wage gap theories and gender wage gap literature in Turkey. Gender pay gap literature has evolved significantly over the last century. It shifted from an early theory of gender pay gap – the human capital approach formulated by Gary Becker and further supported by Mincer and Polachek – that put greater emphasis on individuals' own human capital investments via education and training to explain their earning differentials, to a more institutional approach developed by Barbara Bergmann, which provided explanations looking beyond human capital, suggesting the existence of occupational segregation between men and women is a result of labour market discriminations. The institutional stream of thought is then followed by other feminist explanations of discrimination – motherhood penalty and patriarchy – in recent decades. Notably, neoclassical, institutional and non-neoclassical arguments provided ground explanations for gender earning differentials and social scientists seek to offer alternative explanations to different labour market outcomes between groups. However, some theories (human capital theory) may still have some superiority over others due to their applicability for empirical work and also their impact on narrowing the gender wage gap, i.e., human capital theory (education and experience factors) continue to play a significant role in the reduction of gender wage gap (Blau and Kahn, 2017). However, they do not fully answer the gender pay differentials in labour market outcomes. Human capital theory is more complete when demand-side factors (e.g., discrimination, overcrowding and patriarchal structures) are also factored in when explaining gender pay inequality puzzles in the labour markets. Therefore, traditional and modern explanations should be revisited to test the validity of these theories in a world where labour and labour market conditions are constantly evolving. What's more, the literature on gender pay differences in Turkey indicates that no particular research has solely focused the ICT sector; therefore, like-for-like comparison is not feasible. This in itself explains the importance of our study in that it proposes a new explanation, labour market distortions, for the gender pay gap issue.

2.3 THE ROLE OF THE STATE IN GENDER WAGE GAP OUTCOMES

Gender pay inequality in labour markets resulting from occupational segregation and patriarchy results in systematic discrimination against women; this does not only harms women's earnings, bargaining power and retirement pay, but also has a significant negative impact on productivity, economic growth and domestic violence, which in turn become a financial burden for governments in the forms of poverty, healthcare and increased state pensions for women. It is necessary to differentiate between equal pay and the gender pay gap. Rubery and Grimshaw (2015) argue that pay is multifaceted and can be perceived as the price for allocating labour within a labour market, as a principal source for both socioeconomic status and living conditions and as a negotiated product of a contested work relationship. This contestation takes place at both the macro institutional level, the authors continue, where wage- and price-setting agreements are in place, and at the corporate and occupational level, where compensation policies and payment processes are part of the wage-effort bargain. Thus, equal pay concerns unjustified pay discrepancies within a particular group of people carrying out work of an identical or broadly similar nature, so that women are treated no less favourably than men (Eva et al., 2001). Most nations, including Turkey,[41] have existing legislation that prohibits unequal pay (Smith, 2012; Lewis et al., 2018). Rubery and Grimshaw (2015) state that the perception of pay can provide a different lens through which to analyse pay differences between men and women: *(i)* lower wages for women labour due to productive attributes or lower returns to attributes; *(ii)* women's lower socioeconomic status in contrast to male breadwinners and/or perceived lower income requirements; *(iii)* occupational segregation as well as women's underrepresentation in positions with higher pay; and *(iv)* gender bias in job-grading at the corporate level and with discretionary payment systems. As well as enacting equal pay laws, the state can also address wider inequalities through state policies and practices in minimum-wage, part-time work, informal employment and maternity/paternity leave, all of which have implications for gender pay disparity outcomes (which will be discussed in Chapters VII and VIII).

A growing number of governments, in Europe and North America in particular, are therefore pledging to enact laws, policies and regulations that address and deal with the drivers of the gender

[41] 'The principle of equal pay for work of equal value was adapted in Turkish legislation for the first time by Act No. 5518 of January 25, 1950 on Amending Various Laws of the Labor Code' (Şenol et al, 2005, p.12). Article 5 of the Constitution states that 'For equal or equivalent jobs, there cannot be a disparity of wages based on gender' (Müftüler-Baç, 2012, p.12).

wage gap. The actions taken by some governments reveal that public policy matters in reducing or eventually closing the gender wage gap. Rubery and Koukiadaki (2016) argue that legal mechanisms may affect the gender wage gap in various ways. One of these is a symbolic impact that may prompt a reconceptualisation of employment policies on pay, bring about attitudinal change and serve as a tool for resetting the agenda. They may have an indirect impact when it comes to structural reasons influencing gender pay disparities: e.g., family-friendly policies and maternity leave (Mandel, 2012; Rubery and Koukiadaki, 2016). For example, Van der Lippe et al. (2018) carried out research utilising data from 259 organisations in nine EU countries and find that the 'gender wage gap is smaller in organisations where work-life policies are available' (p.22). In contrast, they reported, parental leave and childcare support are less significant than flexibility policies in reducing the gender wage gap. Finally, legal mechanisms can directly guarantee equal pay for work of equal value (Rubery and Koukiadaki, 2016). The world's first 'equal pay' law was passed in 2017 in Iceland, where the gender wage gap was found to be around 5.6 to 13.7 percent during 2013-2015 (Government of Iceland, 2020). This law came into force in January 2018 for Icelandic companies with 25 or more employees annually to 'enforce the current legislation prohibiting discriminatory practices based on gender and requiring that women and men working for the same employer shall be paid equal wages and enjoy equal terms of employment for the same jobs or jobs of equal value'.

The European Commission proposed in 2014 that member states adopt pay transparency measures to strengthen the principle of equal pay and minimise the gender wage gap (Savolainen, 2018). The regulations around gender pay gap reporting (i.e., wage transparency) came into force in April 2017 in the UK, where the gender wage gap that year was 16.5 percent (CIPD, 2019) for organisations with 250 or more employees. However, in contrast with Iceland, there are no compliance mechanisms in place in the UK to ensure that companies disclose their gender pay gap statistics other than the risk of publishing the identities of those companies that do not comply with the regulations. It is also acknowledged by government officials that the regulation primarily highlights the gender wage gap as a concern rather than providing a remedy (Parliament, 2020), as no mandatory actions are demanded when a significant wage gap is revealed. However, it is clear that the mandatory gender pay gap reporting creates public pressure ('name and shame') on companies to publish their pay gap figures and take actions to reduce the gap. Similar gender pay reporting measures have been taken up by France (50 or more employees) and Germany (500 or more employees) to promote pay transparency. Germany requires all businesses to inform workers, when requested, how their pay compares with that of workers of the opposite sex in similar positions within the company (Financial Times, 2018).

Turkey has also acknowledged the principle of equal pay for men and women for quite some time,[42] Foubert (2010) argues, and in full compliance with EU law, at least from a strictly legal point of view. Turkey adopted the ILO Equal Pay Convention in 1966, and signed the Convention to Eliminate All Forms of Discrimination against Women (CEDAW) in 1985. Furthermore, the 2003 Labor Law provided the legal framework for equal pay for equal work and stated that there should be no discrimination against women in the workplace. The Labor Law also benefits from the concept of sexual harassment at work set out in the 2005 Penal Code (Müftüler-Baç, 2012; Bakırcı, 2019). The concept of equal treatment remains, in general, in the area of the state and occupational social security systems. Contributions to and entitlements from social security systems are identical for men and women, and gender-neutral language is used (Süral, 2007). However, the complexities of realising equal treatment at work mean that the gender wage gap in the country has not been properly tackled. For instance, women are more likely to have limited access to decent work and to be in informal employment. They pay the highest motherhood penalty and their ages become a factor in determining their wages (Bakirci, 2019).

However, Turkey lags far behind some EU countries and US states in narrowing down the gender wage gap. For instance, in Nordic countries (Norway, Sweden and Finland) employee tax returns can be made available upon request in these countries, so that the taxable income and capital gains of anyone can be accessed by the citizens of these countries online or via a phone call. The person whose tax returns are requested will be notified who has made the request. Other countries conduct gender audits (Spain, Austria, Denmark and Belgium), pledge to act against pay discrimination (Italy and Portugal), and provide free application tools for companies to detect and measure unequal pay within their institutions (Poland) and thereby tackle the issue (Ornstein and Glassberg, 2018; Europa, 2019). Finland introduced mandatory pay auditing in 2005 to be carried out every two to three years in companies with 30 or more employees (the *Act on Equality between Women and Men (609/1986*) and revised this in 2014 in order to narrow the gender pay gap

[42] 'Turkey has basic laws and regulations in relation to gender equality in the workplace. Article 10 of the Turkish Constitution states there is a principle of equality and people from all genders are equal before the law. Also, the Labour Law No: 4857 refers to the principle of equality and under Article 5, discrimination based on gender (and pregnancy) is expressly prohibited, including but not limited to recruitment, layoff, determining working conditions (e.g., equal pay for male and female employees working at the same/equivalent level of jobs), paid leave or overtime work. Sanctions for breach of such provisions vary from paying compensation to administrative fines and imprisonment.' (CMS, 2018, p.22)

(Savolainen, 2018). A dozen countries[43] adopt statutory quotas for women directors on corporate boards and in executive positions to tackle gender-based thought patterns and to improve gender representation, diversity and inclusion at work. Seven other nations (Finland, Hong Kong, Japan, New Zealand, Poland, Turkey and the UK) have passed regulatory disclosure laws on the percentage of women at various levels of an organisation (Fortin et al., 2017). In addition, specific states in the US (e.g., California, New York and Massachusetts) have been leading the charge towards pay parity through wider equal pay regulations, income transparency standards and banning salary history questions to job candidates in interviews (Novello, 2018; CP, 2019).

The Turkish state adopts none of the above initiatives, except passing a regulatory disclosure law on the percentage of women, mentioned above, nor are they on the political agenda. Given that FLFPR is still low (approximately 30 percent)[44], Foubert (2010) suggests, the prime focus on gender equality is given to policies that encourage women's participation in the labour markets (which will be discussed in Chapter VIII) rather than fixing the gender wage gap. The gender wage gap in Turkey was recorded at 12 percent in 2018, which is low compared to the global gap of 18.8 percent, according to ILO data (2019a).[45] Bakirci (2019) argues the issue surrounding gender pay difference is possibly the difficulty in detecting it because the concept of fair pay refers to 'workers who belong to the same category, have the same formal qualifications and provide the same services aimed at serving the same category of needs, under the same conditions' (p.33). Therefore, there is no comparison against employees who have different qualifications or perform different duties. As a result, there are no established policy plans, legislations or mechanisms such as gender pay gap reporting, disclosure of tax returns or pay audits to resolve the gender pay gap and there are no prospects or indications that the issue will be on the political agenda in the near future (CMS, 2018).

It is fair to say that these initiatives do not offer a 'silver bullet' for fixing the issue, since the gender pay gap is a complex and challenging matter. It is difficult to detect it, identify its drivers, measure its size, take collective action and, ultimately, fix it. It requires continuous engagement, effective collaboration among all parties – e.g., government, employers, employees and trade unions – and both legal and moral commitment. However, without a doubt, these

[43] Including Australia, Austria, Belgium, Denmark, France, Greece, Israel, Italy, Malaysia, the Netherlands, Norway and Spain
[44] 'In Turkey, there are provisions prohibiting access for women to certain jobs (coal mines, underground quarries, embanking, digging and excavation of soil) and dangerous works (Labour Act, Art. 72).' (Süral, 2007, pp.818)
[45] It should be noted that there are some discrepancies in gender wage gap statistics for Turkey. OECD estimates the gender wage gap in Turkey for 2016 at 20 percent (Rubery and Koukiadaki, 2016).

initiatives have received media coverage and increased public awareness of its significance in these countries, to say the least. As these initiatives are not even on the political agenda in Turkey, it is vital to raise both public and political awareness of the gender pay gap through achieving long-term behavioural changes in individuals, organisations and policy-makers.

Furthermore, Turkey may still have a latecomer's advantage – an advantage of backwardness. To explain it further, most of these measures in these countries have been taken in recent years, therefore their full impact and potential are still unknown. Existing studies (Bertrand et al., 2014; Savolainen, 2018; Milner, 2019; CIPD, 2019) primarily focus on the scope, planning and implementation of these measures, assess employer reactions or suggest whether these steps were successful in detecting gender wage gaps and identifying follow-up actions to be taken. Rubery and Koukiadaki (2016) also argue that legal mechanisms have their own limitations regarding closing the gender wage gap. For example, basic national minimum wage policies may establish a minimum floor for pay, and the correlation between minimum wages and shrinking gender pay gaps has been well documented (ILO, 2020); however, if the set pay is not a 'decent' living wage or the wage policies themselves directly or indirectly discriminate against women, it does not serve the purpose of resolving the pay gap issue and, as a consequence, the government's role in deciding the minimum wage becomes important. Similarly, employers may attempt to evade equal pay laws by outsourcing or discriminating against women during hiring practices. Finally, the limitations on disclosure of pay information at organisations fails to address the power imbalance between employer and employees. Hence, the government may closely examine these initiatives and their implications in other countries in order to maximise their potential and minimise the issues associated with them. The government may also design their own unique initiatives to solve the gender wage gap issue that are applicable in practice and aligned with the cultural and social values of the country. Rubery and Koukiadaki (2016) suggest that additional innovative laws on transparency should be enacted in order to develop more transparent labour markets: e.g., the promotion of women's rights to request accurate payroll details; the responsibilities of employers regarding regular recording of pay policies and practices; and conducting pay audits with the participation of stakeholder organisations. Legal mechanisms should be supported with social dialogue and collective bargaining by promoting wage policy based on collective bargaining institutions, extension mechanisms and living minimum wage levels with voluntary actions supporting voluntary campaigns and forming broader coalitions between women's pressure groups, NGOs and trade unions; finally, gender-specific social policies should be employed and social protection systems re-designed.

To conclude, looking at direct and indirect interventions, this section addressed how state policies may influence gender pay gap outcomes. Policy statements indicate that low female LFPR is the prime issue for the state that needs to be solved urgently. Thereby, greater emphasis has been given to increasing women's employment in the country (which will be discussed further in Chapter VIII), but the gender pay gap issue is still not a priority for the state. Given that the gender pay gap is not only a women's issue but also has negative consequences for economic growth and public spending as a result of domestic violence against women as well as for bargaining power between men and women (discussed in Chapter I), all of which are ongoing issues for Turkey, solving the gap will also have a positive impact on these areas. Ultimately, Turkey society as a whole would do well to take the gender pay gap issue more seriously than they do at present.

2.4 Conclusion

This chapter is broken down into three parts. In Part 2.1, the historical and empirical evolution of the Turkish labour markets was addressed by analysing past and current gender and development trends. The section examined the history of women's movements in Turkey and more recent labour force participation and employment rates. It found that the most significant changes in women's status came as a result of a secular state. However, the aforementioned changes in women's status have not been fully reflected in the labour force participation of women in Turkey. In contrast to both international standards and to that of men, FLFPR remains low. Part 2.2 looked at the major gender wage gap theories in the literature, both modern and traditional. The section concluded that in a world where labour and labour market dynamics are continuously changing, conventional and contemporary explanations of gender wage gap should be revisited to assess the validity of these theories, highlighting the significance of our research, which suggests a new explanation for the gender wage gap: labour market distortions. The final section of the chapter (Part 2.3) illustrated the ways in which state policies may impact on gender wage gap outcomes. Low FLFPR is once again highlighted as a major concern that must be tackled urgently by the state. It also concluded that Turkey lags behind several EU countries and the US in terms of closing the gender wage gap. The measures taken to reduce gender wage gaps in these countries have not been implemented by the Turkish state, with the exception of passing regulatory disclosure laws on the percentage of women at various levels of an organisation. There are no further measures on the national agenda either.

CHAPTER III

OVERVIEW OF THE ICT SECTOR IN TURKEY

ICT is the backbone of the knowledge economy and a powerful engine for promoting economic growth and sustainable development through its relatively low usage costs and its ability to overcome distance (Chen and Kee, 2005, p.16). It is recognised as a leading growth engine for ensuring competitiveness, robust and sustainable economic growth, and social well-being. ICT has the ability to embrace and integrate the power of digital technologies, which is a key factor for the future development of economies, businesses and individuals, and the digital technologies and business models are the essential source of today's increasing levels of innovation. The literature (Kramer et al, 2007; Gomez and Pather, 2012; Baller et al., 2016) argues that the constantly evolving nature of ICT and its immense impacts on other sectors – such as increased productivity, reduced costs, improved processes, increased business profitability, improved value, connectivity and fostering innovation – mean the ICT sector has become a foundation for all the other sectors in today's economies.

This chapter will start with defining the ICT sector. It will then present the global ICT sector trends (size, value-added, employment, productivity, sub-industry and so on) and then focus on the Turkish ICT sector. Finally, it will comment on the contribution of this study to understanding the ICT sector or one aspect of it.

3.1 Defining the ICT Sector

One of the challenges of carrying out empirical research in the ICT sectors is the difficulty of defining the sector owing to its constantly evolving nature. Currently, there is no universal consensus on the definition of ICT, since the concepts, methodologies, methods and applications involved in ICT are subject to continual change at rapid pace. The challenge of agreeing on a universally defined ICT sector has forced governments and organisations such as the United Nations and OECD to revise their ICT definitions regularly over the last two decades. Constantly changing economic structures and new technology generate new economic activities and products, and if intervals between the revisions are too long, the relevance of the classification may vanish over time. On the other hand, if revisions are made too often, then the comparability of the data over time may be adversely affected.

In 1998, OECD countries agreed on the first ICT sector definition and the principles underlying it:

> *ICT is the combination of manufacturing and services industries that capture, transmit and display data and information electronically.* ***For manufacturing industries, the products of a candidate industry:*** *must be intended to fulfil the function of information processing and communication including transmission and display, or must use electronic processing to detect, measure and/or record physical phenomena or to control a physical process.* ***For services industries, the products of a candidate industry:*** *must be intended to enable the function of information processing and communication by electronic means. (OECD, 2002, p.81)*

The above definition was based on ISIC Rev.3 and considered to be the first step towards measuring core indicators in the ICT sector and allowing comparisons across time and countries. *ISIC* is the acronym[46] that is used by the UN to designate the international reference classification of productive activities. The main aim of ISIC classifications is to provide a set of economic activity categories that can be utilised for the collection, analysis and reporting of a large range of statistical data at the global level. In the ISIC Rev.3 classification of the ICT sector, only manufacturing and services industries are considered; ICT wholesale activities were not included: 'Unlike previous revisions the third revision of the ISIC required harmonization with other activity classifications and with classifications of goods and services. This requirement added considerable complexity and constraints that had not applied in earlier revisions of the ISIC' (UNStats, 2002, p.8). Unprecedented changes in the economic structure of many world countries and the emergence of new technologies and divisions of labour between organisations since the publication of ISIC Rev.3 in 1990 posed challenges for the providers and the users of the data. Therefore, the update of ISIC Rev.3 (ISIC Rev.3.1) was undertaken in 2002. In the update to Rev.3 (ISIC Rev 3.1), wholesale trade of computers, IT equipment and software as well as wholesale trade of electronics and telecommunications equipment were taken into account. The structure of classification and boundaries of its building blocks was kept largely unchanged. However, for more accurate and consistent interpretation of content and boundaries of individual classes, new exploratory notes were added. Finally, the fourth revision of ISIC was approved in 2006. The primary purposes of the latest revision of ISIC were to improve and strengthen its relevance, such as reflecting the necessity of incorporating new economic production structures and activities and its comparability with other classifications, while considering its continuity. Comparability determined the identified need for a convergence of the Australian and New Zealand Standard

[46] The *UN International Standard Industrial Classification of All Economic Activities* (ISIC). The first revision of the ISIC was issued in 1958, the second revision was issued in 1968 and the third revision was considered and approved by the Statistical Commission in 1990 (UNStats, 2002).

Industrial Classification (ANZSIC), the General Industrial Classification of Economic Activities within the European Communities (NACE), the North American Industry Classification System (NAICS) and other activity classifications used around the world (UNStats, 2008). In this revision, changes have also been made in ICT-related classifications, and industries complying with the second ICT definition below were categorised into three groups: ICT manufacturing industries, ICT trade industries and ICT services industries.

> *The production (goods and services) of a candidate industry must primarily be intended to fulfil or enable the function of information processing and communication by electronic means, including transmission and display.* (Second ICT Sector definition based on the ISIC Rev.4)

The UN emphasises that ISIC classification differs from other types of classification for several reasons. One of which is that ISIC is a classification according to the type of production activity and not a classification of goods and services. As it is not feasible to establish a one-to-one correspondence between activities and products, ISIC is not designed to measure product data at any detailed level. For this purpose, a separate classification exists, namely, the Central Product Classification (CPC) which can be used as a tool for identifying the principal activity of a unit. Furthermore, the ISIC does not draw any distinctions according to the kind of ownership of a producing unit, type of legal organisation or mode of operation because such criteria do not relate to the characteristics of the activity itself. Similarly, manufacturing units are classified according to the principal kind of economic activity in which they engage (UNStats, 2008, p.9). ISIC also does not differentiate between power-driven machinery and handmade work; a factory or household production; modern and traditional production methods; formal and informal methods; or legal and illegal production and market and non-market activities (UNStats, 2008).

NACE is another classification system[47] that has been used at the European Union level to classify the various statistical classifications of economic activities since 1970. NACE provides the framework for collecting and presenting a large range of statistical data according to economic activity in the fields of economic statistics (e.g., production, employment, national accounts) and in other statistical domains (EuroStat, 2008, p.13). It is a mandatory statistical economic activity classification within the European Statistical System. It is derived from ISIC Rev.4: ‘Categories at all levels of NACE have been defined to be either identical or to form subsets of single ISIC

[47] *Statistical Classification of Economic Activities in the European Community* (NACE). It is derived from the French title *Nomenclature statistique des Activités économiques dans la Communauté Européenne* (Eurostat, 2008).

categories. In addition, the coding systems used in classifications by the United Nations and European Community are as far as possible the same' (UN, 2008, p.37).

> ISIC and NACE are identical up to the two-digit level (divisions) of the classification. At lower levels, NACE has created more detail suitable for European users of the classification. The additional detail created can always be aggregated to ISIC categories at the three- and four-digit levels, within the same structure. (UNStats, 2002, p.36)

NACE Rev.1 was updated in 2002 to NACE Rev.1.1, adding the new activities which did not exist previously and activities that had grown in importance through technological change or economic reality, but with no significant restructuring of the NACE Rev.1 (InStat, n.d.). However, NACE Rev.2 was created based on ISIC Rev.4 in 2007 and adapted for the European circumstances (EuroStat, 2008).

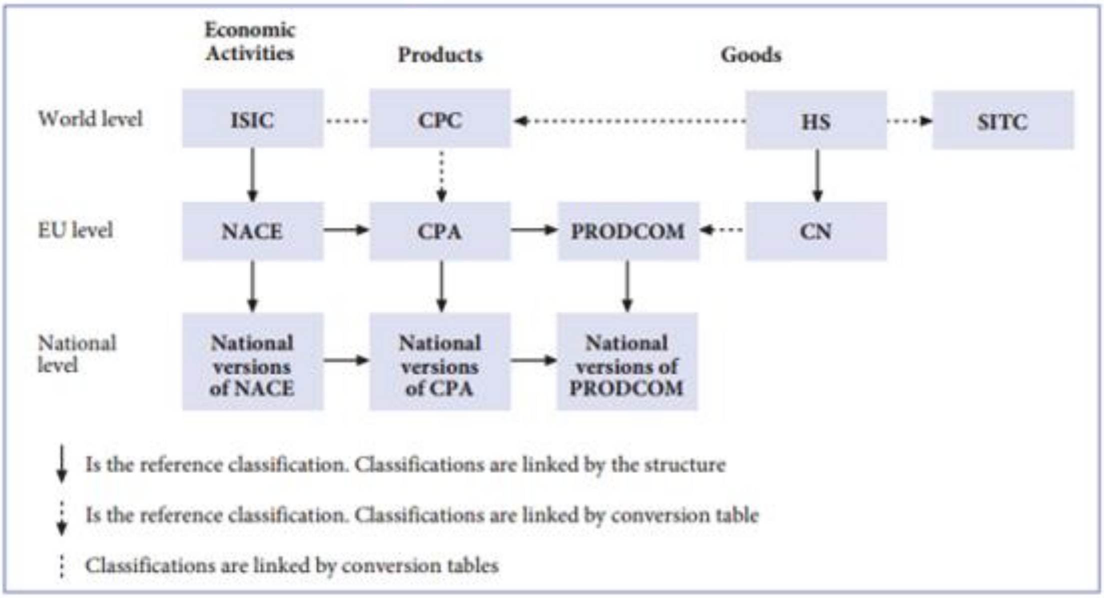
According to the NACE Rev.2 definition (Table 3.1), the ICT sector comprises three main industries: ICT manufacturing, services, and trade. ICT manufacturing industry activities include manufacturing electronic components and boards, computers and peripheral equipment, communication equipment, consumer electronics, and magnetic and optical media. The ICT services industry activities involve software publishing, wired/wireless, satellite and other telecommunication activities, information technology service activities, computer programming activities, computer consultancy and facilities management activities, web portals, data processing, hosting and related activities, repair of computers, and peripheral and communication equipment. Finally, the ICT trade industry comprises the wholesale trade of computers, computer peripheral equipment, software, electronics and telecommunications equipment and parts.

Table 3.1: OECD Definition of ICT (Based on ISIC Rev.4 and NACE Rev.2)

ICT Manufacturing Industries		
ISIC Rev.4	**NACE Rev.2**	**Activities**
2610	26.10	Manufacture of electronic components and boards
2620	26.20	Manufacture of computers and peripheral equipment
2630	26.30	Manufacture of communication equipment
2640	26.40	Manufacture of consumer electronics
2680	26.80	Manufacture of magnetic and optical media
ICT Trade Industries		
ISIC Rev.4	**NACE Rev.2**	**Activities**
4651	46.51	Wholesale trade of computers, computer peripheral equipment and software
4652	46.52	Wholesale trade of electronic and telecommunications equipment and parts
ICT Services Industries		
ISIC Rev.4	**NACE Rev.2**	**Activities**
Software Publishing		
5820	58.20	Software publishing
Telecommunications		
6110	61.10	Wired telecommunications activities
6120	61.20	Wireless telecommunications activities
6130	61.30	Satellite telecommunications activities
6190	61.90	Other telecommunications activities
Information technology service activities		
6201	62.01	Computer programming activities
6202	62.02	Computer consultancy activities
	62.03	Computer facilities management activities
6209	62.09	Other information technology and computer service activities
Web portals, data processing, hosting and related activities		
6311	63.11	Data processing, hosting and related activities
6312	63.12	Web portals
Repair of computers and communication equipment		
9511	95.11	Repair of computers and peripheral equipment
9512	95.12	Repair of communication equipment
Source: Adapted from OECD (2011) and INE (n.d.)		

ISIC (Figure 3.1) is the *International Standard Industrial Classification of All Economic Activities*, a global classification, while NACE is a statistical classification of economic activities at the EU level. At the national level, each country applies the NACE classification of economic activities across sectors, including ICT.

FIGURE 3.1: The International System of Economic Classifications



Source: EuroStat (2008, p.15). ISIC is the United Nations' International Standard Industrial Classification of all Economic Activities. CPC is the United Nations' Central Product Classification. HS is the Harmonized Commodity Description and Coding System, managed by the World Customs Organisation. CPA is the European Classification of Products by Activity. Prodcom is the classification of goods used for statistics on industrial production in the EU. CN stands for the Combined Nomenclature, a European classification of goods used for foreign trade statistics.

One of the challenges that the OECD's *Working Party on Indicators for the Information Society* faced was defining the 'content and information media sector'. Evolution and advancements in information technologies has led to opening and expansion of new communication channels and distribution systems, hence the evolution of the digital content production and distribution industries. Profound structural changes such as the expansion of the Internet network created new forms of distribution channels for news, music, films, books, video games, DVD etc. As a result, the production, publication and/or electronic distribution of content products were included within the content and media sector. Publication of books, newspapers, journals and other publishing activities, cinematographic video and television programme activities, games software, sound recordings and music-editing activities, radio and television programming and broadcasting activities and other information services are considered to meet the conditions of the content and information media sector. As a result, the concept of information economy sector is recognised as the sum of the ICT sector and the content and media sector together. This thesis will be using the NACE Rev.2 definition for the Turkish ICT sector.

3.2 Global ICT Sector Trends

During the last two decades, the ICT sector (NACE Rev.2) has become the driving force for technological progress and international competitiveness. The size of the global ICT sector (73.1 percent of which was the ICT services industry) has tripled in value-added in the last two decades in real terms (1995-2014).[48] The ICT sector[49] in OECD countries for the year 2013 accounted for 5.5 percent of total value-added (OECD, 2015).[50] The global ICT revenue doubled from €2.3 trillion euros (1995) to an expected €4.5 trillion (2019). With regards to employment, 5.6 million professionals in the EU were employed in the ICT sector in 2014 (Mas et al., 2017), while the share of ICT sector employment in OECD countries was roughly 3 percent (equivalent to 14 million people) in 2013 (OECD, 2015).[51] The striking feature of the report was that the weight of ICT employment decreased in countries with a large ICT sector and increased in countries with a smaller ICT sector during 2001-2013 with the exception of Belgium and Hungary. The OECD report provided a possible explanation for this trend, stating that the 2007-2009 global economic crisis fostered rationalisation in large national ICT sectors and favoured ICT firms in countries with lower labour costs. ICT specialists with the ability to develop, operate and maintain ICT systems and for whom ICT constitutes the main part of their job (OECD, 2004, p.219) represented 3.6 percent of all workers in 2014 in OECD countries. While 5.5 percent of male workers in OECD countries were ICT specialists, this proportion was just 1.4 percent for women workers (OECD, 2016b, p.7). While ICT sector employment was stable, employment of ICT specialists across all sectors of the economy had risen, reaching at least 3 percent of total employment in most OECD countries year-on-year during 2001-2013.

Although the share of ICT manufacturing employment was 27 percent of total ICT employment in 1995, the sub-sector has experienced negative growth rates from the late 1990s onwards. Meanwhile, the services industry share has increased dramatically: i.e., ICT services, the largest ICT sub-sector, represented 90.1 percent of the total ICT sector in 2014. Similarly, the productivity of all ICT sub-sectors exceeded the productivity of the total economy: e.g., the ICT

[48] The report analysed 40 economies in total: the EU28 (plus Norway, Russia and Switzerland) in Europe; Canada, the United States and Brazil in the Americas; China, India, Japan, South Korea and Taiwan in Asia; and Australia (Mas et al., 2017, p.3).
[49] The ICT sector is defined in the report as the sum of industries according to ISIC rev.4 26, 582, 61 and 62-63 (OECD, 2015).
[50] The share of ICT in terms of total value-added indicated large variations across countries, ranging from 10.7 percent of value added in Korea to less than 3 percent in Iceland and Mexico. Ireland and Japan had the second largest share (7 percent), followed by Sweden and Hungary (over 6 percent). Over 67 percent of the ICT sector in the OECD is accounted for by IT and other information services (2 percent of total value added) and telecommunications (1.7 percent) (OECD, 2015).
[51] The figure ranged between over 4 percent in Ireland and Korea to less than 2 percent in Greece, Portugal and Mexico. IT and other information services together with the telecommunications industry account for 80 percent of ICT employment in the OECD area (OECD, 2015).

services productivity was 76.7 percent higher than the total productivity in the economy in 2014 (Mas et al., 2017, pp.6-8).

According to the OECD (2016b), increases in wages in ICT services are in line with productivity growth over the last 15 years. In 2013, ICT investment in the OECD area accounted for 2.7 percent of GDP and 13.5 percent of total fixed investment (OECD, 2015).[52] However, the report demonstrates that the share of both ICT investment and total fixed investment fell during 2001-2013 owing to a decrease in IT and communication equipment and an increase in software.[53] The generalised reason stated for this slowdown in ICT investment was the rapid decrease in prices as well as the increasing proportion of business ICT spending. In 2013, total business expenditure in R&D (BERD) amounted to 1.6 percent of the OECD GDP. ICT R&D expenditure in the OECD area tended to be more concentrated in ICT manufacturing (60 percent of ICT BERD) than in ICT services (OECD, 2016b, p.40).[54] More than half a billion patent applications (nearly 40 percent of total applications) were filed worldwide under the Patent Co-operation Treaty in 2010-2012, while ICT-related patent applications in the OECD area dropped by 2.8 percent compared to 2000-2002 (ibid.).[55] Finally, the number of FTE researchers in the EU ICT sector reached 180,000 in 2014, which was 1.8 times more than in 1995. Similar trends have been observed for R&D researchers and R&D personnel. In addition, the proportion of FTE researchers in the ICT services industry doubled, from 33 percent in 1995 to 67.2 percent in 2014 (Mas et al., 2017).

Regarding international ICT trade, ICT services exports grew faster (30 percent per year) than global exports of manufactured ICT goods between 2001 and 2013. The share of computer and information services nearly doubled from 3.4 percent to 5.8 percent of world exports of services, while for the OECD area it rose from 5.8 percent to 8.3 percent of total service exports for the same period. The top five exporters of ICT goods globally were China (32 percent), USA (9 percent), Singapore (8 percent), Korea (7 percent) and Chinese Taipei (7 percent), while the top five services exporters globally were Ireland (approximately 14 percent), India (approximately 14

[52] ICT investment across OECD countries varied from just below 4 percent of GDP in Switzerland and the Czech Republic to less than 2 percent in Greece and Ireland. These differences tend to reflect differences in the specialisation of each country and its position in the business cycle (OECD, 2015, p.160)

[53] ICT investment dropped from 3.4 percent to 2.7 percent of GDP, and from 14.8 percent to 13.5 percent of total fixed investment (OECD, 2015, p.160)

[54] In 2013, Chinese Taipei and Korea devoted over 70 percent and 50 percent, respectively, of their total BERD to ICT manufacturing. Despite the drop in Nokia's activities, Finland continues to spend over 40 percent of its total BERD on ICT manufacturing, followed by Singapore, Japan, the United States and Sweden, all of which spent above 20 percent of their total BERD (OECD, 2015, p.40).

[55] Applications by Brazil, Russia, India, Indonesia, China and South Africa (BRIICS) more than doubled, reaching 55 percent, largely as a result of increased patenting by China (OECD, 2015, p.41).

percent), Germany (approximately 10 percent), the US (approximately 9 percent) and the UK (approximately7 percent). Internet access[56] has increased dramatically in the OECD area between 2005 and 2015, exceeding 90 percent in nearly all countries in the OECD region for households in the top income quartile in 2012, while the rate was 60-70 percent in relatively wealthier countries and 10-20 percent in lagging ones (OECD, 2013). According to the 2016 ICT Development Index (IDI) used to monitor and compare developments in ICT sectors between countries over time, which has been published annually since 2009 by the United Nations International Telecommunication Union based on 11 internationally agreed ICT indicators,[57] the Republic of Korea, Iceland, Denmark, Switzerland and the UK were ranked as the first five places, respectively. Turkey was ranked 70 out of 175 countries, lagging far behind its neighbours such as Bulgaria, Greece, Azerbaijan and Middle East countries such as Saudi Arabia, Qatar, Kuwait, the UAE, Oman and Lebanon (ITU, 2017b).

Despite these developments and significant shifts in the essence of work in present-day societies (from agrarian to knowledge), gender roles continue to shape individuals' occupational preferences. Sectors, occupations and roles are separated as 'feminine' and 'masculine' based on the skills that the job requires, the nature of the work and the working environment (ILO, 2016). Masculinity and femininity are mostly interpreted as opposites, with masculinity claiming the higher status and authority (Nelson, 1992). Gender-stereotypical traits, such as 'reason vs emotion', 'hard vs soft', 'logic vs intuition', 'scientific vs humanistic', (Nelson, 1992), 'competitive vs cooperative', 'taking-charge vs taking-care' (Prime et al., 2009) or 'competence vs warmth' (Kachel et al., 2016), are systematically used to emphasise the differences between men and women, with the former perceived to be possessed predominantly by men. Jobs generally requiring social and interpersonal skills or care are classified as 'feminine' while jobs related to physical power, risk-taking or decision-making are considered 'masculine' (ILO, 2016). However, many scholars (Gerson and Peiss, 1985; Kalof, 1993; Bohan, 1997, Smiler, 2004; Lindsey, 2015; Kachel et al., 2016) argue that gender (and therefore, gender-stereotypical traits and gender roles) are socially constructed rather than individually constructed. Therefore, it is not individual, but gained through interaction with others (Lindsey, 2015), specific to a particular culture (Gerson

[56] Statistics on Internet access by households consider the possibility of connecting to the Internet from the premises of the household, irrespective of the technology used (wired or wireless) and of advertised speed. A standard mobile subscription is counted as an active broadband subscription only when it allows for full access to the Internet via HTTP (subscriptions that only offer walled gardens or email access are not counted) and when content or services were accessed using the Internet Protocol (IP) during the previous three months (OECD, 2013, p.166).

[57] The 11 ICT development indicators are depicted using the three-stage model: ICT access, ICT use and ICT skills (ITU, 2017a).

and Peiss, 1985) and changes overtime (Twenge, 1997). Gender roles are determined by one set of male and female designated scripts, Lindsey (2015) convincingly argues, with each script allowing a range of behaviour options that ultimately promote ‘a pattern of between-sex competition, rejection, and emotional segregation’ (p.10). These patterns of mapping lead to gender labelling and members of each sex behaving or accepting responsibility or privileges according to their given label; therefore, the behaviour separates genders, rather than connecting them. Prime et al. (2009) suggest that as a result of gender-stereotypical traits, women can be portrayed ‘as being relatively ill-suited’ for male-dominated roles such as leadership, while men are portrayed as ‘naturally endowed with the prerequisite qualities’ (p.28). Furthermore, gender-stereotypical beliefs may be embedded within organisational rules, structures, procedures and policies, which may themselves contribute to occupational segregation and, thus, to the gender wage gap (Nelson and Bridges, 1999; Ridgeway and Correll, 2004). In fact, the authors continue, a number of studies reveal that men and women have far more in common than disparities, ‘both in cognitive functioning (Spelke, 2005) and personality traits (Hyde, 2005)’ (Prime et al., p.26).

Women, globally, make up less than 40 percent of total employment, and nearly 60 percent of them work in part-time employment (ILO, 2016). Some professions are significantly gendered – disproportionately large numbers of men or women occupy these jobs – while others are gender-mixed – the proportions of men and women are similar (Blackburn and Jarman, 2006): ‘Men still pick “blue” jobs and women “pink” jobs… Most men still work mostly with men, and most women with women’ (The Economist, 2019, p.0). Construction, manufacturing, durables, mining, quarrying, oil and gas extraction, utilities, and transportation and warehousing are still mostly male-dominated industries in the US, Europe and Canada (Catalyst, 2020), while women predominantly occupy the health and social care, education and non-profit sectors. This occupational segregation is a form of gender inequality (Weeden, 1998) and the outcome of less equitable access to labour market opportunities for the under-represented sex; it is one of the main drivers of gender pay gap (Bergmann, 1974; England et al., 1994; de Ruijter et al., 2003; Blau and Kahn, 2007) and negatively affects women’s pay. To illustrate the link between earnings and occupational segregation, 26 out of the 30 highest-paying occupations in America are male-dominated; 23 out of the 30 lowest-paid positions are femaledominated. Hourly wages in Europe are 35 percent lower in feminised industries than those in gender-mixed occupations (The Economist, 2019). Furthermore, when the decrease in occupational segregation was strongest – in the 1980s in the US – the gender wage gap was smaller; when occupational integration slowed down in the 1990s, the gap increased, and when the occupational integration stagnated in the

2000s, there was little improvement in the gender earnings ratio (Hegewisch and Hartmann, 2014). Similarly, Strawinski et al. (2018), examining the relationship between the gender wage gap and occupational segregation in Poland, found that in 2012 strongly male-dominated occupations paid the highest average wages per hour while the lowest average wages for both men and women were recorded within strongly female-dominated occupations.

Globally, the ICT sector remains male-dominated and segregated. Kelan (2008) states that ICT sectors value rational and technical-competence skills that are classified as 'masculine' higher than emotional and social skills that are categorised as 'feminine'. Male domination in the ICT sectors is marked by gendered dynamics and inequality, in a fundamentally similar way to the majority of the other economic sectors (Andre and Bona, 2018). There are several primary reasons for women's under-representation in the sector: patriarchal values, gendered culture, stereotypes and biases against women; women's gendered roles as mothers and careers (leading to poor work-life balance); limited flexible working patterns and childcare facilities; discrimination during hiring practices; lack of women role models in the field; fewer women studying ICT; and masculine corporate culture, which tends to implicitly or explicitly exclude women (da Silva Reis and Schulze, 2012; Segovia-Perez et al.; 2019).

The sector has been irrepressibly and continuously growing and developing since the 1990s, with women left at the margins. According to Eurostat (2020), the low share of women ICT specialists of 20.8 percent (2010) further dropped to 17.7 percent (2019) across the 27 EU countries.[58] Under-representation is even more pronounced in tech-related or decision-making positions. The share of women ICT specialists in the US was also less than 25 percent (2015) (Castaño and Webster, 2011) and women are far more likely to leave the ICT sectors than men (UNESCO, n.d). Furthermore, 88 percent of all IT patents were received from male-only invention teams as opposed to the 2 percent of patents received from women-only invention teams during 1980-2010 (Ashcraft et al., 2016). Similarly, the proportion of male employment in C-level positions, working as managers and professionals, were 70 percent and above in the 177 largest Silicon Valley tech companies (Tomaskovic-Devey and Han, 2018)[59]. The *ITU Report* (2017c) also suggests that although 70 percent of the world's youth are online, in two-thirds of the world's

[58] Only in Romania and Bulgaria were the shares of women ICT specialists more than 25 percent, while in any other EU country they represented less than a quarter.
[59] The share of women in tech jobs in most popular companies was also low: Apple (20 percent), Google (17 percent), LinkedIn (17 percent), Facebook (15 percent), Yahoo (15 parent) and Twitter (10 parent) (Luxton, 2016).

countries, the digital gender gap persists: i.e., the share of men using the Internet is higher than the share of women. Only 29 out of 1000 women have ICT degrees in the EU while the number is 95 for men. Women make up only 9.3 percent of academics (full professors) in Engineering and Technology Faculties in the EU (Yellow Window, 2018). Furthermore, given that male-dominated sectors tend to pay higher salaries, on average, than female-dominated sectors, occupational segregation in ICT sectors may also contribute to gender wage gaps.

The Turkish ICT sector is no different to the global ICT sector in terms of employment patterns. The sector is also male-dominated and suffers from occupational segregation as a result of reasons similar to those listed above. Although women's presence in the sector (approximately 25 to 30 percent) is similar to that in some developed countries – e.g., the US (25 percent) – it is very much seen as 'male-dominated' by wider society. That is, the role itself and society's gender expectations of that role may differ; therefore, women's pay might be lower because of the socially-constructed belief that women are less technically competent than men. Furthermore, research carried out by TÜBİSAD (2018b) with 486 women ICT professionals indicated that more than half of the participants were working in marketing/sales, followed by business development (20 percent), information technologies (19 percent), and R&D/product development (13 percent). Our study (discussed in Chapter VII) also found that men tend to hold strictly technical positions, (e.g., software developers, engineers, experts, managers and architects), while women participate in less technical roles (e.g., consultants and analysts) or purely non-technical positions (e.g., sales, marketing and HR). Thus, from the technical point of view, the Turkish ICT sector remains male-dominated while women presence is higher in non-technical positions. Given that there is a strong link between occupational segregation and the gender pay gap, the ICT sector is male-dominated and segregated. Thereby, after exploring the nature and extent of the gender wage gap in the sector, this thesis will examine the gender pay gap differences in both technical and non-technical roles and draw firm conclusions.

3.3 Turkish ICT Sector

Turkey is the eighteenth largest world economy with nearly a GDP of US$761.4 billion as of 2019. It is a member of various international institutions[60] and an emerging economy with a young (the population's average age was 32.4 years in 2019) and growing population (83.8 million, 2019). Table 3.2 indicates that the annual GDP growth rate has remained above 5 percent since the 1990s, except in 2017. The agriculture's share of GDP has decreased dramatically from 56 percent (1960) to 6.9 percent (2017) while the services share has more than doubled, increasing from 26.6 percent (1960) to 60.2 percent (2017). According to the WDI database, the FLFPR has remained one of the lowest among OECD countries over the last three decades, varying from 34 percent (1990) to 27 percent (2010) and 33.5 percent (2018), while male labour force participation rates have been 70 percent or above since the 1990s. However, the services share of female employment (percentage of total female employment) has increased significantly since 1991 (14.5 percent) to 2000 (23.7 percent) to 2018 (56.6 percent) as opposed to the agriculture share, which has experienced a sharp decline from 77 percent (1991) via 39 percent (2010) to 28 percent (2018). According to Eurostat (2018), although the percentage of total employed ICT specialists across all sectors increased from 0.4 percent (2008) to 0.9 percent (2017), the number remains low. The gender breakdown of these specialists also indicates unequal gender distribution; i.e., the percentage of total women ICT specialists[61] dropped from 20.6 (2007) to 10 percent (2017).

[60] Turkey's has international membership of the following organisations: NATO, the UN (including many subsidiary organisations like UNESCO, UNICEF, the World Bank, World Health Organization, and World Trade Organization), the G20, OECD, the European Council, European Union–Turkey Customs Union, the Organisation for Security and Co-operation in Europe, the Economic Cooperation Organization, Organization of Islamic Cooperation, Islamic Development Bank, and the Black Sea Economic Cooperation Organization (Üreyen, n.d.).

[61] For the ICT specialists, Eurostat used International Standard Classification of Occupations (ISCO-88/08) definition.

TABLE 3.2: GDP Growth & Share of Economic Sectors in GDP, Selected Years, 1960-2017

	1960	1970	1980	1990	2000	2010	2015	2017
GDP Growth Rate (Annual, %)	1.2*	3.2	-2.4	9.3	6.6	8.5	6.1	2.6
Economic Sectors	**Share of Sectors in GDP (%)**							
Agriculture	56.0	40.0	26.5	18.1	11.3	9.5	8.5	6.9
Industry (including construction)	17.7	22.5	23.8	32.2	31.3	26.4	26.5	32.9
Services	26.6	37.3	49.7	49.8	57.4	64.2	65.0	60.2
Total	100	100	100	100	100	100	100	100

Source: World Bank Development Index Indicators (2019). 2017 data for share of economic sectors is from TURKSTAT.
** 1961 data. Due to rounding, the total may not add up to 100.*

Despite its small contribution in terms of employment, the ICT sector is a growing sector making an increasing contribution to GDP. This contribution has more than doubled in size from ₺61.6 billion (2013) to ₺131.7 billion (2017). Table 3.3 indicates that the number of firms also rose significantly from 31,434 (2009) to 44,718 (2017). Despite this growth, the report published by TÜBİSAD (2018) indicates that the share of the ICT sector value-added against the total private sector value-added is small, dropping from 5.6 percent (2008) to 3 percent (2015). Similar trends have been observed in the ICT sector employment. Although ICT sector employment has increased from 100,500 jobs (2013) to 139,000 (2018), ICT employment as a percentage of total employment has remained below 2 percent during 2009-2017. The share of women working in the ICT sector remained around 30 percent between 2009 and 2017. However, ICT sector employees as a share of total private sector employment was only 1.5 percent (2008) and no significant changes were observed in 2015. In addition, although the share of ICT sector services within the total private services sector reached as high as 10 percent in 2008, it experienced a sharp decline due to the 2008 financial crisis and was only at 5-6 percent between 2010 and 2015.

TABLE 3.3: Share of Male & Female Employment in Turkish ICT Sector, 2009-2017

Years	Number of Enterprises	Number of Persons Employed[62]			Number of Employees[63]			% of ICT in total employment
		Female (%)	Male (%)	Total	Female (%)	Male (%)	Total	
2009	31 434	27.4	72.6	139 109	32.1	67.9	117 420	1.77
2010	32 958	27.5	72.5	151 164	32.0	68.0	125 445	1.75
2011	36 712	27.2	72.8	173 352	31.6	68.4	147 523	1.78
2012	41 098	26.4	73.6	184 038	30.5	69.5	154 055	1.71
2013	42 564	30.2	69.8	178 665	34.0	66.0	147 026	1.56
2014	42 922	33.3	66.7	215 925	36.9	63.1	184 080	1.77
2015	44 017	29.1	70.9	224 580	31.2	68.8	192 509	1.76
2016	43 641	-	-	224 198	-	-	199 080	1.74
2017	44 718	-	-	241 435	-	-	210 384	1.80

Source: Author's own calculations according to NACE Rev.2, TÜRKSTAT, Annual Industry and Service Statistics (2018) Note: For % of ICT sector in total employment, total 'number of persons employed' in the ICT sector was divided by total employment. Numbers may differ due to TÜRKSTAT updates. Additionally, TÜRKSTAT states that they cannot share female and male employment figures anymore. The gender figures above were downloaded in Jan 2017. Currently, there is no such gender information available.

Given that the Turkish ICT sector comprises two sub-sectors – information and communication – the share of information technology (33.9 percent) remained smaller than the communication technology sub-sector (66.1 percent) during 2013-2018. Table 3.4 indicates that although the share of hardware decreased and the share of software and services increased in the information technology sub-sector during the same period, the share of hardware in communication technologies slightly increased. Similarly, even though the communication sub-sectors' contribution to the total ICT sector was higher than the information technology sub-sector, the share of the information technology sub-sector was higher for both total exports and total ICT employment.

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[62] According to TÜRKSTAT, '*number of persons employed'* is obtained by adding the annual average number of owners, partners and unpaid family workers and apprentices active in the enterprise to the annual average number of employees.

[63] According to TÜRKSTAT, '*number of employees'* is the count of people who work for an employer and who have a contract of employment and receive compensation in the form of wages, salaries, fees, gratuities, piecework pay or remuneration in kind.

TABLE 3.4: ICT Sector of Turkey (2013-2018)

ICT Sector of Turkey	2013	2014	2015	2016	2017	2018
Size of the sector ($bln)	32.0	31.6	29.9	31.2	31.3	27.4
(TRLbln)	61.6	69.2	81.5	94.3	113.8	131.7
Information Tech. (%)	29.3	32.0	31.8	31.4	33.5	33.9
Hardware	55.9	48.0	47.0	44.0	39.0	38.0
Software	27.4	36.0	37.0	40.0	39.0	41.0
Services	16.8	16.0	16.0	16.0	22.0	21.0
Communication (%)	70.7	68.0	68.2	68.6	66.5	66.1
Hardware	26.1	27.4	28.9	29.8	32.4	32.1
Electronic Comm.	73.9	72.6	71.1	70.2	67.6	67.9
Share of ICT sector in GDP (%)	3	3	3	4	4	4
Total firms	2555	2369	2979	3421	4701	5405
Total exports ($bln)	0.60**	0.58*	0.81	1.0	1.2	1.0
Information Tech. (%)	78.8	88.7	81.5	83.7	88.3	89.2
Communication (%)	21.2	11.3	18.5	16.3	11.7	10.8
Total employment (thousand)	100.5	102.9	111	120	128	139
Information Tech. (%)	63.4	62.3	66.0	67.0	69.0	76.0
Communication (%)	37.6	37.7	34.0	33.0	31.0	24.0
Female employment (%)	27	26	26	28	27	32
R&D employment (%)	21	18	14	15	10	21
Share of sub-contractors (%)	10	8	6	2	1	4

Source: Adopted from TUBISAD Informatics Industry Association, ICT Sector Reports (2018). The information in this table only includes firms that provide data for TUBISAD. The number of firms reporting info to TUBISAD was 5,405 in 2018. However, total firms in the sector was 44,718 in 2017 according to Turkstat data. The size of the sector seems to increase in TRL value, yet decrease in $ value. This is due to the devaluation of TRL. *Exchange rate: $2.33. ** Exchange rate: $2.17. The share of ICT sector in GDP is calculated using World Bank data, $, it is an estimate and subject to change due to exchange rates.

The Turkish ICT sector is also said to have suffered over the years, and is expected to suffer, from an ICT talent shortage (TÜBİSAD, 2018; Özkan, 2016; The Hürriyet, 2017). Higher growth rates in the sector as a result of continuous demands for ICT products and services push labour demand for ICT specialists higher, consequently creating a shortage of ICT-skilled professionals. Thereby, we examine the number of ICT graduates to see whether it is likely to help with reducing this anticipated shortage in the coming years. Table 3.5 demonstrates that the number of graduates in ICT-related fields at vocational training schools decreased from 15,485 (2013/2014) to 12,639 (2017/2018). At the bachelor’s level, no major rise was observed during the same period, except for 2014/2015, and it stayed around 900. However, at the master's and doctorate levels, the number of graduates in these fields increased dramatically over the same period. Once we look at the new admission figures, although the number of new admissions varied each year without indicating a clear trend at all educational levels (except for the doctoral level during the period 2013-2019, which showed a dramatic upward trend), new admissions to these fields at all educational levels increased in 2018/2019 compared to the 2013-2014 academic year, except at bachelor's level, which remained at nearly the same amount.

Despite an overall increase in the number of graduates and new admissions to ICT-related fields, the share of female students remains around 30 percent, which is in line with the proportion of women employed in the ICT sector. To illustrate, during the academic year 2018/2019, between 27 and 34 percent of the total graduates at all educational levels were women. However, when we look at the change in the new admissions from 2013/2014 to 2018/2019, despite an increase in absolute numbers, the percentage of women dropped, standing at around 24 percent for vocational and bachelor degrees, while it increased at master's level (31.4 percent) and for doctoral degrees (38.6 percent). In summary, it is clear that interest in ICT studies has increased over the years. However, the numbers still remain low considering the fact that the skills and expertise of ICT specialists are not only needed in the ICT sector but also across all sectors that are subject to rapid technological change. Similarly, the percentage of female graduates and current students suggests that the lack of women in ICT-related fields does not help to reduce the said talent shortage.

Table 3.5: Number of ICT Graduates & New Admissions at Universities and Vocational Training Schools by Gender, 2013-2018

ICT- Related Fields	VOCATIONAL TRAINING SCHOOLS			UNIVERSITIES								
	College Degree			Bachelor's Degree			Master's Degree			Doctorate Degree		
	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total
NUMBER OF GRADUATES												
2013-2014	5,335	10,150	15,485	331	586	917	80	193	273	2	3	5
2014-2015	4,412	9,133	13,545	390	728	1,118	124	330	454	3	3	6
2015-2016	4,060	8,469	12,529	205	460	665	66	217	283	15	19	34
2016-2017	4,051	8,649	12,700	215	595	810	108	252	360	3	10	13
2017-2018	3,564	9,075	12,639	237	681	918	143	358	501	19	20	39
2018-2019	2,876	7,802	10,678	897	1,756	2,653	308	669	977	13	30	43
NUMBER OF NEW ADMISSIONS												
2013-2014	6,021	14,826	20,847	540	1,475	2,015	117	316	433	6	21	27
2014-2015	6,051	14,697	20,748	812	1,951	2,763	161	472	633	11	52	63
2015-2016	6,138	15,526	21,664	1,386	3,568	4,954	292	1114	1406	13	61	74
2016-2017	6,619	19,050	25,669	354	1,174	1,528	189	652	841	24	52	76
2017-2018	4,307	12,243	16,550	399	1,347	1,746	211	806	1,017	28	55	83
2018-2019	5,758	17,811	23,569	470	1,572	2,042	314	685	999	39	62	101

Source: Adopted from YÖK (2019), Official Statistics Programme

3.4 The Study’s Contribution to the ICT Sector

The ICT sector is key for economic growth prospects and international competitiveness. Although ICT is not the key sector in Turkey – it is a more recent addition than all the other, more traditional sectors such as agriculture, manufacturing and textiles – but it has the potential to become so. The number of studies that look specifically into the ICT sector is limited. As the sector is comparably new and there is still no universal consensus on its definition, secondary data is mostly unavailable. Finally, considering the fact that women’s share in the sector is still small, understanding the sector, the role of women and the pay gap better is very important, and currently missing. Therefore, this study fills in a gap within the ICT sector by providing an analysis of primary quantitative and qualitative data collected during this study.

CHAPTER IV

RESEARCH DESIGN AND METHODOLOGY

After presenting a review of the theoretical and empirical literature on gender inequalities in the labour market and the current trends in the case of Turkey in Chapter II and an overview of the ICT sector in Chapter III, this chapter focuses on the methodological approach of the thesis. This thesis aims to answer the research questions below:

- *What is the extent and nature of the gender pay gap in Turkey's ICT sector?*
- *What is the distinction between the technical and non-technical gender pay gaps? What's the role of labour market distortions in explaining this pay gap?*
- *What is the role of the state and state policies in shaping the gender pay gap?*

Evidently, a detailed analysis of the ICT sector with regards to employment statistics, working conditions, progression etc. is necessary in order to address the objectives of the thesis. One of the most challenging issues in undertaking research on the gender wage gap and discrimination is the availability, quality and quantity of data. This is particularly true for the case of Turkey and the new and constantly evolving ICT sector. Since the onset of the research investigation, it was established that although secondary data for the Turkish ICT sector was available via the Household Labour Force Surveys (HLFS) and Survey on Income and Living Conditions (SILC) – specifically with regards to individual wage and occupational data – some gaps and limitations in this data became quickly apparent. In particular, this data was not sufficiently detailed to enable the gender pay differentials between technical and non-technical occupations to be examined nor could it facilitate a deeper understanding of how pay gaps and labour market distortions interact.

HLFS data is obtained for selected years in order to carry out background analysis on gender wage differentials within the Turkish ICT sector. The Blinder-Oaxaca decomposition technique is then applied to measure the gender wage gap for consistency, since the same decomposition technique is utilised for the primary data analysis in Chapter VI. An expanded model linear regression analysis is carried out on Stata 15 by utilising individual human and workplace characteristics collected via HLFS data. Natural logarithms of mean wages are estimated as functions of gender, age, education, marital status, positions (technical vs non-technical), tenure, types of employment (formal vs informal), employment status (full, part-time etc.), types of work (permanent vs temporary), overtime, and location. To account for the impact of sampling design and non-response, sample weights are applied in the estimation. Table 4.1 indicates the demographic profile of the ICT sector, while Table 4.2 reveals the gender wage gap outcomes of HLFS data.

Table 4.1 shows various trends and insights into the ICT sector, based on HLFS data. The *first major trend* reveals how the sector is predominantly male and young has seen a sharp increase in the number of single people. Nevertheless, the presence of women has increased from 19 percent (2005) to 24 percent (2019) of the workforce, and in 2019, more than 60 percent of the sector was comprised of younger professionals (below 35 years of age). Moreover, the number of single professionals increased from 28 percent (2005) to nearly 50 percent (2019). The *second trend* highlights that the proportion of employees with university degrees has more than doubled over the period 2005-2019. *Another striking result* is that the number employed in technical professions increased dramatically over the same period, indicating a broader sectoral growth (discussed in Chapters VII and VIII). Furthermore, the vast majority of sector employees were in full-time and permanent employment, and one third worked for companies in İstanbul. No significant change is observed for overtime trends. *Finally*, it is clear that employment tenure has decreased with time, with over half of the sector's employees in 2019 employed in their current position for less than three years. This may be indicative of either high job turnover or job growth within the sector.

Table 4.1: Demographics of Turkish ICT Sector, 2005-2019, Selected Years

	2005 N=811	2010 N=988	2015 N=931	2019 N=738
Gender				
Male	81%	72%	72%	76%
Female	19%	28%	28%	24%
Age				
Below 35	45%	61%	66%	62%
35+	55%	39%	34%	38%
Marital				
Single	28%	47%	47%	48%
Married	72%	53%	53%	52%
Education				
Below High School	28%	22%	15%	14%
High School	42%	38%	28%	22%
University	30%	41%	57%	64%
Technical	17%	21%	33%	37%
Formal	89%	83%	92%	92%
Full-time	99%	98%	98%	97%
Permanent	99%	98%	96%	96%
Overtime	40%	52%	46%	41%
Tenure				
0 - 3 years	30%	52%	55%	53%
3 - 5 years	10%	13%	14%	13%
5 - 10 years	14%	12%	14%	20%
10 + years	46%	23%	17%	14%
Location				
Istanbul	27%	27%	30%	32%
Other	73%	73%	70%	68%

Source: Author's own calculations using HLFS, Turkstat

The HLFS data may offer a reliable gender wage gap estimation, since the selection of the observations is based on random sampling. The outcome of the regression analysis (Table 4.2) reveals a downward trend in the size of the gap – from 9.3 percent (2005) to 5.4 percent (2019). For example, in 2005 the natural log of the mean wages (₺) for males was 6.71 and for females was 6.62, yielding a gender wage gap (difference) of 0.09. The gender wage gap was smaller in 2010 and 2019 compared to other years. Although this seems at first glance like progress, it may not be an entirely accurate picture of the gender wage gap over the last decade due to *(a)* the relatively small number of observations for 2019 (n=738) and *(b)* external factors such as the global financial crisis of 2008 impacting on the result in 2010. The narrowing of the pay gap in 2010 may be partially explained by the financial crisis and its repercussions for gender roles in the economy and ICT sector. As in other contexts, this may be a case of the pay gap narrowing due to men's wages levelling down rather than women's wages levelling up (Khitarishvili, 2016).

Considering the data for other years, such as 2005 (9.3 percent) and 2015 (10 percent), we observe that the overall gender wage gap is significantly smaller than the estimated 23 percent found in this study (Chapter VI). The difference in the gender wage gap outcomes between the HLFS data and our own primary data might be partially explained through the use of wage brackets in our estimations, with large intervals such as ₺5,000-9,999 and ₺10,000-14,999 potentially causing an overestimation of the real gender wage gap.

Table 4.2: The Wage Gap, Turkish ICT Sector, 2005-2019, Selected Years

	2005	**2010**	**2015**	**2019**
Natural log of male wages	6.71	7.04	6.61	8.16
# of male obs.	657	715	671	563
Natural log of female wages	6.62	7.05	7.51	8.10
# of female obs.	154	273	260	175
Wage Gap	**0.09**	**-0.01**	**0.10**	**0.05**
R^2	42.3%	55%	49%	59.7%
Total obs.	811	988	931	738

Source: Turkish Statistical Institute, HLFS

However, the HLFS data provides no explanations for what drives the gender wage gap *nor* whether any differences exist between occupational groups, since such sub-classification results in relatively small sample sizes; therefore, representativeness is not guaranteed. For instance, the number of women classified as working in technical occupations numbered only 13 in 2005, gradually increasing to just 40 in 2019. These numbers are too small to draw any firm conclusions or make any comparison between technical and non-technical occupations. The HLFS data is not sufficiently disaggregated to carry out an ICT sector gender discrimination analysis with regards to earnings for this thesis, as the existing data cannot provide explanations for the underlying causes of the gaps or discrimination. There are also other data sources, such as the social security data, that provide an aggregate view of the number of compulsory insured persons, number of workplaces by city, gender and public or private status; however, it does not provide detailed sectoral distribution by occupation, technical and non-technical, education level, and so on.

These data gaps, therefore, justify further research: to measure the gender wage gap; to examine the distinction between the technical and non-technical gender wage gaps; to investigate their causes and drivers by collecting primary quantitative and qualitative data; and finally to provide alternative explanations for the pay gap. The primary data collected in this thesis allows the researcher to utilise and disaggregate the salaries of the ICT professionals by gender, education, marital status, occupation, position, computer degree, technical and non-technical, employment status, experience, tenure, city, overtime, and private and public sector, and finally offers explanations for the gender pay gap in Turkey. In order to dissect the character and essence of the gender wage gap within the Turkish ICT sector, this study collects primary data and uses a mixed method approach that combines quantitative and qualitative data.

Furthermore, Chapter II indicates that state policies may influence gender pay gap outcomes through equal pay legislation, pay transparency policies, employee tax returns and gender audits. According to the HLFS data (Table 4.2), the gender pay gap has narrowed over time. If this is the case, it is important to evaluate what role the state may have played in achieving this outcome. As a result, the thesis will demonstrate that being employed (working experience) is the most significant driver in terms of explaining the gender wage gap in the sector (Chapter VI); therefore, the thesis looks at the state's efforts to increase employment of women. The study will also reveal that labour market distortions (rapid sectoral growth and shortages of technically skilled labour) affect gender wage gap outcomes (Chapter VII). The thesis will investigate the state's engagement in promoting development of and gender equality in the ICT sector (Chapter VIII) in order to obtain a complete picture explaining the ICT gender wage gap.

It should be noted that this thesis applied different research methodologies to answer each research question. The methodological framework and methods for data collection and analysis for answering research questions 1 and 2 will be discussed in detail in the rest of this chapter. For question 3 – the role of state in relation to ICT sector development, employment and gender equality – a retrospective documentary analysis is applied in this study as a qualitative methodology. Bowen (2009) defines documentary analysis as 'a systematic procedure for reviewing or evaluating documents—both printed and electronic (computer-based and Internet-transmitted) material' (p.27). Flick (2013) maintains that the documentary method is considerable effective as a methodological concept. It gives access to 'theoretical knowledge' (p.230) and reveals patterns in the emergence of the discipline as well as connections between policy and practice (Addington-Hall et al., 2007).

Documentary analysis can be carried out as a stand-alone research. However, it is used in this study as a useful supplement alongside other forms of evidence – namely, surveys and interviews – to triangulate findings from these other sources and to understand or compare each source's particular biases, thereby ensuring a critical and comprehensive analysis of the gender wage gap (Hodder, 1994; Shaw, 2004; Bowen, 2019; Frey, 2018). Coleman and Briggs (2002) assert that documentary analysis is no less time-consuming or easier to manage than other forms such as evaluating interviews, questionnaires or focus groups. The analysis requires reviews and interpretations of documented data in order to obtain meaning beyond the words, gain understanding and develop knowledge (Bowen, 2009). However, Shaw et al. (2004) warn that 'official documents are likely to be partial or superficial, representing aspirations rather than realities' (p.259) *or* subjective (Coleman and Briggs, 2002). Therefore, the scope for analysis may be limited (Shaw et al., 2004). In addition, in most cases, there is a little scope for contact between the researcher and the producer of the documentary evidence. Thereby, this interaction gap may present concerns about the application of meaning and procedures which culminate with the document under review (Shuid, 2011). To mitigate these limitations, non-governmental sources, along with official government documents, are also utilised during the analysis to enhance qualitative rigour. The findings of the documentary analysis are then used in a limited and complementary way with the other forms of data gathering (questionnaires and interviews).

To carry out documentary analysis, the researcher began with the location and selection of a variety of documented sources to create a collection of relevant material on gender equality, employment and ICT sector development (Gorsky and Mold, 2020). The selected information was then appraised to establish its context and significance for the subject under examination. Finally, the appraised documents were synthesised to combine separate elements and ideas in the documents and to form a new whole in order to address the research question (Bowen, 2009). For instance, along with the comprehensive review of existing studies, in order to examine the role of the state in gender equality and women's employment, various state documents (industrial policies and development plans; employment laws such as Law No. 4447, 5763 and 6111; İŞKUR, ÇSGB, TİSK, KOSGEB, DİSK, press releases and Ministry of Family, Labour and Social Services) are identified and analysed. The period is divided into two categories, pre-2000 and post-2000, to reflect the differences in industrial policies in Turkey, and to observe similarities/differences in gender equality and women's employment.

Furthermore, public and private sector differences are also explored with regards to female employment.

In order to evaluate the role of state in ICT sector development, the reports produced by government and inter-governmental agencies are analysed (TÜBİTAK, Ministry of Industry and Technology, Technology Development Foundation of Turkey), along with industry reports (TÜBİSAD, YASED), policy and development plans, Directorate General of Budget and Fiscal Control for budget analysis, government officials' speeches and actions such as implementation of various ICT projects. For example, the three most significant state channels that promote ICT sector development are identified from these sources and then their relative impact on the ICT sector growth is examined. Finally, the role of state in gender equality and employment and ICT sector development is synthesised to offer an insight into the principles and practices adopted and pursued by the government in shaping the ICT sector development and promoting gender equality.

Therefore, by incorporating qualitative (survey), quantitative (in-depth interviews), and documentary analysis, this study applies a mixed method approach to carrying out the gender wage gap issue in the ICT sector. The documentary analysis is reviewed in the section above. The focus of the remainder of this chapter will now be on the methods employed for sampling, research design, data collection and analysis in the qualitative and quantitative approaches. The chapter proceeds as follows. *First*, the methodological framework for the thesis is presented. The thesis then moves onto the research methods applied to answer the research questions stated above by particularly focusing on the sampling framework for the quantitative and qualitative collection. *Second*, it delves into the methods of quantitative and qualitative analysis. *Third*, it explores the representativeness of the sample in terms of the population characteristics. Finally, it concludes with the challenges and limitations of the methodological approach employed.

4.1 Methodological Framework

The current literature on the gender wage gap utilises, broadly, the neoclassical (human capital approach, psychological attributes and non-cognitive skills), institutional (crowding hypothesis proposed by Barbara Bergmann, labour market discriminations, segmented labour markets theory) and feminist explanations of discrimination (patriarchal theory and motherhood penalty). This thesis uses a conceptual theoretical framework based on Bergmann

(1977)'s crowding theory. In her earlier work, she persuasively argues that as a result of discrimination in the labour market, most employers discriminate against a specific sub-set of the population (e.g., black workers). Black workers, therefore, crowd into occupations such as domestic work with lower skills and qualification requirements and increase labour supply in these professions. That results, on one hand, in lower wages in these occupations, given the increase in the labour supply. On the other hand, in the professions where the labour supply is restricted, white workers enjoy higher relative earnings compared to those in occupations where supply has been inflated. The occupational crowding in Bergmann's work can also be applied to different segments/categories; not least, it can be applied to groups such as traditionally male (technical) vs traditionally female (non-technical) professions, and is used thus in this thesis. Therefore, the major finding in our study – i.e., a crucial difference in the gender wage gap between the technical and non-technical professions – is very much in line with Bergmann's overcrowding hypothesis. In the presence of labour market discriminations, employers favour men for technical positions and consequently women crowd into non-technical positions that are more generic and require 'soft' rather than technical skills. As a result, the latter positions become more feminised and inflated, leading to greater labour supply which pushes wages down.

However, our study modifies Bergmann's crowding hypothesis by bringing in the labour-demand side more prominently. In the Turkish context, where there are shortages in technically-skilled labour and high growth and profitability in the ICT sector, traditionally recognised causes of the gender wage gap, such as motherhood penalty, occupational segregation, marriage compensation, social norms and prejudice, are overcome. Our finding reveals that high demand for technical labour due to the shortages of technically-skilled labour and the products of the sector (that is, high growth and profitability in the Turkish ICT sector) decreases the gender wage gap dramatically for technical positions and overwrites the traditional causes of the gender wage gap. In this study, we find that the overall gender wage gap is smaller for technical (10.4 percent) than non-technical positions (40.5 percent). Furthermore, nearly 92.3 percent of the technical and only 65.2 percent of the non-technical gender wage gap can be explained with our model, leading to a small unexplained gender wage gap for technical positions and a quite significant gap for non-technical positions. None of the traditional theories above take labour market distortions (labour supply shortages, unusual rapid growth) into account when analysing the causes of the gender wage gap. Therefore, this thesis takes Bergmann's hypothesis one step further by bringing labour demand into the equation. Labour market distortions (labour supply shortages and unusual sectoral rapid growth) are one of the most powerful factors determining the nature and the extent of the gender wage gap, since discrimination takes different forms under different labour market conditions, i.e., time and space, and can even be overcome.

4.2 Method

In order to answer research questions 1 and 2, a mixture of quantitative (closed-ended) and qualitative (open-ended) research methods are adopted to gather descriptive, interpretive and empirical data. A mixed method research approach, whereby both quantitative and qualitative data is collected and analysed within the same study (Shorten and Smith, 2017), works as one method complements another and allows for the gathering of more in-depth knowledge and understanding of the social phenomena under study, since purely quantitative analysis leaves various themes unexplored and uncaptured. Malina et al. (2011) suggest that 'using a mixed method approach provides the best opportunity for addressing research questions' (p.60). Integration of quantitative and qualitative data and analysis enables researchers to simplify a complex social phenomenon and assists them with the conceptualisation of the issues. Findings can be triangulated, in ways that identify and discover new perspectives from various aspects. The approach then augments and validates the findings from quantitative techniques: e.g., a questionnaire. Once a mixture of quantitative and qualitative research techniques is applied, Zawawi (2017) argues, a researcher can reap the benefits of each technique (e.g., the objectivity, generalisation, reliability, time and cost friendly features of quantitative analysis and the interpretive element of qualitative methods) rather than focusing on numbers and frequencies. At the same time, it can off-set the drawbacks associated with these techniques when used in isolation: e.g., the inflexible and shallow properties of quantitative methods and the higher time and resource consumption of qualitative methods. Therefore, a weakness of one research method becomes a strength of the other, and applying a mixed method approach eliminates these weaknesses in a smooth manner.

Applying a mixed method research design in this thesis is in anticipation of capturing the distinctive dynamics of the Turkish ICT sector and delving into the broader experience of women ICT professionals. The quantitative method employed is an online questionnaire,[66] aimed at unravelling detailed information about the profile of the ICT workforce, their pay and

[66] See Appendix 5 (p.313) for the details of the questionnaire.

working conditions and job prospects. The questionnaire contains open- and closed-ended, five-point Likert-scale and ranking questions relating to workers' gender, age, marital status, academic qualifications and skills, positions at work, employment status, professional experience, career advancement, career change plans, gender pay gaps and so on. As the gender wage gap is central to this thesis, the earning differentials between men and women are also collected. In addition to the questionnaire, qualitative aspects of working conditions and experiences are captured through semi-structured interviews and informal conversations with employees and employers in Turkish ICT companies.

The quantitative and qualitative data is integrated through the following steps. *Firstly*, the questionnaire (quantitative data) is developed based on the existing gender wage gap literature and ICT sector specifics. *Secondly*, the data is collected and the results of the questionnaire analysed. *Thirdly*, based on the initial results from the quantitative analysis, semi-structured interview questions are developed and qualitative data collected. *Finally*, both qualitative and quantitative data are merged during further analysis and discussion in order to yield a greater insight into the gender wage gap phenomena in Turkey. For instance, the quantitative approach provides wage data and enables the researcher to run a gender wage gap analysis of Turkish ICT professionals. The researcher of this thesis then embedded qualitative data to explain the reasons behind the relatively small gender wage gap for technical professionals and larger gap for non-technical professionals, which will be discussed in detail in Chapter VII.

4.2.1 Sampling Framework for Quantitative and Qualitative Data Collection

Identifying the population and determining the sample selection method are crucial and often challenging practices in conducting academic research. Groves (1989) identifies three different populations: *the population of inference* is the population that the researcher would like to explore and draw conclusions about; *the target population* is a finite group from the population of inference that will be studied and that the researcher has an access to; and *the frame population* is the portion of the target population which the survey materials delimit, identify and subsequently allow access to (Fricker, 2008, p.198). According to Groves (1989)'s identification of different populations, the Turkish ICT sector workforce regardless of their status, position or nationality is the population of inference; the ICT workforce within the turnover-based top 500 ICT companies in Turkey of 2015[67] is the target population for this study; and finally, the employees/owners of these companies who are members of LinkedIn is the frame population. Just over 70 percent of the target population, the turnover-based top 500 ICT companies in Turkey of 2015, operate in İstanbul and the rest are located in other major cities such as Ankara (15 percent), İzmir (5 percent), Kocaeli (2 percent), and Bursa (2 percent) as well as other parts of Turkey. This indicates that the concentration of ICT companies is high in İstanbul compared to the rest of Turkey.

The sampling method chosen directly influences the representativeness of the sample collected relative to the whole population. A representative sample, which should closely mirror the socio-demographic, attitudinal and behavioural characteristics of the population under study, is essential for generalising the findings (Krosnick, 1999; Lohr, 2010; Paulauskiene and Kurasova, 2016) and for external validity of the survey, which 'concerns whether the observed relationships can be extrapolated, or generalized, to other samples of units (e.g., people), situations, or times' (Oppewal, 2010). Researchers agree that *probability sampling* (random, stratified, cluster or systematic), wherein each member of the target population has given a known, non-zero chance of being included in the sample, offers the ability to draw generalised conclusions about the population; therefore, it should be applied in research to obtain a representative sample (Churchill et al., 1992; Teddlie and Yu, 2007; Fricker, 2008; Dillman et al., 2014). *Simple random sampling* occurs when every randomly selected member of the target population has a known and equal chance of being included, and their selection is independent of one another (Dillman et al., 2014). Simple random sampling is considered to be 'the most adequate' method to avoid bias in sample selection, as it provides an equal chance of being included in the sample, thereby allowing the researcher to obtain a representative sample and generalise the findings to the entire population (Tashakkori and Teddlie, 2003). However, Malekinejad et al. (2008) argue that the 'most adequate' method depends on the purpose of the study. For instance, for studies that look at HIV, simple random sampling may not be the most appropriate choice because of the size of the groups involved, which is too small to capture sufficient numbers in surveys, and also the difficulty of accessing them due to 'socially stigmatized or illegal behaviors' (p.106). *Stratified random sampling* involves dividing the population into non-overlapping sub-populations, called strata, and then

[67] Ranking these 500 ICT companies was done by an institution called 'BThaber Yayıncılık ve Etkinlik Hizmetleri A.Ş.'. These companies were ranked according to their turnover in different categories such as hardware, services, telecommunication and so on.

taking random samples from each stratum (Powers and Knapp, 2010). This probability sampling technique may not be beneficial when the population consists of a number of heterogeneous groups (Fricker, 2008). The third probability sampling type is c*luster random sampling* which occurs when sample units are grouped (or clustered) and then the clusters are randomly sampled rather than sampling the individual units (Dillman et al., 2014). Teddlie and Yu (2007) state that this type of probability sampling becomes more convenient when the individual units are geographically separated, and the researcher prefers to utilise monetary and/or time resources effectively. The last type of probability sampling is *systematic sampling*, which is defined by Churchill et al. (1992, p.307) as the selection of every k^{th} member in the population for the sample pool after a random start. Systematic sampling does not require a sampling frame assembled beforehand (Fricker, 2008). It is particularly advantageous when simple random sampling is not convenient due to the complication of selecting each sample member randomly (Churchill et al., 1992).

Another sampling technique is the non-probability sampling method. Tashakkori and Teddlie (2003) argue that nearly any research question with a complex nature requires applying more than one sampling technique, which involves both probability and non-probability (purposive) sampling techniques. *Non-probability sampling* arises when the researcher makes a deliberate and purposive selection of population elements in a non-random manner (Kothari, 2004; Kumar and Phrommathed, 2005). It does not require identification of a target population (Lukas, 2014, p.395) and does not guarantee a known and non-zero chance of being selected. The population elements are selected on the ease of access or the researcher's judgement, unlike random selection (Kothari, 2004). Non-random sampling is preferred if the population is unknown or the researcher is unable to identify the population elements individually (Gupta and Gupta, 2011)., and this type of sampling may not be representative of the population. There are five forms of non-probability sampling techniques: Quota, snowball, convenience, judgement and self-selection sampling. *Quota sampling* is the non-probability equivalent of stratified sampling (Nachmias and Nachmias, 1981). This method is preferred when the population is heterogeneous. The strata and their proportions as represented within the population are identified by the researcher (Gupta and Gupta, 2011). The size of the quota for each stratum is generally proportionate to the size of that stratum in the population (Jawale, 2012, p.188). Then, the subjects are selected on the basis of the researcher's convenience and judgement to fill each subgroup that is homogeneous. *Snowball sampling (chain referral sampling)* is another type of non-probability technique used to identify and contact research subjects of marginalised, hidden or hard-to-reach populations such as billionaires, drug addicts, sex workers, HIV-infected individuals, homeless people, human trafficking victims, undocumented migrants, and so forth, in an informal manner. The researcher randomly selects one realisation of the population at a time who matches the research criteria and then asks this key informant for the name of another subject, who in turn provides the name of a third informant and so on (Vogt, 2005; Gupta and Gupta, 2011; Baltar and Brunet, 2012; Alvi, 2016); in this way, the researcher builds a chain of subjects who have the required, but similar, characteristics. This type of technique is susceptible to sampling bias, which is a failure of selecting a truly random sample and, therefore, may not be representative of the larger population. To address sampling bias, gender wage gap analysis is also carried out by utilising secondary data (HLFS) in order to tackle selection bias: i.e., non-randomness of the survey data. *Convenience sampling* – also known as haphazard sampling or accidental sampling – is based upon how easily researchers can access the targeted subjects (Gupta and Gupta, 2011; Etikan et al., 2015) and it is the least rigorous/costly sampling technique for the researcher concerned with time, money and effort (Marshall, 1996). Therefore, it is considered an unreliable and non-representative method of sampling the population. *Judgement sampling* occurs when the researcher uses their own judgement to select the items which she/he considers representative of the population, and it is often applied in qualitative research where generalisation of the data is not a primary concern (Kothari, 2004). This non-probability sampling technique is also subject to sampling bias as well as sampling errors, marking the difference between values obtained through the survey and though the population. Unlike sampling bias, sampling error can be predicted and calculated via confidence intervals, standard error terms, coefficients of variance and P values (Woodruff et al., 2009). The final non-probabilistic sampling technique is the *self-selection sampling method*, which occurs when the researcher uses open general invitations on portals, platforms or frequently visited websites to target potential respondents for the study (Couper, 2000, p.479). In this case, potential respondents self-select themselves to take part in the research. Couper (2000, p.479) argues that this form of sampling is 'one of the most threatening to legitimate survey enterprises' as often there are no access restrictions to the survey and the researcher has a little or no control over multiple completions. Hence, non-randomly selected samples create self-selection bias which may undermine the representativeness of the sample.

Based on the sampling methods discussed above, a mixture of non-probability sampling methods has been deployed for the quantitative part of the thesis. Initially, deliberate and purposive selection (workforce of the turnover-based top 500 ICT companies of 2015) of the population (the Turkish ICT sector workforce) was made via targeting a frame population (ICT workforce who are LinkedIn members), leading to an exclusion of those who are not on LinkedIn. Potential respondents were targeted based on ease of access (convenience sampling) for the researcher as well as geographical proximity and willingness to participate (Etikan et al., 2015). Tashakkori and Teddlie (2003) argue that if the selected units are spread over a large geographic area, it might be inconvenient to reach the target population through a simple random sampling technique. However, this disadvantage is eliminated by using LinkedIn – a platform bringing professionals together not only locally but also globally – as a sample frame to reach out to every possible ICT worker in Turkey. In order to access employees directly, the names of the ICT companies on the 'turnover-based top 500 ICT companies in Turkey of 2015' list were located on LinkedIn. So as to connect with the 'correct' company employees on LinkedIn, each company's website was visited to look out for the LinkedIn icon to go to their LinkedIn page. In case no LinkedIn icon was found on the websites, LinkedIn was directly used to search for these companies as a way of eventually finding their employees. Once these companies were identified, networking invitations were randomly sent to the employees of these companies. Furthermore, each potential respondent on LinkedIn was contacted independently of one another (simple random sampling). It would be more difficult to obtain a representative sample with other sampling techniques – acknowledging the fact that the employees of the turnover-based top 500 ICT firms are located in different cities of Turkey – not only because of the cost and time constraints but also because it is crucial to provide a known, non-zero, equal chance of being selected for the sample.

When the employees accepted the networking invitation on LinkedIn, an invitation letter to participate in the questionnaire was sent as a private message with the survey link provided. Anonymity and confidentiality regarding the questionnaire were confirmed with potential participants.[68] No incentives for the completion of the questionnaire were provided in the letter. When participants asked for the results of the survey after they completed it, they were informed that the results would be shared on various platforms, including LinkedIn, once the analysis was complete. Once the participants confirmed that they had filled in the questionnaire, they were encouraged to share the link with their colleagues (snowball sampling) in order to reach out to other ICT workers who are not on LinkedIn. However, as this was a

[68] See Appendix 7 (p. 325) for the invitation letter sent to potential participants.

web-based survey, there is no reliable way of knowing whether the encouraged respondents indeed sent the survey link to their colleagues or whether their colleagues filled in the questionnaire. Furthermore, the number of respondents who confirmed their participation in the research through private messages corresponds closely with the number of valid questionnaires. The process continued for all company employees who were on LinkedIn and accepted the networking invitation. In addition to personal invitations, an open general invitation was posted on the researcher's LinkedIn page to target potential respondents (self-selection sampling) and follow-up reminders were sent so as to increase the participation rate. To ensure that the questionnaire was filled in only by the ICT sector workforce, the first question was '*Do you work in the ICT sector*?' so as to increase the data accuracy and reliability. The questionnaire was ended for those who answered with 'No'. I did not put any IP address restriction on the survey that could prevent participants filling in the questionnaire if they work for the same company and use the company's network to fill in the questionnaire.

Given that ICT workers are digital natives, an online questionnaire can be considered the most 'adequate' option to obtain a sample representativeness for this study. Marshall (1996) argues that this type of sampling technique is the most efficient in cost and effort; therefore, it may result in poor data quality. Many qualitative studies, he argues, have an element of convenience sampling, but this can be justified with a more cautious selection approach. Considering that the employees of the turnover-based top 500 ICT companies of 2015 were selected as the target population in this study, it can be argued that the selection of the sample was careful - particularly since the ranking of these 500 ICT firms includes Turkey's biggest information and communication technology companies. These companies, therefore, serve as representative of the formal ICT sector in Turkey since they are all registered.

4.2.2 Quantitative Data Collection Method: Online-Questionnaire

Choosing an appropriate data collection tool for questionnaires – such as paper, post, telephone, fax, the Internet or mobile phone – is a key element of the research process after determining the population of interest. This study has used a web-based survey method. Online surveys have recently gained popularity and become a useful means of conducting research with the rapid advancements in, and access to, technology and its convenience for participants as well as scholars. The increasing ubiquity of the Internet in our daily lives and a reduction in the cost of computer hardware and software have made it convenient for researchers to connect with their target populations via the Internet (Cook et al., 2000; Şimşek and Veiga, 2001; Kaplowitz et al., 2004; Wright, 2005). Çobanoğlu et al. (2001, p.441) even claim that postal and telephone-based surveys have passed their optimal usefulness.

There are several advantages to using web-based surveys. Through web survey methodologies, researchers can access their target population with common characteristics in a very short time with a relatively lower delivery costs compared to traditional paper-based surveys (Couper, 2000; Granello and Wheaton, 2004; Kaplowitz et al., 2004; Wright, 2005; Lefever et al., 2007; Greenlaw and Brown-Welty, 2009; Fan and Yan, 2010). This approach allows participants to complete the survey with a reduced response time, at their own convenience, and in an environment of their choice without a researcher interfering in the participant's daily routine. It is also acknowledged that participants who take the survey in their own time may spend more time and provide honest and longer open-ended responses to web-based surveys. Furthermore, in conventional paper-based surveys, respondents can skip as many questions as they desire. However, web-based surveys can include a non-skippable feature in order to prevent missing values (which can pose a challenge for researchers), though this may encourage some participants to leave the survey uncompleted. In this study, it was decided to use a non-skippable feature for all 34 questions in the survey in order to eliminate missing values. With respect to the data collection process, collected data can be processed immediately and stored as opposed to the paper survey mode, which requires scanning and physically storing completed questionnaires (Bennett and Nair, 2010). Web-based surveys also reduce the human error caused by inputting responses, as the responses are automatically entered by the participants and electronically transferred to the system (Çobanoğlu and Çobanoğlu, 2003; Umbach, 2004; Lefever et al., 2007; Fleming and Bowden, 2009). The whole data collection process can be made even more convenient for the participants as well as researchers through interactive formatting options such as multi-language, logic questions, question and page randomisations, one question at a time and progress bars.

However, there are certain drawbacks associated with the use of Internet-based surveys. One of the most widely acknowledged challenges of this method is errors: coverage, sample, nonresponse and measurement error. Groves (1989, p.10) conceptually structures coverage, sampling and nonresponse errors as an *error of nonobservation* in surveys. Couper (2000, p.467) defines *coverage error* as the mismatch between the target population and the frame population. It arises when some part of the population cannot be fully 'covered' in the sample (Umbach, 2004, p.25); therefore, it threatens the representativeness of the population.

However, Couper (2000) argues that this error type can be removed through limiting the study to those who have access to computers and the Internet or overcoming the limitations of accessing the technology by making it accessible to all those included in the sample. A *sampling error* occurs because of the sample surveyed rather than the whole population, and different survey data might be collected if different samples are selected from the same population. However, it could be argued that no matter how perfectly the sample is constructed, the values from the randomly selected sample cannot be exactly the same as the entire population (Woodruff et al., 2009). This also questions the sample's representativeness of the whole population (Fricker, 2008). However, Dillman et al. (2014) argue that in most cases, estimates will be representative of the true value, despite the fact that the sampling error significantly depends on the sample size and sample design. Couper (2000) clarifies the difference between coverage and sampling errors:

> *Coverage error refers to people missing from the frame (in this case, those without Internet or Web access), sampling error arises during the process of selecting a sample from the frame population, necessitating a means of identifying people on the frame.* (p.467)

Nonresponse errors arise when the researcher fails to collect data from all the individuals (*unit nonresponse*) or for all the questions (*item nonresponse*) in the sample (Groves, 1989). For example, potential respondents in the sample frame may be unavailable or unwilling to take the survey. Likewise, respondents from different social strata may not have equal access to web technologies (Shih and Fan, 2008). *Response rate*, which is the ratio of the number of survey respondents to the number sampled (Fricker, 2008, p.198), is used to measure how well the survey results can be generalised. Higher response rates in a survey are associated with a lower nonresponse bias and a higher representativeness of the whole population. Nonresponse bias arises when the attitudes or demographic characteristics of respondents within the sample frame significantly differently from those who did not complete the survey. The bias becomes even more problematic when the computer/digital literacy levels of potential participants are heterogonous, and the problem worsens with lower response rates (Fleming and Bowden, 2009). However, Couper (2000) argues that if the frame sample cannot be identified in surveys, then identification of nonresponse issue becomes harder. For instance, as he continues in his comprehensive study, if a researcher issues an open invitation on a web portal for participation in a survey, the number of eligible participants is typically unknown; therefore, the non-response error becomes difficult to identify and the response rate cannot be calculated. *Measurement error* occurs when the respondents provide 'incorrect/dishonest' answers to certain questions about sensitive topics such as addiction, sexuality, abuse, religion and even wages or they may misinterpret questions. Fricker (2008) suggests that measurement error can be greatly reduced through careful testing and revision of the survey instrument and questions as well as choice of survey mode. Fan and Yan (2010) state other limitations of web-based surveys such as technical failures, computer viruses or cybercrimes. They argue that these can damage and even entirely destroy all the stored survey data. However, it is possible to reduce these risks through installation of firewalls and anti-virus software, frequent backing-up of files and setting up complex, secure passwords for the survey accounts among other things. Such errors have been eliminated in this thesis by excluding 139 uncompleted questionnaires as a result of participants' avoidance of sensitive topics (e.g., salaries) or conflicting or dishonest answers such as claiming to be a CEO with earnings less than the minimum wage.

The other major limitation that Internet-based surveys suffer from is low response rates, and, therefore, poor outcomes due to poor data quality and bias results. Several researchers have argued that Internet-based surveys lead to a lower response rate compared to paper-based surveys (Couper, 2000; Cook et al., 2000; Crawford et al., 2001; Dommeyer et al.; 2004; Ardalan et al., 2007; Shih and Fan, 2008; Nulty, 2008; Manfreda et al., 2008; Fan and Yan, 2010). For example, a meta-analysis of 45 published and unpublished experimental comparisons between web-based and other survey modes, conducted by Manfreda et al. (2008), revealed that, on average, web-based surveys yield an 11-percent lower response rate than other survey modes. Ardalan et al. (2007) found that response rate for paper-based surveys (68.7 percent) was more than double those of web-based surveys (30.7 percent). A similar study by Nulty (2008) also finds paper-based surveys show higher response rates (56 percent), on average, than the web-based equivalent (33 percent). However, there is also evidence of the opposite. McCabe (2004) examined the survey mode effects between online and mail surveys with a sample of 7000 undergraduate students at a large Midwestern public research university and achieved a 63-percent response rate with a $10 gift voucher for a local book store and 40-percent response rate for the mail survey mode. Similarly, Greenlaw and Brown-Welty (2009) showed that response rates were higher for web-based surveys (52.46 percent) compared to paper-based surveys (42.03 percent), when the former are administered to an educated population with access to computers. The latter can be a valid characteristic of the Turkish ICT sector workforce, who are digitally literate and active users of the Internet and where Internet connectivity is stable and widely accessible. With regards to the content of the responses, some researchers (Layne et al., 1999; Kwak and Radler, 2002; Dommeyer et al., 2004; Bennett and

Nair, 2010) have pointed out that student respondents provide more information to open-ended questions in web-based surveys than in in-class surveys.

Given the consensus amongst researchers on the lower response rates of web-based surveys relative to conventional paper-based surveys, determining an adequate response rate for the former is still debated (Couper et al., 2001; McCabe, 2004; Johnson and Owens, 2003; Dommeyer et al., 2004; Nulty, 2008; Saldivar, 2012; Morton et al., 2012). A high response rate is an essential criterion for reducing the risk of nonresponse bias, which is the answers of the respondents differ meaningfully from the answers of the nonrespondents (Armstrong and Overton, 1977; Johnson and Wislar, 2012), and for increasing the quality of the survey, thereby influencing the external validity of the survey. However, Sax et al. (2003) claim that 'low responses alone do not necessarily suggest bias' (p.412), referring to the argument of Dillman (1991) and Krosnick (1999) that as long as respondents are representative of non-respondents, low response rates can be non-biased. However, identification of non-respondents may be a challenge (Armstrong and Overton 1977; Dey, 1997). Response rates might be falling due to the difficulty of identifying the right population, a drop in volunteerism (Morton et al., 2012) and technical difficulties with an Internet survey such as slow modem speeds, low-end browsers and so on (Couper, 2000). Whether response rates are adequate depends on how the data will be utilised (Nulty, 2008). For instance, if the data is collected for teaching evaluations in order to improve the teaching and learning experience, then even one useful response may provide necessary information and lead to improvements. Therefore, the response rate technically becomes irrelevant. However, he claims, it is politically discomforting to accept low response rates because a proportion of respondents may not be the representatives of the non-respondents. He states that the best response rates (65 percent, 47 percent and 25 percent) achieved for the teaching evaluation web-based surveys were only adequate if the class size was above 500, 750 and 2000, respectively, with a 3-percent sampling error and 95-percent confidence level.

However, lower response rates for Internet-based surveys can be increased through pre-testing, pre-contact letters, personalised invitations and follow-up reminders, as opposed to the traditional paper-based survey method, which is very much bound to time and location (Couper, 2000; Solomon, 2001; Granello and Wheaton, 2004; Kaplowitz et al., 2004; Fan and Yan, 2010; Hardre et al., 2012). Moreover, providing monetary and non-monetary incentives (cash, vouchers, donations, lotteries, books, gift cards, share of the results) for potential participants, increase response rates on average by 6.5 percent (Yammarino et al., 1991) for both postal and online surveys (Church, 1993; Dillman, 1999; Harzing, 2000; Deutskens et al., 2001; King et al., 2001; Sheen et al. 2001; McCabe, 2004; Nulty, 2008; Lefever et al., 2007; Fan and Yan, 2010). However, Ilieva et al. (2002) argue that incentives may encourage some participants to fill in the questionnaire in a rush and with incorrect information so as to get the prize (such as a raffle or draw) or the participants may complete the survey more than once to increase their chances of winning the prize. Hence, they continue, web-based surveys are more subject to this type of data unreliability if the respondents are selected on a random choice basis, as researchers' control over the people entering the survey is limited. However, they conclude, this disadvantage might be minimised through contacting the participants via e-mail and personalised invitations.

Those who have studied the ICT workforce in different parts of the world did not discuss response rates in their web-based studies (Arun and Arun, 2002; Al-Gahtani et al., 2007; Griffiths et al., 2007; Elnaggar, 2008; Kovacs and Casaca, 2008; McKinney et al., 2008; Rosenbloom et al., 2008; Timms et al., 2008; Pretorius et al., 2015). Those who do discuss this (Turner et al., 2002; Aziz, 2004; Warne et al., 2011) report very different response rates (11 percent, 66 percent and 28 percent, respectively). For instance, Turner et al. (2002) achieved an 11-percent response rate using an informal woman-only platform, Systers, whose members were women working in the technical side of computing. The survey was posted on the platform with 2500 members and all the members were invited to participate in the survey. Likewise, Aziz (2004) managed to get a 66-percent response rate via e-mailing the questionnaire to 400 full-time women IT professionals working in 10 different IT organisations. Finally, Warne et al. (2011) uploaded the questionnaire onto the Australian Computer Society website with 2421 members and offered a bouquet of flowers as an incentive to be delivered to the first and last 20 respondents' addresses, achieving a 28-percent response rate. Furthermore, Çalışır et al. (2011) conducted research into the factors affecting IT professionals' intentions to quit their jobs in Turkey and achieved a 35-percent response rate with 204 completed surveys out of 586 invitations sent out to the potential participants' e-mail addresses.

In this thesis, a total of 3052 questionnaire invitations were sent to potential respondents during 1-10 October 2017. A follow-up message was then sent to those who did not respond to the invitation within two weeks. The survey was kept live from 1 October to 12 November

2017, and ended on the latter date. In total, 2707 individuals attempted to fill in the questionnaire, 651 of whom left it incomplete and 139 of whom answered ‘no’ to the first question. These two groups were excluded from the data. As a result, a total of 1917 valid questionnaires were collected, demonstrating a 63-percent (1917/3052) response rate. It is worth mentioning that the total number of employees in the ICT sector was 139,000 in 2018, according to TÜBİSAD Informatics Industry Association, which was explored in more detail in Chapter III. However, this employment data only includes firms that provide data to TÜBİSAD: a total of 5405 firms in 2018. However, the total number of ICT firms in the sector was 44,718 in 2017, according to TÜRKSTAT data. Regarding turnover, the author of this thesis was given the data by the organiser of the turnover-based top 500 ICT companies of 2015, BThaber Yayıncılık ve Etkinlik Hizmetleri A.Ş, which accounts for 90 percent of the total ICT market share.

4.3 Survey Design and Data

To start with, the frame population for the quantitative part of this study is the employees/owners of the turnover-based top 500 ICT companies who are also members of LinkedIn. The questionnaire was designed following an extensive literature review in Chapter II, covering information and communication technologies, labour force participation and women in the ICT workforce. The questionnaire consisted of 34 questions concerning demographics and background characteristics, skills and qualifications, as well as work related questions such as company type, employment status, positions at work, wages, overtime, home-based work and so on. The respondents were also asked about the benefits and challenges of working in the ICT sector. Some respondents answered fewer than 34 questions due to the logic feature applied in the survey, which allowed the respondents to skip some questions that are not relevant to them by tracking their previous responses. All the questions were made compulsory and no skip option was offered. Some ICT professionals were first consulted for feedback prior to rolling out the questionnaire. Based on the feedback received, the questionnaire was developed further and tested with a smaller group of academics and ICT professionals and then made live on Survey Monkey on 1 October 2017 before the population was contacted.

The wage data was indispensable for the analysis of this study, as discussing wage information is still taboo in Turkey; therefore, most individuals are hesitant to disclose their salaries even if they have been made aware that the survey is anonymous. This is evidenced by various studies with lower response rates or skipped questions. For that reason, the salary information is collected as a salary range rather than asking participants for their exact salaries. Despite a high participation rate in the survey, in some cases, participants left the survey incomplete when they could not skip the question.

The initial idea with regards to data collection was to contact the employers of these turnover-based top 500 ICT companies in order to get their permission to distribute the survey link amongst their workers. After careful consideration it was decided to contact ICT employees directly in order not to jeopardise the reliability of the data. To explain further, the respondents' answers to the questionnaire might have been influenced by the subordinate-superior relationship: for example, by employers if the survey is taking place in their workplace or an institutional setting. For instance, Dommeyer et al. (2004) find that Internet-based surveys are less susceptible to faculty members' influence than in-class surveys. A faculty member could influence the respondents' answers through favourable activities on the day by providing pizza parties, educational games or being present before or during survey completion, especially if students have suspicions that the faculty member may identify the respondents. Considering that the population of inference in this study is the Turkish ICT sector workforce, the computerised and self-administered survey applied in this study might be considered one of the most appropriate methods, as opposed to paper-based surveys carried out in offices where employers, managers and colleagues may be present and the environment may be distracting. Additionally, participants may rush to complete the survey during work time, which may jeopardise data quality and hence the results of the survey.

Lefever et al. (2007) highlight the unreliability of e-mail address lists and the lack of willingness of the population to participate in online surveys. This limitation was reduced in our case due to messaging participants on LinkedIn without relying on e-mail addresses. The researchers also mention that survey participation invitations sent by e-mail are frequently associated with junk e-mails and deleted straight away by the recipients. This possibility is also eliminated to a greater extent here. Moreover, the recipients were referred to by their real names which made the invitations more personalised. Additionally, the willingness of the population to take part in the survey was much greater than expected. This may be due to the fact that very limited research has been done among Turkish ICT sector workers. Due to the fact that the ICT sector is relatively new and emerging compared to other sectors in the Turkish economy, participants may have felt heard and understood by the authorities and their employers as well as by their colleagues. Therefore, this research may have been seen by the participants as a ‘tool’ for this purpose.

4.3.1 Methods of Quantitative Analysis

A quantitative analysis of a total of 1917 valid questionnaires is carried out to *partially* explain the gender wage gap phenomena, since this thesis is integrating both quantitative and qualitative approaches. The descriptive statistics of the Turkish ICT sector workforce in terms of human capital (age, gender, marital status, educational level, having children and so on) and workplace characteristics (occupation, wages, types of employment, overtime, sub-sector, type of company, city, field of company activity and so on) are used to describe, organise, summarise and analyse the data using advanced Microsoft Excel functions. In addition, Stata 15.0 & Eviews 10 software are used to explain and predict the probability of staying overtime (that is, the logit model of staying overtime) as a function of the demographics, which will be detailed in Chapter V.

The quantitatively collected data is divided into two sub-sections for technical and non-technical positions, which will be discussed in Chapter VI. The divided data is then transferred to Stata 15 software to employ the Blinder-Oaxaca decomposition technique, one of the most widely applied methods in the empirical literature used to test disparities on earnings between groups in the labour markets, discussed in details in the previous chapter. However, and as also discussed in Chapter II, the empirical analyses carried out by applying the Blinder-Oaxaca decomposition technique is primarily based on the human capital theory and neoclassical approach, ignoring non-neoclassical conceptualisations of gender wage disparities. The technique provides a common ground for the pay gap issue by groups such as sex, race and ethnicity as long as the independent variables can be observed. Part of the pay gap is then referred as ‘explained’ by the explanatory factors plugged into the model, and the rest is broadly attributed to ‘discrimination’. Therefore, the results from the technique put the ‘unexplained’ part under the broad ‘discrimination’ umbrella and leave the deeper analysis to the imagination of the reader, bearing in mind that discrimination may mean different things to different people. In order to provide a better perspective for the reality of gender inequality in relation to wage gaps, the significant, relatively non-quantifiable determinants such as patriarchy, the motherhood penalty and occupational segregation should also be captured and analysed in gender pay gap analyses. This thesis integrates both institutional (crowding hypothesis and labour market discriminations) and non-neoclassical approaches in the following way. *First*, it achieves this by carrying out the Blinder-Oaxaca decomposition technique, using Stata for a broader understanding of gender wage inequality; *second*, it gathers qualitative data on the non-quantifiable determinants (e.g., patriarchy and the motherhood penalty) to explain what this attributed discrimination is and what causes it, particularly for the non-technical positions, in order to gain a deeper understanding of the issue.

4.3.2 Qualitative Data Collection and Analysis

For qualitative data collection, in-depth semi-structured interviews (n=33) were conducted during 5-25 April 2018 and in December 2018 (Table 4.3 for more details). All but six of the interviews were conducted in İstanbul, the technological hub for the majority of the country's ICT-related activities. Two interviews were held abroad to fit the schedules of the participants. All the interviews were on an individual basis and conducted in-person, apart from four Skype interviews. Random interview invitations were sent through LinkedIn to those who previously participated in the online ICT questionnaire and were currently working in the ICT sector regardless of their gender, position and experience. Anonymity and confidentiality guarantees, in relation to personal and company information, were given to all respondents.

All interviewees were allowed to determine the interview locations in order to find the most comfortable environment for the participants and also eliminate any bias that might occur due to superior-subordinate relationships if the interviews were held primarily in the workplace. Interviews took place at participants' workplaces, in cafes and in bookstores. The open-ended interview questions were not shared with the participants prior to the interviews, although they were aware of the main themes of gender differences and working conditions in the ICT sector in Turkey. Twenty-five main questions were asked about personal information, gender perceptions and differences, social norms and values, recruitment processes, entrepreneurship, positions held, employment opportunities, promotions, workplace turnover, positive discrimination and working conditions. Additional questions were also raised during the interviews depending on the conversational flow. All participants were asked for their permission to make audio recordings and all but one accepted. The average duration of the interviews was around 68 minutes (SD = 20 mins, median = 67 mins), the longest interview lasting 1h 45 min and the shortest 10min.[69] Participants were asked for clarification, elaboration and their reflections. After the interviews, some participants were asked for a referral to a

[69] The participant was interrupted with an emergency.

colleague/friend who works in the ICT sector and a total of three women participants were reached through this snowball sampling. The remaining respondents were a sub-sample of the respondents from the web-based survey. Notes were taken and observations were made during the interviews, and immediately after each interview, the audio recorder was verified to see if it had worked.

For the analysis of the 33 semi-structured interviews, *qualitative content analysis,* defined as a 'research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns' (Hsieh and Shannon, 2005, p.1278), is carried out to analyse the interview data. *Firstly*, all the recordings were translated and transcribed by the researcher. *Secondly*, the data was coded to identify themes (e.g., the motherhood penalty), note patterns and relationships, and make comparisons between genders, positions and employer and employees. For instance, word frequency is used to establish trends and emerging themes: e.g., marriage compensation law and wage negotiations. *Thirdly*, information gathered from the interviews was used to verify and triangulate the results gathered via the online questionnaire such as types of employment, overtime, overtime pay and so on, which will be discussed in Chapter VII.

4.4 Representativeness of the Survey Sample

Determining whether the survey sample is representative or not requires knowing the characteristics of the targeted population. One can compare the properties of the sample to see if the sample characteristics closely correspond with those of the population. However, this becomes a challenge if the population characteristics are unknown or only partially known. Therefore, the sample collected cannot be 'fully' compared with the population's socio-demographic, attitudinal and behavioural characteristics, and clear conclusions about the population cannot be drawn. This is arguably the case for this thesis. There is only very limited information available about the characteristics of the ICT workforce in the literature and some from the Turkish Statistical Institute and other relevant institutions. This may be due to the fact that the ICT sector itself is relatively new compared to other, more mature sectors such as agriculture and manufacturing. Therefore, some measurements or benchmarks are used in this study to compare with the population (Turkish ICT workforce), using partially existing information about the population in the next section.

4.4.1 Population Characteristics

HLFS data may be a reliable source as it is considered random and representative. However, it is not sufficient to answer our research question – *Is there a distinction between the technical and non-technical gender pay gaps?* – or to form any firm conclusions, as the sample size is too small. Thus, primary data collection is essential to carry out this study.

We also look at institutional reports and press releases. As reported in the Turkish Statistical Institute (TUIK) 2018 press release, women's employment across all sectors in the economy was 28.9 percent in 2018 (the rate was 65.5 percent for men with regards to the ICT sector), and the number of enterprises in the ICT sector increased from 31,434 (2009) to 44,718 (2018). According to the TÜBİSAD ICT sector reports, the information technologies industry's share in Turkey was nearly $9 billion and the share of the communications sector was nearly $18 billion as of April 2018. Put differently, the information technologies industry in Turkey made up roughly 50 percent of the communications sector. Similarly, the number of ICT employees increased from 100,500 individuals (2009) to 139,000 (2018). Furthermore, the share of women's employment was 5 percent more in 2018 (32 percent) than in 2009 (27 percent). Of the turnover-based top 500 ICT companies in 2015, just over 70 percent operated in İstanbul and the rest were in other major cities such as Ankara, İzmir and Kocaeli. This indicates that the concentration of ICT companies is high in İstanbul compared to the rest of Turkey. Turkish Ministry of Economy statistics disclose that 1679 companies in the ICT sector were with foreign capital as of June 2017. Germany (287) accounted for the highest number of foreign-owned companies in the Turkish ICT sector, followed by Holland (134), USA (120), Iran (113), UK (104), Syria (98) and Azerbaijan (54). As of August 2017, there were 56468 companies with foreign capital operating in Turkey. In other words, approximately 3 percent of the foreign-owned companies in Turkey invested in the ICT sector, according to the Ministry of the Economy.

TÜBİDER (2013) conducted a study with a sample size of 6995 people (6572 workers, 423 employers) formed over a two-year period, approximately 33 percent of the respondents were female and 64 percent of them male. The age distribution in the sector was roughly 48 percent in the 18-24 group and 28 percent for the 25-34 group. With respect to educational levels, 51 percent of the total respondents had secondary-high school diplomas and 49 percent with bachelor and master's degrees.[70]

The results of a survey of 483 respondents published by the Chamber of Computer Engineers of Turkey, BMO (2009) showed that 16 percent of the participants were female and 84 percent male. Sixty-nine percent of all respondents were in the 25-34 age group. According to the National Employment Strategy of Turkey, (UIS, 2014), the number of university graduates in the ICT field increased by 60.9 percent during 2006-2012. However, Council of Higher Education data reveals that the number of ICT graduates from vocational training schools dropped from 15,485 (2013/2014) to 12,529 (2015/2016) and the number of university graduates (bachelor, master's and PhD combined) fell from 1195 (2013/2014) to 982 (2015/2016).[71]

4.4.2 Sample Characteristics

The quantitative survey data collected in our study (Table 3.4, Chapter III) reveals that the communication technologies contributed more (66.1 percent) in 2018 to the size of the ICT sector than information technologies (33.9 percent). However, the majority of the ICT professionals (76 percent) in the sector were employed in the information technology industry during the same year. Considering these employment patterns in the sector, we can now compare this figure with our study to see how representative our sample is. In our sampling data, nearly two-thirds of the respondents worked in information technology and just over one-tenth identified themselves as professionals in the communication technology industry; less than a quarter stated that they worked in a mixture of the two. Our sample is representative of the ICT sector with regards to the breakdown of the sector, i.e., more information technology professionals in the sample, but it may not fully represent the proportional distribution of the sector, as the communication technology professionals may be under-represented in the sample (10 percent vs 24 percent for the sample and this study, respectively). In terms of the gender distribution of the sample, 76.9 percent of the respondents were male and 23.1 percent were female, which is similar to the HLFS results for 2019 (Table 3.6, Chapter III). According to TÜRKSTAT, women's share in the ICT sector was 29 percent (2015). TÜBİSAD reports also indicate that female ICT employment was 32 percent in 2018. As a result, female representation in the sample may be small compared to the proportional distribution of women professionals

[70] The report does not include professionals with PhDs.
[71] Author's own calculations using Council of Higher Education statistics.

in the population. Similarly, concerning the age distribution in the sample, 59.6 percent of the participants were in the 25-34 age group in this study (again, similar to the HLFS data), while 25.4 percent were in the 35-44 age group. Comparing these results with the survey results of the Turkish Chamber of ICT Sector carried out in 2013 mentioned above, the 18-24 age group may be under-represented in the sample. With reference to educational level, roughly 88 percent of the participants in the sample had a bachelor's degree or higher. This implies that ICT workers with lower educational qualifications might not be well represented in the survey. Furthermore, the vast majority of respondents (96.8 percent) were private sector workers, while only 3.2 percent were public sector employees. Roughly 35 percent of the respondents stated that they work for a foreign company (11.1 percent) or a domestic/foreign partnership company (23.5 percent). In addition, it is possible that the sample captured a limited portion of the ICT workforce who were not members of LinkedIn due to the snowball sampling technique applied in this study, as LinkedIn membership was not a pre-condition of filling in the questionnaire. It is acknowledged that the study might not capture those who were not members of LinkedIn.

Furthermore, the locations of the respondents' workplaces in the sample significantly corresponds with the locational distribution of the 'turnover-based top 500 ICT companies in Turkey of 2015' list. It is, nonetheless, acknowledged that contacting potential respondents through this list may have excluded employees of those ICT companies with lower turnover that are not ranked in this list. In a similar fashion, senior level professionals with higher incomes who may or may not work in large companies might be over-represented, while low-income ICT employees, individuals with lower educational attainment or professionals in the over-50 age group may be under-represented in this study (LinkedIn, 2017). Consequently, the data collected may be subject to a sampling bias due to the failure to draw a proper random sample and, therefore, following a non-probabilistic sampling method (Woodruff et al., 2009; Sharma, 2017).

We now look at the primary qualitative data collected in this study. The sample covered the perspectives of both employers and employees. There were 17 male and 16 female professionals in this study, indicating a fair gender distribution, exploring the issues that came up in the questionnaire as well as new areas that had not emerged from the questionnaire. Furthermore, the number of technical and non-technical professionals in the sample was also proportional. The research participants held a variety of positions in non-technical areas (C-level professionals, directors, HR professionals and managers such as sales, product, accounting, general and regional) and in technical areas (software developers, specialists, engineers, consultants and analysts). The sector experience of the respondents was also diversified, allowing exploration of past and present trends in the sector. As a result, the primary qualitative data collected in this research can be considered a fair representative of the ICT sector.

4.5 Challenges and Limitations

The decomposition results – small gender wage gap for technical positions (10.4 percent) and larger gender wage gap for non-technical positions (40.5 percent) – should be interpreted with caution for several reasons. *Firstly*, the wages of the research participants are self-reported. Self-reported information may create a response bias that leads to inconclusive or false insights. The respondents may decrease/increase their actual salaries or randomly pick a wage bracket in order to avoid exposing themselves, despite being aware that the survey is anonymous and voluntary, or simply to save time on it. However, it should be noted that unless the data was derived from government departments or organisational records, even if the questionnaire was designed as a paper-based survey, it would still be self-reported information and would eventually lead to response bias. Web-based online surveys can be considered an appropriate option for data collection. *Secondly*, although the survey method is one of the key tools for collecting information about 'sensitive' topics (e.g., wages in Turkey), it may result in low response rate. To avoid this, wage-related questions in this study were asked in a categorical form – such as '*which wage bracket are you in?*' – rather than asking participants to state their precise wages. This way of collecting wage data helps with tackling low response rates but creates a complication of missing information, since each participant's precise wages are not provided. Such information is necessary for calculating a more precise gender wage gap. To deal with this issue, the categorical wage data was transformed into continuous data by taking the arithmetic mean of the wages. This may not be the most precise way of examining the wage differentials between groups, as it may cause measurement error, i.e., the difference between the measured and the true value of a variable. *Thirdly*, if the first question in the questionnaire – *'Do you work in the ICT sector?'* – was answered with 'no', the survey ended. However, the questionnaire could still have been completed by ICT specialists who work in the other sectors (e.g., banking and defence), although this number might be small. For that reason, semi-structured interviews with ICT sector employees were conducted to verify the information provided through the surveys. *Fourthly*, targeting the Turkish ICT workforce who were LinkedIn members as the frame population in this study, created an exclusion of other professionals who were not members of LinkedIn. Exclusion of some members of the Turkish ICT sector workforce would lead to a sampling bias. *Fifthly*, the unexplained part of the decomposition analysis is commonly referred as ‘labour market discrimination’ in the literature. However, there were some unobserved or missing independent variables that might not be collected during the data collection process for several reasons or that were specific to an individual firm, which can increase the unexplained part of the wage gap and eventually the share of discrimination in the decomposition analysis. For instance, as stated by Blau and Kahn (2017), if male workers have high levels of unmeasured productivity or if female workers are better endowed with unmeasured observables, the discrimination would be over- or under-estimated. As another example, if the sales figures of both sexes have not been observed, the discrimination estimation for sales and marketing professionals may be overestimated. Thus, all the factors mentioned above may lead to an over- or under-estimation of the gender wage gap in Turkey’s ICT sector and figures should be considered as suggestive rather than conclusive. *Finally*, Blau and Kahn (2017) argue about psychological factors, as discussed in detail in Chapter II, and how these ‘psychological attitudes may themselves be influenced by context such as anticipated treatment of women in the labor market may affect their aspirations’ (p.2) and ‘discriminatory attitudes and stereotyping may be unconscious’ (p.31). The authors refer to several studies that provide an alternative explanation for gender wage differentials by examining gender differences in personality traits or non-cognitive skills. In these studies, men are found to be risk-takers and more competitive, less agreeable and with high self-esteem, place a higher value on money and have more control over their own fate compared to women, implying that they are willing to accept more difficult working conditions in return for higher pay. However, Blau and Kahn (2017) suggest that women may be rewarded less than men or even penalised for the same psychological traits; e.g., being ambitiousness may be perceived as a positive trait for men, but negative for women. The authors conclude that ‘the gender differences in psychological factors account for a small to moderate portion of the gender pay gap’ (p.37). As a result, our model does not capture whether psychological factors have an impact on the unexplained part of the gender wage gap, particularly for non-technical positions which require different skill sets: i.e., emotional intelligence, negotiation and communication skills, being a team member and time management. Due to the limitations stated above, qualitative data collection was also carried out to support quantitative data results. The author acknowledges the drawbacks associated with this study. However, these results give a crude idea of the extent of the wage gap in the Turkish ICT sector, which has not been studied until now, and provide a starting point for exploring its causes and implications.

The next chapter will now report the descriptive findings of this study and then move onto exploring various attitudes and trends in occupation, gender wage differential, overtime, job turnover and working in or quitting the sector.

Table 4.3: Characteristics of Interviewees (n=33)

Code	Gender (16F, 17M)	Position	Experience in current workplace	Experience in the ICT sector	Ownership type of the firm	Form of employment
F1	Female	Owner	12 years	22 years	Domestic	Full-time
F2	Female	Owner/HR Professional	2 years	11 years	Domestic	Full-time
F3	Female	Software Developer	7 months	1.5 years	Domestic	Full-time
F4	Female	Product Manager	6 months	14 years	Foreign	Full-time
F5	Female	Junior Analyst	1.5 years	1.5 years	Domestic	Full-time
F6	Female	Account Manager	5 years	12 years	Domestic-Foreign	Full-time
F7	Female	Sales Manager	5 years	17 years	Domestic-Foreign	Full-time
F8	Female	Owner	18 years	20 years	Domestic	Full-time
F9	Female	Senior Technology Consultant	7 years	20 years	Foreign	Full-time
F10	Female	Product Manager	3.5 years	7 years	Domestic	Full-time
F11	Female	Regional Sales Manager	6 years	10 years	Foreign	Full-time
F12	Female	Consultant	2 years	4 years	Domestic-Foreign	Full-time
F13	Female	Owner	2 years	2 years	Domestic	Full-time
F14	Female	CEO	4 years	35 years	Domestic	Full-time
F15	Female	Project Manager	2 years	15 years	Domestic	Full-time
F16	Female	Manager	1.5 years	1.5 years	Domestic-Foreign	Full-time
M1	Male	Senior Software Developer	1 year	9 years	Domestic	Full-time
M2	Male	Software Developer	7 months	2 years	Domestic	Full-time
M3	Male	Owner	5 years	11 years	Domestic	Full-time
M4	Male	ERP Sales Manager	13 years	13 years	Domestic	Full-time
M5	Male	Director	2.2 years	18 years	Domestic-Foreign	Full-time
M6	Male	Director	8 years	18 years	Domestic	Full-time
M7	Male	Senior Analyst	2 years	4 years	Foreign	Full-time
M8	Male	Computer Engineer	2 months	2 years	Domestic	Full-time
M9	Male	Senior Software Developer	3 years	10 years	Domestic	Full-time
M10	Male	HR Professional	2 years	7 years	Domestic	Full-time
M11	Male	IOS Developer	4 months	5 years	Domestic	Full-time
M12	Male	SAP Consultant	3 months	5 years	Domestic	Full-time
M13	Male	IT Support Specialist	7 months	10 years	Domestic	Full-time
M14	Male	Senior Software Engineer	5 ay	3 years	Foreign	Full-time
M15	Male	Owner	3 years	3 years	Domestic	Full-time
M16	Male	Engineer	8 years	8 years	Domestic	Full-time
M17	Male	ICT Researcher	17 years	0 years	Domestic	Full-time

CHAPTER V

DESCRIPTIVE RESULTS

In this chapter, the overall descriptive survey results are presented in line with the objectives of this study – to explore the gender wage gap in the Turkish ICT sector. The chapter firstly reports an overall description of the sample such as the number of questionnaires completed, male/female ratio, demographic profiles of the respondents (age, marital status, children and education level) and workplace characteristics (location, sector, sub-sector and employment status). The section then moves onto more specific areas that matter most to the objectives of this thesis such as wage differentials between male and female ICT professionals, positions they hold, overtime trends and motivations for working in the sector. Therefore, this chapter provides a more descriptive than empirical analysis; however, it functions as a framework for the next chapter that will investigate the gender wage gap in the sector in an empirical manner.

5.1 Overall Descriptive of the Survey Data

A total of 1917 completed questionnaires were analysed resulting in a roughly 63 percent (1917/3052) response rate: 23.1 percent (443) of which were women and 76.9 percent (1474) men: a female-to-male ratio of 1:3.3 in the sample. Nearly 60 percent of the subjects were in the 25-34 age group, followed by 25.4 percent (35-44), 9.2 percent (18-24), 4.4 percent (45-54) and the other age groups (less than 1 percent each). There were twice as many women than men in the 18-24 age group. Married professionals accounted for just over half of the total sample while 44 percent were single. Men were mostly married, and women mostly single. Nearly 60 percent of the female and just over half of the male respondents in the 25-34 age group were single.

The great majority of the respondents (88 percent) had a bachelor’s degree or higher.[72] There were more women with Bachelor’s degrees than male respondents but more men with master’s degrees than female respondents had. Percentages of respondents with PhDs were similar for both sexes (approximately 2 percent), and 10 percent more men than women held computer science-related degrees. The majority of technical professionals (software

[72] Bachelor’s degree (60.9 percent), master’s degree (25.4 percent), PhDs (1.8 percent). Less than one-tenth had associate degrees and less than 5 percent qualifications at high school level or below.

developers, architects, engineers and administrators) held computer-related degrees as opposed to those in non-technical areas (HR, sales and marketing or management roles). Nearly two-thirds of the women (64 percent) and almost 70 percent of the male respondents in technical positions held computer science degrees. Similarly, just over 40 percent of the male respondents and roughly 30 percent of the female in non-technical positions held computer-related degrees. In the non-technical positions, male ICT professionals who held computer-related degrees were mainly those in managerial positions: e.g., managers (72 percent), team leaders (10 percent), and directors (5 percent). For female ICT professionals in non-technical areas, sales and marketing professionals also held technical degrees (17 percent) along with managers (58 percent). Furthermore, 56 percent (25 people) of the owners had no computer-related degrees, but all had bachelor's degrees or higher.

The vast majority of the sample (96.8 percent) were made up of private sector professionals. No significant gender differences were observed regarding public and private sector employment.[73] A considerable number of professionals worked in major cities such as İstanbul (67.7 percent), Ankara (17.9 percent) and İzmir (4 percent) and for domestic companies. Almost a quarter worked for domestic/foreign partnership companies and just above one-tenth for foreign companies.[74] The numbers of male and female respondents who worked in domestic companies (around 65 percent) were very much alike, although more men worked for foreign companies and more women worked for domestic/foreign partnerships. Given the fact that the ICT sector can be divided into three sub-sections, information technology professionals occupied almost two-thirds of the sample, while just over one-tenth were communication technology workers, and less than a quarter worked in a mixture of the two. There were no gender differences in the ICT sub-sections. A majority of male and female respondents worked in the ICT services industry (software, wired and wireless telecommunication, consultancy, web portals, data processing and repair activities, and so on) while only 6.8 percent worked in hardware (computers, electronic components, communication equipment, consumer electronics, magnetic and optical media hardware, etc.), 5.5 percent in trade (retail and wholesale activities) and about one-fifth in a mixture of the three above. There were only few female and male respondents who worked for a hardware company.

[73] There were only 61 respondents (3.2 percent) in the whole sample, who worked in the public sector.
[74] 0.7% chose 'I don't know' as an answer.

(i) Positions at Work

The participants were asked about their positions at work with 57.1 percent of the subjects stating that they worked in technical positions that included software developers[75] (14.6 percent), specialists[76] (14.4 percent), consultants[77] (12.5 percent), engineers[78] (9.6 percent), analysts[79] (3.0 percent), administrators[80] (2.1 percent) and architects[81] (1.0 percent) while *less than half* (42.9 percent) worked in non-technical positions as managers[82] (28.7 percent), team leaders (3.6 percent), sales and marketing professionals (3.2 percent), executives and directors[83] (2.9 percent), owners (1.3 percent), HR professionals (1.0 percent), interns/assistants (0.9 percent), training professionals (0.7 percent) and co-ordinators (0.6 percent).[84] A great majority of the technical (77.1 percent) and non-technical positions (75.9 percent) were filled by men. This is more or less in line with the share of males and females in our sample. Once we zoom in only to male and female samples, there were no significant gender differences; i.e., nearly 57 percent of men and women occupied technical positions in their own samples. However, in terms of technical positions, there were more female consultants and more male software developers, engineers and specialists. Concerning non-technical positions, the highest number of male and female respondents worked as managers. In comparison to male owners, executives, directors and team leaders, there were many more female sales, marketing and HR professionals, interns and assistants.

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[75] **Software Developers**: Front-End, DWH (Data Warehouse), IOS, ETL (Extract, Transform, Load), Web App, Mobile App, ABAP, Android, Business Intelligence, Full Stack, Hybris, Java, Middleware, Oracle and SharePoint Developers.

[76] **Specialists:** Network systems and information, SEO & SEM, IT, ICT, ERP, VOIP, Software test, GIS (Geographic Information Systems), Infrastructure, Data processing, Information risk, CBS, Business App, Cloud Solutions, Cyber Security, Information Security, IT security, IT System Support, Database, Security Events Management, System and Hardware, SAP Basis, Voice Services, Planning Business Management Software Specialists.

[77] **Consultants:** SAP, R&D, Azure Technologies, Business Intelligence, Cloud technologies, Technical, Customer Solution, Functional software, IT, Network Security, Network Solution, Successfactor, Information Security, CRM, ERP (Enterprise Resource Planning), Business Development, Business Analytics, IT Project, Operations Research Consultants.

[78] **Engineers:** Computer, R&D, Project, System, Test, Software, Network and Security, Electrical and Electronic, Industrial, Fix Network Transmission, Security, Business Development, IT Infrastructure, IT Test, Network Operation Centre, Field, System, Technical Support Engineers.

[79] **Analysts:** Business Intelligence, Security, Help Desk, Quality, Process and Data Analysts.

[80] **Administrators:** Backup, IT System, Linux System, Network Monitoring Operator and Network Admins.

[81] **Architects/Designers:** Enterprise, Network, Software, Solution Architects and UI/UX Designers.

[82] **Managers:** GM (General Manager), Account, Finance, Auditing, Consultancy, Communication, Private Client, Information Systems, ERP Project, Sales and Marketing, Business Unit, Business Development & Process, Cloud And Data Centre Infrastructure, Integrated solutions, Enterprise Security Delivery, Software Development and Automation System, Network Solution, Client, Partner Development, R&D and HR Managers.

[83] **Executives/Directors:** CSO (Chief Strategy Officer), CEO (Chief Executive Officer), CIO (Chief Information Officer), CTO (Chief Technology Officer), COO (Chief Operating Officer) and Internal Communications, IT, Finance, Business Development and Regional Directors.

[84] Twenty-two invalid answers related to the positions were excluded.

In order to understand the differences in the types of jobs men and women perform during their first three years in the ICT sector, technical and non-technical positions were analysed for both gender, controlling for up to three years of ICT sector experience and full-time employment status. After controlling, it was revealed that except for managers and intern/assistant positions, men were recruited in greater numbers for technical positions and women in for non-technical positions. The percentages of male and female directors and team leaders with up to three years sector experience who work full-time were alike. Men with up to three years of experience in the ICT sector held more managerial positions than women did. The data was then further controlled only for those who stated that the current company was their first employer, were studying immediately before their current role and held computer-related degrees. The results then changed dramatically in favour of men. Male computer degree graduates were employed in greater numbers than females for both technical[85] and non-technical[86] positions at both job tenure levels,[87] with the exception of managers. Male professionals without computer-related degrees worked as software developers and engineers while their female counterparts worked as administrators, HR professionals, managers and sales and marketing professionals.

The most popular principal statistic, the Index of Dissimilarity (DI), is applied to measure whether occupational segregation by gender occurs in the Turkish ICT sector. Duncan and Duncan (1955) measure this index as

$$DI = \frac{1}{2}\sum_{i=1}^{n}\left|\frac{Mi}{M} - \frac{Fi}{F}\right|$$

Where:

n = number of tracts or spatial units
Mi = number of males in tract i
M = total number of males in the sample
Fi = number of females in tract i
F = total number of females in the sample

0 < DI < 1, where 0 means no segregation and 1 means complete segregation.

[85] There were no architects after controlling.
[86] There were only managers, sales and marketing professionals and interns/assistants.
[87] There was only one job tenure (1-3 years) for all non-technical positions and also administrators.

TABLE 5.1: Index of Dissimilarity by Gender

Index of Dissimilarity					
Tract	**M_i**	**F_i**	**M_i/M**	**F_i/F**	**Absolute % (M_i/M- F_i/F)**
Technical	**DI_{IT} = 0.5 (38.1) = 19.1%**				
Administrator	34	6	2.4%	1.4%	1.0%
Analyst	33	23	2.3%	5.3%	3.0%
Architect	17	2	1.2%	0.5%	0.7%
Consultant	156	80	10.9%	18.3%	7.4%
Engineer	149	33	10.4%	7.6%	2.8%
Software Developer	225	51	15.7%	11.7%	4.0%
Specialist	221	52	15.4%	11.9%	3.5%
Non-Technical Positions	**DI_{nonIT} = 0.5 (50.6) = 25.3%**				
Coordinator	10	1	0.7%	0.2%	0.5%
Director	29	5	2.0%	1.1%	0.9%
Executive	18	2	1.3%	0.5%	0.8%
HR Professional	2	17	0.1%	3.9%	3.8%
Intern/Assistant	8	9	0.6%	2.1%	1.5%
Manager	433	111	30.2%	25.4%	4.8%
Sales and Marketing Professional	27	33	1.9%	7.6%	5.7%
Team Leader	61	8	4.3%	1.8%	2.4%
Training Professional	10	4	0.7%	0.9%	0.2%
TOTAL	**1433**	**437**	**100.0%**	**100.0%**	**43.0%**
	DI_{TOTAL} = 0.5 (43) = 21.5%				

According to Table 5.1, the Index of Dissimilarity between male and female is 21.5 percent: i.e., half of the sum of absolute percentage differences of all spatial units. The figure can be interpreted as a measure of displacement. The dissimilarity index of 21.5 percent implies that one-fifth of male and female professionals would have to move to a different occupation in order to achieve uniform distribution. The extent of occupational gender segregation is even higher for non-technical positions (25.3 percent)[91] than for technical positions (19.1 percent). To put it simply, a quarter of male and female ICT professionals who hold non-technical positions in the sector would have to trade places so as to achieve desegregation.

(ii) Gender Wage Differentials

The participants were asked to state their wages within wage ranges, and table 5.2 reveals the crude gender wage gap in the sector. For the majority of the jobs, both the percentage of male ICT professionals in the upper pay scale and the percentage of female ICT professionals

[91] D for technical and non-technical positions are calculated using each category's total.

in the lower pay scale are higher.[92] Almost two-thirds of the respondents earned ৳5,000 and above monthly gross salaries (৳) excluding overtime. Thirteen percent fewer women earned ৳5,000 and above than their male counterparts. When we look at the highest income bracket (৳15,000+), we see three times as many men as women. By contrast, two percent more women than men earned below ৳1,777.50. Considering that the sample includes more male executives and female assistants/interns, this result is expected. Overall, there were more women in the lower scale of salary ranges (up to ৳4,999) and more men in the higher (৳5,000-15,000+).

TABLE 5.2: Salaries by Gender

Variable	(n=1474)	(n=443)	(n=1917)
Salaries (৳), excluding overtime	**Male**	**Female**	**Total**
Less than 1,777.50	3.0%	5.0%	3.5%
1,777.50 – 1,999	1.5%	2.5%	1.7%
2,000 – 2,999	8.2%	12.6%	9.2%
3,000 - 3,999	11.1%	13.3%	11.6%
4,000 - 4,999	10.0%	13.3%	10.7%
5,000 - 9,999	38.1%	35.7%	37.5%
10,000 - 14,999	17.5%	13.8%	16.6%
15,000 +	10.6%	3.8%	9.0%
Total	**100%**	**100%**	**100%**

Note: The total may not add up to 100 due to rounding.

Let us take a look at the ICT consultants and observe how a crude gender wage gap appears for this particular occupation. On one hand, the percentage of female consultants who earn below ৳5,000 and the percentage of male consultants who earn above ৳5,000 are both higher. The percentage of male consultants earning ৳10,000 and above (19.9 percent) is twice than that of female consultants. These crude wage differentials can be observed in other positions such as engineers, software developers, executives, directors and managers, to name a few.

In order to measure whether the crude gender wage gap can be explained by human capital factors, respondents' positions are first categorised as technical and non-technical. For the technical positions, responses are controlled for educational level (bachelor's degree and above), holding a computer-related degree, occupation, number of years with the current

[92] Occupations and positions are used interchangeably.

employer (3+ years), full-time employment status and city (İstanbul, Ankara and İzmir only, which together account for 89.6 percent of the total sample). The result implies that part of this wage difference can be explained by the differences in human capital characteristics between men and women. For instance, the percentage of women earning at the lower pay scale (below ₺5,000) decreases after controlling. However, despite the controlling for human capital and workplace characteristics, the gender wage gap still favours men in all the technical positions in the table, except analyst. This indicates that human capital endowments can only explain part of the gender wage gap and the rest is considered as 'unexplained factors'. Comparing two ICT professionals with the same level of education, job tenure, both holding a computer-related degree, and working full-time in one of the three major cities, a male professional, on average, earns more than the female. For instance, male consultants earn more than their female counterparts in both job tenure levels. Moreover, 93.8 percent of male respondents with 3-5 years of job tenure claimed that they earn ₺5,000 and above, while only 71.4 percent of women claimed earning at the same pay scale. Similarly, a higher proportion of men is observed in the upper pay scale relative to women. A fair proportion of men claimed to receive top salaries, while no women were observed at the ₺15,000-plus pay scale for all occupations and job tenure levels.

For the non-technical positions, responses are controlled for the same variables as in technical positions, except for holding computer-related degrees. The results revealed that a gender wage gap emerges in favour of men for some non-technical positions in certain job tenures. For instance, all the female directors claimed that they earn between ₺10,000 and ₺14,999, while only 12.5 percent of male directors reported earning within this range and the rest (87.5 percent) reported earning ₺15,000 and above. Similarly, the percentage of male managers on the upper pay scale was higher than that of their female counterparts. Unlike the IT-related positions, only female managers and executives claimed to have earned ₺15,000 or more, while male respondents claimed to have received the same amount as directors, sales and marketing professionals and team leaders as well. On the other hand, half the female executives earned more than their male counterparts. Likewise, male sale and marketing professionals with 3 to 5 years of job tenure earned relatively less than their female counterparts. This again implies that human capital characteristics can only explain a portion of the gender wage gap and the rest is due to labour market discrimination or unobservable variables.

(iii) Overtime Trends

With regards to employment status, despite the fact that respondents were given the option of selecting more than one answer to the question[93], full-time employment was the most common (91 percent) for both gender. Contract-based, project-based, self-employment, part-time, seasonal employment, internship and retirement were listed as the other types of employment. Just over one-third of the respondents who did not work full-time were students. About a quarter of the participants who did not work full-time stated that 'other forms of employment were a common practice in the ICT sector' owing to its nature, while one-fifth preferred this sort of employment out of personal choice. Interestingly, there were some gender differences in the reasons for not working full-time. For example, although 'being a student' was the main reason overall for not working full-time for both genders (58.3 percent of women, 32.1 percent of men), male participants stated that 'part-time/project-based/contract-based work patterns were common practices in the ICT sector' as the reason, while female participants reported that they were not the main breadwinner in the family. Those who claimed that they were not the family's primary breadwinner had children under the age of 18.

An overwhelming majority reported that they worked 40-49 hours per week, excluding overtime, while 10 percent worked 50-59 hours. When the respondents were asked how frequently they work overtime[94], and nearly a quarter reported working overtime as 'often' or 'always'. Only one-tenth 'never' worked overtime. The percentage of women who never worked overtime was 4 percent higher than that of men. Those who said they 'often or always' work overtime was similar for men (25.3 percent) and women (22.6 percent). The majority of those who claimed that they 'often or always' work overtime were married men and single women.[95] Of those men and women who worked overtime regardless of frequency, two-thirds stated that they worked 1-5 hours and just over one-fifth reported 6-10 hours during the week, while almost 60 percent stated they never worked overtime over the weekends. Women worked overtime during the weekdays more than men for between 1-10 hours; however, men worked overtime during the weekends more than women for the same hours.

[93] 1917 respondents, 2041 choices made. Percentages are as of 2041 entries.
[94] Owners (25) excluded.
[95] Owners excluded.

The overtime trends among technical and non-technical professionals[96] did not vary significantly. Approximately 23 percent of technical and 26 percent of non-technical professionals worked overtime 'often or always'. For both technical and non-technical professionals, the percentage of respondents who said they 'rarely or never' work overtime was comparable (approximately 40 percent), but the percentage of men (approximately 75 percent) that worked overtime 'often or always' outnumbered that of women (approximately 25 percent). Therefore, there are no significant differences in the overtime patterns between technical and non-technical professions. Men work overtime more than women regardless of the technicality of the positions.

When asked how often they[97] are paid for overtime, just over three-quarters reported that they never get paid, while only 14.6 percent stated that they always get paid. The percentage of women who stated that they never get paid for overtime was 10 percent more than men who said the same. In contrast, the percentage of men who said that they always get paid was nearly twice that of the women. No significant differences were observed in other categories. When all the respondents were asked how they get paid for overtime, almost two-thirds stated that they get paid at a regular rate of pay[98] and the rest reported that they get paid more than the regular rate of pay. Furthermore, 10 percent more men reported getting paid above the regular rate of pay than women did. The majority of those[99] who commented on how much more they get paid, reported 50 percent more than the normal hourly work rate for each hour of overtime. Other comments also included 1.5 times more for weekday overtime and twice the rate for weekends/public holidays; the normal hourly work rate for weekdays, but double for the weekends/public holidays; and 40 percent more than the normal hourly work rate or time off in lieu of overtime.

In order to model our overtime data, we use a logit regression model – a specialised technique used for binary (dichotomous) data from answers to survey questions with only two possible values, such as being present or absent, a smoker or not, married or not and so on. To identify which factors determine the likelihood that an ICT sector employee will work overtime, the logit model is estimated with 1820 observations on Stata 15.0 and Eviews 10

[96] Whole sample: excluding 25 firm owners
[97] Whole sample: excluding 25 firm owners (1701 in total) and those who never stayed overtime (191)
[98] The rate for each hour of overtime work should be paid by increasing the normal hourly work rate by 50 percent, according to Labour Act No: 4857 of Turkey.
[99] Of 150 respondents who said they get paid more for overtime, 69 of those respondents commented on how much more.

statistical software to explain and predict the probability of staying overtime as a function of demographic characteristics[100] (age, gender, marital status, having children, education level and holding a computer degree).

The form of logistic regression equation can be written as:

$$\text{logit}(p(x)) = log\left(\frac{p(x)}{1-p(x)}\right) = a + b_1x_1 + b_2x_2 + \ldots$$

P: Probability (0<p<1)

P/1-P: Odd ratio (0 to ∞)

Logit (log of odd ratio): Values from -∞ to +∞ and symmetrical around the logit of 0.5 that is zero (Thompson, 2008). Variables in our study for the first logit table:

Y_i = Overtime: If stay overtime = 1 (= 0 otherwise)
X_1 = Age: Number of years
X_2 = Gender: If male = 1, female = 0
X_3 = Marital: If married = 1, single = 0
X_4 = Children: If yes = 1, no = 0
X_5 = Education: If having a bachelor degree and above = 1 (= 0 otherwise)
X_6 = Tenure (Experience with the current employer), in years
X_7 = Position: If technical position = 1 (= 0 otherwise, non-technical)
X_8 = Salary (in thousands)

[100] Answers to the question 'How often do you work overtime?' were converted into binary data as follows: if the answer is never= 0 (=1 otherwise).
Marital status: Divorced and widowed were excluded.
Education: Below bachelor degree = 0 (=1 otherwise).
Positions: Data was categorised as technical and non-technical positions. Owners and invalid values were also excluded.
Averages were used for age, salary and experience variables.

TABLE 5.3: Logit Model of Staying Overtime

Logistic regression	Number of obs	=	1,820
	LR chi2(10)	=	86.65
	Prob > chi2	=	0.0000
Log likelihood = -550.52084	Pseudo R2	=	0.0730

Overtime	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Age	.0084224	.0154701	0.54	0.586	-.0218984	.0387432
Gender	-.2960665	.2401998	-1.23	0.218	-.7668495	.1747166
Marital	-.5193357	.2342214	-2.22	0.027	-.9784012	-.0602701
Children	.3275112	.2370232	1.38	0.167	-.1370458	.7920681
Education	.2383726	.2247974	1.06	0.289	-.2022222	.6789674
Computer	.2709058	.1721384	1.57	0.116	-.0664792	.6082908
Position	.5686581	.1777311	3.20	0.001	.2203115	.9170046
Salary	.0001565	.000027	5.79	0.000	.0001036	.0002095
Tenure	.0540279	.0273402	1.98	0.048	.0004421	.1076137
Gender_Children	.1489043	.3618181	0.41	0.681	-.5602462	.8580547
_cons	.278246	.5102708	0.55	0.586	-.7218664	1.278358

According to the estimated logistic model (log of odds ratio), our model above can be written as

$$\ln\left(\frac{p(x)}{1-p(x)}\right) = B_0 + B_1.\text{Age} + B_2.\text{Gender} + B_3.\text{Marital} + B_4.\text{Children} + B_5.\text{Education} + B_6.\text{Tenure} + B_7.\text{Position} + B_8.\text{Salary} + B_9.\text{Gender\_Children}$$

Using a significance level of 5 percent where p-values are less than or equal to 0.5, marital status tenure, positions (technical or non-technical) and salary independent variables are all statistically significant. There is a meaningful relationship between working overtime and these independent variables. As the coefficients for tenure, position and salary variables are positive, the probability of staying overtime increases when the experience with current employer increases (job tenure). It is expected that the longer a worker stays with a company, the better skilled and experienced she or he becomes. Hence, they may be asked to work overtime to carry out more tasks or take charge in case of unexpected events such as system/network shutdowns, power failures and so on. Furthermore, workers who fill in technical positions as opposed to non-technical positions as well as higher paid professionals are more likely to work overtime. However, despite the significance of the marital status variable, the negative sign of the coefficient indicates the single ICT workers are more likely to stay overtime compare to their married counterparts. On the other hand, the independent values of age, gender, marital status, children and education level have no statistically significant impact on working overtime. Furthermore, an interaction term between gender and children is also added into the regression to observe the effect of having children on gender with regards to overtime. However, the result of the regression indicates that the interaction between the two is insignificant. Overall, it can be concluded that ICT professionals' age, gender, educational level or whether they have children are not the determinant factors for overtime. This result for the gender variable is also confirmed through the frequency of overtime table which reveals similar frequency (percentage) for both genders working overtime.

We also calculated marginal effects rather than only looking at the raw coefficients to describe the mean effect of changes in independent variables on the change in probability of logistic regression outcomes (Norton et al., 2019). Our findings (Table 5.4) indicate that there are statistically insignificant gender differences, as well as differences between individuals with or without children.

TABLE 5.4: Marginal Effects for Staying Overtime

```
Conditional marginal effects                    Number of obs     =      1,820
Model VCE    : OIM

Expression   : Pr(Overtime), predict()
dy/dx w.r.t. : Age Gender Marital Children Education Computer Position Salary Tenure Gender_Children
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	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf.	Interval]
Age	.0006277	.0011533	0.54	0.586	-.0016328	.0028883
Gender	-.0220667	.0178993	-1.23	0.218	-.0571487	.0130153
Marital	-.0387076	.0173492	-2.23	0.026	-.0727115	-.0047037
Children	.0244104	.0176292	1.38	0.166	-.0101423	.058963
Education	.0177666	.016779	1.06	0.290	-.0151196	.0506528
Computer	.0201914	.0128018	1.58	0.115	-.0048997	.0452825
Position	.0423837	.0132563	3.20	0.001	.0164019	.0683656
Salary	.0000117	1.83e-06	6.38	0.000	8.08e-06	.0000153
Tenure	.0040269	.0020227	1.99	0.047	.0000624	.0079913
Gender_Children	.0110983	.0269611	0.41	0.681	-.0417445	.063941

Note: dy/dx indicates the discrete change from the base level for factor levels.

TABLE 5.5: Expectation-Prediction (Classification) of the Model

Expectation-Prediction Evaluation for Binary Specification
Equation: UNTITLED
Success cutoff: C = 0.5

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	0	0	0	0	0	0
P(Dep=1)>C	183	1637	1820	183	1637	1820
Total	183	1637	1820	183	1637	1820
Correct	0	1637	1637	0	1637	1637
% Correct	0.00	100.00	89.95	0.00	100.00	89.95
% Incorrect	100.00	0.00	10.05	100.00	0.00	10.05
Total Gain*	0.00	0.00	0.00			
Percent Gain**	0.00	NA	0.00			

In order to analyse the predictive quality of our model above, the expectation-prediction evaluation is applied. In the classification table (Table 5.5), the 'correct' classifications are obtained when the predicted probability is less than or equal to the cut-off (which is 0.5 here) and the observed y=1, or when the predicted probability is greater than the cut-off and the observed y=0. In other words, 0 of the Dep=0 observations[101] and 1637 of the Dep=1 observations are correctly classified by the estimated model. Furthermore, the model predicts 100 percent of the respondents who stay overtime, which is the sensitivity result – the fraction of y=1 – while it dramatically fails to predict those who does not stay overtime, which is the specificity result – the fraction of y=0. Overall, the classification model illustrates that the estimated model above correctly predicts nearly 90 percent of the observations.

When participants[102] were asked why they worked overtime, they expressed three primary reasons: heavy workload, unmanageable project deadlines and staff shortages. Furthermore, respondents stated that they worked overtime, because they love what they do, but they are overwhelmed by routine and administrative activities such as meetings during normal working hours or they are expected to work outside of normal hours. Other reasons were listed, including helping other colleagues who struggle with the English language, unexpected events such as cyber security breaches, system/network shutdowns, power failures, system upgrades, data control and operational issues, short project deadlines, reliance on the work of others, travelling for business, ineffective time, planning and resource management, last-minute client requests, interviewing outside of regular hours, personal development and in

[101] Dep = Dependent variable. Dep=1 is staying overtime for our model.
[102] Multiple answers (1701 respondents, 3384 choices made). Owners and those never stayed overtime excluded.

lieu for studying professionals. There were no significant gender differences in the reasons for working overtime.

Almost two-thirds of the respondents did not have any children, while just over one-third had children under 18 and the rest had children aged 18 and over. There were twice as many male respondents who had children under 18 than female respondents, which is expected as the number of married male and single female respondents were higher in the sample. Just over half of those with children under 18 said their husband or wife looks after their children while they are at work. Almost one-fifth stated receiving support of other family members, friends and relatives, babysitters, kindergartens or leaving their children under 18 alone to look after themselves. However, men's and women's responses about the care for children differed. For example, 60.3 percent of men stated that their wives were looking after their children, while only 11.4 percent of women stated their husbands cared for their children while they were at work. Therefore, the majority of working women got the help of others, while men were supported by their wives. This figure indicates that women's role as mothers and primary caregivers in the family continues to influence family commitments, family structures and women's involvement in the labour force and men's role as breadwinners. Considering the fact that women's LFPR is low in Turkey, women continue to perform the majority of housekeeping duties such as cooking and cleaning alongside child bearing and caring for the elderly. Women are discouraged from entering the labour market by the widespread cultural belief that 'women's position is in the home'. Even if they do enter the labour market, they may be expected to remain at home after childbirth, care for elderly relatives or when demands on household income rise temporarily. Furthermore, women who work full-time and contribute to the family's income are required to perform the majority of household chores after work. This puts a strain on women's work-life balance, leading to an increase in economic inactivity and alienation from the workforce. Men continue to play the primary breadwinner role in the family and the family structures and commitments remain unchanged.

The respondents were also asked about their opinion of home-based working and nearly three-quarters said they had worked from home in their current jobs. Almost two-thirds of the participants were willing to work more from home. Working from home is favoured by 5 percent more women than men. Roughly three-quarters of male respondents and slightly more than two-thirds of female respondents had worked from home, with the two primary reasons listed as too much time spent in traffic during rush hour, leading to excessive stress and high transportation costs, followed by being able to concentrate more and be more productive at home compared to noisy office environments, workplace mobbing[103] and the nature of the job that allow them to work from anywhere with a computer and Internet access. Increased motivation and productivity when working from home a few days a week, spending more time with family, corresponding with international clients in different time zones, living in any city they want to and buying pets were among other reasons for the desire for home-based working. In contrast, those who were against more home-based working stated that they needed to be in the field to do their jobs, such as sales representatives. Others feared not fully utilising their abilities and skills and getting distracted by their children in home settings.

(iv) Motivations for Working in the ICT Sector

When asked why they wanted to work in the ICT sector, the constantly changing and evolving nature of the sector was most frequently cited, followed by high salaries, love for computers and technology, global career opportunities, prestige, state-of-the-art technologies, high job security and employer's reputation. In contrast, the challenges of the ICT sector were stated as the way managers work, staff shortages, wage discrimination and low career opportunities. Other choices included occupational health and safety due to excessive overtime, poor work-life balance, low wages and earnings, and male-dominated corporate culture. They were then asked about the reasons for changing jobs from their previous sector, stating low wages and earnings, low career opportunities, the way managers work and job dissatisfaction due to not learning anything new at work. While we do not have a figure for how many professionals left the ICT sector or which sectors ICT recruited new employees from, these figures suggest that there might be a strong positive female migration to the ICT sector.

All respondents were also asked to provide details of their three most significant reasons for working in the ICT sector, with the most popular response being a 'love for computers and technology', followed by 'constantly changing and evolving nature of ICT sector', 'global career opportunities', high salaries, state-of-the-art technologies, prestige, high job security and difficulty of finding jobs in other sectors. No significant gender differences were observed in the answers to this question, except that men stated love for computers and technology and the

[103] The research participants were not asked whether they had experienced any types of workplace problems, yet they reported the term 'mobbing' as one of the reasons for preferring to work from home. Therefore, they may not be fully aware of the differences between 'mobbing', 'bullying' and 'harassment'. Although, these differences are not addressed in this thesis, see the relevant literature (Zapf, 1999; Nolfe et al., 2007; Duffy and Sperry, 2007; de Pedro et al., 2008; Crawshaw, 2009) for more details.

constantly evolving nature of the sector as their first two reasons, while women chose the reverse. Other responses to this question included graduating from an ICT-related degree, the love and skills that they had for the job, a job offer from an ICT company, addiction to problem solving, recommendations from family and friends, future promise of the sector, and more opportunities to find a job in other sectors as ICT spreads across the economy. Finally, in comparison to other sectors, ICT is seen as more professional and subject to fewer restrictions and controls, allowing for more innovation and development. One of the firm owners (25 of them in the survey) believed that 'ICT is the best sector for employers'.

A female project manager commented:

> *I work as a network project manager and there are very few women who do this in the sector. Hence, as soon as I leave a job, I get another job offer in the same area.*

And another female consultant expressed that

> *Consultancy*[104] *is a great occupation until the moment you have a child. After that, it becomes extremely hard to handle out-of-town projects.*

Not surprisingly, only two respondents[105] indicated that nursery/kindergarten facilities were the reason for working in the sector, since it is still not a common practice in Turkey for companies to provide care facilities for working mothers on their premises, even in sectors which women's presence is relatively high.

When respondents were asked about the three most important challenges of working in their current role in the ICT sector, staff shortages (15.3 percent) was the most frequently picked option. It is worth noting that 'staff shortages' was not one of the first three primary reasons for changing jobs in answer to question 28, but it was picked as the most significant reason. This finding confirms the connection between IT and scarce information technology talent (Khosrowpour, 2001; Agarwal and Ferrat, 2002; Adelsberger et al., 2013; Cole et al., 2014; Hersh, 2014). Staff shortages also explain the ICT professionals' heavy workload and overtime. The most surprising aspect of the answers given to this question was that management style was chosen almost as often as staff shortages as a challenge in the

[104] IT consultant is a technical specialist who provides advice to clients on how to integrate information technologies in achieving their business objectives. Out-of-town projects can require consultants to be away from home a few nights a week.
[105] 640 respondents had children under 18 in the sample. The question was asked to all the respondents (n=1917).

respondents' current role. The respondents also indicated in question 28 that one of the reasons for leaving their previous job or jobs was the management style of their managers. The anecdote from a male sales manager below from the field work summarises this issue:

> *Lack of business and communication ethics amongst senior-level managers, particularly in the private sector; lack of knowledge and enormous ego of these managers (ego versus know-how); market presence of many non-institutional boss companies.*

This result suggests that this viewpoint remains unchanged for the current challenges that ICT professionals face in the workplace. Low wages and earnings and wage discrimination shared third place despite low wages and earnings being the underlying reason for the majority of respondents leaving their former companies in answer to question 28. This does not necessarily imply that there was an improvement in wages, but may suggest that staff shortages and managerial incompetence were the most important reasons for the majority of respondents. Furthermore, low career opportunities were given as the second most important reason for changing jobs in answer to question 28, though fewer respondents indicated it was a hardship in their current job. Some respondents found occupational health and safety concerns due to excessive overtime as the main obstacle, while others stated poor work-life balance and job dissatisfaction as they were not learning anything new at work. Only a very small minority believed that the male-dominated culture, prejudice against women engineers and discrimination against motherhood and pregnancy were the issues they confronted in their current roles. Despite statements such as 'the idea that *women cannot be engineers* still exists in the sector' and 'male-dominated corporate culture' in answer to questions 28 and 32, which aimed to explore respondents' reasons for job changes and challenges faced at work, very few respondents picked these reasons – despite the fact they were obvious and explicit way at the top of the list for question 28 and respondents were allowed to choose as many options as they wanted. Once this question is analysed in terms of gender, management style of their managers and staff shortages are revealed as the primary challenges in the current workplace for women and vice versa for men. Furthermore, male professionals reported low wages and earnings and wage discrimination, while women professionals reported occupational health and safety concerns due to excessive overtime and wage discrimination, as the other two main reasons. However, above statements which aimed to explore bias against women such as male-dominated culture, prejudice against women engineers and discrimination due to motherhood and/or pregnancy scored twice as highly (approximately 10 percent) among women compared with the answers to question 28 (5.4 percent) as reasons for changing jobs.[106] Furthermore, responses to wage discrimination also increased from 5.1 percent in question 28 to 8.4 percent in question 33 on current challenges in the ICT sector.

Overall, a great majority of respondents (79.7 percent of 1917) said ‘yes’ to the question ‘*If you could choose any career now, would you still pick a career in the ICT sector?*’ There were no significant gender differences among answers to this question. This may suggest that, despite its challenges, ICT is attractive to a great number of professionals. Not surprisingly, the highest number of male respondents who said ‘no’ to the question were in the 25-34 and 35-44 age groups. When examined in terms of their marital status, responses varied by gender. Roughly 56 percent of the female respondents were single, while just over 60 percent of male respondents were married.[107] Once the question was narrowed down by sector, a quarter of the total public sector respondents said ‘no’ to the question, and they were all men – as the number of female public sector professionals in the sample was very small. Furthermore, about 62 percent of the total who chose ‘no’ worked for a domestic company, while 26 percent worked for a domestic-foreign partnership and only 11 percent worked for a foreign company. In addition, the highest number of respondents who said they would change their career if they had the chance were managers for both gender, followed by male specialists and female consultants. The data also indicates that the majority of women and a good proportion of men who would prefer to work in other sectors instead of ICT were working for companies that operate in the ICT services industry, such as software, telecommunication, computer programming, consultancy and so on. More than two-thirds of the male respondents who said ‘no’ had more than five years of experience in the ICT sector. It was noticed that the higher the experience in the sector was, the higher the number of men that said that they would like to change their careers. No such linear relationship was observed for women respondents.

5.2 Conclusion

According to the demographic profiles of the ICT professionals, the sector’s working population is young. Male professionals are mostly married and females mostly single. The sector comprises highly educated individuals with the majority holding technical degrees. The number of men holding computer-related degrees is 10 percent higher than the number of

[106] Totalling 252 in number. Those who said they were working in another sector (82) and those who said that the current company was their first workplace (109) were excluded from the comparison.
[107] About 40 percent of those married men who said ‘no’ had children under 18.

women with such degrees. A vast majority of professionals in the sector work for private domestic ICT companies, in major cities and mainly in the ICT services subsector. When the male and female sub-populations for technical positions are observed separately, the share of males and females in their respective sub-samples are almost identical (57 percent). This implies that nearly 60 percent of men and women who are employed in the sector work in technical areas. The results of the Index of Dissimilarity reports that one-fifth of male and female professionals would have to move to a different occupation in order to achieve uniform distribution. Occupational segregation is greater among non-technical than technical positions.

For the majority of professions, men tend to be in the upper pay scale, while women tend to be in the lower pay scale. There are three times more men than women in the highest wage bracket, while 2 percent more women than men are found in the ‘below minimum wage’ bracket. Contrary to expectations, there are no major gaps in overtime numbers between technical and non-technical professions. On average, men work more overtime than women regardless of the technicality of the positions. Ten percent more men get paid for working overtime than women do. Once we had run a logit model for working overtime predictions, it confirms that technical employees and high-paid professionals are more likely to work overtime. Finally, the most popular reasons reported for changing jobs were low pay, fewer opportunities for personal growth and development, and conflicts with managers. ICT sector employees chose to work in the sector for its constantly evolving nature, relatively high wages when compared to other sectors, their passion for computers and technology, and global career opportunities.

CHAPTER VI

GENDER PAY GAP IN TURKEY'S ICT SECTOR

The ICT sector is increasingly recognised among nations as one of the backbones of technological development and innovation. It is perceived as the sector of the future due to the rapid and continuous demands for ICT goods and services, its immense contribution to productivity, economic growth and technological development and innovation and its potential for transforming other sectors and economies. The sector will play a significant role in the maintenance of gender equality in the workplace and beyond. Therefore, it becomes crucial to examine the position of women within the ICT sector.

Among various gender equality indicators, the gender wage gap is one of the more prominent indicators used to demonstrate gender inequalities in the workplace. Gender pay gap analysis of the ICT sector allows us to understand the existence of gender pay inequalities and their extent within the Turkish context. The aim of the chapter is to explore the extent of the the gender wage gap, on average, in the ICT sector and how this compares to other studies done on national or regional levels, as there is no study to compare on a sectoral level. As the Turkish ICT sector is relatively new and rapidly growing, wage data broken down by gender and sector is currently unavailable. As a result, despite the existence of various gender wage gap studies on national and regional levels, the gender wage gap in the ICT sector has not been researched. Therefore, this study makes a major contribution to research on gender wage gap in the ICT sector of Turkey by demonstrating the results of Blinder-Oaxaca decomposition analysis. In this chapter, Blinder-Oaxaca decomposition analysis is applied to quantitative data based on 1917 valid questionnaires collected for this research project. Therefore, this chapter is mostly descriptive and focuses on discussion of the gender wage gap results based on our quantitative data. Subsequent chapters further explore the gender wage gap phenomena in the Turkish ICT to consider their causes and consequences.

6.1 Blinder-Oaxaca Decomposition Analysis

Wage discrimination is a major area of interest within the field of labour economics. The Blinder-Oaxaca decomposition is one of the most frequently applied techniques to examine wage differentials between groups: for example, on the basis of gender or race. Oaxaca (1973, p.694) states that 'discrimination against females can be said to exist whenever the relative wage of males exceeds the relative wage that would have prevailed if males and females were paid according to the same criteria'. According to Jones and Kelley (1984, p.324) 'discrimination is said to exist when the market values the same bundle of productivity-related characteristics differently for one group (say, women) than for another (say, men)'. This method decomposes average wage differences between two demographic groups, such as white-black or male-female, into differences across a whole array of 'objective' observable characteristics that the model can explain (Blinder, 1973; Oaxaca and Ransom, 1999) such as education, professional experience, city, region and business size. The remaining wage gap, if any, can then be attributed to the differences in the structure of the model that cannot be explained or observed by the model (Oaxaca and Ransom, 1999). This unexplained part of the wage gap – often referred to as labour market discrimination - if significant and large enough, might indicate that the groups are rewarded differently for the same observable individual characteristics and that non-observable factors, exogenous to the model, might hold greater explanatory power.

Decomposition techniques all start with Mincer's famous equation. Mincer (1958, 1974) employed the term 'human capital' in his pioneering work and developed the *Mincer earnings function* to examine the distribution of earnings across the population (Polachek, 2007). In this single-equation model, Mincer (1958, 1974) estimated natural logarithms of wages as a function of education (years of schooling) and potential labour market experience (years of experience).

$$\ln W_i = \alpha_0 + \beta_0 Edu_i + \beta_1 Exp_i + \beta_2 Exp_i^2 + \varepsilon_i, \qquad (1)$$

where lnW_i is the natural logarithm of wages or earnings[108] at education level, Edu_i and professional experience Exp_i. Exp_i^2 is the squared experience.[109] β_0, β_1 and β_2 denote the

[108] Logs (ln) are frequently used in econometric models due to its convenience and because it fits purpose, yet Lemieux (2006, p.130) argues there is a strong theoretical rationale behind the usage in human capital earnings regressions. Log-linearity of earnings as a function of years of schooling is in fact a key empirical implication of the human capital model with identical individuals. Hence, the assumption of log-linearity is very accurate for most of the range of the wage distribution.

[109] $Experience^2$ is used to capture the fact that on-the-job training investments decline over time in a standard lifecycle human capital model. A quadratic function (say years in experience) captures very well the main features of the empirical experience earnings profiles (Lemieux, 2006, p.135). Wage increases with the experience up to a point. The more experienced a worker becomes, the more wages s/he earns. However, wage starts to increase at decreasing rate and then eventually falls during retirement. Hence the wage and experience relationship become an inverted U-shape. A Positive effect of experience and a negative effect of experience-squared indicate that when people get older, the effect of experience is lessoned. The outcome table indicates that this relationship exists for our sample.

estimations of the regression parameters (model coefficients). α_0 represents the i^{th} individual's level of earnings with no schooling and no experience. ε_i is the random error.

The Mincer human capital earnings function (Equation 1) has become one of the most widely used earnings equations in the field of labour economics, not only for capturing human capital effects on wages but also the effects of workplace characteristics. Some scholars have decomposed the wages of racial groups (black and white) using both human capital and workplace characteristics of the individuals (Oaxaca, 1973; Blinder, 1973; Cotton, 1988; Oaxaca and Ransom, 1994; Neal and Johnson, 1996) while others investigated male and female wage differentials (Daymont and Andrisani, 1984; Neumark, 1988; Newell and Reilly, 1996; Jarrell and Stanley, 2004; Weichselbaumer and Winter-Ebmer, 2005; de Carvalho, 2017). Findings of these studies reveal that, on average, men receive higher earnings than women and that black employees earn less than white ones. Wage decomposition in these studies is estimated separately for the individuals (i) of the different groups (e.g., male and female) by rewriting equation 1 as

$$\text{In}W_{mi} = \beta_m X_{mi} + \varepsilon_m, \qquad (2)$$

$$\text{In}W_{fi} = \beta_f X_{fi} + \varepsilon_f, \qquad (3)$$

where lnW_i is the natural logarithm of males (InW_{mi}) and females (InW_{fi}) wages; X denotes the control characteristics of a male (X_{mi}) and female (X_{fi}) i individuals; β_m and β_f are the regression coefficients; ε_m and ε_f represent the stochastic error terms.

As a result, the total wage gap between male and female groups can be decomposed into two components: one that can be 'explained' by the differences in the observable productivity characteristics of the groups; and an 'unexplained' component that the regression model cannot capture, i.e., an estimate of labour market discrimination. The residual left after controlling for the differences in endowments is the measurement of discrimination. If the low earning group (e.g., women) has inferior endowments and/or lower rates of return compared to the high earning one (e.g., men), then the residual will be less than the observed gap. The residual will be greater if the low earning group's endowments are indeed superior (Jones and Kelley, 1984). Overall, the difference in mean log of the wages can then be written as

$$\overline{W}_m - \overline{W}_f = (\overline{X}_m - \overline{X}_f)\hat{\beta}_m + (\hat{\beta}_m - \hat{\beta}_f)\overline{X}_f \tag{4}$$

where $\overline{W}$ denotes the mean logarithms of male and female wages. X represents the vector of variables that describe characteristics of male (X_m) and female (X_f) i individuals. $\hat{\beta}_m$ and $\hat{\beta}_f$ are the estimation parameters. Therefore, the left side of the equation indicates the gender wage gap, the first term represents the 'explained' part of the wage gap (endowments) and the remaining part reflects the 'unexplained' portion of the gender wage gap, i.e., coefficients, including differences in the intercept.

Despite its success at exploring the sources of the wage gap, the Blinder-Oaxaca decomposition method suffers from several drawbacks. *Firstly*, the literature attributes the unexplained part of the wage gap to labour market discrimination. In order to correctly measure the residual component of the equation (discrimination), all the wage determinant factors need to be present and properly accounted for (Cotton, 1988). In the case of omitted control variables (unobserved skills) that correlate with the Xs, β coefficients would be affected (Altonji and Black, 1999; Weichselbaumer and Winter-Ebmer, 2005). Therefore, the unexplained part not only captures discrimination, but also the unobserved group differences. Poor data quality, restricted numbers of indicators and sample selectivity would also impair the performance of the model (Polachek, 2008). *Secondly*, the observable control characteristics that are included in the model can be affected by discrimination themselves. In that case, the estimated discrimination would be under-estimated (Weichselbaumer and Winter-Ebmer, 2005). *Thirdly*, using dummy variables in the estimation model may affect the outcome variable, as dummy variables are sensitive to the reference category (Li and Miller, 2012). Therefore, the results should be interpreted with caution. However, despite these recognised weaknesses, the Blinder-Oaxaca decomposition method is regarded as a reasonable first approximation for wage differentials between groups. Furthermore, the decomposition techniques can also be employed in other settings such as health inequalities by poverty status (O'Donnell et al., 2008) and schooling (Krieg and Storer, 2006).

The Blinder-Oaxaca technique proposes two alternative forms of gender wage decomposition on the basis of either of two assumptions:

> *If there were no discrimination, 1) the wage structure currently faced by females would also apply to males; or 2) the wage structure currently faced by males would also apply to females. Assumption one (two) says that females (males) would on average receive in the absence of discrimination the same wages as they presently receive, but that discrimination takes the form of males (females) receiving more (less) than a nondiscriminating labor market would award them. (Oaxaca, 1973, p. 695)*

Cotton (1988) criticises Oaxaca's decomposition method due to its failure to adequately portray the most significant condition: the wage structure that would prevail in the absence of discrimination. According to Cotton (1988), application of the first assumption means that if females would receive, on average, the same wages as men in the absence (as in the presence) of discrimination, females would have no particular economic reason or desire to end discrimination, since their wages would be unaffected. On the other hand, if the second assumption is applied, males would have no objections to ending discrimination, as their wages would not be affected.

Some scholars, on the other hand, have analysed the augmented decomposition technique by introducing a third term called 'interactions' in between the differences in endowments and coefficients in their analysis (Daymont and Andrisani, 1984; Jones and Kelly, 1984; Baraka, 1999; Aldashev et al., 2008; Jann, 2008; Fortin et al., 2011; Li and Miller, 2012). The below equation extends the twofold Blinder-Oaxaca technique to a three-fold decomposition of the earnings difference. Hence the equation can be rewritten as

$$\overline{W}_m - \overline{W}_f = (\overline{X}_m - \overline{X}_f)\hat{\beta}_m + (\hat{\beta}_m - \hat{\beta}_f)\overline{X}_f + (X_m - X_f)(\hat{\beta}_m - \hat{\beta}_f) \tag{5}$$

where the left side of the equation represents the total gender wage gap. According to this equation, the source of the gap can be divided into three components: the first term denoting the *endowments effect*, which is the part of the wage gap due to endowment differences valued at the discriminatory rates of return (e.g., female); the second term is the *coefficients effect*, which is the other portion of the pay gap due to differences in the coefficients per se; and the last term is the *interactions effect*, which involves the simultaneous differences between endowments and coefficients.

The *endowments* part of the wage gap estimates the amount by which the wages of the lower income group (e.g., women's wages) are depressed due to the endowment deficit, compared to those of the higher earning group (e.g., men's wages). For instance, in the case of overtime, how much more would women earn if they worked as many hours as men, *ceteris paribus*. The *coefficients* part of the wage gap measures how much of the gap results from differences in the way in which female endowments are valued in the labour markets and how they would be valued if they were rewarded at the same rate of return as men's. The *interactions* part of the wage gap estimates the amount that the lower paid group (women) would earn if they worked as long as the higher paid group (men) *and* if those additional hours attracted a differential that is currently only paid to the higher paid group. It also captures past discrimination (Daymont and Andrisani, 1984). In the absence of any pay differentials, the interactions effect would disappear. Jones and Kelley (1984) suggest that the choice of the two- or threefold decomposition methods depends on whether there is a clear argument to include the interaction term as an aspect of discrimination. If there is, then the twofold decomposition would be suitable, and, thus, the discrimination estimation would be larger. Otherwise, it is more reasonable to keep the interactions term separate. For the purpose of this thesis, the twofold decomposition technique will be applied, since the model is unable to capture past discrimination. Furthermore, although the use of dummy variables in the model allows us to use a single regression equation to explain the relationship between different groups, the decomposition results are affected by the choice of the omitted base category. To put it another way, the effect of a categorical variable (e.g., gender) is modelled by using 0 (if male) and 1(if female) variables and the base category is omitted to avoid collinearity. The results of the regression will change accordingly if the base category is changed to 0 (if female) and 1(if male) (Jones and Kelly, 1984; Oaxaca and Ransom, 1999; Jann, 2008). Finally, it is worth noting that the equation above is formulated from the perspective of the 'disadvantaged' group: i.e., from the viewpoint of the women. It can also be expressed from the men's perspective (Jann, 2008).

6.1.1 Wage Decomposition with Simple Model

The thesis explores the gender wage gap in Turkey's ICT sector[110] using the Blinder-Oaxaca decomposition technique on Stata 15. The paper identifies the observable

[110] 'ICT is the combination of manufacturing and services industries that capture, transmit and display data and information electronically' (OECD, 2002, p.81). The Turkish ICT sector consists of hardware, software and services industries and their trade.

characteristics of the sector's workforce using the survey data (see Chapter IV on methodology) and seeks to answer the following question: '*how much of the gender wage gap can be explained by these human capital and workplace characteristics and how much of it can be attributed to gender wage discrimination?*'

$$\text{InW}_{M} = \alpha_0 + \beta_0 \text{Edu}_i + \beta_1 \text{Exp}_i + \beta_2 \text{Exp}_i^2 + \varepsilon_{i,} \quad (6)$$

$$\text{InW}_{F} = \alpha_0 + \beta_0 \text{Edu}_i + \beta_1 \text{Exp}_i + \beta_2 \text{Exp}_i^2 + \varepsilon_{i,} \quad (7)$$

TABLE 6.1: The list of variables used in the Expanded Blinder-Oaxaca Decomposition

Variables	Clarifications
Dependent Variable	
lnwage (natural logarithms of monthly salaries, excluding overtime)	Wage variable was in categorical form in the original dataset and it was transformed into continuous data by taking the arithmetic mean of the each wage band. A rounding operation is also performed.
Group Variable	
Gender	Dummy: If female=1, otherwise 0
Independent Variable	
Experience (in years)	Experience data was in categorical form in the original dataset and it was transformed into continuous data by taking the arithmetic mean of the each band. A rounding operation is also performed.
Experience squared	Experience^2
Education (years of schooling)	Education variable was in ordinal data form in the original dataset and it was transformed into years of schooling to decrease the number of dummy variable in the dataset: Illiterate (0 years of schooling), primary (4), secondary (8), high school (12), associate degree (14), bachelor (16), master (18) and PhD (22).
Marital status	Dummy: If married=1, otherwise 0
Location	Dummy: If Istanbul=1, otherwise 0
Employment status	Dummy: If full-time=1, otherwise 0
Positions	Dummy: If technical position=1, otherwise 0
Children	Dummy: If have children=1, otherwise 0
Firm ownership	Dummy: If domestic=1, otherwise 0
Overtime	Overtime variable was in categorical form in the original dataset and it was transformed into continuous form by taking the arithmetic mean of the each band. Number of hours per week was calculated for weekday and weekends separately and their mid-point was then taken.

Note: For the transformation of categorical data to continuous (only for wages, experience and overtime variables), arithmetic mean for lower, geometric mean for medium and harmonic mean for higher bounds were applied to see if it makes any difference, yet the gender wage gap still remained at ~23%. Surprisingly, despite the availability of 'tenure' data for the respondents, it was removed from the regression analysis, since it was not significant for all the three samples (total, technical and non-technical samples). 30,000TL was used as the end point of the highest interval (15,000+) (MichaelPage Report, 2017). 25 years was used as the end point of the highest experience interval (10+). After 25 years of staying in the social security system, a worker is eligible for retirement (Turkish Labour Law, 2017). A worker can work up to 270 hours per year as overtime. Hence, for the upper band (21+), 21 hours was considered.

We start with analysing our model by running a simple regression analysis. Table 6.2 reveals that 35 percent (R^2, n=1916) of the variation in the response variable – lnwage – is explained by the independent variables plugged into our model, meaning that our model has some explanatory power. Similarly, the p-values of the predictor variables are all significant at a 1-percent level with a confidence level of 99 percent.

The simple model decomposition output, Table 6.2, shows that the mean of the natural log of the wages for group 1 (male) is 8.82 and for group 2 (female) is 8.59, yielding a gender wage gap (difference) of 0.23. Then, this wage gap was decomposed into two parts – explained and unexplained. First, 0.19 of the gap could be explained by human capital characteristics; however, the remaining 0.04 could not be explained by our model. In other words, endowments (differences in experience and education) explain almost 83 percent (0.19/.023=0.826) of the wage gap in the ICT sector, therefore approximately 17 percent (0.04/0.23=0.17) remains unexplained. The experience variable accounts for the majority of the wage gap while years of schooling contribute more to women's wages than men's. Although this basic decomposition model provides some simplistic insights into the wage gap, such as avoiding missing-variable biases, we run an expanded model.

TABLE 6.2: Blinder-Oaxaca Decomposition with Simple Model

Source	SS	df	MS		
				Number of obs =	1,916
				F(3, 1912) =	345.51
Model	355.554809	3	118.51827	Prob > F =	0.0000
Residual	655.867176	1,912	.343026765	R-squared =	0.3515
				Adj R-squared =	0.3505
Total	1011.42198	1,915	.528157694	Root MSE =	.58568

lnwage	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Experinyears	.1952569	.0113364	17.22	0.000	.1730239	.2174899
Exp2	-.0070893	.0005471	-12.96	0.000	-.0081623	-.0060164
Edu	.1358284	.0081525	16.66	0.000	.1198397	.1518171
_cons	5.661231	.1387958	40.79	0.000	5.389024	5.933438

Blinder-Oaxaca decomposition

	Number of obs =	1,916
	Model =	linear
Group 1: Gen = 0	N of obs 1 =	1473
Group 2: Gen = 1	N of obs 2 =	443

lnwage	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
overall						
group_1	8.815655	.0188304	468.16	0.000	8.778748	8.852562
group_2	8.586515	.0338532	253.64	0.000	8.520164	8.652866
difference	.2291404	.0387379	5.92	0.000	.1532155	.3050652
explained	.1854621	.0253096	7.33	0.000	.1358563	.235068
unexplained	.0436782	.0309033	1.41	0.158	-.016891	.1042475
explained						
Experinyears	.6119557	.0713032	8.58	0.000	.472204	.7517074
Exp2	-.4178695	.0552008	-7.57	0.000	-.526061	-.309678
Edu	-.0086241	.0117594	-0.73	0.463	-.0316721	.0144239
unexplained						
Experinyears	-.3059955	.1730462	-1.77	0.077	-.6451598	.0331688
Exp2	.1819094	.10511	1.73	0.084	-.0241023	.3879212
Edu	.5357902	.5516574	0.97	0.331	-.5454385	1.617019
_cons	-.3680259	.5553671	-0.66	0.508	-1.456525	.7204736

6.1.2 Wage Decomposition with Expanded Model

In order to expand our model, we ran a multiple linear regression by adding other individual human and workplace characteristics to our model so as to examine whether the explained/unexplained components might change.

$$\begin{aligned} \ln W_M = {} & \alpha_0 + \beta_0 Edu_{mi} + \beta_1 Exp_{mi} + \beta_2 Exp_{mi}^2 + \beta_3 Marital_{mi} + \beta_4 Location_{mi} + \\ & \beta_5 Employ_{mi} + \beta_6 Position_{mi} + \beta_7 Children_{mi} + \beta_8 Ownership_{mi} + \\ & \beta_9 Overtime_{mi} + \varepsilon_i, \end{aligned} \tag{8}$$

$$\begin{aligned} \ln W_F = {} & \alpha_0 + \beta_0 Edu_{fi} + \beta_1 Exp_{fi} + \beta_2 Exp_{fi}^2 + \beta_3 Marital_{fi} + \beta_4 Location_{fi} + \\ & \beta_5 Employ_{fi} + \beta_6 Position_{fi} + \beta_7 Children_{fi} + \beta_8 Ownership_{fi} + \\ & \beta_9 Overtime_{fi} + \varepsilon_i, \end{aligned} \tag{9}$$

The additional variables increased the explanatory power of our model (Adj. R^2 = 42%, n=1882). Similarly, p-values of all but three predictor variables (gender, marital status and children)[111] were significant at the 1-percent level with a confidence level of 99 percent. In other words, all the variables demonstrate significant effects on the outcome variable, lnwage. Once the regression was run for different groups (men and women), our explanatory variables explained the variation in wages for women (Adj. R^2 = 51.3 percent, model for group 2) relatively better than for men (Adj. R^2 = 38.8 percent, model for group 1), which may indicate that there are more explanatory variables regarding women's wages in our model than men's.

The most striking result to emerge from the expanded decomposition output table (Table 6.3) is that the unexplained portion of the gender wage gap does not drop; on the contrary, it almost doubles (17 percent → 31 percent). To explain it further, once the twofold decomposition is run, Table 6.3 indicates that 0.159 of it can be explained by human capital and workplace characteristics, but the remaining 0.072 cannot be explained by the differences in returns to the predictor variables in our model. Endowments now account for roughly two-thirds (0.159/0.231=0.69) of the wage gap in the ICT sector, hence the remaining 31 percent being attributable to the labour market discrimination or unobservable characteristics.

[111] Significant at 5 percent, confidence level of 95 percent

Table 6.3: Twofold Blinder-Oaxaca Decomposition

```
Blinder-Oaxaca decomposition                    Number of obs     =      1,882
                                                  Model           =     linear
Group 1: Gen = 0                                  N of obs 1      =       1447
Group 2: Gen = 1                                  N of obs 2      =        435
```

lnwage	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
overall						
group_1	8.822623	.0188078	469.09	0.000	8.78576	8.859486
group_2	8.590932	.0338282	253.96	0.000	8.52463	8.657234
difference	.2316907	.038705	5.99	0.000	.1558302	.3075511
explained	.1593451	.0273018	5.84	0.000	.1058345	.2128557
unexplained	.0723456	.029422	2.46	0.014	.0146795	.1300116
explained						
Experinyears	.4930516	.0610217	8.08	0.000	.3734512	.6126519
Exp2	-.3382306	.0478198	-7.07	0.000	-.4319558	-.2445055
Edu	-.0115763	.0103961	-1.11	0.265	-.0319522	.0087996
Marital	.013782	.0063385	2.17	0.030	.0013588	.0262051
Location	-.0204151	.0061327	-3.33	0.001	-.032435	-.0083951
Position	-.0009268	.0022505	-0.41	0.680	-.0053378	.0034841
Employment	-.0040578	.0055625	-0.73	0.466	-.0149601	.0068444
Children	.016444	.006937	2.37	0.018	.0028478	.0300403
Ownership	-.0037034	.0038247	-0.97	0.333	-.0111998	.003793
Overtime	.0149776	.0043558	3.44	0.001	.0064404	.0235149
unexplained						
Experinyears	-.3405295	.1724859	-1.97	0.048	-.6785956	-.0024635
Exp2	.1730231	.1022274	1.69	0.091	-.027339	.3733852
Edu	-.1314761	.3684741	-0.36	0.721	-.8536721	.5907199
Marital	-.0113232	.0290421	-0.39	0.697	-.0682447	.0455984
Location	.0267594	.0482257	0.55	0.579	-.0677613	.1212801
Position	-.1481482	.0377678	-3.92	0.000	-.2221718	-.0741246
Employment	-.3820793	.2068505	-1.85	0.065	-.7874989	.0233402
Children	-.0025148	.022654	-0.11	0.912	-.0469158	.0418861
Ownership	-.0989945	.0383167	-2.58	0.010	-.1740939	-.0238951
Overtime	-.0010575	.0347061	-0.03	0.976	-.0690802	.0669652
_cons	.9886862	.4179326	2.37	0.018	.1695533	1.807819

Note: A + sign indicates advantage for males and a – sign indicates advantage for females.

The explained part of the wage gap estimates the amount by which the women's wages are depressed due to the endowment deficit (less experience, lower educational level and so on) compared to male ICT professionals in Turkey. If women had the same human capital and workplace characteristics as men, they would earn 0.16 more than they currently do, thus yielding to the mean lnwage of 8.75 instead of 8.59. Furthermore, evidence from Table 6.3

shows that a significant part of the endowments effect (0.49) has occurred due to female ICT professionals having less sector experience than their male counterparts, resulting in an average male earning more than the average female. To explain it further, female ICT professionals with relatively little sector experience compared to men's contribute 49.3 percent of the explained component of the wage gap. However, years of education narrows the wage gap. For instance, if female ICT professionals had the same education level as males, they would earn 0.01 less than they currently do. This indicates that female ICT professionals are relatively well educated but less experienced compared to male ICT professionals. This result is also supported by the demographic characteristics of the sample, which reveal that the percentage of women professionals with university degrees is relatively higher than that of their male counterparts. Furthermore, being married (1.4 percent), having children (1.6 percent) and working overtime (1.5 percent) also contribute to the explained portion of the wage gap. Overall, 69 percent of the gender wage differentials in the ICT sector occur due to men's superior endowments of various characteristics such as computer-related degrees and experience commanding higher wage returns, leaving 31 percent attributable to unexplained factors.

6.1.3 Blinder-Oaxaca Decomposition by Sub-Populations

Blau and Kahn (2017) argue that the decomposition of heterogeneous samples increases the omitted-variable biases, hence influencing the labour market discrimination figures. In order to overcome the problems of traditional statistical analyses, they argue, some studies use samples to explore wage differentials among homogenous groups such as male and female lawyers, MBAs and so on.

Table 6.4: Expanded Model Gender Wage Gap by Technical vs. Non-Technical Occupations

Variables	Technical Positions			Non-Technical Positions		
	Gender Wage Gap	Explained	Unexplained	Gender Wage Gap	Explained	Unexplained
Experience		0.5234415	-0.1057323		0.5544303	-0.8626719
Experience^2		-0.3780852	0.0546361		-0.3775724	0.5431372
Education		-0.0201324	0.0725869		-0.0007361	-0.4346370
Marital		0.0106136	-0.0462747		0.0184419	0.0614508
Location		-0.0223098	0.0488330		-0.0170407	0.0244619
Employment		-0.0087621	-0.2462891		0.0070737	-0.3197066
Children		-0.0080001	0.0184056		0.0484998	-0.0330072
Ownership		-0.0038307	-0.0770883		-0.0035173	-0.1127139
Overtime		0.0028670	-0.0247802		0.0340502	0.0551613
Constant			0.3142909			1.220074
Total	**0.1043898**	**0.0958018**	**0.0085879**	**0.4051779**	**0.2636293**	**0.1415486**
N	1072			810		
Adj. R^2	0.3751			0.4210		
		(91.8 percent)	**(8.2 percent)**		**(65 percent)**	**(35 percent)**

Note: A + sign indicates advantage for males and a – sign indicates advantage for females. Rounding procedure is applied. Also, despite availability of 'having a computer degree' data for the respondents, it was removed from the regression analysis, since it was not significant for all the three samples (including technical positions) and did not change the gender wage gap figures.

In order to lessen the severity of omitted-variable biases, the total sample was divided into relatively more homogenous groups. All the positions were classified as technical and non-technical and then the decomposition analysis was run separately for both groups. Table 6.4 reports that the gender wage gap shrinks (23 percent → 10.4 percent) for those who work purely in technical positions, while it almost doubles (23 percent → 40.5 percent) for non-technical positions. For those who work in technical positions, 91.8 percent (of 10.4 percent) of the gender wage gap can be explained via human capital and workplace characteristics, while the unexplained part drops in size dramatically from 31 percent to 8.2 percent, compared with the general results. On the other hand, the decomposition analysis reveals that the gender wage gap is most severe for those who work in non-technical positions and that only 65 percent of the wage gap can be explained by human capital and workplace characteristics, yielding 35 percent as unexplained.

Blinder-Oaxaca decomposition analysis is further carried out to observe gender wage differentials amongst other sub-populations. Table 6.5 reveals that the gender pay gap dramatically decreases with age from 20 percent (up to age 35) to 1.7 percent (over 35). This is also confirmed by the experience sub-population, which indicates that gender wage gap of 16.2 percent (up to five years) disappears (0 percent) once the employees gain five or more years sector experience. Therefore, when the employees age, they are expected to gain more experience, which eventually leads to a narrower gender wage gap. Contrary to expectations, however, the raw gender wage gap (15 percent) and unexplained part of the gender wage gap (58 percent) are higher among married employees when compared to singles. This may be explained by the motherhood penalty in the sector, which was also heavily emphasised during the interviews. The gender wage gap is also 5 percent lower in İstanbul. Furthermore, once the gender wage differentials are observed in the same occupational groups, remarkably, the female analysts earn more than their male counterparts by 13.9 percent. Female engineers and software developers also enjoy higher returns to the controlled variables in our model. On the other hand, the unexplained portion of the wage gap (0.52 percent) amongst occupations is the highest for consultants.

Nevertheless, the outcome of sales and marketing should be interpreted with caution, since the input variables in the model may not fully explain the wage differentials. That is to say, the dataset in our study does not include one of the most significant parameters (e.g., sales figures) of wages for sales and marketing professionals; therefore, the gender wage gap is overestimated to a great extent. In fact, sales and marketing may be one of the most equal sub-populations in terms of gender and pay in the ICT sector due to the relatively transparent nature of performance metrics (whether it was sold or not) leaving relatively little or no room for wage discrimination. Sales and marketing professionals also confirmed this during interviews, saying that '*All we care about is the $ sign [referring to whether sales have been completed or not], we don't care who sold it'* (sales director) and '*I don't think we get paid less than men*' (female sales professional). Thus, the Blinder-Oaxaca decomposition result for sales professionals, once more, confirms that the unobservable and missing variables can increase the wage gap and unexplained part of it to a great extent.

Comparing our findings with the national averages and most recent studies (Table 2.5 in Chapter II), it is clear that the gender wage gap is relatively low (23 percent) in our study compared to the most of gender wage gap studies, except for three (Dayıoğlu and Tunalı, 1997;

Hisarciklilar and Ercan, 2005; Aktaş and Uysal, 2012). With regards to the discrimination and/or unobserved component of the wage gap, our study has the lowest unexplained gender wage gap with 31 percent for the total sample. This may be due to the profiles of the ICT professionals who are relatively more aware of their rights at work, less tolerant of inequality in any form and less committed or loyal to their employers. In particular, in such labour market environments where IT talent is scarce, employers may be prepared to pay the market rates for wages rather than attempting to exploit it.

TABLE 6.5: Twofold Blinder-Oaxaca Decomposition by Sub-populations

Sub-population	# Obs. Male	Female	Gender Pay Gap	Explained	(Percent)	Unexplained	(Percent)
Age							
Up to 35	952	343	0.1971220	0.1301045	0.66	0.0670174	0.34
35 +	495	92	0.0171015	-0.0574682	-3.36	0.0745697	4.36
Marital Status							
Single	608	266	0.1458240	0.0900553	0.62	0.0557688	0.38
Married	839	169	0.1533348	0.0645656	0.42	0.0887692	0.58
Experience							
Up to 5 years	501	253	0.1622188	0.0175923	0.11	0.1446265	0.89
5 years +	945	182	0.0021635	-0.0553365	-25.6	0.0575000	26.6
Wages							
Up to ₺5,000	485	202	0.0379167	0.0133307	0.35	0.024586	0.65
₺5,000 +	962	233	0.1115805	0.0411818	0.37	0.0703987	0.63
Wages							
Up to ₺10,000	1039	359	0.1038842	0.0434005	0.42	0.0604837	0.58
₺10,000 +	408	76	0.1091609	-0.0006462	-0.00	0.1098071	1.00
Occupation							
Analysts	33	23	-0.1389644	-0.0155391	0.11	-0.1234252	0.89
Consultants	155	79	0.2295847	0.1110004	0.48	0.1185843	0.52
Engineers	146	32	0.1739340	0.2104745	1.21	-0.0365406	-0.21
Managers	432	111	0.0925804	0.1034160	1.12	-0.0108356	-0.12
Sales & Marketing	26	33	0.4971555	0.2609292	0.52	0.2362263	0.48
Software Developers	223	50	0.1043664	0.1250951	1.20	-0.0207286	-0.20
Specialists	220	52	0.1397146	0.1340868	0.96	0.0056277	0.04
Location							
Istanbul	953	325	0.2431937	0.1663924	0.68	0.0768013	0.32
Other	494	110	0.2927278	0.1877627	0.64	0.1049651	0.36
Occupational Group							
Technical	828	244	0.1043898	0.0958018	0.92	0.0085879	0.08
Non-technical	619	191	0.4051779	0.2636293	0.65	0.1415486	0.35
Full Sample	1447	435	0.2316907	0.1593451	0.69	0.0723456	0.31

Note: A + sign indicates advantage for males and a – sign indicates advantage for females. Rounding procedure is applied. Employment variable was removed from the regression analysis for all the occupations listed above, since zero variances encountered. The occupations that are not listed in the table had no comparison due to limited m/f observations in the sub-samples.

Once we divide our sample into other sub-populations (age, marital status, experience, wage, location and occupational groups), Table 6.5 reveals that some groups are subject to a greater gender wage gap than others. For instance, the gender wage gap is higher for professionals who are below the age of 35; have less sector experience (less than five years); earn above ₺5,000; or live in other cities. However, the gender wage gap is highest (30 percent) among the occupational groups. Non-technical professionals (40.5 percent) suffer from a greater gender wage gap than the technical professionals (10.4 percent). This indicates that the technical vs non-technical division requires further investigation to better understand the gender wage gap in the Turkish ICT sector.

6.2 Conclusion

Three striking results emerge from our study of the gender wage gap in Turkey's ICT sector. *First*, a gender wage gap of 23 percent, on average, exists in the fast-growing ICT sector. *Second*, once endogenous variables are controlled for (education, experience, experience squared, marital status, children, location, position, employment history, firm, ownership and overtime), the unexplained portion of the wage gap is 31 percent. This figure is lower than the majority of the existing studies on wage gaps in Turkey. The professional experience variable is the major driver for the wage differentials between men and women; that is, women having less sector experience than men contributes 49.3 percent of the explained component of the wage gap. On the other hand, the education variable decreases the gender wage gap in the sector. In other words, women professionals earn less than their male counterparts, on average, despite higher levels of education, on average. Thus, ICT women tend to be highly educated, but less experienced. *Third*, one major distinction in relation to the gender pay gap can be drawn relating to occupational differences. To demonstrate, all the self-reported positions were classified[112] as *technical* (administrator, analyst, architect, consultant, engineer, software developer and specialist) and *non-technical* (coordinator, director, executive, HR professional, intern/assistant, manager, sales and marketing professional, team leader and training professional). Once the decomposition analysis was run separately for both sub-groups, the gender wage gap dropped by more than half (23 percent → 10.4 percent) for those who work in purely technical positions and almost doubled (23 percent → 40.5 percent) for those in non-technical positions. Furthermore, for those who work in technical positions, 91.8 percent (of 10.4 percent) of the gender wage gap was explained by our model, implying that the unexplained part dropped in size dramatically from 31 percent to 8.2 percent, compared with the general results. On the other hand, the gender wage gap was most severe for those who work in non-technical positions, with only 65 percent of the wage gap (of 40.5 percent) explained by the human and workplace characteristics, yielding 35 percent as unexplained.

[112] The author's own classification.

In a nutshell, two primary conclusions can be drawn from this chapter. The *first* one is that the gender wage gap in the Turkish ICT sector is not as big as anticipated, compared with other studies. The *second* conclusion is that once we split the sample into technical and non-technical occupational categories, there is a notable discrepancy between those positions. A large proportion of the gender wage gap (91.8 percent of 10.4 percent) favouring technical professions is explained by the variables used in our model, leaving very little for the unexplained part of the gender wage gap; that is, the gender wage gap almost disappears for technical positions with the variables plugged into our model. That is a contrast with the other studies listed above, because other studies found both larger gender wage gaps and also larger unexplained portions of that gap. Thus, our model is accurate enough to explain the majority of the gender wage differentials in the sector for technical positions. However, when we look at non-technical occupations, both the gender wage gap and the unexplained portion of the wage gap are much greater than the technical occupations in our study. This implies that there is a marked discrepancy between the technical and non-technical positions. This has not been explored in previous studies and deserves further analysis.

The next chapter, will therefore explore two issues. *First*, the factors that might explain the gender wage gap differences between technical and non-technical positions will be examined. Why are both the gender wage gap and the unexplained part attributable to labour market discrimination/unobserved variables smaller for technical positions and what causes the persistence of a larger gender wage gap in non-technical positions? *Second*, why is the overall gender wage gap in the Turkish ICT sector not as big as anticipated when compared to other studies?

CHAPTER VII

INTERROGATING THE GENDER WAGE GAP IN THE TURKISH ICT SECTOR

The results of the Blinder-Oaxaca decomposition model in the previous chapter demonstrate that the Turkish ICT sector has a raw gender wage gap of 23 percent, 69 percent of which can be accounted for by the explanatory variables in our model (gender, experience in years, years of schooling, marital status, having children, location, employment status, position, firm ownership, overtime) and the remaining 31 percent is left unexplained by the model. Our gender wage gap figure for the ICT sector is lower than other national gender wage gap studies discussed in the previous chapter.

This chapter attempts to provide a more profound analysis of the gender wage gap, unlike the previous chapter that was largely descriptive. Qualitative data (from semi-structured interviews with female and male owners, C-level professionals, HR professionals, managers and technical and non-technical professionals) will be used throughout this chapter to analyse the differences in the gender wage gap found between technical and non-technical jobs as well as the fundamental drivers and causes of this. This chapter will first present the framework used to illustrate the technical vs non-technical distinction and then explore the following question: '*What explains the large difference in the gender wage gap between technical and non-technical professions in Turkey's ICT sector?*'

Due to the unavailability of a like-for-like comparison for this study in the Turkish context (no other ICT sector gender wage gap studies on Turkey are available), we will compare the result of our study with the existing literature on the gender wage gap that mainly concentrates on the national gender wage gap. Table 6.4 (Chapter VI) clearly reveals that our study has a much lower gender wage gap than the majority of the existing literature, except for three studies (Dayıoğlu & Tunalı, 1997; Hisarcıklılar & Ercan, 2005; Aktaş & Uysal, 2012), two of which use data from 1988 that may lead to fewer observed variables due to a lack of data availability and the last study includes 2006 household income and expenditure data that uses more variables but applies the quantile regression method rather than the Blinder-Oaxaca decomposition technique that might result in different outcomes. Therefore, we can conclude that the gender wage gap in the ICT sector is not as large as anticipated when compared to other studies on a national level. Given that the current Turkish literature on the gender wage gap is not specific to the ICT sector, we will now compare our results with a limited number of international ICT gender wage gap studies listed in Table 7.1.

When we look at international gender wage gap studies on ICT sectors for a like-for-like comparison with our study (Table 7.1), there are, indeed, some gender wage gap studies that concentrate on the ICT sector, but they are limited in quantity and quality. Chamberlain's (2016) report is the most suitable study in the table for like-for-like comparison purposes with our study, since it uses the same model (Blinder-Oaxaca decomposition technique) and also very similar explanatory variables (age, education, experience, state, year, industry, occupation, job title and company name). The author uses 505,000 salaries of full-time US employees shared by the Glassdoor website and reports a lower gender wage gap by industry for the US (5.9 percent and 4.6 percent for information and communication technology industries, respectively) and a large gender wage gap by occupation (28.3 percent and 14.7 percent for computer programmers and information security professionals, respectively). However, the main drawback from this study is that the race/ethnicity factor, which is one of the most important salary-determining characteristics for the US labour markets, is not factored in along with other considerations such as overtime, marital status and having children; this has also been acknowledged as a limitation by the author. In particular, the exclusion of the race factor might lead to under- or over-estimation of the gender wage gap, since employees may be discriminated against not because they are female but due to their race or ethnicity. Consequently, this analysis does not provide a clear distinction for wage discrimination between gender and race/ethnicity.

The second study, conducted by Segovia-Pérez et al. (2019), uses data from the *2014 Spanish Earning Structure Survey* to carry out the Blinder-Oaxaca decomposition method similar to the one used in the previous chapter of this study. The article examines the gender wage gap and the degree of discrimination in ICT occupations regardless of whether these are in the ICT sector or not. The study picks up only two groups of ICT occupations – namely, ICT specialists and ICT technicians – and compares both of them in the ICT sector and in a non-ICT sector. Considering these two positions are both technical in nature, it is worth comparing their results, not with the overall ICT gender wage gap of 23 percent in our study but with the gender wage gap figure for technical positions (10.4 percent).

Segovia-Pérez et al. (2019) report that a significant portion of the gender wage gap they observe cannot be explained by the differences in the control variables (age, schooling, economic sector, size of the firm, type of contract and the responsibility associated with the position they hold). The vast majority of the gender wage gap (91.8 percent out of 10.4 percent) in our study can be explained by our model, leaving very little room for labour market discrimination. This contradiction may be explained by the differences in the variables included in the models. To illustrate, while Segovia-Pérez et al. (2019) include firm size as one of the independent variables, which is not included in our study, they do not include some of the most significant factors (e.g., experience, overtime, location and even marital status or having children), which have tremendous impact on the pay of ICT professionals, as evidenced in the Turkish context.

Even if the age variable has been considered as a proxy for experience, and thereby not included in their model to avoid the collinearity effect, this may not be the most suitable approach for an ICT sector where the age variable does not automatically create a linear relationship with experience for either gender. For instance, maternity leave may not necessarily result in an enormous career break for non-technical professions with regards to expertise and experience, as they can continue with their existing work knowledge on their return. On the other hand, it may reduce the level of expertise and professional experience of women for technical professions due to the nature of the ICT sector, wherein some of their existing knowledge may become out-of-date quickly among the fast-changing technological advancements. This is also evidenced by the in-depth interviews. ICT sector employers and employees all agree that the sector is evolving rapidly and that certain technical languages or software programmes can become obsolete during work absences. Therefore, the exclusion of actual experience[113] data may downplay the gender wage differences.

[113] Some may suggest that the potential experience variable could be calculated as (age-years of schooling-6) as a proxy for actual experience instead of age. However, Blau and Kahn (2008) argue that this method also understates gender differences in labor market qualifications due to the substantial interruptions women face in their careers.

A female computer engineer comments:

> It is very difficult to return after a break in our sector.[114] You need to be constantly working in the sector; you must learn constantly, embrace continuous change and work hard. This is the sector where there is no luxury of *'I can take a break and come again*'. This, for example, may be the triggering effect why women (in the ICT sector) marry at a later age. I mean, as a pharmacist you might say '*let me transfer my pharmacy to someone else for a while or study for three years or give birth and come back to my job again'*. In our sector, we don't have this luxury… For example, I went for maternity leave for three months and during that three months a new 'cloud technology'[115] came up. When you miss this change and you come back, you need to speak a new language.

Furthermore, the exclusion of the experience variable in a gender wage gap study in the ICT sector is not the best approach because labour supply shortages in the sector attract technical employees, such as engineers, from other professions in other sectors who want to pursue a career in ICT. These professionals may have a number of years' experience in other sectors, but, even if older, their age does not necessarily reflect experience in the ICT sector. The second most important variable omitted from their study is overtime, which would be particularly useful for Segovia-Pérez et al. (2019)'s study as it covers technical professionals who may have a larger overtime schedule than non-technical professionals. Consequently, the exclusion of overtime may not reflect the real effects of human capital characteristics and their effects on the gender wage gap.

The next contradiction is that the female ICT professionals in Spain are absent from the high-wage tail of the wage distribution, signalling stronger vertical segregation in the ICT sectors. In other words, according to their study, there is a lack of women in the high wage-tail of the wage distribution. However, in our study we find that the percentages of men and women across all wage brackets are similar for technical positions, leading to weaker vertical segregation. Finally, despite the gender wage gap figures provided in the Spanish study (7.39 percent for ICT sector specialists and 10.18 percent for ICT sector technicians) being in line with the finding of our study (10.4 percent), the majority of the gender wage gap is not explained by their model as it is in our study; therefore, the gender wage gap figure in our study is low.

[114] As a side note, all the single female interviewees were asked '*Are you planning to quit your job or the ICT sector if you give birth?*' All of them clearly said that they would not quit their job or the ICT sector.

[115] Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction (Mell and Grance, 2011, p.2).

Two of the six studies listed on Table 7.1 (Belgorodskiy et al., 2012; Gomółka, 2018) do not provide any gender wage gap figures but report the existence of the gender wage gap. Belgorodskiy et al. (2012) state that female science and technology professionals in the UK earn 16 percent less than their male colleagues. This figure is higher than our findings of a gender wage gap in technical positions of 10.4 percent. Similarly, a World Economic Forum (2016)[116] report also indicates a relatively wide gender wage gap for the ICT sector (25 percent) compared with our study (23 percent). However, it is worth mentioning that, in this study, no composition technique is used to analyse the actual wage data to generate the gender wage differentials. Instead, the indicated 25-percent gender wage gap is only the share of respondents who stated that there was a gender wage gap in their industry for equally qualified female employees in the same roles with the aggregation of the findings used to generate a simple average (p.65). Therefore, the result can be misleading with regards to the actual wage differentials between men and women. On the other hand, the remaining four studies (World Economic Forum, 2016; Chamberlain, 2016; WageIndex Report, 2018; Segovia-Pérez et al., 2019) – three of which are institutional reports on ICT gender wage gaps – provide gender wage gap figures that allow us to make comparisons with our study but do not necessarily provide a full picture of the causes.

[116] The regions included in this study includes Asia and the Pacific (ASEAN, Australia, China, India, and Japan); Europe and Central Asia (France, Germany, Italy, Turkey and UK); MENA (Gulf Cooperation Council); Sub-Saharan Africa (South Africa); and the Americas (Brazil, Mexico and USA).

TABLE 7.1: Cross-National Gender Wage Gap Studies on ICT Sector

Study	Model	Group	Data	Variables	Coverage	Findings
Chamberlain (2016)	Blinder-Oaxaca Decomposition Technique	Male vs Female	Online-survey data collected by Glassdoor from 550,000 full-time US employees	Age Education Experience State Year Industry Occupation Job title Company name	USA By occupation and industry	Gender Wage Gap by occupation Computer programmers USA: 28.3% Information security professionals USA: 14.7% Gender Wage Gap by industry: Information Technologies: 5.9% Communication Technioligies:4.6%
Segovia-Pérez et al. (2019)	Blinder-Oaxaca Decomposition Technique	Male vs Female	Spanish Earning Structure Survey data for 2014	Age Education Economic sector Size of the firm Type of Contract Responsibility	Spain ICT sectors vs. Non-ICT sectors Specialists vs. Technicians	Gender wage differences in: ICT sectors specialists: 7.39% Non-ICT sectors specialists: 6.30% ICT sectors technicians: 10.18% Non-ICT sectors technicians: 11.51% Most of the wage gap cannot be explained by differences in the control variables associated with worker endowments.
Belgorodskiy et al. (2012)	Mixed Method Approach	Male vs Female	Online Surveys (response format was a seven-point Likert scale) and Semi-Structured Interviews	n/a	UK AND New Zealand ICT Sector Comparison	UK and NZ women agree that their pay is out of line with their ICT male colleagues and does not reflect their qualifications for their position in the ICT industry. Yet, UK and NZ women agree that their pay is in line with female colleagues.
Gomółka (2018)	Location quotient (The Balassa-Hoover Index)	Regional	Location quotient in the ICT sector in Poland in 2012-2016 by Central Statistical Office	n/a	Poland ICT Sector	Level of specialization and total remuneration per gender: In regions where the specialisation is the highest, the level of remuneration is also the highest. The location

						quotient values do not explain the differentiation of the gender pay gap
World Economic Forum (2016)	% of respondents who stated that there was a wage gap for equally qualified female employees in the same roles. Results have been aggregated as a simple average.	Male vs Female	Extensive survey of CHROs and other senior talent and strategy executives from 100 largest global employers in each target industry (9 industries, including ICT) Online Survey collected in 2015	n/a	World Sectoral	Gender Wage Gap ICT sector: 25%
WageIndex Report (2018)	Per cent difference between female and male median wages	Male vs Female	Online-survey data collected by the Wage Indicator Foundation during January 2017-December 2018	Gross hourly wage Occupation Employment Type Education Tenure Skill Level Supervisory Position Firm Size	India National and sectoral	Gender Wage Gap National: 19% ICT Sector: 26%
Our Study	Simple and Expanded Model Blinder-Oaxaca Decomposition Technique	Male vs Female ICT Sector	2018 ICT Online Sector Survey 1,917 valid questionnaires	Education Experience $Experience^2$ Marital status Children Location Position Employment Firm Ownership Overtime	Turkey ICT Sector	**ICT Sector as a Whole** Gender Wage Gap: 23 per cent Explained: 69 per cent Unexplained: 31 per cent **Technical Positions Only** Gender Wage Gap: 10.4 per cent Explained: 91.8 per cent Unexplained: 8.2 per cent **Non-Technical Positions Only** Gender Wage Gap: 40.5 per cent Explained: 65 per cent Unexplained: 35 per cent

Source: The author's own elaborations

The next study, conducted by WageIndex (2018), is a report on the gender wage gap in the Indian ICT sector. According to this report, the gender wage gap in the sector is 26 percent in favour of men. However, the report does not state whether the respondents were fully technical or a combination of technical and non-technical professionals. Once examining the questionnaire used in the survey,[117] it is clear that the report does not ignore the non-technical professionals who work in the ICT sector, but it fails to make a distinction between the two groups. Moreover, the mean of gross hourly wage has been used in this report. The gender wage gap has been calculated by taking the gender difference in median gross hourly wages and dividing it by the mean wage of a man, i.e., 'the percentage difference between male and female median wages' (p.6). Therefore, we compare our gender wage gap figure for the whole sector (23 percent) with this report. The comparison indicates that the gender wage gap reported in the Indian context is, on average, larger than our study. However, as the report only includes the gender wage gap figures across different sectors in India, including ICT, it fails to provide any insight into what causes it.

The great majority of these studies have one fundamental flaw. When considering the ICT sector studies on gender wage issues, they fail to include non-technical occupations. Even if they are included, the study makes no distinction between technical and non-technical professions in the sector. There is a misperception that the sector comprises only technical professionals, hence the studies primarily focusing on the technical but neglect the non-technical professions. It is true that the core activities of the ICT sector mostly require technical skills and expertise in the information and communication fields, but there are numerous professions such as sales and marketing or HR that should also be included as part of the sector. It is clear from our findings that this separation of technical and non-technical is crucial to exploring earning differentials between the two groups and thereby to identify the drivers of the gender wage gap; i.e., neglect of non-technical groups in the ICT sector studies results in a host of issues being missed, which this chapter attempts to explore. Through such analysis this thesis makes an important contribution to existing knowledge about the size of the gender wage gap and the major drivers of this for both technical and non-technical professions within the sector.

[117] The author of this thesis examined the survey used in the mentioned report via their website and not from the report itself; she finds that there was a question '*What is your current occupation?*' Among the choices for each industry in the country for the ICT sector under the internal support services section, there were numerous non-technical professionals listed.

In the previous chapter we found that there is a gender wage gap of 23 percent in the Turkish ICT sector, which is not as large as anticipated when compared to other studies. The experience variable explains a significant portion of the gender wage gap in the sector, but there is still a remaining gap that is not captured by our model that can be attributed to labour market discrimination or to unobserved variables. However, the most significant finding emerging from the previous chapter is the clear distinction between technical and non-technical positions in relation to the gender wage gap. Both the extent of the gap and its causes differ between the technical and non-technical positions. The gender wage gap is 10.4 percent vs 40.5 percent for technical and non-technical professions, respectively. Furthermore, the unexplained part of the technical positions is much smaller than that of the non-technical positions (8.2 percent and 35 percent for technical and non-technical, respectively). The causes of the gender wage gap are also very distinct.

7.1 Distinction between Technical and Non-Technical Professions

The results of our study, applying an expanded Blinder-Oaxaca Decomposition model, reveal a 10.4-percent gender wage gap for technical positions in the Turkish ICT sector. Moreover, 91.8 percent of this gap can be explained via observable factors with 8.2 percent left unexplained. In contrast, the gender wage gap for non-technical positions in the ICT sector is much greater, standing at 40.5 percent. Only 65 percent of this can be explained via observable factors, leaving 35 percent of it unexplained. This suggests differences in the causes and drivers of the gender wage gap between technical and non-technical positions that warrant further investigation.

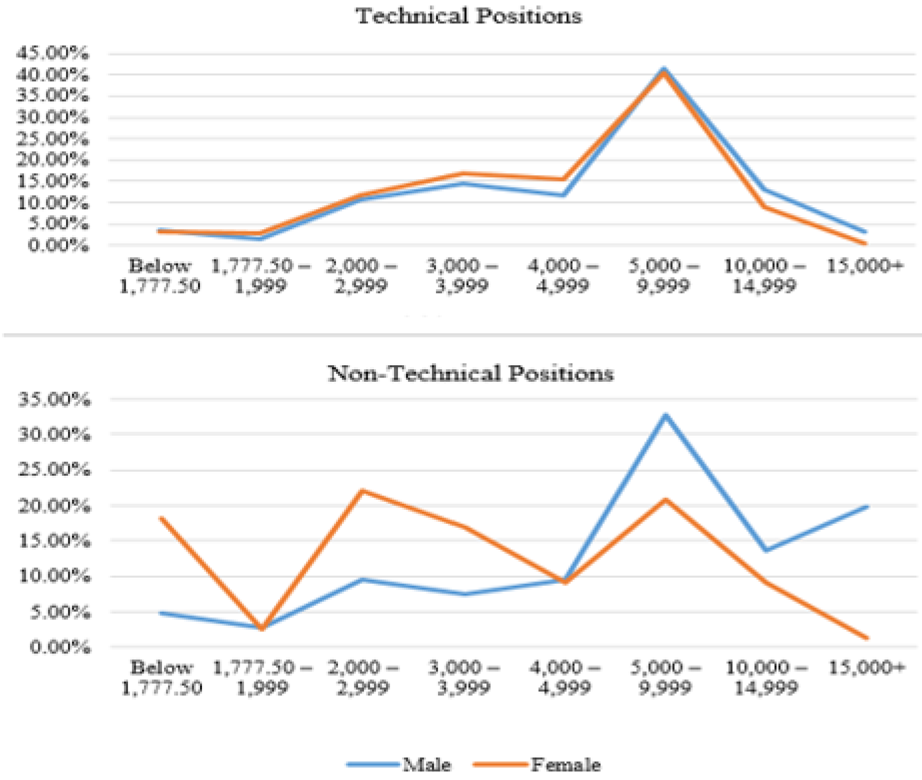
One might wonder why the technical vs non-technical division makes sense when conducting gender wage gap analysis in the ICT sector. First of all, as discussed in Chapter VI, Table 6.5 reveals that the gender wage gap outcome changes dramatically when the technical vs non-technical division is employed, compared to other divisions made along age, marital status, professional experience, different earning levels and location. This in itself is the major reason why such a division is compatible according to the primary data collected in our study. Second, one might argue that occupational levels corresponding to wages and career structures in technical and non-technical groups may differ. For instance, the difference in average pay was more than $20,000 per year in favour of technical jobs in US technology companies (Glassdoor, 2018), meaning that occupational levels corresponding to wages was higher for technical jobs. Similarly, given that ICT is a rapidly-growing and ever evolving sector, Smith (2010) argues that, IT functions redesign their job structures every four years or so, on average. In other words, a worker might see five different career structures coming and going over a 20-year period, indicating that career structures of technical and non-technical groups are distinct. Likewise, the corporate ladder for non-technical occupations may be relatively complex with a longer hierarchical structure compared to technical jobs with flattened, less sophisticated structures that allow information flow between workers in order to promote innovation and development. These are fair points; however, they do not change the fact that both technical and non-technical jobs are merged under the same broader umbrella of ICT.[118] The core difference between the technical and non-technical occupations is the contrasting levels of workers' technical skills and abilities. Although both contribute to the productivity, growth and profits of the ICT sector, they are paid differently. Therefore, it is essential to make such a division in order to have a complete and accurate picture of the gender wage gap analysis.

This chapter uses a conceptual framework based on Bergmann's crowding hypothesis in order to create sub-groups. In Bergmann's early work (1971), occupations can be categorised as traditionally white labour jobs vs traditionally black labour jobs. In this thesis, the groups are categorised as traditionally male (technical) vs traditionally female (non-technical) professions in the ICT context. This distinction is necessary, as it is in line with Bergmann's hypothesis and also gives us sufficient grounds to explore gender wage differentials in the Turkish ICT sector. Figure 7.1 reveals how the wage structure is very different in those technical and non-technical sub-groups. Furthermore, wages in technical professions, on average, are 7 percent higher than in non-technical professions.[119] Similarly, the graph also illustrates how the gender wage distribution in technical positions is more equal than that of non-technical positions.

[118] US technology companies were hiring 57 percent technical (data scientists, software developers, architects, engineers etc.) and 43 percent non-technical professionals (managers, legal professionals, sales representatives, accountants etc.) in 2018, according to the Glassdoor report (2018). Surprisingly, according to our survey sample in this study, the ratio of technical (57 percent) and non-technical (43 percent) professionals in the Turkish ICT sector was identical to the Glassdoor (2018) report, indicating that nearly half of the sector is made up of non-technical professionals.

[119] Below ₺1,777.50 and above ₺10,000 are excluded from the calculation to avoid extreme values. It was controlled for variables as follows: experience, education, gender, overtime, computer degree, marital status, city, full-time vs part-time, having children, ownership structure of the firm, and public vs private.

FIGURE 7.1: Wage Distribution of Technical and Non-Technical Positions



The above section states why the separation of professions into technical and non-technical is a must in the Turkish context when analysing the gender wage gap. The section below will now focus on the possible causes that emerged from interview analysis to demonstrate why the technical gender wage gap (10.4 percent) is much smaller compared to the non-technical one (40.5 percent) and how the traditionally recognised causes of the gender wage gap still matter for non-technical professions but become less relevant for technical professions owing to labour market distortions: e.g., high growth and high labour demand for technically skilled talent.

7.2 Technical Positions

The primary finding in our study is that the gender wage gap is much lower for technical positions than non-technical ones. Once we examine the gender breakdown of the wage differentials in both technical and non-technical positions, women are better off by working in technical positions rather than non-technical ones. To demonstrate, Table 7.2 indicates there are no significant gender differences in the percentages of male and female professionals who earn below the national minimum wage (₺1,777.50 for the year 2017) if they work in technical positions. In contrast, the percentage of females earning below the national minimum wage is nearly four times higher than that of men when they both work in non-technical positions. In addition, the share of women who earn between ₺3,000–₺9,999 is higher than the men that do if it is a technical role and lower if it is non-technical. However, it can be observed that the proportion of men doubles that of women when we move up the wage ladder (over ₺10,000) for technical positions. Moving onto non-technical positions on the table, only 21 percent of women earn wages between ₺5,000–₺9,999 in non-technical positions, but this figure doubles if it is a technical position. Similarly, although the share of males in the highest or ₺10,000-plus wage brackets is higher than that of females, regardless of technical and non-technical positions, the gap is smaller in technical than in non-technical positions. Last but not the least, for the wage bracket of ₺15,000 and above, there are much smaller gender wage differentials (3.11 percent vs 0.40 percent) for technical positions compared to a massive gap for non-technical positions (19.73 percent vs 1.30 percent for men and women, respectively). This indicates that women who work in technical positions are much better off than their non-technical counterparts in the ICT sector.

TABLE 7.2: Wage Differentials between Technical and Non-Technical Positions by Gender

Wage Brackets (in TRL)	Technical Positions			Non-Technical Positions		
	Male	Female	Total	Male	Female	Total
Below 1,777.50	3.47%	3.24%	3.42%	4.76%	18.18%	9.38%
1,777.50 – 1,999	1.68%	2.83%	1.94%	2.72%	2.60%	2.68%
2,000 – 2,999	10.90%	11.74%	11.09%	9.52%	22.08%	13.84%
3,000 – 3,999	14.49%	17.00%	15.06%	7.48%	16.88%	10.71%
4,000 – 4,999	11.86%	15.38%	12.66%	9.52%	9.09%	9.38%
5,000 – 9,999	41.32%	40.49%	41.13%	32.65%	20.78%	28.57%
10,000 – 14,999	13.17%	8.91%	12.20%	13.61%	9.09%	12.05%
15,000+	3.11%	0.40%	2.50%	19.73%	1.30%	13.39%

Note: Owners and executives were excluded from the non-technical sub-sample to eliminate wage inflation for non-technical positions. Managers were also excluded due to the difficulty of distinguishing whether a participant was a manager in a technical department such as software or in a non-technical department such as sales and marketing. Hence, the professions represented in the last two upper wage bands are as follows: directors, consultants, analysts, specialists, software developers, sales and marketing professionals and engineers.

Thereby, it is necessary to explore two questions: (1) ‘*why are female ICT professionals better off in relation to earnings by working in technical positions than non-technical positions in the ICT sector?*’ and (2) ‘*what are the causes of large earning differentials in the non-technical positions?*’ This section first proposes two primary explanations for the first question above: labour supply shortages in technical areas and higher wage returns for ICT skills among women in technical rather than non-technical positions. It then proposes two primary reasons for the large gender wage gap in the non-technical positions. The first is *discrimination in hiring processes* as the outcome of perceived direct and indirect costs of hiring women with or without children, the hierarchies of discrimination in the Turkish ICT sector, and bargaining power and wage negotiations. The second proposed reason is *occupational segregation*.

(i) Labour Supply Shortages for Technical Skills

According to a recent ILO study (2019), many countries around the world face talent shortages in their ICT sectors that will consequently constrain the future growth and job creation in other sectors globally. Maryska et al. (2012) argue that the ICT sector contributes 5 percent to the GDP and 20 percent to overall productivity in the EU, and that a continuous supply of skilled workers are essential for this contribution to continue. The *OECD Digital Economy Outlook 2015 Report* for the ICT sector, also reported that it accounted for 5.5 percent of the total value-added in OECD countries in 2013. ICT sector employment was roughly 3 percent of the total OECD employment the same year.

Turkey exhibits similar trends that follow this global pattern. The ICT sector growth rate was roughly 84 percent between 2009 and 2014. Although ICT employment increased dramatically from 100,500 (2013) to 139,000 people (2018), its share of employment remained below 2 percent which is lower than the EU (2.5 percent, 2018) and OECD averages (3 percent, 2013). A relatively narrow gender wage gap among technical professionals can be explained by the scarcity of IT specialists in the value-creating Turkish ICT sector. Employers may be forced by market dynamics to reward their female employees 'the same' way as their male employees. The contrary might be costlier for the employers, since highly skilled female employees in the ICT sector do not hesitate to switch jobs swiftly when compared to any other sector in Turkey as a result of shortages of technically-skilled labour.

Various factors have an impact on labour supply in the labour markets. Some of these factors may affect the overall labour supply, regardless of gender, such as wages, non-monetary benefits, working conditions, state of the economy, size of the working population, migration, mortality rates, income tax rates and so on, while others may determine the supply of women's labour, such as childbirth, access to sufficient and affordable childcare, care-giving facilities for the elderly or household income level. Labour supply shortages (skills shortages) consequently occur as an economic condition in which a sufficient number of qualified employees cannot be recruited by employers in the labour markets with a 'decent' wage and working conditions. Thus, if an employer seeks an employee who can work at a lower wage than the market rate and under poorer working conditions and cannot fill in the position, then this situation is not considered a labour shortage, rather what I call an 'exploitation shortage' in that an employer fails to exploit labour with low wages and poor working conditions.

Labour supply shortages may create upward pressure on wages due to strong competition for skilled workers. These shortages might increase the use of either voluntary or obligatory or paid or unpaid overtime by existing employees to close the gap in capacity and productivity at the company, as more jobs need to be done by fewer employees. This might create higher job turnover or existing employees might feel that they are entitled to higher salaries due to the higher labour demand or higher workloads. Furthermore, labour shortages might lead to an increased appetite for outsourcing in order to gain access to a broader talent pool.

Several resources (TÜBİSAD, 2016; Özkan, 2016; The Hürriyet, 2017) report that Turkey also suffers from a labour supply shortage of technical positions. Due to higher consumer demand for ICT goods and services and the scarcity of ICT talent, particularly in technical positions, wages in general are relatively high in the ICT sector compared to others. Our study finds that employees who utilise their ICT skills and expertise earn, on average, roughly 7 percent more than those who use none or little, resulting in a higher premium for ICT skills and expertise.[120] As an illustration, Table 7.2 reports that the percentage of professionals, regardless of gender, earning above ₺3,000 is higher (83.6 percent) among technical positions than non-technical positions (74.1 percent), resulting in higher average earnings for technical professionals. In the presence of labour supply shortages, whereby an ICT sector employer struggles to find the right talent for technical roles, if there is a female applicant who meets the expected criteria, discrimination factors such as perceptions around the cost of maternity leave, the possibility of exercising marriage compensation law, gendered social norms and so on tend to fade away. This implies a paradox in the Turkish ICT sector with regards to the demand for labour in technical roles among employers. To explain further, analysis of the interviews reveals that, under the labour market equilibrium, employers use factors associated with employing women such as maternity leave pay, marriage compensation law and so on as an excuse to justify their recruitment attitudes or lower pay offers, and to

[120] Below ₺1,777.50 and above ₺10,000 is excluded from the calculation to avoid extreme values. It was controlled for variables as follows: experience, education, gender, overtime, computer degree, marital status, city, full-time vs part-time, having children, ownership structure of the firm, and public vs private.

explain why they favour men over women for technical roles. These discriminatory factors cause disequilibrium of the market in the sector but also prevent businesses from fully utilising existing human capital because of the stereotyping, prejudice and discrimination they show towards women employees. However, if employers experience labour supply shortages for technical roles, then these factors become largely irrelevant. This implies that the current labour supply shortages for technical skills lower the gender wage gap for technical professions in the Turkish ICT sector. Thus, high demand for technically skilled labour in the sector overcomes any labour market discrimination to a large extent. Under market equilibriums where there are no labour supply shortages or surpluses, employers who systematically favour men over women – particularly in male-dominated areas such as core technical roles – discourage female applicants from staying and excelling in these areas. If specific industries and roles are constantly associated with males or the existing female labour force in the sector cannot find jobs due to stereotyping, prejudice or discrimination, women may feel excluded and experience limited or no opportunities for success; therefore, they might totally quit the labour market or switch to roles or other sectors, which may result in under-utilisation of their human capital. This may lead to further gender wage disparities and occupational segregation, also undermining their competitive position, since they are more likely to hold supporting roles rather than relatively well-paid ones. In conclusion, the tighter the labour market conditions (shortages of technically skilled labour, for example), the narrower the gender wage gaps, specifically for technical positions, and vice versa for non-technical positions.

(ii) Higher Wage Returns to ICT Skills for Women

ICT qualifications, skills and abilities, expertise and experience are highly valued in today's swiftly evolving technological advancements. The gender differences in the wage returns of skills and expertise may be the same or even higher for women in technical professions due to this high demand for technical labour. IT services can be monetised faster than a service produced by non-technical professionals in a digitalised world. For instance, fixing a client's computer may be seen a more straightforward outcome, but the long-term benefit of training a colleague in the HR department may not be perceived the same way. Krueger (1993) explores the effects of computer usage on the wage structure two and a half decades ago when the Internet had just become a public domain, and found that the workers who used computers at work earned 10-15 percent more. Despite a significant rise in the supply of computer-skilled labour during 1984-1989, no decline was observed in the wage differentials associated with computer use at work, suggesting a rapid increase in the demand for computer-literate individuals. The study further suggests that highly educated employees were more likely to use computers at work – hence the proliferation of computers – and could have accounted for at least one-third of the increase in the rate of return to education. The author concluded that the technological change (i.e., the diffusion of computers) had a substantial impact on the changes in wage structure.

Our finding in this study also confirms Krueger's study in the 1990s, and ICT literacy continues to positively contribute to employee wages today. In our study, the occupation variable from the total sample is divided into technical and non-technical positions. The essential difference between these two positions is the technical knowledge. Professionals who occupy technical positions, such as IT engineers in the ICT sector, are expected to have knowledge and understanding of modern technology that involves machines, systems, processes and materials. They have the ability to perform sophisticated technical tasks using their *hard skills* that are the results of their scientific knowledge. On the other hand, those who hold non-technical positions, such as HR, sales and marketing professionals, are required to have general knowledge and perform non-technical jobs using their *soft skills*. As a result, the technical and non-technical separation of the total sample with regards to wages in our study produced two primary outcomes: *(1)* technical professionals are paid a premium for their technical skills; and *(2)* female technical professionals get higher wage returns for their technical knowledge than their other skills.

Table 7.2 helps us understand the first outcome of how technical professionals are paid a premium for their skills. The table first shows that the higher wage differentials exist between technical and non-technical professions in the ICT sector. The share of participants earning below the minimum wage for non-technical positions is nearly three times higher than that for technical positions. Furthermore, there are 20 percent more professionals in technical positions who earn between ₺3,000–₺10,000 or ₺3,000–₺15,000 than in non-technical positions. Furthermore, although it is clear from the table that non-technical positions appear in the top wage bracket (₺15,000 plus) with 13.39 percent (non-technical) vs only 2.5 percent (technical); however, we still end up with 10 percent more professionals earning above ₺3,000 in technical than in non-technical positions. This implies that even those who are at the beginning of their careers but have technical knowledge or skills may be more likely to start earning above the minimum wage than those who do not have such skills (non-technical occupations) and who are more likely to start with lower pay due to the abundance of the generic labour supply.

Therefore, wage returns of ICT skills and expertise for employees, on average, are much higher for technical (hard) than non-technical (soft) skills, resulting in a higher wage premium, overall, for the former.

To explain the second outcome of higher wage returns for females in technical positions, we look at Figure 7.1. Although it is clear from our quantitative findings that the presence of women in technical positions in the sector is small – that the sector is not equal in terms of gender – it is, however, more equal in terms of earnings for technical positions. Technical roles have a flatter hierarchy compared to non-technical roles; therefore, women are mostly found in support roles in non-technical positions in our sample as opposed to men who are mostly in managerial positions, and this generates a higher gender wage gap. Figure 7.1 above demonstrates that the wage distribution for technical roles more closely resembles a bell-shaped curve where wages are normally distributed and concentrated in the centre, and the extreme values in both tails of the curve are smaller. Furthermore, the share of men and women in every wage bracket is almost identical. Although men earn more than women in the wage bracket of ₺10,000 plus, the gap is small compared to non-technical positions. For instance, we fail to see a higher presence of women (men) in the lower (higher) wage brackets. Therefore, proportionally distributed wages between men and women for technical positions imply a lower level of gender wage discrimination and also a lower level of occupational segregation for technical roles. In contrast, wage distribution does not create a bell curve for non-technical roles but a zigzag, where a higher presence of women (men) in the lower (higher) wage brackets can be observed. The share of men outnumbers that of women in the highest wage bracket, and the opposite is true for the lowest wage bracket. Therefore, women are better off in technical professions, since the ICT sector is one of the highest paying sectors in Turkey and also globally, and the deviation from the mean is smaller, but it is also equally spread as opposed to in non-technical roles.

In a nutshell, technical knowledge and qualifications are rewarded in the Turkish ICT sector regardless of gender. Women with ICT skills and expertise are paid similar wages to their male colleagues and are, in general, paid more than men and women in non-technical jobs when specific labour market conditions are met aforementioned above. Owing to differences in returns on endowments (i.e., human and workplace characteristics), they are more likely to be in the higher wage brackets and less likely to be working below the national minimum wage.

Therefore, labour markets, especially the ICT sector in Turkey, compensate women much better for their ICT skills, qualifications and expertise than their other skills, leading to a lower gender wage gap and lower occupational segregation in the sector. Equals' (2019) report also confirms our findings of a lower gender wage gap in technical positions than non-technical. Regardless of the sector, labour market returns are relatively higher for women possessing ICT skills than for men with the same. Similarly, the US Department of Commerce reports the gender wage gap is smaller in STEM (which can be referred as technical) occupations than in non-STEM occupations (non-technical). Both findings are in agreement with our findings in this study, which showed that the technical gender wage gap is smaller than the non-technical wage gap. Belgorodskiy et al. (2012), similarly, support our argument and suggest that the qualifications and skill set of ICT professionals that meet the technical requirements of their work are generally homogenous due to the sector being relatively new and well paid. Therefore, a narrower gender wage gap in the IT sector (referring to technical professions in the sector) is anticipated.

Therefore, careers in the IT field increase women's earnings and decrease gender wage inequality in the Turkish ICT sector. It is worth mentioning that along with the two primary reasons discussed above – labour supply shortages for technical roles, and higher wage returns for ICT skills for women for the large wage differentials between technical vs non-technical fields – bargaining power and negotiation processes are also more likely to end up in favour of women when their profession is technical rather than non-technical, as an indirect outcome of these reasons. Greater negotiation and bargaining power for technical female professionals contributes to lower gender wage gaps. Similarly, occupational gender segregation is higher in non-technical positions compared to technical positions; therefore, bigger wage gaps become inevitable in non-technical fields.

7.3 Non-Technical Positions

Non-technical jobs are mostly generic and broad in scope as opposed to technical jobs that are more particular and specialised in nature. Generic jobs usually have few basic requirements to meet – hence the high labour supply for these types of jobs – as they can mostly be done by any applicant with relatively basic training from a large pool of labour. However, specific jobs that require particular qualifications and intensive training have many requirements to fit before applying; thus, the labour supply for these sorts of jobs is significantly lower than for generic ones. Accordingly, generic jobs are often overcrowded mostly by women due to occupational segregation (Bergmann, 1974) with an employer who has access to a broader pool of potential candidates with fewer skills compared to specific jobs that are usually underpopulated with highly-skilled candidates.

After dividing our sample into technical and non-technical categories, our study clearly demonstrates that that there is still a persistent, large gender wage gap (40.5 percent) for non-technical positions, only 65 percent of which can be explained by our model, leaving a large portion of the gender wage gap (35 percent) unexplained. This figure is much greater than the technical gender wage gap (10.4 percent). Although Bergmann's crowding theory gives us an idea as to why there are more women present in non-technical positions (i.e., occupational segregation) and why overall wages are lower (which means there is a larger labour supply), it does not explain why there is a higher gender wage gap compared to technical jobs; i.e., women are paid less than men for their skills in non-technical roles.

The interview analysis from our study reveals that the motherhood penalty, occupational segregation, marriage compensation law, social norms and prejudice remain the central causes of this major gender wage gap for the vast majority of non-technical professions. To demonstrate, once a woman gains expertise and experience in the sector, the level of discrimination may be reduced or even disappear on the basis of the scarcity of her skills and experience regardless of her age, marital status or having children and so on. The more skill and experience she gains, the more valuable she becomes in the labour market; therefore, the aforementioned discriminatory factors may be overlooked by ICT companies. This is valid not only for technical roles, as discussed in the previous section, due to shortages of technically skilled talent and high growth in the sector, but also for some non-technical roles that are stereotypically female such as sales, HR, project management and so on, wherein women's presence is greater compared to other professions; this implies that discriminatory factors are insignificant.

The following section will address what triggers this wider, unexplained gender wage gap and will explore why these factors persist for the non-technical professions, but can be overcome for technical professions by the labour demand story, i.e., labour supply shortages and higher wage returns to ICT skills for technical professions. The key causes of the greater gender wage gap in non-technical professions will be argued in the remainder of the chapter, and they are as relevant as the reasons outlined for the lower gender wage gap in technical professions.

7.3.1 Discrimination in the Hiring Practices of Turkish ICT Firms

A considerable amount of literature has been published on gender discrimination in the workplace. However, gender discrimination is not the only social phenomenon that negatively affects women's attainment and progress in the workplace and women's empowerment in the public sphere. The term '*motherhood penalty'* is frequently used by researchers (Budig and England, 2001; Avellar and Smock, 2003; Williams and Cooper, 2004; Correll et al., 2007) to describe how working mothers are systematically disadvantaged in the workplace via lower wages, fewer promotions and career progression opportunities, and perceptions among managers and colleagues of women displaying lower competence, productivity and flexibility levels than working women without children and men.

The Turkish ICT sector is no exception to this worldwide phenomenon of the 'motherhood penalty'. Women are discriminated against depending on their marital status (e.g., being single, married or even being newly married) not only during employment but even during the hiring processes (hiring discrimination). The interview participants were asked three questions: '*How do you think married women or working mothers are perceived in the sector? Are there any concerns amongst employers that they may leave the firm/industry due to child-bearing duties? Do you think married women with/without children are disadvantaged during the hiring processes?*' Three broad themes emerged from the analysis of the participants' responses.

(i) Perceived Direct/Indirect Costs of Hiring Women with or without Children

Analysis of the interviews shows that employers, or HR professionals representing employers, find hiring women (with or without children) costly. This is particularly valid for non-technical professions. Even if employers decide to hire women, they offer relatively low wages in order to compensate for or minimise these perceived future costs of hiring women. It should be noted that the perceived costs of hiring women (with or without children) is one of the causes of the gender wage gap among non-technical professions, but it is overcome to a great extent among technical professions, as indicated by the lower technical-profession wage gap discussed in the previous section.

According to the current maternity leave legislation in Turkey (Turkish Labour Law, no. 4857), women are given 16 weeks of fully paid maternity leave with 8 weeks before and 8 weeks after the birth of a child[121] and a guaranteed job on their return (Çukur, n.d). This can be extended further for up to six months on an unpaid basis.[122] In the case of giving birth to twins or more, an additional two weeks can be given to the mother prior to birth. The law also does not require women to have worked for a certain period in order to be entitled to exercise these rights. Furthermore, since maternity leave is a legal right, the employer is not entitled to appeal. Additionally, women employees are granted 1.5 hours of milk allowance per day to breastfeed their infants up to the age of one, and this period is counted towards their daily working hours. Working mothers can also ask for a switch from full-time to a part-time work for up to five years when their children are of primary school age.

The statutory maternity leave payment, entitles the recipient to two-thirds of their monthly gross salary. This cost is borne by the Social Security Institution (SGK) in Turkey. To be entitled to maternity pay, the employee must be actively working at a workplace registered with the SGK as of the date leave begins (i.e., it covers formal sector employees only if they made a minimum of 90 days' premium payments in the last year prior to birth), should not work anywhere else during the leave period and the birth must occur. That is why, as long as the above conditions are met, if the employee does not return to work after the birth of their child, she does not lose her maternity pay but she may not be entitled to severance pay.

It is also worth comparing Turkey's paid leave entitlements with what is available to mothers in other countries. Along with paid maternity leave (all the countries in Table 7.3, except the US), mothers might be entitled to paid parental and home care leave; however, mothers in Turkey are not. Turkish women are entitled only to paid maternity leave that lasts 16 weeks – lower than the OECD average of 18 weeks – at 66 percent of their previous earnings. The OECD average for total paid leave available to mothers, including paid parental and home care, is 55.2 weeks, which is nearly 3.5 times more than offered in Turkey. In neighbouring countries (Greece, Bulgaria and Romania), paid maternity leave is higher, both with respect to the number of weeks (43, 58.6 and 18, respectively) and also the average

[121] Paternity leave in Turkey is 10 days for civil servant fathers and 5 days for worker fathers.
[122] Unpaid maternity leave can be extended up to 12 months for civil servants.

payment rate (54.2, 78.4 and 85 percent, respectively), except for Greece (54.2 percent), where the average payment rate is lower than that of Turkey (66 percent).

TABLE 7.3: Paid Leave Entitlements Available to Mothers

		Paid maternity leave			Paid parental and home care leave available to mothers[c]			Total paid leave available to mothers		
		Length, in weeks	Average payment rate[b] (%)	Full-rate equivalent, in weeks	Length, in weeks	Average payment rate[b] (%)	Full-rate equivalent, in weeks	Length, in weeks	Average payment rate[b] (%)	Full-rate equivalent, in weeks
		(1)	(2)	(3)	(4)	(5)	(6)	(7)=(1)+(4)	(8)	(9)
Australia		18.0	42.3	7.6	0.0	0.0	0.0	18.0	42.3	7.6
Austria	(b)	16.0	100.0	16.0	44.0	80.0	35.2	60.0	85.3	51.2
Belgium		15.0	64.1	9.6	17.3	20.2	3.5	32.3	40.6	13.1
Canada		17.0	48.4	8.2	35.0	54.9	19.2	52.0	52.8	27.4
Chile	(b)	18.0	100.0	18.0	12.0	100.0	12.0	30.0	100.0	30.0
Czech Republic		28.0	62.6	17.5	82.0	43.4	35.6	110.0	48.3	53.1
Denmark		18.0	53.6	9.6	32.0	53.6	17.1	50.0	53.6	26.8
Estonia		20.0	100.0	20.0	146.0	44.5	65.0	166.0	51.2	85.0
Finland		17.5	74.4	13.0	143.5	19.2	27.6	161.0	25.2	40.6
France	(b)	16.0	94.2	15.1	26.0	14.5	3.8	42.0	44.9	18.8
Germany	(b)	14.0	100.0	14.0	44.0	65.0	28.6	58.0	73.4	42.6
Greece		43.0	54.2	23.3	0.0	0.0	0.0	43.0	54.2	23.3
Hungary		24.0	70.0	16.8	136.0	40.4	55.0	160.0	44.9	71.8
Iceland		13.0	59.7	7.8	13.0	59.7	7.8	26.0	59.7	15.5
Ireland		26.0	34.3	8.9	0.0	0.0	0.0	26.0	34.3	8.9
Israel	(d)	14.0	100.0	14.0	0.0	0.0	0.0	14.0	100.0	14.0
Italy		21.7	80.0	17.4	26.0	30.0	7.8	47.7	52.7	25.2
Japan		14.0	67.0	9.4	44.0	59.9	26.4	58.0	61.6	35.8
Korea		12.9	79.5	10.2	52.0	28.5	14.8	64.9	38.6	25.0
Latvia		16.0	80.0	12.8	78.0	51.9	40.5	94.0	56.7	53.3
Luxembourg		16.0	100.0	16.0	26.0	38.4	10.0	42.0	61.9	26.0
Mexico		12.0	100.0	12.0	0.0	0.0	0.0	12.0	100.0	12.0
Netherlands		16.0	100.0	16.0	0.0	0.0	0.0	16.0	100.0	16.0
New Zealand		18.0	42.6	7.7	0.0	0.0	0.0	18.0	42.6	7.7
Norway		13.0	97.9	12.7	78.0	41.3	32.2	91.0	49.4	45.0
Poland		20.0	100.0	20.0	32.0	67.5	21.6	52.0	80.0	41.6
Portugal		6.0	100.0	6.0	24.1	59.6	14.4	30.1	67.7	20.4
Slovak Republic		34.0	70.0	23.8	130.0	23.0	29.9	164.0	32.7	53.7
Slovenia		15.0	100.0	15.0	37.1	90.0	33.4	52.1	92.9	48.4
Spain		16.0	100.0	16.0	0.0	0.0	0.0	16.0	100.0	16.0
Sweden		12.9	77.6	10.0	42.9	57.7	24.7	55.7	62.3	34.7
Switzerland		14.0	56.4	7.9	0.0	0.0	0.0	14.0	56.4	7.9
Turkey		16.0	66.0	10.6	0.0	0.0	0.0	16.0	66.0	10.6
United Kingdom		39.0	30.9	12.1	0.0	0.0	0.0	39.0	30.9	12.1
United States		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OECD average		18.0	-	-	37.2	-	-	55.2	-	-
Costa Rica		17.3	100.0	17.3	0.0	0.0	0.0	17.3	100.0	17.3
Bulgaria		58.6	78.4	45.9	51.9	37.7	19.6	110.4	59.3	65.5
Croatia		30.0	100.0	30.0	26.0	33.6	8.7	56.0	69.2	38.7
Cyprus	(e,f,g)	18.0	75.2	13.5	0.0	0.0	0.0	18.0	75.2	13.5
Lithuania		18.0	100.0	18.0	44.0	100.0	44.0	62.0	100.0	62.0
Malta		18.0	87.0	15.7	0.0	0.0	0.0	18.0	87.0	15.7
Romania	(b)	18.0	85.0	15.3	38.7	85.0	32.9	56.7	-	-
EU average		21.8	-	-	43.8	-	-	65.6	-	-
Eurozone ave.		19.1	-	-	41.4	-	-	60.4	-	-

Source: OECD (2016, p.3)

Employing a mother or a woman of child-bearing age is associated with direct and indirect costs in the workplace. The analysis of the interviews conducted in this study reveals that routine prenatal testing and screenings, paid and unpaid maternity leave, breast-feeding breaks and sudden absences due to child illness as well as the training costs for temporary replacements for employees taking maternity leave and expectations of low productivity and competence after their return are believed to create a heavy financial burden for the company's finances and an excessive workload for company employees who, most of the time, cover the duties of the working mother on leave, as employers often avoid hiring a temporary replacement for financial reasons.

An employer must comply with employment law regarding pregnancy as long as the candidate is in employment. However, anti-discrimination laws do not necessarily kick in before employment starts. That is, employers are not necessarily penalised for discrimination against women during recruitment processes if they choose not to employ a woman of child-bearing age. Recruitment processes themselves, which may involve subjective judgements, do not help either (Beattie and Johnson, 2012). It may be relatively easy for an employer to justify why they did not hire a female candidate than discriminate against them on the grounds of pregnancy during their employment.

On the other hand, these concerns are primarily based on the perception of the costs of maternity leave. To explain further, the financial cost of maternity pay, which is 66 percent of the potential mother's gross salary for 16 weeks, is borne by the Social Security Institution (SGK) and paid from the benefits for temporary incapacity fund in Turkey. However, the female employee does not receive the maternity pay during their leave period but at the end of the 16 weeks. Employers are under no obligation by law to contribute additional maternity pay. If employers opt to cover the maternity pay for their employees until the SGK pays the employee back, then they can claim the whole amount back from the employees. This is a common practice in Turkey. Similarly, if the employer's payment is higher than the SGK allowance, the difference may be kept by the employee as a 'favour' from the employer (Turkish Labour Law, 2014). Ultimately, the SGK reimburses all benefits paid by the employer under Law 506, article 48 on the basis of vouchers (EESC, n.d), except the amount paid by some generous employers as a top-up in order to increase the maternity pay of their employees. Consequently, the financial cost of the maternity pay to employers in Turkey is not as significant as they might think. The argument of not hiring female applicants on the basis of direct maternity leave costs is hence not only discriminatory but also has no validity.

Once an employee is entitled to maternity leave, her employer has no legal right to appeal it but must abide by employment law. However, the employer can decide whether to employ a temporary replacement during her absence. It is, often, a common practice for employers in the

Turkish ICT sector not to find a temporary replacement. Employers may be reluctant to bear training costs and wages for the replacement; therefore, they often distribute the duties of the worker on maternity leave among the existing staff at the company. This may lead to an excessive workload for the existing staff, long working hours, unpaid overtime, accumulation of negative feelings towards the employee on maternity leave, and job dissatisfaction. If the employer decides to temporarily appoint a maternity cover replacement, then there may be additional costs involved in recruiting and training them. As a result, the real costs fall significantly on the existing employees of the company rather than being fully borne by the employers.

Interviewees were asked '*Do you think married women with or without children are disadvantaged during the hiring processes*?' and '*Are there any concerns amongst employers that they may leave the firm/industry due to child-bearing duties?'* Both men and women, regardless of whether they worked for domestic or foreign companies or whether they were employees or employers, agreed that a woman's biology is an important factor in the hiring process and women are repeatedly discriminated against because of this during hiring processes. The interviewees' quotes clearly reflect the discrimination against women during hiring processes.

A female sales professional who had just returned from her maternity leave, clearly advised,

> "It is very important to enter into the sector as single in order to be trusted by the employers. If you are looking for a job when you are married, becoming pregnant in few years and taking time out of employment is not well received. Particularly in the ICT sector, everything changes too fast and if you don't keep up to date for six months, you are running behind a lot. Hence, you need to get married and have children after you have some experience in the sector. If you are married or have children, then you need to give assurance to the employer that you will do your work very well and having children will not affect your performance."

One female ICT sector employer put it this way:

> "Sure. They (employers) see married woman/woman with children as a burden. Even in some companies, I heard that women are fired when they become pregnant, or they fire a woman who is planning to get married, since they (employers) think that she may practise the marriage compensation law. In short, these are disadvantage for organisations and it is abused (by firms)."

When asked "*How do you feel about this practice as a female business owner*?" she expresses:

> "Of course, it is not right! However, the burden on employers in Turkey is also too high. The taxes, labour burden, being competitive, costs etc. are all straining employers. Even if the employers know that this is not the right thing to do, they are still doing inhuman practices in order to protect majority's wellbeing."

A male HR professional expressed,

> "During the hiring processes, female candidates' status becomes important. *Is the female candidate in the stage of giving birth? Does she plan to have a baby? If she goes on maternity leave, how would this affect her performance after her return?* These questions are considered a lot."

However, the comment below is the one that summarises a perception of motherhood in the sector that assumes child-care is a permanent holiday.

A male manager comments on the issue:

> "Women want to quit their jobs by themselves. They say: '*That's enough! I worked hard. I am tired. You (*to their husbands*) work and I will take care of the kids*.' Women have this option; I don't think men have this luxury."
>
> When asked "*Do you think women choose this option themselves or are they pushed towards this*?" he explains:
>
> "No!!! They are choosing this with pleasure! Imagine this as you are going on holiday with your child. Some choose this as a short-term break, some permanently. If the family has financial security, the life pressure is reduced on the family, they (working women) are starting to ask why to struggle."

This quote from the male manager draws our attention to a few issues that women experience in the ICT sector. One is the manager's faulty perception of child-rearing activities, as he strongly believes that the bearing and caring for children is a holiday for women, when in fact, it is a serious long-term, ongoing commitment that is unpaid and primarily performed by women in the patriarchal Turkish society. It is mostly undervalued, overlooked and not considered as a full-time job in its own right. As a result, men are regarded as significant figures in the society who do the 'important' job, while women only step in when needed. Secondly, the male manager goes on to say that women have the luxury of quitting their jobs due to childcare, while men do not. The manager might have a point with regards to women's 'flexibility' and expected desire to quit the labour market as different from the experience of men; however, this view has its own flaws. To demonstrate, the domestic duties that are necessary for the welfare of the family such as planning and providing for their needs, care of children and the elderly, cooking, cleaning and so on are not equally distributed between men and women in Turkish society; men are still expected to be the primary earners, while women are the primary carers. Thereby, the perceived 'luxury' of quitting the labour market, in fact, reaffirms the position of women in the family as the secondary contributors after men and underestimates the complexity and challenges of caring for children and the elderly. Women are positioned in society by men, who mostly deliver production, as helpers who step in when they are needed. Even if women take part in production, they receive lower wages as a result of this secondary role relative to men, since their work is undervalued. Finally, what the male manager also fails to take into account is that working women with children do not only work in the labour market but continue to work at home providing care for children and the elderly and completing housework. Even if the labour market conditions were equally adequate for both men and women (i.e., no gender wage gaps, equal promotion and training opportunities, and gender-blind hiring processes) women might still ask '*why struggle?*', as the male manager remarked, due to their second job at home. Therefore, they may be more likely to consider quitting their jobs due to the traditional gender-based division of labour. They may even quit the labour market owing to their guilt around not spending enough time with their kids as mothers, which society imposes on them as the primary carers. Although quitting the labour market may first appear as a 'luxury' women can enjoy, it could actually indicate the significant long-term sacrifice expected of women. Quitting the labour market comes with costs in the long run: lower family income, forgone severance pay, decreased savings and retirement income, financial dependency on other family members, lack of health insurance and even mental health or self-esteem issues.

In conclusion, household work, economic activities or care of children and the elderly should be considered the equal responsibilities for both men and women in Turkish society, along with paternity leave, better childcare facilities, child support from the state and an abundance of part-time job opportunities for both men and women. These measures would surely benefit women via career development, higher financial stability and increased retirement income, but also benefit men in various ways. Not only can fathers spend more time with their children through the equal distribution of care work, but shifting the burden from men as primary providers to women may provide the flexibility men need to quit the labour market when it becomes unbearable, allow their other halves to take financial responsibility for the household and also both enjoy a more balanced family and work life. Finally, the hiring process should be gender-blind and purely based on qualifications, skills and the professional experience the applicants bring regardless of their sex, marital status, age or whether they have children. Gender blindness during hiring is of fundamental importance, since labour-market discrimination is more frequent during the recruitment process (Rinne, 2014), and preventing any type of bias, prejudice or discrimination at the point of hire is the best way to start to solve the issue. Similarly, group inequalities should be fully eliminated, as it has been widely acknowledged that it is in the best interest of the companies to promote equality at work via diversity and inclusion, since diverse teams in terms of age, ethnicity, and gender are more creative and perform better (Krishnan and Park, 2009; Herring, 2009; Rohner and Dougan, 2012; Hoogendoorn et al., 2013). To illustrate, Reynolds and Lewis (2017) have run an execution exercise around the world more than 100 times over the last 12 years, working with senior executives, MBA students, general managers, scientists, teachers and teenagers. They challenge the idea of 'more diverse teams regarding gender, age and ethnicity perform better' by stating that it is not these characteristics that boost creativity and performance, but the resulting cognitive diversity, which is defined as 'differences in perspective or information processing styles' (p.2). This implies that favouring men over women in the workplace does not guarantee improved performance but certainly diminishes the likelihood of reaching out to the greater pool of individuals with specific skills and expertise because they represent specific groups in society by gender, age, race and so on.

(ii) The Hierarchies of Discrimination in the Turkish ICT Sector

One of the themes that emerged during the semi-structured interviews was '*severance pay for newly-married women*'. Despite not being asked, a majority of the research participants reported their views and experiences regarding the issue during the discussions around hiring newly-married women. Article 14 of the Labour Act no. 1475 dictates that employees have a right to severance pay under prescribed conditions,[123] one of which is severance pay for newly-married women (hereafter, *marriage compensation*). By law, an employee who resigns voluntarily cannot be entitled to severance pay; however, the marriage compensation law allows newly married women with at least one year of employment to voluntarily terminate their employment contract because they are married, within one year of the date of the official marriage. This is not option provided to newly married men. This severance pay, which is covered by the employer and not the state, is equal to the employee's last gross monthly salary multiplied by their years of service in the company and transferred from employer to employee as a one-off payment. The upper limit for severance pay was ₺6,017.60 per year as of June 2019.

[123] For reasons such as death of an employee, compulsory military service, old-age pension, health issues, being newly-married for women or the termination of the employment by the employer outside the rules of morality and goodwill, employees are entitled to severance pay according to the Labour Act no. 1475.

It was observed during the semi-structured interviews that the marriage compensation law was considered by both male and female employers as a drawback when employing newly married women or women of a marriable age. Some participants expressed strong views about the issue, noting that the marriage compensation law makes women's labour force participation in the ICT sector even harder, as they are constantly quizzed during the recruitment processes about their marriage plans. The widely held view amongst interviewees was that the marriage compensation law is very often, if not always, taken into consideration by employers during recruitment processes.

One female business owner pointed out,

"The other issue is that, you can be eligible for a marriage compensation within the one year of your marriage. '*My husband does not allow me to work, give me my compensation, I am terminating my contract…*' This is the most nonsense thing I have ever heard in my life. I believe that it is humiliating women, and I don't know any women who don't practise this."

When she is asked "In what ways does the marriage compensation law humiliate women?" she explained as:

"If the same law is also in practice for men, agreed. If a man can also say that '*My wife doesn't allow me to work, give me my compensation*', then it is OK. On top of it, after a newly-married woman quits her job and gets her compensation, she can go and work for another firm, but I end up paying the compensation."

A male employer commented:

"There is a marriage compensation in Turkey. To me, it (marriage compensation) is women's legal rights. They (women) should practice it. In the end, the State gives this right to women."

When asked "*Do you think that women are using the marriage compensation law as a trump card?*" he replied by saying that:

"Are they using it as a trump card? (Thinking). Let them use it. As an employer, you should regard a newly-married woman as a potential leaver, especially if they have accumulated compensation. Employers can do nothing about this. Practicing this marriage compensation is even easier in our sector, as oppose to other sectors which women may not find jobs after they quit, since the unemployment is quite high in the country, but in our sector someone with 3-5 years of experience in SAP (Systems Applications and Products) consultancy can find a job very easily. For this reason, they immediately quit their jobs to be eligible for this compensation."

Additionally, the marriage compensation law is exercised by newly married working women in the sector, not necessarily on the grounds of receiving accumulated funds or their husbands' unwillingness to 'allow' them to work, but mostly owing to job dissatisfaction from lower wages, lack of feedback and recognition, limited training and development opportunities, unfair and/or unclear performance reviews and so on. No other reason than being newly married needs to be given to utilise this law from the woman's perspective. As one female interviewee summarised this tendency,

> "I don't hold with married women with/without children getting discriminated against. Yet, there are also women who leave the firm not because their husbands don't want them to work, but to receive marriage compensation. I don't find that ethical. However, if the companies really appreciate their employees, women would not have to use this law. Women are using this law due to the HR policies of the companies. So, the companies should not think that women are leaving due to marriage compensation. They need to see the real reason."

Young single female applicants (below 35 years of age)[124] are favoured over newly-married women and married women without children due to the possibility of the marriage compensation law being activated and the perceived costs of maternity leave. The vast majority of females who work in technical positions (92.7 percent) were below the age of 35 as opposed to those in non-technical positions (61.3 percent). Likewise, the percentage of single females was much higher (67.2 percent) in technical positions than in non-technical ones (45 percent). As a result, the percentage of females who are young and single in technical positions was double (65.2 percent) those in non-technical positions (33 percent). This may indicate that females who are young and single are more likely to hold the necessary skills for the ICT sector than those who are over 35 with children. Therefore, we cannot conclude that women above 35 are discarded from technical professions because of their sex; rather, it is very likely because of their inferior ICT skills compared to those of their younger female counterparts.

The analysis of the interviews demonstrates women's ability and willingness to work overtime is a further important factor. This has been perceived as affected by '*invisible'* factors such as the husband's educational level, his reaction to overtime and even his own occupation. To be more specific, a highly educated husband is more likely to be understanding and accepting of mandatory or voluntary overtime, working nights, weekends and holidays or on emergency call outs. Similarly, if a husband also works in the same sector as an ICT professional or in an industry with similar requirements such as being a doctor in an emergency unit in healthcare, he is more likely to be supportive and less intrusive about his wife's overtime routine. Furthermore, a woman arriving home late or leaving the house late at night as a matter of course may feel unsafe if no private transportation is provided by the employer. Similarly, coming home late or leaving the house at night may be perceived as inappropriate by the husband, other family members or even neighbours, thereby putting pressure on women to take

[124] 67 percent of female and 54 percent of male technical professionals are single in our study.

on more socially and culturally expected gender roles with ‘appropriate hours’. Depending on the location, educational level of surroundings and even the wealth of the family, this pressure may be reduced for single women.

A male software developer explains:

> “If overtime is not a common practice in companies, hiring a married woman with/without children may not be an issue for these companies. But, sometimes, if husbands (of female professionals) prefer them not to come home at night (due to overtime), women may not want to work for the companies with overtime requirements.”

To sum up, any woman is discriminated against during the hiring process in the Turkish ICT sector in non-technical roles, whether she is single, newly married, of child-bearing age or a mother already due to the perceived costs of maternity leave or the real cost of marriage compensation law, unless these non-technical roles are fully associated with women such as HR. That is to say, women are being assessed not only on the basis of their qualifications, skills and experience, but on personal characteristics such as age, marital status, whether they have children and so on. However, the scale of discrimination differs between these groups. Young single females (around 18 to 25) are the most favoured group as they are less likely to get married in the near future, more ambitious about their career plans, presumably more productive and committed to their work and able to work overtime during nights and weekends, to travel freely and to cope with the long working hours that are associated especially with the IT industry. Newly married women or single women of marrying age are the groups discriminated against the second most frequently owing to the possibility of invoking the marriage compensation law. Discrimination against women in the Turkish ICT sector is highest for married women without children, who are not in the labour market due to the perceived costs associated with maternity leave and absences due to child rearing.

This statement from a female industrial engineer outlines this pattern:

> “I had a colleague who was dealing with recruitment used to say, “*If a candidate is married, newly-married or has plans to get married, I have hesitations. They may want to work to get paid during maternity leave and also get insured. Six months later, they may go on maternity leave. Hence, I prefer not to hire women. If she is a new graduate, not a problem, but I don’t recruit someone who is newly married and around her 30s.*”

The interview analysis also reveals that discrimination against these groups may be in the forms of ‘gender’ or ‘intra-sex’ discrimination. To illustrate, assuming that there are three female candidates for a job interview, all of which have similar observable human and workplace characteristics such as education, experience and so on, a single candidate has a powerful advantage to be hired over a newly-married or a long-married woman without children. Now, consider a similar setting with four candidates, one of which is male, a male candidate may have a significant advantage over all of the previous three female candidates (gender discrimination). Even the young singles experience discrimination. Both of these scenarios may be practiced during the hiring processes mostly for the non-technical positions, as it becomes insignificant for the technical positions under labour supply shortages in high growth environments. However, the reverse may appear 'in favour' of women for those such as non-technical (sales and HR positions), entry level or support roles. Accordingly, for better paid positions such as technical or managerial, women are subject to discriminatory practices among themselves as well as against their male counterparts, depending on whether they are single, newly married or long married without children.

Finally, one might question how discrimination in hiring practices as a result of perception of direct and indirect costs of maternity leave and marriage compensation law contributes to the gender wage gap in the ICT sector of Turkey if women are not even hired in the first place. In order to answer this question conclusively, one must consider two possible scenarios that may arise owing to the existence of discriminatory hiring practices across the ICT firms in the sector. In the *first* possible outcome, a biased recruitment manager favours one sex (say, male) over another (say, female), resulting in a job loss for the latter. The disadvantaged sex (female) then seeks similar job opportunities suitable for her skills and expertise in the sector but continues to face similar discriminatory practices. As a result, she may choose underemployment in or across other sectors in order to meet her economic needs or overcrowd certain sectors primarily associated with women. This leads to lower earnings, gradual obsolescence of her skills and talents and eventually to higher gender wage gaps in and across the sector(s); she may completely quit the labour market *or* she may choose never to participate in the labour markets at all as a result of anticipated unfair treatment, resulting in lower FLFPR. In the *second* possible outcome, despite the discriminatory practices during the hiring process, a female candidate's superior skills and qualifications result in her employment. However, the female employee may still be penalised because of the expectations of the recruitment manager over future costs of maternity leave, the possibility of exercising her rights in marriage compensation law, her overall (perceived) 'inferiority' compared with men in terms of her talents and expertise (despite being employed), her expected lower productivity and higher staff turnover. In order to compensate for these perceived future losses, the female employee may be offered lower wages and provided with no or fewer training and promotion opportunities than her male colleagues. Consequently, both scenarios of discriminatory hiring practices lead to lower earnings for women as a result of *(1)* the crowding effect from the first scenario; and *(2)* lower pay due to weak bargaining power and negotiations in the second scenario.

(iii) Bargaining Power and Wage Negotiations

The art of bargaining is a long-established tradition in Turkish history that goes back to the ancient trade channel, the Silk Road, which linked the East with the West and enabled the exchange of various goods from silk and salt to porcelain and rugs and from precious metals to horses. Despite today's non-negotiable price-tag culture, Turks still practice haggling as a day-to-day ritual in almost every aspect of their social and business lives. Wage bargaining during the hiring process, however, is even more common in the Turkish labour market than social bargaining; non-negotiable price tags are mostly inevitable in retail outlets and department stores, but the great majority of job postings in Turkey, regardless of the sector, do not list pay or salaries, leaving immense room for wage bargaining during recruitment processes.

The majority of the existing literature on wage bargaining can be divided into two groups: centralised wage bargaining (McDonald and Solow, 1981; Calmfors, 1993; Moene et al., 1991; Alexopoulos and Cohen, 2003; Hirsch et al., 2014) and decentralised wage bargaining (Blanchard, 1991; Lindbeck, 1993; Granqvist and Regnér, 2008; Janssen, 2018). In centralised wage bargaining, there is a strong presence of trade unions and employers' federations who set the wages as opposed to decentralised wage bargaining, whereby individual firms and workers bargain over wages on an enterprise level (Reiersen, 2001). North America and Japan are considered as highly decentralised wage settings, Nordic countries and Austria highly centralised bargaining; other countries (France, Belgium, Italy, Germany and the Netherlands) sit between the two and mainly bargain at the industry level (Calmfors, 1993; Reiersen, 2001; Caju et al., 2008). Scholars emphasise that collective contracts and works councils reduce the gender wage gap (Gartner and Stephan, 2004) and a decline in collective wage bargaining has led to a strong rise in wage bargaining in Germany (Antonczyk et al., 2010). Muthoo (2000) suggests that due to the asymmetric information, wherein at least one player knows more relevant information than the other, knowledge becomes a genuine power in wage negotiations in favour of the informed. Cahuc et al. (2006) detect that intermediate or low-skilled workers have no significant bargaining power as opposed to high-skilled workers, who have modestly positive bargaining power. Furthermore, high-skilled workers receive more outside offers than less-skilled workers. The findings of Cahuc et al. (2006) support our argument that the gender wage gap is lower in technical positions where employees are regarded as highly skilled and have positive bargaining power.

Although legalisation of trade unions started in Turkey in the early 1960s (Ünal and Köse, 2018) and one-quarter of workers[125] were protected by collective bargaining by the end of the 1980s (Birelma, 2018), unionisation remains at a very low level in Turkey (Birelma, 2018; The Hürriyet). According to the Ministry of Labour and Social Security, there were 1.5 million workers unionised out of a workforce of 13 million in 2016, representing an 11.5 percent unionisation rate, leaving nearly 90 percent of workers without a trade union or collective agreement. However, according to DİSK[126], the rate is underestimated, since it does not take into account unregistered workers. Collective bargaining is more common in banking and finance, insurance, energy and general affairs, and less so in tourism, office and retail work, construction, education, health, social services, journalism and textiles. The unionisation rate for male workers (13 percent) is nearly twice that of female workers (7 percent). Despite having the highest number of workers, İstanbul has one of the lowest unionisation rates, according to DİSK-AR's (2019) report. According to the ITUC Global Rights Index, which ranks over 100 countries against 97 internationally recognised indicators to assess whether workers' rights are best protected in law and practice, Turkey was ranked in the fifth category, where 'there is no guarantee of rights' (Fair Wear Foundation, 2016, p.19), and listed as one of the worst countries for working people as a result of prosecutions of workers and arrests of trade union leaders (ITUC Global Rights Index, 2019, p.27).[127]

[125] 'There is a clear legal distinction between workers and civil servants in Turkey. All employees except civil servants are defined as "workers" by Turkish Labor Law 4857. Workers and civil servants work under different labor laws (4857 and 657) and organize according to different union laws (6356 and 4688). The main difference in the labor laws of workers and civil servants is the much greater job security of civil servants compared to workers; nevertheless, civil servants are not allowed to strike.' (Birelma, 2018, p.3)

[126] DİSK (The Confederation of Progressive Trade Unions of Turkey with 160,568 members) is one of the major trade unions in Turkey along with Memur-Sen (1,010,298), Turk-Is (958,618), Hak-İş (654,000), Türkiye Kamu-Sen (394,423) and KESK (146,287 members) (Birelma, 2018, p.5).

[127] Other countries included Algeria, Bangladesh, Brazil, Colombia, Guatemala, Kazakhstan, The Philippines, Saudi Arabia and Zimbabwe (ITUC Global Rights Index, 2019, p.6).

Decentralised wage bargaining[128] culture, whereby wages are negotiated by an employee and employer at firm level, is one of the most significant factors that widens the wage differential amongst individuals in the same positions in the ICT sector, since the presence of trade unions is little to none. Trade union activities are particularly negligible in the information technology industry, as opposed to the communications industry, where union density among formal workers lies at 21 percent. One might wonder how the presence of wage differentials for the same roles, regardless of sex, influences the gender wage gap in the Turkish ICT sector. To address this, women are penalised more than men in Turkey with regards to wage differences for the same line of activities; i.e., wage differences for the same positions between intra-sex groups (say, men) are smaller than those across genders. According to the DİSK (2019)[129] report, based on the Turkish Social Security Institution statistics on gender inequality and the national minimum wage, the ratio of average earnings of men and women operating in the same line of business to the national minimum wage varies. Male workers, on average, earn 10 percent more than the national minimum wage in all branches of activity. The gender wage gap is highest among the clerical support workers and human health services,[130] where female workers outnumber male workers. The ratio of average earnings to national minimum wage, for men and women, is observed at 128 percent and 82 percent for clerical support workers and 101 percent and 60 percent for human health services, respectively. Similarly, various studies (Blau and Kahn, 2017; Bear and Babcock, 2012; Belgorodskiy et al., 2012; Stuhlmacher and Walters, 1999; Kaman and Hartel, 1994; Stevens et al., 1993) report that men outperform women in negotiation skills; they are more likely to be active in salary negotiations and also have higher wage expectations than women, leading to higher gender wage gaps. Therefore, decentralised bargaining practices are an important source of the larger gender wage gap in the ICT sector for non-technical positions. Card et al. (2015) also support our argument and state that firm-specific pay premiums contribute to the gender wage gap if women are offered worse terms when wage bargaining than men or if women are less likely to work at high-paying firms.

[128] Although decentralised wage setting is common in Turkish labour markets due to lack of strong trade unions across all sectors, there is a mandatory national minimum wage set by the Minimum Wage Determination Commission, which is composed of workers, employers and government representatives. The national minimum wage was first introduced in 1951 and the National Minimum Wage Determination Commission implemented in 1969 before spreading across Turkey by 1989 (Kaplıca, 2016; Ocal and Karaalp-Orhan, 2018).

[129] DİSK stands for the Confederation of Progressive Trade Unions of Turkey.

[130] See ISCO-08 for the standard qualifications of occupations at https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_172572.pdf. Accessed: 08/07/19

In order to demonstrate how the gender wage gap widens for non-technical positions in terms of wage negotiations and bargaining power in the Turkish ICT sector, we start by examining the job ads on the labour market. It is rare to see any wage/salary information on job ads.[131] This being the case, it is also evidenced from the interview analysis that a company's internal or external recruitment team, regardless of the sector, seeks out qualified candidates. Job seekers then apply for the positions not knowing whether the salary offered by the company is, in fact, in line with their economic needs. The applicant screening procedure is followed next by the recruitment team to unpick the most suitable candidates from thousands of applications, which is a burden for the recruitment team owing to time and resource constraints. The suitable candidates are then subject to a series of steps from pre-employment tests, medical, credit or background checks, and various telephone and face-to-face interviews, depending on the company hiring. A small pool of top contenders is then interviewed further by the senior leadership of the company. Salary bargaining mostly takes place at this stage, which is critical for the top candidates; i.e., the information asymmetry between the employer and candidate regarding the wage for the role creates two specific risks for the interviewee. If the candidate indicates higher wage expectations than the company hoped for, then they might not get the job. If it is the opposite is true, then they might end up working for a wage that is well-below the market rate. Thus, possessing exceptional bargaining skills becomes crucial for ensuring a salary at least at market rates or even higher for the job seekers in the Turkish labour markets.

There are *four* primary reasons that emerged from the interviews for this deeply rooted practice of not including wage information on job postings in the ICT sector. *First of all*, wage uncertainty allows firms not only to attract candidates but also very talented candidates who otherwise would not be reached.[132] Alternatively, short-listed candidates who are subject to various steps may become exhausted due to the time and effort they have devoted to the hiring process; thus, they may be more willing to accept a job offer even if it is lower than their real wage expectations so as to avoid similar job hunting processes with other companies. As a

[131] See the most popular jobsites in Turkey for wage disclosure for reference in anywhere in the country, in any sector, occupation or position. https://www.kariyer.net/; https://www.yenibiris.com; https://www.secretcv.com; https://www.eleman.net/; https://esube.iskur.gov.tr

[132] Research done by Brencic (2012) examining wage posting in job ads in the US, the UK, and Slovenia also found that 'the most notable empirical finding is that employers were more likely to post a wage offer in their job ads when they were less concerned about attracting an adversely affected pool of job applicants, that is, when a recruitment agency screened the job applicants, when the opportunity costs of the search were high (i.e., the job ad indicated that the job had to be filled immediately) and employers were therefore less likely to be selective, or when employers aimed to hire workers with fewer skills or with skills that were easier to observe and measure' (p.1531).

result, the company succeeds in maximising the benefits from top talent and minimising the cost via lower wages; the gap between the benefits and costs widens even further in favour of the given company during financial crises or recessions.

Secondly, wages for the same position in the same company differ among company employees regardless of their sex in the ICT sector. To illustrate, a new employee may be offered a much higher salary for the same position than existing workers in the company, depending on the labour market conditions, such as labour supply shortages, job vacancies or unemployment rates. Considering the current labour market conditions in the Turkish ICT sector, new employees in technical professions are more likely to be offered higher wages due to labour supply shortages. The culture of wage confidentiality in the sector also makes this possible. However, our findings regarding the gender wage gap in terms of technical vs non-technical professions – i.e., narrower for technical and much wider for non-technical positions – makes it clear that this is much bigger issue in non-technical professions, where labour supply surplus is prevalent. In order to eliminate any dissatisfaction or possible resignations by existing qualified employees owing to wage differentials for the same positions, the company chooses not to disclose salary information on the job listings. To ensure that the higher paid new employees do not cause any inconvenience in the work place such as compulsory pay rises for existing employees or negative fairness, remuneration or even resignation discussions, employees at many companies in Turkey are strongly advised to keep salary information confidential. Again, this was the primary reason why salary ranges instead of precise salary data was collected in this study despite the participants being informed the survey was anonymous. In some cases, salary disclosure may be considered grounds for the termination of an employment contract by some Turkish employers. The wage-setting practices in the Turkish ICT sector is in line with Card et al. (2015), who suggest that market-level supply and demand factors determine wages rather than wage-setting policies at particular firms in the traditional competitive labour markets. Therefore, wages differ among employees who work in the same positions, regardless of sex, and that widens the gender wage gap in the ICT sector. When asked '*Does equal pay for equal work exist in the ICT sector?*' a female HR professional strongly expresses her disapproval of the situation:

> "There is no such thing…we (companies) pay for the individuals, not for the jobs…it depends on how much the employee needs the job…Say, I have five existing employees paid at TRL 4,000pm and am looking for another two to join the company. One of the top two candidates is already working for another institution for TRL 4,500pm and negotiating strongly and the company is offering the amount she wants. The second candidate who is perhaps much more skilled than the first candidate, expecting TRL 4,000pm, is currently unemployed, in need of a job, and perhaps has family, children, an ill mother…Plus, s/he is calling and showing enthusiasm and willingness to start urgently. Once the company is sure of the second candidate that the job offer will be accepted, it offers TRL 3,500 and the second candidate agrees to it."

Thirdly, considering the fact that the objective of the most companies is to maximise their profits, wage asymmetry in the Turkish labour markets opens the doors wide to profit maximisation, as employee salaries are still one of the prime overheads in most traditional companies' income statements. During the very first stage of job applications, the majority of companies require applicants to state their salary expectations. Not knowing the salary range or the wage policy of the company and to avoid being eliminated at the very beginning of the process, applicants may be willing to lower their salary expectations in order to be shortlisted for the job or may accept whatever the company proposes for the position, if they are in a desperate financial situation. This situation is particularly relevant for those who have generic (i.e., non-technical) skills and aware of the fierce competition owing to the labour supply surplus for these roles. As a result, the hiring firm may even lower their non-disclosed salaries depending on the wage expectations of potential candidates because of the employer's higher bargaining power when compared to other potential candidates via non-disclosure practices. However, a potential candidate with ICT skills is often aware of the labour supply shortages for technical skills in the sector. Hence, they are more likely to keep their salary expectations much higher, regardless of sex. This is also evidenced from our quantitative data, which reports that technical professionals earn wages roughly 7 percent higher, on average, than non-technical professionals.

Fourthly, wage confidentiality also brings an illegal advantage for some companies in the ICT sector and other sectors in Turkey. According to a report published by the Central Bank of Turkey (2019), about two-thirds of the total employment in Turkey consists of paid and casual employees, half of which are paid an amount around the national minimum wage or lower. To illustrate this point, as there is a government-mandated national minimum wage in Turkey which needs to be paid directly to the workers' bank accounts for companies employing more than 10 workers,[133] some companies do not provide the actual wage data that they pay for their formal employees but a lower figure. For instance, a company secretly agrees with a new or existing employee to pay, e.g., ₺5,000, for their work but only pays the national minimum wage (₺2,020) via bank transfer and the rest in cash. This allows the employer to pay a lower employer share of the social security premium, which is not based on the actual salary paid but based on the national minimum wage. Even worse, some companies employing subcontractors in the public sector pay their 'formal' employees the national minimum wage via bank transfer, but secretly take back part of this pay in cash. Thus, these employees are paid at the national minimum wage in theory but earn less than national minimum wage in reality (Cini, 2018). Despite the existence of fines and prison sentences by law against these unlawful practices, it still exists at a fair scale in the economy. As a result of these informal practices in the 'formal' sector, the employee receives low severance pay and a low retirement income in the long term. It is worth noting that the fourth point is also a more serious issue for non-technical rather than technical professions due to the labour market conditions discussed above.

In conclusion, in terms of the higher wage returns of ICT skills and expertise, professionals who work in technical positions have much stronger bargaining power than those in non-technical roles. The bargaining power of female employees in technical positions is much higher than those in non-technical positions, regardless of gender. Furthermore, the exclusion of salaries from job listings serves as a chief factor in the concealment of unfair wage practices within companies and also shifts bargaining power in favour of the employers. Gender wage gaps that widen through wage negotiations and bargaining power can be largely overcome in technical positions due to the reasons discussed above, but this continues to be one of the most significant factors affecting larger gender wage gaps in non-technical positions, since non-technical candidates are more likely to start with lower pay and negotiate less often over pay and overtime. Therefore, so as to decrease or eradicate the gender wage gap in the ICT sector, as well as on the national level, disclosure of wage information on job sites, the elimination of wage negotiations during the hiring process, and greater wage transparency policies during employment are vital for the Turkish labour market.

[133] The net fixed national minimum wage in Turkey was ₺2,020.00 per month in 2019 (appx €422 per month).

7.3.1.1 Educational Mismatch in the Turkish ICT Sector

Given that one of the main drivers of gender pay inequality in the Turkish ICT sector is the discriminatory hiring practices, as identified in this study, it is also necessary to further examine whether women are more likely to be under- or overqualified for the positions they hold in the ICT sector. The identification of mismatched persons is significant, since the mismatch negatively affects the earnings, productivity, motivation, job satisfaction and absenteeism of the worker. For example, the overeducated are more likely to be unsatisfied with their jobs than their undereducated or well-matched counterparts, and therefore more likely to search for alternative employment (ILO, 2014/2018b). Furthermore, a large body of international evidence reports a wage penalty for overeducation (Korpi and Tahlin, 2009; Pekoraro, 2014; Nieto and Ramos, 2017; Wu and Wang, 2018). Wu and Wang (2018), citing Hartog (2000), state that 'the return of education for the overeducated is about half to two-thirds of the return to that of the well-matched, while the penalty for undereducation is somewhat smaller.' (p.1). The International Labor Organization's framework, based on ISCO-08/88 codes[134] in HLFS, is utilised to measure the degree of the qualification mismatch in Turkey's ICT sector.[135] According to ILO (2018b), qualification mismatch occurs when a person in employment during the reference period, occupies a job whose qualification requirements do not match with the level of qualification the person holds. One form of qualification mismatch which emerges is when the educational level of a person in employment does not conform to the level of education required to perform their job.

Table 7.4: Educational Mismatch by Sex (ISCO-based, %), Turkish ICT Sector

	2005		2010		2015		2019	
	Male	Female	Male	Female	Male	Female	Male	Female
Undereducated	19.6	11.0	15.1	5.9	11.6	3.8	10.5	5.7
Overeducated	41.7	46.8	42.0	51.3	37.9	51.2	38.9	41.7
Total Mismatch	61.3	57.8	57.1	57.2	49.5	55.0	49.4	47.4

Source: Author's own calculations using HLFS for the selected years.

[134] "The International Standard Classification of Occupations 2008 (ISCO-08) is a four-level hierarchically structured classification that covers all jobs in the world…ISCO-08 provides a system for classifying and aggregating occupational information obtained by means of statistical census and surveys, as well as from administrative records. It is a revision of the International Standard Classification of Occupations 1988 (ISCO-88), which it supersedes." (ILO, 2012, p.3)

[135] First, the occupations from the HLFS survey sample are matched with the International Standard Classification of Occupations (ISCO 08) such as managers, professionals, technicians and so on (see appendix 8, p. 326). The level of education of each sample observation is then cross-matched with the required educational qualifications (ISCO-08). If the level of education to perform the work of an individual employee was higher (lower) than the level of education required for that job, it was categorised as overqualified (underqualified), otherwise considered a match.

Total educational mismatch (under/overeducated) diminishes overtime for both men and women in the sector (Table 7.4). The decline in the mismatch is much stronger for the undereducated than the overeducated. One of the reasons for this could be that the educational supply may be increasing at a higher rate than improvements in job quality or the number of job opportunities across the sector (Korpi and Tahlin, 2009). Workers can over-invest in education to increase their chances of getting hired. Vermeylen et al. (2014) argue in countries where unemployment is high such as Turkey, schooling is seen as a signal to the employer that they can reduce their training costs. In addition, the overeducated may at first consider their overqualification as a short-lived phenomenon, and accept a wage penalty of overeducation in the short run with anticipation of earning higher wages through promotions and job switches in the long run. For instance, it is found that graduates may be overeducated at the beginning of their career (Battu et al., 1999; Carroll and Tani, 2013; Meroni and Vera-Toscano, 2017), but overeducation may diminish overtime through professional experience gained in the labour market (Verhaest and Omey, 2009). The ILO (2019c) also reports that in middle-income countries, overqualification was mostly found to be decreasing, while underqualification has been on the rise. In recent years, underqualification and overqualification rates have converged, on average, across all countries, confirming that underqualification is an important issue for developing labour markets. This indicates that mismatch is one of the changes resulting from educational supply failing to keep pace with job quality in these countries. Furthermore, undereducated mismatches are found less frequently in highly-skilled occupations, such as the ICT sector (Gammarano, n.d). Also, it may be difficult to measure the real mismatch in countries where informal employment is high (ILO, 2019c), such as Turkey (discussed in Chapter II).

Table 7.4 also reveals that educational mismatch was significantly higher among female ICT professionals during the selected years, while the undereducated mismatch was relatively more prevalent for men than women in the sector. This implies that women are more likely to be overqualified for the positions they occupy which may further contribute to the wage penalty of overeducation, and men are more likely to be underqualified in the Turkish ICT sector. Although the schooling mismatch is more likely for women than for men in the labour market as a result of occupational segregation and gender discrimination (ILO, 2019c), the declining trend in educational mismatch for women might signal changes in employment practices in the sector. To illustrate, employers traditionally favour men over women for STEM jobs, including ICT, as a result of gender-stereotypical beliefs, and as a result employers may be more demanding with regards to qualifications and skills of women applicants: e.g., requiring a master's degree when a graduate degree is sufficient to perform the job. However, employers may relax these requirements for women applicants, when labour supply is constrained and demand for labour grows alongside the growth of the sector. In these circumstances of limited labour supply, and in order not to lose talent to rivals, employers may reduce their qualification demands on prospective women candidates. Therefore, the declining trend in educational mismatch can partially be explained by the labour market distortions in the sector.

To summarise, the analysis of the educational mismatch in the Turkish ICT sector highlights two significant points. *First*, educational mismatch has been declining in the sector since 2005, for both men and women. This trend may partially be explained by labour market distortions in the sector. This study also demonstrates (Chapter VI) that technical occupations suffer less from the gender wage gap. The decrease in educational mismatch over the years is likely to have a positive impact on earnings, as the overeducation wage penalty decreases, resulting in lower gender wage gaps in the sector. *Second*, despite the reduction in educational mismatch over time, men are still more likely to be undereducated, while women tend to be overeducated for their positions. Such a result may be associated with discriminatory hiring practices, although further research is warranted to investigate this more fully. However, together with other evidence presented in this thesis, these findings help to support the fact that discrimination is likely to be one of the drivers of gender wage gaps in the ICT sector in Turkey.

7.3.2 Occupational Segregation

Occupational segregation is defined as a systematic concentration of individuals based on their gender, race or ethnicity and so on into specific occupations within or across the entire job spectrum. Bergmann (1971) argues convincingly that women are occupationally segregated and that creates a crowding effect in specific jobs, leading to lower wages for women compared to men. In case of *horizontal occupational gender segregation*, men and women favour different occupations, thus creating male or female domination or over- and underrepresentation of men and women in specific sectors, occupations or roles, while *vertical occupational gender segregation* emerges when positions of men and women differ in the professional hierarchy in terms of authority, promotion and so on. As a result of occupational gender division, women tend to occupy roles with lower wages, mostly as carers, secretaries, nurses, primary school teachers, cashiers, waiting staff, HR professionals, and administrative and sales assistants, while men work as drivers, contractors, engineers, mechanics, oil and gas drillers and so on. Lapidus (1976) suggests that *income inequality* is the third dimension of occupational segregation, which is considered partially a result of horizontal and vertical segregation and partially a consequence of differences in education, skills, experience and also some degree of direct discrimination. Although occupational gender segregation is not as persistent as in the twentieth century, since there are more women in the male-dominated fields and more men in the female-dominated occupations due to technological, social and economic transformations, meaningful differences persist.

Turkey's ICT sector also indicates similar occupational gender segregation trends. However, occupational segregation is more severe in non-technical positions than technical ones. The raw survey data indicates that the share of research participants in our study (57.2 percent) working in technical positions – such as software developers, engineers, administrators and so on – is higher than the share of non-technical positions (42.9 percent), such as sales and marketing, HR, management, team leadership and so on. Surprisingly, when we look at the gender breakdown, the share of women working in technical positions (56.5 percent) is similar to that of their male counterparts (57.3 percent). However, once we explore occupational differences, an occupational segregation emerges. To illustrate, considering one of the sub-populations (e.g., technical positions), men occupy greater shares of purely technical positions than women, such as software developers (15.4 percent vs 11.6 percent, men and women, respectively), engineers (10.2 percent vs 7.5 percent), specialists (15.2 percent vs 11.9 percent), administrators (2.3 percent vs 1.4 percent) and architects (1.2 percent vs 0.5 percent); women engage with relatively less technical roles such as consultants (18.3 percent vs 10.7 percent) and analysts (5.3 percent vs 2.3 percent, women and men, respectively). Moving onto the non-technical positions in our sub-population, similar patterns emerge. For instance, the share of men in managerial positions working as executives, directors, managers and team leaders combined (37.1 percent) is much higher than the share of their female counterparts (28.7 percent). However, the share of women in positions that are mostly associated with women such as sales and marketing (7.5 percent vs 1.9 percent, women and men, respectively), HR (3.9 percent vs 0.1 percent), interns and assistants (2.1 percent vs 0.5 percent) outnumber that of men's. Finally, there are also more male business owners (1.6 percent) than female ones (0.2 percent), which may also impact on the hiring practices mentioned in the previous section.

Gender social norms and values with regards to the stereotypical categorisation of men and women in society continue to be the crucial factors in widening occupational gender segregation in the ICT sector. The biological differences between men and women, together with gender constructed through social and cultural differences, determine the roles of Turkish men and women, their relative social positions, their access and control over land and resources, and the division of labour (therefore, gender equality) within society. Women are usually still the primary carers of children or other dependents and responsible for most of the household duties in Turkey, while men tend to be the primary earners. Gender roles and the unequal division of domestic labour between men and women continue to strongly influence the career choices of men and women in Turkey. Research participants frequently reported that women often need to consider household duties such as maintenance, motherhood and care for the elderly when making career choices. When the research participants were asked '*Why don't more women choose to work in technical fields?*', a female HR professional who runs a recruitment agency only for IT jobs clearly summarises the issue:

> "Society is putting so much responsibility on women who are expected to come home early, take care of children, cook and also work. Women know that one day she will get married and give a birth, take care of children along with other duties. So, she is usually prioritising family over her career by working in non/less technical jobs that require shorter hours, less overtime and less travel. For instance, women don't work if the location is far away, particularly if she has a kid, but that is not an issue for men, because women go home early and cook. Eighty percent of the stories I hear are like this. This does not mean that women are technically incompetent, but the existing view and gendered social norms are pushing women to select certain positions. HR is one of them, because women's soft skills are better."

Overall, the analysis of the quantitative survey and qualitative semi-structured interviews clearly demonstrates that the ICT sector in Turkey suffers from occupational gender segregation. Along with the crude analysis discussed above, the Index of Dissimilarity (DI) score of 21.5 percent discussed in the previous chapter also confirms our findings. The result of the index demonstrates that occupational gender segregation is higher for non-technical positions and overall, one-fifth of the male and female professionals would have to move to a different occupation in order to achieve uniform distribution. Consequently, similar to the most countries in the world, women crowd into non- or less technical roles that pay relatively low wages, thereby contributing to the gender wage gap in the ICT sector. In fact, women's much greater presence in purely technical positions across the globe should not be overlooked or neglected by any means but should be taken as a long-term strategic decision to prepare for a digitalised world in which even men are expected to lose their jobs in the very near future (despite their superior experience and skills in purely technical fields) owing to the expected dramatic changes in the nature of work following fast evolving technological advancements. Therefore, the current gender wage gap owing to occupational segregation may be widened even further if women cannot keep up with the technical skill requirements of the near future as a consequence of discriminatory practices.

It is worth noting that technoparks in Turkey might offer an alternative solution for both occupational gender segregation and the gender wage gap. Technoparks, which are presumably centres for technological development and innovation, accommodate relatively high numbers of R&D and technical (rather than non-technical) personnel compared to usual ICT companies. Increasing the share of female employment in technoparks would lead to a decrease in occupational gender segregation, since there would be more women in relatively technical areas, and would decrease the gender wage gap according to our findings, which state the gender wage gap is narrower in technical positions. The significant increase in the number of technoparks opened since the 2000s is surely welcomed by the Turkish ICT sector, as it symbolises increasing investment in technological development and innovation; however, the majority of these technoparks do not function at satisfactory levels due to the reasons that will be discussed in more depth in the next chapter.

7.4 Conclusion

There are two major conclusions that emerge from the above analysis. *One* is that there is a clear distinction between the gender wage gaps of technical and non-technical professions; i.e., the technical gender wage gap (10.4 percent) is much smaller than the non-technical wage gap (40.5 percent). The *second conclusion* is that the discriminatory factors driving the gender wage gap for non-technical professions in the Turkish ICT sector (the motherhood penalty, marriage compensation law, occupational segregation, social norms and values, and prejudice) can, indeed, be overcome in technical professions, to a great extent, under the labour market distortions that are in favour of technically skilled labour (i.e., labour supply shortages, high growth and product demand, and high returns on ICT skills).

The second major conclusion above brings us back to Bergmann's (1971) crowding hypothesis. Bergmann argues that black labour crowds into low-paid occupations owing to labour market discrimination, hence white labour's higher relative returns on their skills. Similar settings can be applied for gender, whereby women crowd into certain occupations that are traditionally non-technical because of discrimination, leaving men to fill in the technical professions that are comparatively well-paid. Bergmann's hypothesis is therefore in line with the findings of this study.

This thesis, however, modifies Bergmann's hypothesis by bringing the labour demand narrative into the equation. The existence of labour market distortions such as shortages of technically skilled labour, rapid growth and profitability in the Turkish ICT sector creates different gender wage gap outcomes for technical and non-technical positions. The gender wage gap is found to be significantly narrower for technical positions compared with non-technical positions, although both are in the same sector. Labour market distortions dampen the explanatory power of other factors of the gender wage gap in technical positions, such as the motherhood penalty, occupational segregation, marriage compensation, social norms and prejudice. Technically skilled female ICT professionals earn wages close to their technically skilled male counterparts in the Turkish ICT sector, while technically unskilled female ICT professionals are mostly penalised with lower wages as a result of conventional causes of the gender wage gap. Thus, this evidence suggests that labour market discriminations are also impacted on by labour supply shortages driven by demand conditions.

To be clear, this study certainly does not propose market disequilibrium (such as labour supply shortages) as a solution to the gender wage gap issue in the high-growth ICT sector. On the contrary, it suggests that the negligence of specific labour market distortions in an industry, sector or economy in terms of gender wage studies can be incomplete and misleading, as it may result in the under- or overestimation of gender pay differentials. The gender wage gap should be understood in the context of both the supply- and demand-side forces and growth conditions in order to uncover the real gender wage differentials. It is evidenced in our study that the same gender-discriminatory factors discussed above may be present or absent depending on labour market conditions, indicating that these discriminatory factors are, in fact, not that meaningful or relevant to the employer in the first place. This study then makes a noteworthy contribution to the existing literature on the gender wage gap; labour market distortions create different outcomes in the nature and extent of the gender wage gap, and the discriminatory factors are mostly perceived without any rational grounds, as they are overcome in certain labour market conditions. Thereby, policies around reducing the gender wage gap should be structured differently and the existing labour market conditions should be taken account of during this process.

The next chapter will now look at the role of the state in relation to gender equality, employment and ICT sector development in Turkey. It will examine the industrial policy documents to find out whether the state takes any measures or actions to prevent gender discrimination in relation to work and pay. It will also investigate the existing channels used to promote the ICT sector.

CHAPTER VIII

THE ROLE OF THE STATE IN RELATION TO ICT SECTOR DEVELOPMENT, EMPLOYMENT AND GENDER EQUALITY

The previous chapter interrogated the striking distinction between technical and non-technical gender wage gaps; that is, the technical gender wage gap (10.4 percent) is found to be much smaller than the non-technical gender wage gap (40.5 percent) in the Turkish ICT sector. The chapter proposed *labour market distortions* (rapid sectoral growth and shortages of technically skilled labour) as an explanation for this difference, which narrowed the gender wage gap for the technical professions, and suggested discriminatory factors that contributed to the gender wage gap for non-technical professions. The discriminatory factors were overcome, to a greater extent, for the technical professions, once the specific labour market conditions were met.

However, the discriminatory factors were still strongly present for non-technical professions. The literature review on the role of the state (Chapter II) indicated that patriarchal norms and traditions are favoured in Turkey, hence the lack of significant impact of various policy and regulatory changes on gender inequality and discrimination. The Blinder-Oaxaca decomposition analysis also demonstrated that professional experience (employment) is the major driver for explaining the majority of the gender wage gap. As a result, this chapter will first examine whether the Turkish state has made any efforts to increase female employment and promote gender-equality policies before and after the 2000s (section 8.1). Chapter VII demonstrated that rapid sectoral growth and shortages of technically skilled labour have had a significant impact on the gender wage gap outcomes, both of which have increased demand for labour regardless of sex, which can be seen in the TÜRKSTAT (Table 3.3 and 3.4) and HLFS data (Table 4.1). Therefore, this chapter will investigate the role of the state in ICT sector growth and development in order to shed light on the gender wage gap outcomes (section 8.2). It will propose the three most significant channels (Technology Development Zones, TÜBİTAK and ICT Sector-Specific Incentives) used by the Turkish state to promote ICT sector growth and development and that have influence on gender wage gap outcomes.

The findings of this chapter indicate that the state indirectly promotes women’s employment in the private sector by offering various incentives and subsidies. The Turkish government has also launched a large number of initiatives to promote ICT growth and development. However, this thesis identifies various issues with these initiatives that diminish their overall impact on female employment, gender equality and gender wage gap outcomes.

8.1 The Role of the State in Female Employment and Gender Equality

The industrial policy in Turkey before 2002 was different than what followed for ICT sector development, employment and gender equality issues; thus, the distinction between the industrial policies of Turkey pre and post the 2000s is essential. Industrial policy up until 2002 relied on two phases. During the first phase (1960-1980), the pre-liberalisation era, Turkey witnessed a rapid industrialisation through ISI (import-substituting industrialisation), medium-term planning, heavy state involvement and protectionist policies. However, this was at the cost of export sectors and Turkey remained a largely agrarian and closed economy. During the second phase (1980-2002), the liberalisation era, the country adopted ELI (export-led industrialisation), which involved trade liberalisation, a shift towards a free-market economic environment and integration with the global economy via a customs union agreement with the EU. The driver of Turkey's rapid industrialisation up until 2002 was the labour-intensive manufacturing sector, but without the Turkish women's significant contribution to the labour workforce, a lack of technological development and neglected gender equality.

With regards to the technological development during trade liberalisation, Lall (2000) defined Turkey's export structure as technologically weak and stagnant due to the dominance of low technology products, overwhelmingly in textiles and garments, and with little evidence of an ability to shift to more dynamic products. The Turkish textile and apparel industry that was characterised by resource-based and labour-intensive manufacturing did not invest heavily into research and development (Yaşar et al., 2007), but predominantly focused on the accumulation of imported goods; thus, the country's dependency on imported raw materials, and intermediate and capital goods remained unchanged (Yülek, 2016). Productivity rose dramatically with the 1980 reforms, reaching to 6 percent per annum in the private sector and 3.5 percent in the public; the manufacturing sector grew, on average, at 8 percent per annum, and exports rose to OECD countries (Weiss, 1993, p.296). Turkish engineers were able to operate conventional modern technology competently and adapt it to local conditions. However, Weiss (1993) continues, Turkey did not make the necessary investments to maintain its scientific and technological capacity in the public sector but instead accommodated the intense popular demand for higher education by expanding its university system; this allowed its research infrastructure to decline and the eventual abandonment of its major agency for technology policy and public sector research. R&D activities did not develop in the Turkish manufacturing industry during the ELI era (Taymaz, 1999). Turkey did not manage to shift production and exports away from labour-intensive production towards the export of more capital-intensive textile machinery or to develop and adapt home-grown technologies (Yülek, 2016). As a result, although the Turkish manufacturing industry was a prime driver during the country's industrialisation process, it was not closely backed up with technological development and innovation. The technological aspects of manufacturing production were therefore largely neglected before 2002.

In relation to employment and gender equality, a widely held view based on cross-country analysis is that export-led strategies resulted in an increase in employment and the feminisation of the labour force. This was the outcome of low-cost, labour-intensive, low-skilled and high-turnover jobs that are associated with women, which caused severe gender inequality due to the lack of job opportunities in developing countries (Çağatay and Berik, 1991; Cox-Edwards and Edwards, 1994; Çağatay and Özler, 1995; Park, 1995; Seguino, 1997; Berik, 2000; Özler, 2000). Feminisation of the manufacturing industry in developing countries was achieved with the shift from ISI associated with male domination and a certain degree of capital-intensive production to a female-dominated ELI in the context of structural adjustment policies (Schmitz, 1984; Çağatay and Berik, 1990). Therefore, employment, industrial strategy and gender equality were much more closely linked especially during the ELI phase in developing countries as a result of greater emphasis put on the female labour, thanks to their significant contribution to economic growth and development. Women's participation in the labour force increased as industrialisation proceeded (Park, 1995) and that resulted in gender inequality in the forms of gender wage gaps, occupational segregation and a low-skilled labour force with little job security (Seguino, 1997).

Turkey is an exception to this pattern. Turkey neither witnessed the feminisation of labour[136] in its manufacturing sector before the 2000s nor did it experience a sharp increase in

[136] Boserup's influential book on women and development led one stream of researchers to carry out more studies in other parts of the world to investigate the existence of feminised labour in sectors such as agriculture and manufacturing, where women had a higher presence. As will be evidenced in the studies below, the feminisation of labour has a strong link with gender pay gap. Some sectors were feminised during the industrialisation process and women contributed to economic development through low wages.

the FLFPR. The links between employment and gender equality were not very strong before the 2000s and have weakened further since. The section below examines the role of the state in employment, gender equality practices and ICT sector development in relation to the gender wage gap.

8.1.1 Employment and Gender Practices before 2002

Contrary to the literature on the feminisation of labour literature around export-led growth strategies, the manufacturing sector was not a major source of women's employment during the ELI era (Çağatay and Berik, 1990; Başlevent and Onaran, 2004; İlkkaracan 2012). The export-led strategy of the large-scale manufacturing sector happened, Çağatay and Berik (1990) argue, without relative growth in women's employment. It was not manufacturing, but the services sector, that was the real engine for both feminisation and job creation during the ELI period (İlkkaracan, 2012). Over the period 1980-2009, 75 percent of net jobs were created by the service sector, while only 22 percent were created in manufacturing. In fact, the share of female employment in the manufacturing sector dropped from 32 percent to 26 percent during 1988-2001 (Başlevent and Onaran, 2004). Roughly 37 percent of women were economically active during the ISI and ELI eras (1960-1985) (Çağatay and Berik, 1990). Approximately 90 percent of these women were employed in agriculture and 93 percent (in 1985) of those were unpaid family workers. Furthermore, women's share of employment in manufacturing rose during the initial ISI period and then had declined by 1980. Similarly, Çağatay and Berik (1990) argue that, despite heavy public-sector involvement, private firms employed more women in both the ISI period and in the 1980s, but there was no notable change in female employment in either sector. During the period of 1990-2001, which was associated with attempts by policies and industrialists at capital deepening, capital demonstrated a preference for skilled male workers over skilled female workers (Özay, 2015). Overall, the feminisation of labour did not take place in the Turkish manufacturing sector during the trade liberalisation era. Gender equality imperatives were largely overlooked before the 2000s. Instead, a gendered division of labour was observed at this time with an over-representation of women in the food and textile industries performing low-skill, non-technical and standardised labour (Kasnakoğlu and Dikbayır, 2002). The prevalence of patriarchal, traditional and cultural beliefs also led to low FLFPR. Women were not considered primary household earners but only as providing non-essential income, and they were expected to change their paid work according to their home's requirements (Topçuoğlu, 1978; Ecevit, 1991).

8.1.2 Employment and Gender Practices since 2002

It is clear from various state documents (Industrial Development Plans, İŞKUR, ÇSGB, Ministry of Family, Labour and Social Services) that increasing female employment in the private sector is regularly on the political agenda of the Turkish state. There are also various state efforts to increase female employment, which is acknowledged as one of the most significant components for sustainable economic growth and development and a solution to the unemployment problem. Given that Turkey has the lowest FLFPR among OECD countries, it has become one of the priority reform areas for policy makers. In 2008, the Turkish government initiated an employment subsidy scheme targeting women in an attempt to improve their labour market outcomes. Employment subsidies are considered effective tools for decreasing labour costs for the employer and increasing demand for targeted disadvantaged groups (Dildar, 2019). In a formal employment agreement, when an employee is hired, both employee and employer are required to pay national insurance premiums for the wages of the employee. This is a legal requirement that qualifies the employee for certain benefits and the state pension in retirement. However, national insurance premiums are seen as financial burdens by employers. Therefore, the Turkish state provides a subsidy for national insurance contributions. Law No. 5763 was introduced in May 2008 with the possibility of extension to provide employer's contributions to social security premiums for five continuous years (until 31/12/2015) for women aged 18 and over (with no age limit) and for men (aged 18-29) employed between May 2008 and May 2010 (Topçu, 2011). The employment subsidy was covered by the Unemployment Insurance Fund (UIF) and paying 100 percent (of the employer's national insurance contributions) for the first year, decreasing by 20 percent every year for the remaining four years (Erol and Özdemir, 2012).

'Additional employment incentives' (Law No. 5763) were rearranged in 2011 in line with Article 49 of Law No. 6111 and the temporary Article 10 of Law No. 4447 to cover the entire insurance premium of both employees and employers. The monthly incentive was for between ₺1,103.62 and ₺2,943 per worker in manufacturing and ICT sectors and ₺1,103.62 for other sectors (TÜRMOB, 2018). The purpose of these incentives was to increase youth and women's participation in the labour markets; encourage new job creation; reduce the risk of unemployment by increasing employee qualifications; encourage vocational and technical education; and improve quality and effectiveness in the workplace (Umdu, 2011). For instance, İŞKUR provided vocational training courses to unemployed, İŞKUR-registered individuals. It was organised in order to teach a profession to citizens without one; to improve the qualifications of citizens with professions; and to ensure the employment for those with a profession, who were unable to find a job through employment-guaranteed training courses. Furthermore, daily essential expense payments were made to the attendees during the training. Women who attended employment-guaranteed vocational training courses in the industrial sector could receive care support of ₺400 per month for their children between the ages of two and five (İŞKUR, 2020). Dildar (2019) argues that Turkey has used numerous support programmes to promote job opportunities in the form of social security cuts to employers. The first round of cuts addressed individual jurisdictions instead of a specific group of workers. Before 2008, Law 4325 (1998), Law 5084 (2004) and Law 5350 (2005) were enacted to improve employment opportunities in low-income provinces by providing cuts in social security premiums for employers, income tax deductions on wages, and energy use and land subsidies. However, Dildar (2019) continues, the 2008 employment package was the only one targeted at women and youth as disadvantaged groups and applied to all provinces.

In order to benefit from the UIF, both employees and employers are required to meet certain criteria. Employees should be unemployed for the last six months prior to taking up the subsidised employment. The recruitment period should be between Mar 2011 and Dec 2020 and the insured should work actively. Private sector employers should employ these subsidised workers in addition to the average number of insured employees in their company.[137] Employers must provide monthly premium and service certificates to the relevant authorities during the subsidised period of employment. In addition, the company should pay premiums regularly and not have any unpaid premiums, administrative fines or related penalty debts. If there is a debt, these debts should be structured or be paid in instalments. The length of the benefits can also differ according to gender, age, qualification and recruitment type. For instance, men should be between 18 and 29 years old and women 18 and over. Similarly, a programme (temporary Article 10 of Law No. 4447) was introduced in 2018 and designed to support women, youth and those with vocational qualification certificates (certificates of professional competence) (Adaman and Erus, 2018, Bitirmiş, 2019). The duration of the benefits from this programme also differ for men and women who are vocationally trained and with or without vocational qualification certificates. The incentive period lasts between 48 and

[137] The new employment should be an addition to the average number of insured employees in the company whose premium and service documents are reported to the Social Security Institution during the prior six months.

54 months for those unemployed men and women with vocational qualification certificates; 36 to 42 months for those with only vocationally training; and 24 to 30 months for those without any education. This indicates that the employer's share of social security premiums becomes more attractive if they employ unemployed workers with vocational qualification certificates. Furthermore, a vocational qualification certificate is made mandatory for unemployed people who want to work in one of 48 dangerous and very dangerous occupations (17 in the construction sector, 8 in automotive, 4 in electronics, 9 in energy and 10 in metal). As a result, according to TİSK (2018), 185,000 individuals received vocational qualification certificates up until 2018 both to be more attractive to employers seeking to minimise the financial burden of social security premiums and also to apply for positions that require the certificate. In addition, Erol and Özdemir (2012) add that İŞKUR-registered recruitment has a longer incentive period (up to 54 months) compared to normal recruitment (up to 48 months) for unemployed men and women. However, Koray (1992) argues that the monopoly of İŞKUR in finding employment opportunities for the unemployed has been eliminated and private employment agencies are also allowed to provide consultancy services (cited in Koca, 2016).

Employers who employ uninsured (informal) workers are prohibited from both the 5-percent premium discount and the full coverage of the employer's share of the social security premiums. In addition, those employers are fined up to ₺10,000, if caught. Given that employee registration (formal employment) eliminates various risks such as getting caught, financial penalties or work-related injuries, these subsidies are often seen as an incentive for employers to come forward (İŞKUR, n.d.). It is estimated that the financial costs of work-related accidents and illness in Turkey amounted to ₺78 billion in 2015 (TİSK, 2018). Therefore, these incentives are not only used as a tool to directly increase labour force participation and female employment but also to fight indirectly against informal employment in an economy where roughly one-third of workers are informal (discussed in Chapter II).

The first 'Women's Employment Action Plan' in Turkey was formed in 2014 and jointly implemented by ILO and İŞKUR and some stakeholder organisations, financially supported by the Swedish International Development Cooperation Agency (SIDA) in order to endorse policies aimed at creating more female employment (ÇSGB, 2015). Phase I of 'More and Better Jobs for Women' was implemented during 2013-2018 to promote decent work for women. Phase II of the initiative will cover the period of 2019-2022, and SIDA will provide 30m SEK (Swedish krona) of funding to the ILO-led project implementations. In collaboration with multiple organisations, the ILO Office for Turkey aims at carrying out projects in the provinces of Ankara, Bursa, İstanbul, İzmir, Kocaeli and Konya to facilitate women's access to job opportunities and to improve working conditions for women (ILO, 2018). Looking at the low female employment rates over the years (discussed in Chapter II), one of the reasons for this initiative may be that it was thought the previous policies and regulations had failed to achieve the anticipated growth in female employment. The *Women's Employment Action Plan* states two primary ways to achieve higher levels of female employment. The *first* is through the acquisition of vocational skills and job orientation, and the *second* via increasing the means by which women can enter the labour market. The former will be achieved by coordinating on-the-job training programmes that maximise employment opportunities for women; developing a gender perspective in institutions; identifying employment mobility challenges and offering solutions during policy realisation; ensuring continuity of special support programmes; increasing availability of childcare units and playrooms; carrying out labour market studies to specify the areas with high female demand; and offering women's advisory services and directing victims of domestic abuse to vacant roles. The latter will be accomplished, in particular, by offering incentives to employers for women's employment along with concentrating on entrepreneurship and job-guaranteed training courses for women. In recent years, various laws and regulations have been enacted to combat low FLFPR and unemployment among women.

There are also initiatives targeting specific sectors. In 2019, the government (via the Ministry of Treasury and Finance) pledged to pay the employer and employee share of social security premiums for those companies employing someone who has been unemployed for a period longer than three months in the ICT and manufacturing sectors. Social security premium support for the employer's share has been provided under the regional, large-scale and strategic investment schemes. Half of the employer's share of social security premiums of R&D personnel in technoparks and R&D and design centres are set to be paid by the state until 2023. Financial support is also available for firms to increase youth, women's and disabled employment in the private sector by providing finances for minimum wage or support for additional employment in general (İŞKUR, 2019). For instance, when a woman is employed, private sector employers receive additional national insurance support over a longer time period (up to 54 months).

The Turkish state has been putting great efforts into attempts to increase women's participation and employment in the labour markets through various employment packages. the value of total subsidies, which are all financed from the UIF, reached ₺116.7 billion by the end of 2017 (Adaman and Erus, 2018). Looking at the same year, the authors continued, 401,636 employees (42 percent of which were female) and 164,940 companies benefited from the fund. Overall unemployment rates dropped from 11.8 percent (2017) to 9.9 percent (2018), and the drops in non-agricultural and youth unemployment rates were even more pronounced. Some scholars have examined the effects of these packages on job creation and women's employment (Ayhan, 2013; Uysal, 2013; Cilasun et al., 2015; Balkan et al., 2016; Dildar, 2019). Ayhan (2013), using quarterly data for the period 2006-2010 from HLFS, finds significant impact in the quarters shortly after the employment policy announcement. Topçu (2011) states that a great majority of the applications (83 percent) benefitting from the policy were made after the second announcement (cited in Ayhan, 2013). The probability of women (30-34 ages) getting hired increased by 1.6 percent in the final quarter of 2009. Uysal (2013) also finds that social security premium incentives had a positive impact on women's employment, in particular for married women with lower levels of education. Cilasun et al. (2015) report that although the employment subsidies were effective in targeting unemployment among women and the youth, the advantage for women of getting hired is eliminated once the incentives have been expanded to all workers, since employers tend to favour male workers over their female counterparts. Balkan et al. (2016) reveal that the post-2008 employment subsidy programme has been especially successful for some of these subgroups. For instance, the probability of older women getting recruited was higher than for younger women, and they find no observable effect for younger men. Finally, Dildar (2019) reports that the employment subsidies have been effective in increasing the proportion of women in formal employment, the effect being observable in both the services and manufacturing sectors. In addition, policy impact was stronger in conservative provinces than more progressive ones, suggesting that despite cultural constraints the policy was effective.

Koca (2016) suggests that one of the issues influencing the effectiveness of these policies is agency coordination: that is, the presence of multiple agencies responsible for promoting employment-related incentives. For instance, İŞKUR is obliged to introduce these incentives to employers, and SGK is responsible for financing them via UIF. The existence of multiple agencies may cause confusion for potential beneficiaries and discourage them from applying for these programmes. Similarly, the complex nature of the legislation extending the scope of the target groups such as men, women and youth and also targeting groups unaware of the incentives has reduced the power of these initiatives. Adaman and Erus (2018) conclude that the use of UIF is another concern for these subsidies. UIF consists of contributions collected from workers' salaries, and employer and government contributions. Although the initial law prohibits the use of UIF for purposes other than unemployment insurance, a number of supplementary legislations since 2008 have made it possible to use it. Considering that UIF should benefit employees, employers paid ₺11 billion to the UIF as contributions and received ₺19 billion as incentives, while the total amount paid to employees by the UIF in 2019 was ₺10 billion (Yenimesaj, 2019). Current subsidies, therefore, are a temporary solution to unemployment among various groups, and structural reforms are needed to effectively address unemployment (Adaman and Erus, 2018).

It is also worth mentioning that women entrepreneurs in Turkey have been supported via various mechanisms (governmental, entrepreneurial associations, development and support institutions, charities and banks), one of which is KOSGEB.[138] This institution provides grants for up to ₺50,000 or low-interest loans for start-ups of up to ₺300,000. In 2018, KOSGEB gave nearly ₺220 million to 11,000 women entrepreneurs, meaning that women entrepreneurs, on average, received ₺20,000 from KOSGEB. Projects in manufacturing, high-tech fields and the software industry were prioritised, and the upper limit for technology-related areas was increased to ₺360,000 in 2019 (KOSGEB, 2019).

Overall, low unemployment rates have remained one of the strategic priorities for the Turkish state. The industrial strategy plans have included targets for reducing unemployment rates and increasing FLFPR. The above studies agree that these subsidies have a significant impact on the female employment. The Turkish state has been promoting employment indirectly by stimulating private sector employment through incentives appealing to employers. Given that the 2008 employment package was the only initiative that targeted

[138] KOSGEB (Small and Medium Enterprises Development Organization) is an organisation which is established with the Law No.3624 in 1990 with the aim of providing services and support only for the production industry SMEs, but extended to cover all SMEs since 2009. The basic activities of KOSGEB are listed as support and laboratory services, information activities and the project execution. The organisation provides support in five different categories: entrepreneurial support, R&D, technological production and domestic support, enterprise development, growth and internationalisation support, SME finance support and laboratory services support. Technology development centres (TEKMER) for the implementation of R&D, innovation and industrial activities and Business Development Centres (ISGEM) for supporting start-ups in their most fragile first years and for a sustainable growth have been established by KOSGEB. Subsidiaries (Kredi Garanti Fonu A.Ş., Venture Capital Investment Trust Inc. Co. (KOBİ A.Ş.), İstanbul Risk Capital Enterprise, Turkish Growth and Innovation Fund and Muallimköy Technology Development Manager Inc. Co.) are also other establishments that provide access to financial resources through KOSGEB.

women's employment, the gendered effects of these subsidies on employment may not be as significant as they first appear. It is also visible that additional employment incentives primarily point out the manufacturing and ICT sectors but other sectors are also included. From this perspective, the state may attempt to address occupational segregation by encouraging women into ICT, traditionally perceived as a male-dominated sector. However, these subsidies do not consider the gender pay gap as an explicit issue in their design. They primarily focus on increasing women's participation in paid work, and to a lesser degree, on reducing informal working. Therefore, the subsidies may provide a short-lived solution for female employment as long as employer contributions are covered by the UIF, which is not sustainable in its own right, without the aim of solving deeper issues relating to the gender pay gap, both at national and sectoral levels.

8.1.2.1 Public Sector Employment & Gender Equality

Despite high unemployment rates, public sector employment has not been a priority for the Turkish government since the 2000s. OECD and ILO data reveals that the share of public employment within total employment (public workforce) in 2013 was relatively high for Nordic countries (around 30 percent). The rate for Turkey (13 percent) (OECD, 2015)[139] was lower than the OECD average (21.3 percent) and included 38 percent female public sector employment.[140] Comparing Turkey with other middle-income countries such as Poland (25.2 percent), Brazil (12.1 percent) and Argentina (17.8 percent),[141] Turkey has a relatively low – or in some cases similar – public sector employment. The share of public sector employment has decreased over time from 13 percent (2013) to 10.9 percent (March 2018) with the Turkish state employing 3.1 million workers in 2018. In the *Tenth Development Plan, 2014-2018*, the Turkish state did not pledge to increase public employment by 2023.

Currently, there is no publicly available data on the share of ICT specialists and female ICT employment in the public sector. ICT personnel are considered civil servants and classified under the technical, education and general administrative services. There are also initiatives to employ ICT professionals within the contract-based employment category. Because of this lack of data granularity, it is difficult to examine the traditional disparities in the gendered employment outcomes of ICT professionals in the public and private sectors.

[139] It was 13.9 percent in 2009 and dropped to 12.9 percent in 2013.
[140] 2018 data. See public employment table below.
[141] 2016 data from ILO

According to Eurostat (2018), the proportion of ICT specialists in total employment during 2012-2017 was 0.9 percent in Turkey. The proportion of ICT specialists against total employment (0.9 percent) includes those working in the Turkish ICT sector.[142] The share of the ICT sector – including both IT and non-technical professions – against total employment was 1.6 percent in 2015, according to Türkstat. The share of female employment in ICT specialists across all sectors of economic activities fell from 20.6 percent (2007) to 10.0 percent (2017). This figure (10.0 percent) does not include those working as non-technical professionals in the ICT sector but only technical professionals. Nonetheless, the reduction in the share of female ICT specialists suggests a significant shift. Due to the lack of data availability, it is not plausible to suggest whether the share of ICT specialists working across industries is significant. However, subcontracting[143] as a form of employment has become a notable trend in the public and private sectors since the 2000s (Parlak and Özdemir, 2011; Çolak, 2017; Ari and Engin, 2018) to gain a competitive advantage from cheap labour, which is created by lack of job security, low wages, irregular or missing payments for workers, discrimination and exclusion, poor working conditions, lack of unionisation and annual leave and so on. Although the data on subcontracting is limited and inconsistent, there were 1.6 million registered subcontracted workers in 2011 in Turkey and the figure was expected to reach 2 million in 2017 (Öngel, 2014; Ari and Engin, 2018). According to the TÜBİSAD 2017 ICT Sector Report, the share of subcontracting in the ICT sector was only 1 percent. However, due to the benefits subcontracting brings to employers, there is a growing appetite in the sector and other industries and an upward trend of ICT specialist employment through outsourcing. Therefore, it can be concluded that subcontracting at its current level may not have a significant impact on the gender wage gap outcomes in the ICT sector.

It is evident from various state documents (*Eleventh Development Plan, 2019-2023*; the *Information Society Strategy and Action Plan, 2015-2018*) that the gender dimension of employment in ICT (gender pay gap, wage transparency, occupational segregation, motherhood penalty or greater inclusion of women in higher level roles) is neglected, let alone prioritised, with the exception, to some degree, of broad policies to increase female employment. These documents claim to ensure women's empowerment and non-

[142] 'Data on the ICT specialists in employment includes all sectors of economic activities; however, no sector breakdown is provided.' (Eurostat, 2018). See https://ec.europa.eu/eurostat/cache/metadata/en/isoc_skslf_esms.htm

[143] A subcontractor is defined by OECD (2005) as 'a person or firm being contracted by a main contractor or employer to carry out work or deliver services, labour or materials as part of a larger project'.

discrimination in all aspects of social, economic, political and cultural life: greater participation among women in politics, in media, and in managerial levels in the public and private sector; promotion of female entrepreneurship, encouraging girls in STEM fields; ensuring the enrolment of women and girls at all levels of education; and prevention of violence against women, and prevention of early or forced marriage. Despite the inclusion of these issues, the documents do not offer a systematic map of how these goals will be accomplished or how their effectiveness will be measured. The ICT sector-specific targets are limited to internet usage for women, which currently stands at 65.5 percent, being increased to 90 percent by 2023. Furthermore, women are targeted for some initiatives such as the ‘Literates Teach Computer Use to Illiterates Project’ which is aimed at promoting specific groups (women, youth, children, the handicapped etc.) to be trained on basic computer and internet skills, office programs, digital life, internet security, web design and software development to assist their full integration and diffusion into the information society. It is argued that societies which offer greater gender equality and inclusive growth gain more than those that discriminate, and poverty reduction, environmental sustainability and innovation are slower in societies with greater gender inequality. Turkey is not an exception to this. Sustainable and rapid development can only be achieved with full participation of women in every sphere of life.

It should be noted that the government's rhetoric has not been supported with concrete actions. On one hand, the state promotes high technological production, R&D and innovation via building technoparks, providing ICT sector incentives and increasing R&D spending to stimulate economic growth, increase productivity and global competitiveness. On the other hand, the policy discourse of public officials fails to follow the future ICT growth goals set out in the current national development plans and industrial strategy (2014-2018). To illustrate, by analysing a speech of a former Minister, Zafer Çağlayan,[145] Yaman (2015) argues that the industrial strategy documents explicitly emphasise the production of high-value and high-tech content, since they have the potential to increase their competitiveness and productivity. However, the government officials’ discourse and practices reveal that the emphasis was placed on low-wage employment in low-tech sectors such as textiles and garment manufacturing rather than high-tech sectors.

[145] ‘Former Minister Zafer Çağlayan (2012b) said, “labour intensive sectors such as the garment industry have the highest female employment rate. We will transform some selected provinces of east and southeast of Turkey into a region which could compete with China, Bangladesh and Vietnam”.’ (Yaman, 2015, p.2)

Developing Yaman (2015)'s argument further, the out-of-date and short-term objectives – such as investing in low-tech industries associated with higher female presence, low pay and poor working conditions – do not conform with the discourse of the government about technological growth and innovation *or* practical long-term initiatives. Turkey's comparative advantage in leveraging low-cost and low-tech production in the manufacturing sector has been long challenged by China's dominance over the last two decades. Furthermore, 'scientific and technological research capability requires a lead time of 5-15 years to build.' (Weiss, 1993, p.297). However, over the past decades, Turkey did not set technological development and innovation strategies as a priority. In a highly digitalised and tech-driven world, any attempt to evolve into high-tech and high-value added growth may come at a much higher cost to Turkish society than it did during the era of ISI and ELI, in which low-skilled workers were welcomed. During the twentieth century, the major industrial forces were predominantly the developed Western countries that had effectively completed their industrialisation process. The superpowers of the twenty-first century, on the other hand, are to be determined not by their military, economic or political capabilities, but their technological and skills power, which will ultimately shape the previous three capabilities and determine the global position of the country in question.

Moreover, it is argued (Dildar, 2015; Yılmaz, 2019) that the current gender ideology in Turkey, which defines the role of women as motherhood first and foremost, and the controversial comments by senior government officials over the number of children a woman should have, equality between men and women, abortion, C-section births and so on,[146] have entrenched traditional family values. Women are being forced outside the labour markets. As a result, the authors continue, the employment and gender equality objectives have become even less significant than in past decades and are undermined by dominant patriarchal values, a spectrum of religious conservatism, discriminatory discourse around gender and short-term political gains. Thus, the government's rhetoric and the current priorities of technical growth and innovation are contradictory, inconclusive and do not serve the long-term needs of the country.

[146] See Dildar (2015, p. 45-49) for more details. Available at: https://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1480&context=dissertations_2. Accessed: 09/06/19

8.2 The Role of the State in ICT Sector Development Today

The Turkish state currently promotes ICT sector development through various direct or indirect channels: industrial development policies; establishment of technological hubs such as Technology Development Zones (TDZs), R&D and design centres by providing tax deductions and exemptions via special laws; R&D spending via government agencies such as TÜBİTAK, KOSGEB, the Ministry of Industry and Technology and development agencies such as Technology Development Foundation of Turkey (TTGV), and İstanbul and Ankara development agencies; direct and indirect employment; general, regional, large-scale and strategic incentive schemes; structural transformation through digital transformation such as E-government and the FATIH Project[149] initiatives; and, finally, administrative measures taken by the Ministry of Transport and Infrastructure and the Information and Communication Technologies Authority (BTK) to encourage the development of the ICT sector. Figure 8.1 illustrates the visualisation of the Turkish state's role in the ICT sector's development.

All of the above initiatives have displayed different degrees of effect on the ICT sector development. For instance, although R&D and design centres[150] are supported via various allowances, exemptions, support and incentives, the significant portion of the activities carried out in these centres are machinery and equipment manufacturing, automotive supply industry and textile production, as opposed to the technoparks, where the majority of the R&D and innovation activities involve computer programming. According to YASED (2012), although the 'share of ICT R&D expenditure in the private-sector was 34 percent (2009), only 13 percent of the total R&D budget within the scope of the R&D centres was allocated to the ICT sector companies, indicating that ICT companies do not use/prefer R&D centres enough' (p.110). Similarly, the amount of funding (grants or loans with no interest) allocated to KOSGEB for SMEs may be high, but KOSGEB funds primarily promote manufacturing[151] start-ups (Olcay and Bulu, 2015) and their overall impact on individual firms is lower due to the relatively small amounts granted/loaned to the firms. For instance, KOSGEB provided ₺13,034,902 to 1,070

[149] The FATIH project, an acronym for Movement to Increase Opportunities and Improve Technology, was implemented in December 2010 with the cooperation of the Ministry of National Education (MoNE) and the Ministry of Transportation, so as to create equality of educational opportunity, maximise technological literacy and improve the success rates of students by providing 470,000 interactive white boards, 10.6 million tablet computers, printers and Internet network infrastructure in 40,000 schools and to train 705.000 teachers with 110 remote-learning centres in basic education (Pouezevara et al., 2013; Isci and Demir, 2015; ULAKBIM, 2018). As of 2016, 1,437,800 tablet computers, 432,288 interactive white boards and 45,653 multi-functional printers had been distributed. However, the total cost of the ongoing FATIH project is unclear.

[150] See Appendices 1 and 2 (pp. 298-300) for detailed information about R&D and design centres.

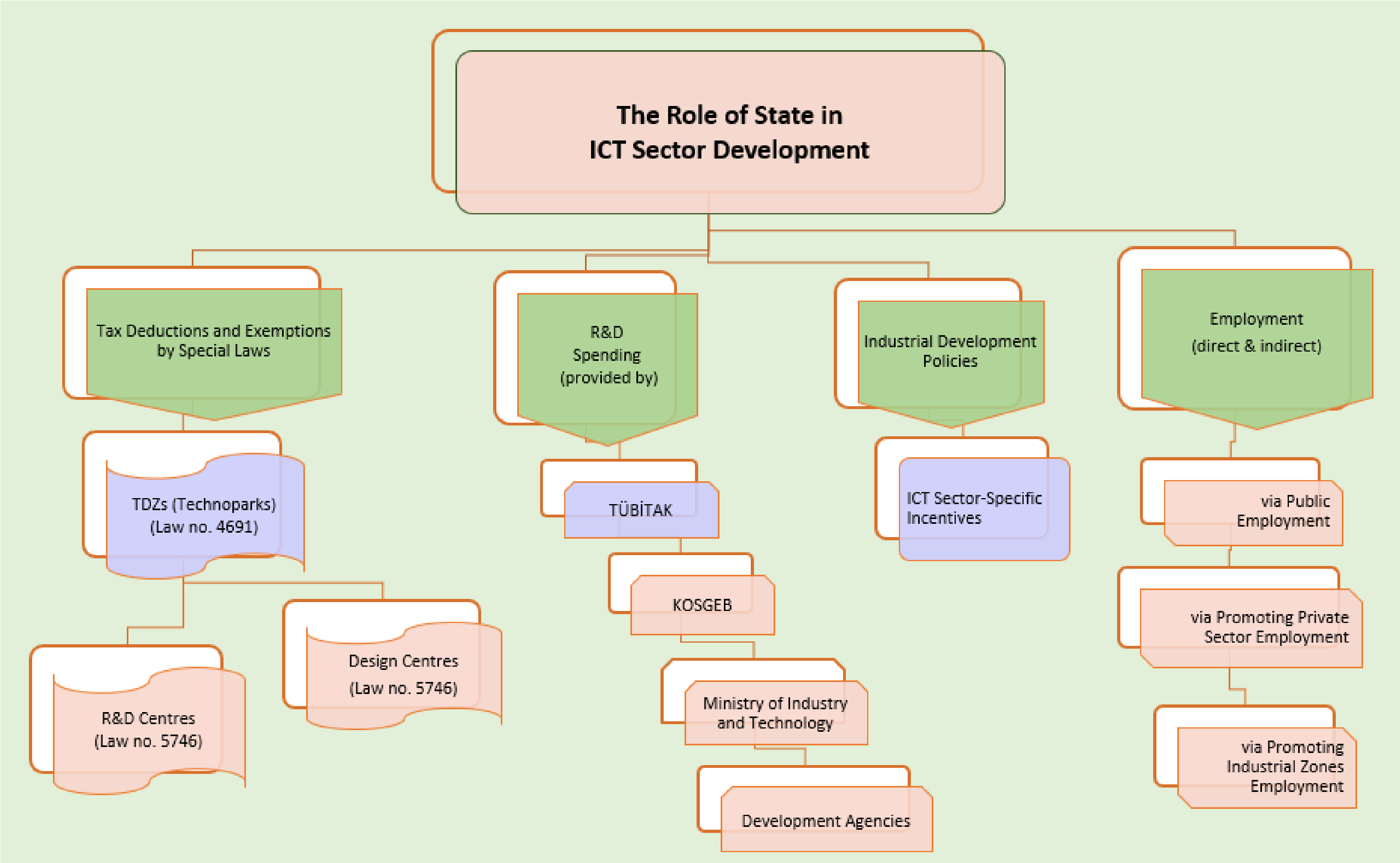
[151] ₺2 billion was allocated for KOSGEB in 2018, ₺1.7 billion of which to be given as interest-free loans. In an interview, the Minister of Science, Industry and Technology stated that the sector benefiting primarily from the 2019 KOSGEB budget would be the manufacturing sector (IHA, 2017).

ICT firms (₺12,182 per firm, on average) in 2016, while TÜBİTAK granted ₺88,482,002 to only 477 ICT companies (₺185,497 per firm, on average), according to the Turkey Industry Submit report (2018). In addition, general, regional, large-scale and strategic incentive schemes do not specifically target the ICT sector but manufacturing, pharmaceuticals, chemistry, petroleum and so on to produce finished or intermediate goods. The benefits from these incentives for the ICT sector companies are limited and are usually provided as part of strategic and large-scale incentive schemes. The International Investors Association (YASED, 2012) explains this limitation in its report below.

> "The reason for this failure concerning the ICT sector may be considered to be the Law No. 5746 on Promotion of R&D activities, which already is in force and offers significant incentives and supports, and the Law. 4691 on Technology Development Zones. In addition, when it comes to the supports provided by TUBITAK and other institutions, the ICT sector may seem to be of secondary importance as the sector already benefits from many incentives under the new incentive program because these laws provide, regardless of regional differences, incentives such as R&D deduction, withholding tax incentives, employer support for PPP, stamp duty exemptions, in areas of new technology, process development and so on." (YASED, 2012 p.116)

This chapter, therefore, suggests the *three primary channels* (lilac coloured) used by the Turkish state to directly promote the ICT sector development in the economy: (1) *Technology Development Zones* (*TDZs*) employing tax deductions and exemptions by special laws; (2) *TÜBİTAK grants,* which are predominantly used for R&D spending; and (3) *ICT sector-specific incentives* via industrial development policies. The policies introduced across these networks are examined to see if they are successful in promoting ICT sector development as well as how they intersect with policies on female employment and gender equality.

FIGURE 8.1: The Role of State in ICT Sector Development



Source: Author's own work

8.2.1 Technology Development Zones (TDZs)

TDZs – often referred to as technoparks – are economic, academic, social and technological sites designed to support R&D and innovation activity by enabling entrepreneurs, researchers and academics who want to produce new or advanced technologies to carry out their industrial and commercial activities under the same roof at or near universities. The first technopark in the world, Stanford Research Park[152], was established in 1951 in the City of Palo Alto, California with the collaboration of Stanford University and industry by forging a seminal partnership. Harmancı and Önen (1999, p.2) argue that there are many main objectives of the technoparks in the US: to create and expand new technological companies; to transform university invention and know-how into a commercial enterprise; to encourage entrepreneurship; to diversify the economic activities of the region; to increase the transfer of technology; to convert R&D activities into investment; to increase training opportunities; to expand job opportunities for university graduates in the region; to provide the park with the highest profits and to create highly paid work areas.Therefore, the success of TDZs and efficient national innovation historically lies within powerful university-industry partnerships.[153] Guimon (2013) enumerates how the partnership benefits the universities through improvements in teaching, access to funding, reputation enhancement, and access to empirical data from industry; other benefits include gaining access to complementary technological knowledge (including patents and tacit knowledge), tapping into a pool of skilled workers, providing training to existing or future employees, gaining access to the university's facilities and equipment, and gaining access to public funding and incentives (p.4).

Although the establishment of TDZs began in the early 1980s in Turkey and accelerated during the second half of the 1990s, İzmir Teknopark A.Ş (established in 1988) was the first technopark in Turkey with company status, followed by Anadolu Teknoloji Araştırma Parkı A.Ş. and İTÜ-KOSGEB TDZ in 1990, ODTÜ-KOSGEB TDZ in 1991 and TÜBİTAK-MAM Teknopark in 1992 (Harmancı and Önen, 1999). The draft TDZs Law (No. 4691) was introduced in 1995, but it was only approved by parliament in 2001 and amended in 2011.

[152] Stanford Research Park is considered as an engine for Silicon Valley and today hosts headquarters to a number of high-technology companies such as Tesla, Nest, Hewlett-Packard, VMware, TIBCO, Ford, SAP and Skype.

[153] Industry-academia partnership refers to a continuous and sustainable collaboration for scientific and technological knowledge transfer between the agents of the universities (academics, research assistants, experts, students, graduates, R&D centres and personnel, researchers) and the industry (industrial, science, marketing and advertising companies and factories).

TABLE 8.1: Evolution of Technoparks in Turkey

	Number of Technoparks	Number of Firms	Number of Employees	Number of Employees, Average per firm	Number of Completed Projects*	Exports (million $)
2002	2	80	300	3.8	25	5
2004	6	324	3,795	11.7	187	35
2006	14	546	9,081	16.6	600	171
2008	18	1,154	11,093	9.6	4,211	406
2010	28	1,515	13,397	8.8	7,179	520
2012	34	2,174	19,498	9.0	10,661	890
2014	42	3,016	30,729	10.2	14,859	1,789
2016	51	4,217	40,172	9.8	20,734	2,335

Source: Adopted from Cansız (2017), p. 41. * Number of projects refer to the solutions primarily provided by software development in these complexes for variety of issues such as developing a software for visually impaired to surf the web; chips that enhancements of LCD display; prevent malicious calls on phones by operators; light rail systems and on-board communication system; obtains high efficiency thermal energy and so on.

TDZs came into force on 6 July 2001 with the objective of establishing a strong linkage between the business sector and the higher education sector; it was regulated by Law No.4691 and funded by the Ministry of Science, Industry and Technology. As of August 2020, there are 85 technoparks in Turkey, 70 of which are operating while the rest are under construction (MSIT, 2020). The operating technoparks host 5,920 companies and 60,757 employees, 82 percent of whom are R&D personnel. A total of 36,963 projects have been completed and $5.2 billion in export value realised. Thus, the number of employees at technoparks constitutes 29 percent (60,757 out of 210,384) of the total ICT sector employment in Turkey. Given that technoparks hold a considerable portion of the sector, it is essential to examine whether technoparks that create and expand technology, offer definitive solutions to women in ICT with respect to discrimination during hiring processes or occupational segregation, which are directly linked to gender pay gap issue (discussed in Chapters II and VII).

In his detailed study of technoparks, Cansız (2017) found that 2577 companies left TDZs during 2001-2016 for several reasons, such as switching to better established technoparks, running operations outside of technoparks or closing down. Similarly, 53,308 employees left technoparks during the same period to move on to non-technopark companies outside the TDZs – e.g., moving to foundations, defence industry companies or public companies in Ankara – or becoming entrepreneurs. According to the Informatics Industry Association of Turkey (2018), 14 percent of the total ICT sector volume in 2017 was created by TDZs. Sarıçiçek (2012) reports that the technopark revenues generated from domestic or foreign sales far exceeded the total tax incentives provided by the state.

8.2.1.1 Incentives and Exemptions for Investments in TDZs

The state provides incentives and exemptions that are reinforced by Law No. 4691, through the Ministry of Science and Technology, for investments carried out in TDZs to promote R&D activities. Some of the advantages of TDZs (Teknoloji Geliştirme Bölgeleri Kanunu, n.d; Investment Zones, n.d.; TÜBİTAK, 2012; Ezell, 2015) are listed below:

- Income generated through software, design and R&D-based activities in the TDZs will be exempt from income and corporation tax until 31/12/2023.[140]
- Sales of software applications for system and data management, internet, business, mobile phones, the Internet and military that are created in TDZs will be exempt from value added tax until 31/12/2023.
- Remuneration for R&D, software, design and support personnel employed in TDZs exempt from all taxes until 31/12/2023.
- Employers in TDZs will be exempt from 50% of their share of social security premium for R&D, innovation and support personnel until 31/12/2023.
- If managing companies cannot cover, the grand support will be provided by the Ministry for the expense of procuring the land for establishment of the zones, the infrastructure expenses and the expenses to construct an administrative building.
- TDZs that are operating a wastewater purification facilities will not be charged for wastewater costs.
- Imported products will be exempt from custom and stamp duty for applicable documents within the scope of software, design and R&D-based activities.
- Incentives will be applied until 31/12/2023 to R&D expenditures incurred in the R&D centres with the condition of employing at least fifty full-time equivalent R&D staff.
- Incentives will be provided until 31/12/2023 to enterprises that benefit from the capital support provided to techno enterprises.
- Incentives will be given until 31/12/2023 for pre-competition cooperation projects.
- For the technology upgrading purposes, 40% of imported machinery and equipment is funded for small, 30% for medium, and 10% for large-scale companies.

Incentives that are provided to the companies operating in TDZs, and R&D and design centres have surely raised awareness of the ICT sector and created opportunities and platforms for more skilled ICT specialists to produce new technologies in a comparatively technologically advanced ecosystem. For instance, *The Report: Turkey 2012* reported that 500 young entrepreneurs received ₺100,000 grants every year from the state for their activities in technoparks (p.176). However, one of the most significant challenges faced by the predominantly SME or micro-level technopark companies (Kılıç et al., 2016) is the failure in the process of commercialisation of the R&D produced in the technoparks (Sarıçiçek, 2012; Olcay and Bulu, 2015). Young entrepreneurs and researchers are often in need of funding in order to nurture R&D and innovation with limited market knowledge or experience or a lack of access to networks. Therefore, they are more inclined to suffer from a failure of R&D commercialisation of their products. However, large-scale companies, which have higher potential to commercialise their R&D activities through spending relatively high levels of capital, know-how and their networking abilities, tend to establish their own R&D centres outside of the technoparks. Anecdotal evidence from the interviews also indicates that the state policies have not been fully successful in supporting R&D and innovative-minded start-ups in the metropolitan technoparks (İstanbul, Ankara, İzmir), which are occupied close to 100 percent by Turkey's most mature companies in the banking, telecommunications and insurance industries. The high occupancy rates provide very little room for entrants that are in their early stages of growth and often suffer fierce competition from large-scale mature companies because of the lack of space and high rental costs. In lieu of creating, commercialising and absorbing the knowledge through R&D and creating sustainable R&D links between business and academic sectors, mature companies are more enthusiastic about using technoparks as office spaces to lease for their own internal projects, and an effective and continuous industry-academia alliance is critical. However, this is also overshadowed by the desire to take advantage of generous incentives offered to these companies at technoparks, evidenced by the fact that only three technoparks account for 87 percent of total exports from TDZs. In conclusion, in order to fully utilise and optimise the potential benefits of R&D and innovation incentives, the incentives provided for TDZs or R&D centres alone are not adequate for further promotion of productisation, product life cycles, sales and commercialisation.

₺750m was granted to the TDZs during 2004-2018, resulting in an average of ₺53.6m per year (Varank, 2019), with roughly ₺250m of it granted during 2016-2018 (İŞ'TE KOBİ, 2018). Owing to the lack of annual data about the grants provided for TDZs, for simplicity, we should assume that the ₺125m was allocated from the 2018 general budget (worth ₺751,299,665,000). This suggests a contribution of just less than 1 percent. Furthermore, Cansız (2017) illustrates that the total exports generated by technoparks during 2001-2016 reached to $2.3 billion and $200 million in 2016 alone. Just three technoparks – İTÜ Arıkent Technopark (İstanbul), ODTÜ and Bilkent Cyberpark Technoparks (Ankara) – have generated almost 87 percent ($2 billion) of the total export volumes. The export contribution of the remaining technoparks stayed at around $300 million during the same period. Similarly, these three technoparks constituted half of the projects completed at all technoparks, and 80 percent of the patent applications came from technoparks located in İstanbul and Ankara. In addition, during the period 1995-2018, a total of 173,890 patent applications were filed, 119,404 of which were granted in Turkey. Furthermore, 87.3 percent of the granted patents were of foreign origin, the majority of which were granted to metropolitan cities such as İstanbul, Ankara, Bursa and İzmir, according to the Turkish Patent Institute. The OECD reports that only 900 ICT-related patent applications were filed in Turkey under the Patent Cooperation Treaty (PCT) during 1999-2016, almost in line with Brazil (820), higher than Argentina (111), and significantly lower than the US (253,845), Japan (143,666), China (114,942), Korea (52,167) and Germany (41,337). Kılıç et al. (2016) indicate that Turkish technopark companies have implemented technology intelligence processes, mostly with non-technical and informal methods as opposed to a formal and structured process carried out in tech-based and R&D-oriented companies around the world. Furthermore, budget and staff allocations for technology intelligence processes are not a standard practice in most technoparks.

Failure to commercialise R&D, insufficient funding and inefficiency are not the only issues faced by technoparks. The current incentive and support mechanisms raise various issues with respect to the implementation, coordination and scope of these incentives (YASED, 2012). A sufficiently developed collaborative culture and synergies across R&D and innovation have not been completely achieved by either the Turkish ICT sector or the TDZs, where interaction encourages innovation and enables knowledge creation. To illustrate, Turkish technopark firms are motivated to perform technological intelligence (Kılıç et al., 2016), but they often fail to demonstrate any intent and desire for collaboration, either on and off the technoparks, which is an essential mechanism for performing technological knowledge acquisition and technology transfers (Kaymaz and Eryiğit, 2011). Despite the promising new and fresh nature of technoparks (Yüksel and Cevher, 2014), weak collaboration and the inability of universities to identify and produce knowledge consistent with the requirements of the industry are the reasons for the lack of commercialisation in the sector (Tezcan and Yanıktepe, 2006; Kaplan, 2011). Yalçıntaş et al. (2015) indicate unfit interfaces as one of the reasons for this inadequate university-industry cooperation that does not support social sciences but science and engineering fields, while Tezcan and Yanıktepe (2006) note that the university and other research institutions appear to intensify their theoretical studies, which puts off industry, ultimately causing a low level of cooperation between the two.

Wilson et al. (1995) suggest ‘cultural incompatibility or conflict between collaborating organizations, inexperience of collaboration management, a perception of inequitable inputs and/or outputs amongst collaborating organizations or vulnerability to personal chemistry and personality clashes as some of the key causes for failure in collaboration’ (p.174). Wu (2012) points out that companies embedded in technological alliances might fear the possibility of a collaborator being a competitor under fierce market conditions, which ultimately undermines collaborators' mutual confidence and actively discourages them from collaborating. However, the constraints around R&D development and innovation, such as risks, cost and time management, integration or complexities requiring a wide range of expertise, and the alliance of university and industry offers complementary expertise (Zhao, 2001; Park and Ungson, 2001) and helps with the nurturing of a collaborative culture that is highly influential in terms of knowledge sharing (Lee and Bozeman, 2005; Yang, 2007). The fact that the greater success of TDZs in Turkey in terms of export volumes, number of projects or patent applications are limited to only a few technoparks in a few major cities suggests that collaborative culture and diffusion of knowledge are still far from becoming rooted in the industry. Similarly, in order to establish a dynamic environment for research and innovation, a collaborative agreement on the definition of R&D activities; the functioning of the processes; harmony between the ICT firms applying for funds and the public agencies and structures that provide these incentives are essential (YASED, 2012). Effective mechanisms are then required to monitor and measure the technical and commercial success of these incentives and their impact. Powerful university-industry, business-to-business, public-private and international partnerships historically lie at the heart of successful R&D and innovation, increased know-how, and the establishment of new technology supply ecosystems and technology transfers; such partnerships are much more relevant in the digital world. Therefore, the inability to cooperate and establish a clustering atmosphere together with the absence of structures that foster entrepreneurship in technology and stimulate talent in both the TDZ and ICT sectors undermines the potential for scientific and technical innovations and global competitiveness.

Last but not least, it is not only successful technopark entrepreneurs that move to technoparks in developed countries (Cansız, 2017) but also successful employees, provided that the Turkish technoparks are relatively new and in their developmental stages. Overall, 28.4 percent of the total brain drain has come from the ICT sector in recent years (Şap, 2019). Furthermore, the ICT sector experienced its highest number of merger and acquisition (M&A) transactions in 2017 and 2018 (EY, 2019). Cross-border M&As as a form of FDI may send a positive signal for the host country, on one hand, for the potential entry of new technologies, efficient production lines and know-how transfers (Neto et al., 2008), but on the other hand, it may be a source for increased competition in the product and factor markets and raise the opportunity cost of entrepreneurship compared to employment (Danakol et al., 2016).

In unfavourable environments, such as political or economic instability, legal and regulatory or integration issues which Turkey often experiences, foreign investors may even pull back. While not sector-specific, the empirical literature also indicates contradictory evidence on the effects of FDI on Turkey's economic growth and exports (Aslanoğlu, 2002; Alagöz et al., 2008; Örnek, 2008; Kahramanoğlu, 2009; Yılmazer, 2010; Ersoy and Yılmaz, 2014), thus providing an insight into the influence of these activities on the ICT sector. These issues lead to a low level of R&D and innovation activities at the majority of technoparks, a small number of patent applications and approvals, limited commercialisation and branding of R&D, innovation and know-how activities, thereby resulting in low volume of exports from TDZs, and constraints on further developments of high-tech firms, direct and indirect employment and high tech-driven economic growth in the long run.

TABLE 8.2: Technology Development Zones in Turkey (2018)

TDZs in Turkey	2018
Number of Technoparks	60
Computer programming activities	41%
Other research and experimental related to natural sciences and engineering	7%
Computer consulting activities	4%
Biotechnology research and experimental development activities	3%
Manufacture of basic pharmaceutical and pharmaceutical materials	3%
Engineering and consultancy activities for industrial and manufacturing projects	2%
Growing legumes	2%
Engineering and consultancy activities for energy projects	2%
Engineering consultancy services (except in connection with a project)	2%
Wholesale of computer, computer peripherals and software	1%
Other information technology and computer service activities	1%
Other	32%
Total firms*	5,216
Number of foreign firms	290
Total employment	49,759
R&D	40,604
Support	3,113
Out-of-scope	6,042
Number of completed projects	29,792
Number of ongoing projects	8,682
Number of patents	1,053
Number of patent applications in process	2,260
Total Exports ($bln)	3.6

Source: Ministry of Science, Industry and Technology (2018). * Majority (41%) of these firms perform software programming activities (Ministry of Industry and Technology, 2018). Majority of these TDZs are university-oriented technoparks.

8.2.1.2 Employment and Gender Practices in Technoparks

Four further interviews were conducted via Skype with professionals who worked or were working at technoparks (two men and two women) to investigate whether working conditions and female employment at technoparks are any different than those in the non-technopark ICT sector companies. These interviewees were contacted via LinkedIn in a similar manner to that discussed earlier in the methodology section. The participants were asked 16 open-ended questions during the roughly one-hour long interviews about differences in working conditions, any advantages that technoparks have for women's employment, the jobs they do or positions they hold, salary differences in comparison with the non-technopark ICT sector companies as well as a comparison of urban vs rural and domestic vs foreign technopark companies.

The analysis of the interviews reveals that technoparks do not offer the ultimate solution to the issues faced by female ICT professionals. For instance, in a similar manner to the ICT sector, female applicants may be disadvantaged during the recruitment processes owing to maternity leave, child bearing and rearing duties, marriage and so on, particularly when applying for purely technical positions. Similarly, occupational segregation still persists at technoparks, as gender bias leads to a limited female presence in technical areas as well as at senior positions within technical fields. Women continue to occupy soft-skilled or less-technical areas at technoparks. That is to say, women are predominantly responsible for jobs that mostly require ‘soft skills’ such as sales and marketing, project management, business development, business analysis, accounting, administrative relations, HR and secretarial positions. The jobs considered strictly technological such as software developer, information architect, database and network developers and so on are mainly occupied by men. As a result, it is uncommon to see female C-level managers, directors or managers who run strictly IT-related divisions of technoparks, but many of them can be found in less-technical areas.

Working conditions at technoparks could be more favourable than non-technopark ICT sector companies with regards to women’s employment. The majority of the Technoparks deliver a ‘healthier ecosystem’ with relatively modern buildings in greener settings at or around university campuses surrounded by Turkey’s most mature companies, close to cafes, restaurants, shops, gyms etc. Thanks to their interactions with the universities around them, technoparks are often perceived as less socially segregated. Nonetheless, these benefits can come with costs. In order to be closer to the university campuses for the purpose of industrial-academic partnerships, some technoparks are situated far from city centres. Due to the distances involved and poor transportation links, potential employees and employers who are willing to work and hire, respectively, are geographically limited in terms of their access to jobs and talent. In view of these restrictions, potential female workers may be further discouraged from applying for employment at these technoparks than their male counterparts owing to issues specifically related to women, such as picking up their children, housekeeping duties, or avoiding travelling late owing to safety issues, to name a few. However, geographic location may not be as critical a problem as discrimination or misconceptions about women in the workplace, as employers may provide transportation as a common practice. To illustrate, it is reported during interviews that male hiring managers at technoparks might favour male over female applicants, because of perceptions around child bearing and rearing duties, maternity leave, etc. In the same way, female candidates may be preferred for roles in sales and marketing, HR and secretarial roles. As a result, hiring processes at technoparks show similar patterns to those in the ICT sector.

Moreover, because of the incentives offered for R&D activities, technoparks are regarded as tax-break zones by businesses. One of the incentives discussed above is the income tax exemption for R&D, software, design and support personnel until the end of 2023. However, the analysis of the interviews indicates that it is at the discretion of employers at technoparks to pass these income tax benefits on to workers. Indeed, most, if not all, technopark companies do not pay their workers gross wages but 'net wages'. An employee and an employer agree on the net salary during the hiring process. When the employer receives income tax support for the employee from the state, they are not obliged by law to reflect any of the support in the worker's salary. The technopark companies may tend to think that they have the right to retain the income tax incentives from the state and not pass them on to the employees, since they are the ones who pay the employee's income tax to the state in the first place. Therefore, they might regard the money as theirs.

Employees, on the other hand, may not be fully aware of the incentives, as they may feel better off at working in technoparks. Their net salaries may be higher than the non-technopark companies, as the incentives given to the technopark companies may compensate them for paying higher wages. In contrast, in some cases, offering jobs at technoparks can be used as leverage by technopark firms to gain bargaining power over potential employees during salary negotiations. The prestige of working at technoparks – e.g., relatively modern buildings in leafy surroundings, being in touch with technology and innovation, working for and interacting with well-known corporate brands and potential networking opportunities – may be compensating for relatively low salaries at first. Overall, however, along with the corporate tax exemption and the 50-percent employer share of social security insurance provided by the state, the employer's income tax contribution decreases. However, employees may receive higher salaries if employers decide to reflect all these contributions onto the employees. Once technopark employees become more skilled and experienced and decide to leave the technoparks, regardless of their gender, they may also benefit from the same leverage over non-technopark ICT companies during the salary and benefit package negotiations.

In the context of female employment, there is no additional support defined by law to help increase the female employment levels at technoparks, which is similar to the ICT sector employment practices. That is, the state does not provide incentives for technopark companies to increase female employment. This result might be anticipated, because the fundamental reason behind the establishment of these technoparks was not necessarily to increase the number of employees directly but rather to encourage the tenant companies located in those parks to set up new technology and value-creating enterprises that could ultimately increase the number of employees.

Having said that, some organisations transfer their technopark employment practices to their businesses outside the technoparks and vice versa. Encouraging companies to counter-balance gender employment practices in order to establish and sustain gender-neutral organisations is key to achieving higher FLFP, higher female employment and productivity at work, and ultimately reducing gender discrimination, thereby eliminating the crowding-out effect[154] and gender wage gaps across the sectors. With regards to gender in TDZs, Cansız (2017) found the share of female R&D personnel in technoparks was 19.1 percent in 2017. This is less than the total female employment rate (28.9 percent)[155], though the share of female entrepreneurs was 17.6 percent, which is greater than the proportion of female employers (9.0 percent)[156] in Turkey.

[154] ‘Women are denied access to many occupations; hence they are crowded into a limited number of remaining occupations. The existence and procedures of occupational segregation by gender have caused us to argue that the result of a crowding policy is the intent to lower wages in certain occupations.’ (Grybaite, 2006, p.87)
[155] 15 and over age group female employment rate in 2017 (TÜRKSTAT, 2018)
[156] 2016 data

Regarding the differences in working conditions and employment practices between domestic or foreign technopark companies, a great number of research participants (including ICT sector interviewees) associated mature foreign companies with slightly better pay and benefits, opportunities for training and mentoring, gender diversity and employee-friendly HR policies and procedures, compared to their domestic small or family-owned businesses. Nonetheless, the share of foreign firms at technoparks remains low – 5.5 percent in 2018.

Concerning urban vs rural differences, while urban technoparks enjoy between 80 and 100 percent occupancy rates, the rate for rural technoparks is lower. Similarly, technoparks in rural settings suffer from shortages of qualified human resources and limited access to funds. There is also a smaller number of patents and completed and ongoing projects. To some degree, expansion of the ability of rural technopark firms to access global markets and their contribution to exports are minimal. Gender diversity is also weaker as opposed to urban technoparks (İstanbul, Ankara, İzmir) due to the lower female participation rates, lower numbers of female graduates with related degrees, and gender-specific employment practices carried out by predominantly male-owned technopark companies. However, the number of technoparks, occupancy rates and total employment figures are relatively better at technoparks in industrial areas such as Kocaeli, Gebze, Bursa and Tekirdağ than other rural areas in the Mediterranean, Black Sea, or Eastern and South Eastern Anatolia regions.

In a nutshell, thanks to their desirable modern facilities, buoyant atmosphere and green surroundings, technoparks deliver a better working environment for ICT professionals, regardless of gender, than non-technopark businesses can. The required industry-academia alliance for technoparks may also furnish students or newly graduated applicants with an opportunity to consolidate their theoretical knowledge and a higher chance of getting jobs or internships with prospective technopark employers. Similarly, provided that it is reflected in employee salaries, tax incentives for R&D, software, design and support personnel may increase the earnings of technopark professionals. The benefits to employees may be greater in urban technoparks, especially those located in metropolitan areas such as Ankara, İstanbul and İzmir, or in foreign or mature domestic companies rather than small companies or start-ups because of more limited benefit packages, fewer promotional opportunities and in-house transfers, and so on. Overall, technoparks do not have an immediate panacea for the challenges that female ICT practitioners face.

8.2.2 TÜBİTAK

With the establishment of TÜBİTAK (The Scientific and Technological Research Council of Turkey) in 1963, Turkey had no shortage of bilateral, multilateral and regional cooperation agreements in science and technology by the era of liberalisation, privatisation and globalisation during 1980-2002, particularly in industries such as the automotive, pharmaceutical, telecoms and home appliances sectors (Reisman et al., 2004). In contrast with the industrial age of the twentieth century, since the 2000s Turkey has placed a stronger emphasis on Science, Technology and Innovation (STI) policies than industrial ones, according to development plans. TÜBİTAK is designated as the primary agency in Turkey responsible for designing and formulating STI policies, supporting and conducting R&D and building a supportive and functioning technology ecosystem under the control of the Ministry of Science, Industry and Technology. Empirical studies suggest that expenditures on R&D has the effect of job creation (Bogliacino and Vivarelli, 2012), significantly in terms of self-employment (Ciarli et al., 2018). R&D spending is also an EU target for job formation, employment and productivity boosts (Wallace, 2020). Therefore, this section investigates the role of one of the state agencies – TÜBİTAK – in R&D spending and R&D related employment, since Chapter VII demonstrated that employment (professional experience) is the major driver for explaining the gender pay gap in the sector.

Turkey has seen a variety of regulations and incentives and exemptions for building STI capacities as a large, fast-growing, middle-income OECD economy, resulting in a 9.7-percent annual growth in GERD[157] (gross domestic expenditure on R&D) in 2009-2014, according to the *OECD STI Outlook* (2016). According to Turkey's *Tenth Development Plan*, despite an improvement in R&D intensity from 0.60 percent (2006) to 0.86 percent (2011), Turkey is still behind the *Ninth Development Plan's* 2-percent target and the EU average of 1.9 percent.

The Turkish state's R&D expenditure takes two primary forms. The first is the grants issued by government agencies such as TÜBİTAK, KOSGEB, development agencies and Ministry of Science, Industry, Technology. The second is through tax deductions and exemptions by special laws being granted to TDZs (Law No. 4691) and to R&D and design centres (Law No.5746) (Deloitte, n.d.) for the general advancement of knowledge in higher

[157] GERD (Gross domestic spending on R&D) is defined as the total expenditure (current and capital) on R&D carried out by all resident companies, research institutes, university and government laboratories, etc., in a country. It includes R&D funded from abroad, but excludes domestic funds for R&D performed outside the domestic economy (OECD, 2015a).

education, defence, industrial production and technology and agriculture. Although the Turkish defence industry makes a fair contribution to the country's R&D and innovation activities[159], it is not addressed for the purpose of this thesis.

TÜBİTAK remains the top-ranked STI policy-making body, allocating the most resources from its budget for the ICT sector's R&D activities. TÜBİTAK is motivated by encouraging R&D activities as well as shaping the scientific ecosystem of the country. Since the 1960s, it has had the capacity and the broad experience required to establish STI policies in Turkey. With its qualified HR and research infrastructure, it is a reliable institution. There is a central framework which can serve industry and academia separately or together. TÜBİTAK is also open to international cooperation and has an international representative authority in the field of science and technology. TÜBİTAK's grants have certainly raised awareness of R&D and innovation activities in Turkey, considering that R&D investment is a key deciding factor in companies growing in competitiveness and market share.

Nevertheless, there are various issues associated with TÜBİTAK incentives. One is that despite the increased amount of funding over the years, the potential benefits from these grants have not been fully unlocked. To illustrate, in 1995-2018, the amount of grants allocated to R&D activities from the TÜBİTAK budget was ₺9 billion and ₺16.3 billion in R&D volume. Moreover, 20,737 out of 39,166 projects have been supported at 9,314 firms and universities. Of these grants, 84 percent were private sector industry supports. The highest share of this support (30 percent) was dedicated to the ICT sector alone[160] followed by the automotive (17 percent), machine and manufacturing technologies (13 percent), defence (12 percent) and health sectors (8 percent), mostly in cities such as İstanbul, Ankara and Kocaeli. More grants were obtained by large-scale businesses between 2000-2012, which was then reversed with more SMEs offered grants between 2012 and 2018. According to TÜBİTAK statistics, the ICT sector receives the highest amount from TÜBİTAK funds, but the 30-percent ICT sector

[159] Turkey is ranked as the second largest military force in NATO after United States. As part of the Vision 2023 goal for the defence industry – to become a self-sufficient state in terms of defence – the country's state-owned enterprises such as Turkish Armed Forces Foundation (TAFF) have spent large sums in R&D activities and on high-tech military equipment. According to the top 20 companies for R&D spending, the R&D spending of Turkish Armed Forces Foundation companies – Aselsan (first in ranking), Tusas (2), Roketsan (5), Havelsan (9) and as well as the indirect affiliated partners of TAFF, Netas (10) and Mercedes-Benz Turk A.S (13) – reveals the significant contribution of the defence industry to Turkey's R&D development. All top four TAFF companies - Aselsan (33 percent) and Tusas (28.3 percent), Roketsan (37 percent) and Havelsan (28 percent) – spent large shares of their turnover on R&D activities. The share of R&D personnel in the top four TAFF companies also accounted for the 32 percent of the total R&D personnel in the R&D 250 List.

[160] Within the scope of 1501, 1507, 1509 and 1511 coded programs, the grants were made to the specific sectors.

share may be misleading. To demonstrate, the calculation of this figure was carried out by taking into account just a few coded programmes. In fact, there are other numerous technology and innovation programmes under different codes that TÜBİTAK runs.[161] The share of the ICT sector may, therefore, be higher or lower. However, assuming for simplicity that it is 30 percent, despite having this generous share of the TÜBİTAK budget, ICT sector exports were valued at $3 billion compared to the $13.4 billion exported by the machinery sector, according to the MÜSİAD (2017) report. This suggests the realisation of ICT products from R&D activities has been successful, but there remains substantial, unrealised potential and the commercialisation, access and expansion strategies into the global markets have largely failed.

The second issue with regards to TÜBİTAK incentives is that despite the rise in public support for R&D and innovation in recent years, the impacts and outcomes of the policies and programmes implemented are neither sufficient, fully monitored nor reported. Funding agencies and research organisations should evaluate the impact of their grants – i.e., its contribution to scientific knowledge or creative output; the target population; its economic and societal impact; the level of impact such as local, national, regional or global; changes in the quality of life, such as influencing policy and practices, increasing effectiveness of private and public services; and so on. Engagement with the impact of distributed funds is crucial in order to provide an evidence-based analysis for future decisions and strategic development. This can be done by examining which activities work and which do not; documenting funding practices for transparency, legitimacy and quality assurance for the activities funded; and establishing accountability for public funds and credibility of the funding institutions (Branstetter and Sakakibara, 2002; Aggett et al., 2012; Bornmann, 2012; Jacob and Lefgren, 2011; Gurwitz et al., 2014). The evaluation process is an indispensable component of innovation policies; therefore, it should be systematic. Procedures should be identified in advance and the findings should be communicated and consequently become a source of feedback (Tandoğan, 2016). Furthermore, incentives and financial support should be subject to ex-ante and ex-post evaluations of research impacts, since the incentives and support given by the public agencies

[161] TÜBİTAK runs various technology and innovation programmes under different codes: 1501 - Industrial R&D Projects Support Programme; 1503 - Project Markets Support Programme; 1505 - University-Industry Cooperation Support Programme; 1507 - TÜBİTAK SME R&D Start Support Programme; 1509 - TÜBİTAK International Industrial R&D Projects; 1511 - TÜBİTAK Priority Areas Research Technology Development and Innovation; 1512 - Techno-Enterprise Capital Support Programme (BiGG); 1513 -Technology Transfer Offices Support Programme; 1514 - Venture Capital Support Programme (GİSDEP); 1601 - Innovation for Capacity Building in Entrepreneurship; 1602 - TÜBİTAK Patent Support Programme.

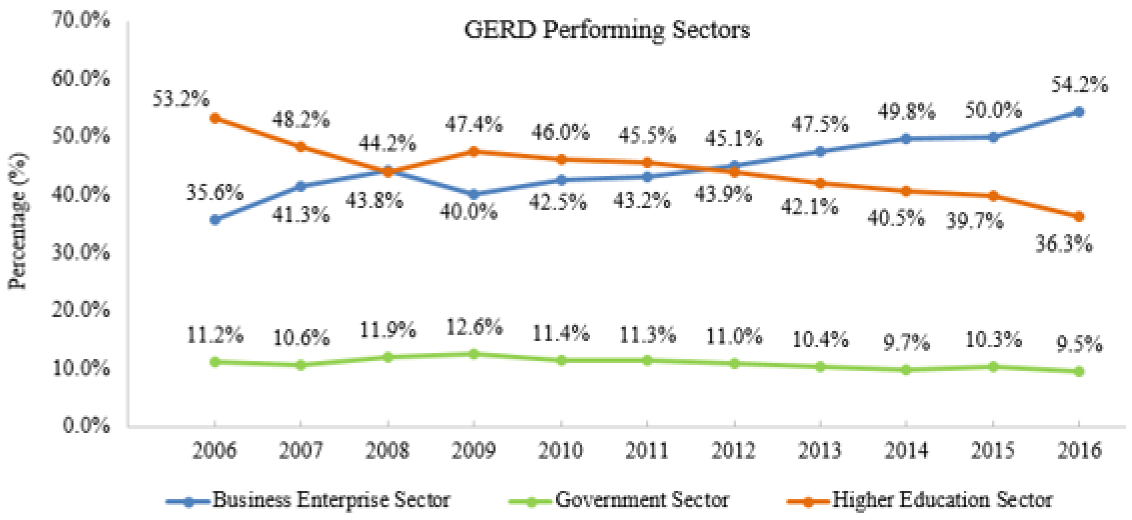
may build financial dependence within firms or sectors that are them unable to survive without such public grants (Efe, 2017).

Another issue overshadowing the credibility of the institution is the popular belief that the TÜBİTAK grants are not always awarded based on the scientific merits of the projects but rather on ideological or political grounds. Some of the projects rejected by TÜBİTAK were globally recognised and funded (Karakullukçu, 2016; CNN Türk, 2018). Along with anecdotal evidence and the research participants' statements, TÜBİTAK also acknowledges this matter in a broader sense in their 2017 annual report, stating '*The habit of making decisions not based on research or evidence, but on opinion' (p.143)* as one of the threats to corporate capability and the capacity of institutions. The existence of beliefs, bias, conformity, nepotism and arbitrary practices, rather than meritocratic grounds for the decision-making process of resource distribution and funding institutions, undermine the reliability of these institutions that are cornerstones for societal progress and the social system of science (Martin, 1986; Wenneras and Wold, 1997; Viner, 2004) and disrupt the process of technological and scientific knowledge and innovation. The research applicants competing for scarce public resources who experience deliberate or subconscious bias – i.e., in favour of insiders, preferred or dominant groups during the evaluation process – may be disheartened and discouraged, and as a result their creativity and innovation might not flourish (Martin, 2000). Unfairness and subjectivity may diminish research diversity (Wahls, 2018), encourage uniformity and increase systematic under-representation of specific perspectives, ideas or concepts. Therefore, such biases should be proactively countered with effective design policies and procedures to ensure the integrity of science research funding that entrenches the culture of fairness, transparency, equality, proportionality, accountability and consultation in the evaluation process (Murray et al., 2016; Efe, 2017).

Although government spending on R&D has increased and made progress in proportion over the past decade, it is still not enough to increase labour and business productivity across the country. Ülkü and Pamukçu (2015), who investigated the impact of in-house R&D intensity on the productivity of Turkish manufacturing firms, find that the impact depends on the technological capability of these firms. For instance, beyond the technological capability threshold, firms will reap the productivity benefits of their R&D investments. In addition, R&D tax incentives are found to be less successful than R&D grants and loans in developed countries, including Turkey (Özçelik and Taymaz, 2008). Gür (2017) argues that the reasons behind the insufficient R&D activities are the lack of R&D awareness amongst firms, decisions to concentrate more on distribution than production, and errors in R&D management. Finally, only 6 percent of the financial support provided by KOSGEB was granted to IT companies in 2011. These adverse effects are triggered by the planned budget cuts for TÜBİTAK as well as at the Ministry of Industry and Technology in 2019-2021. Chen and Li (2018) argue that a 'high level of R&D intensity does not guarantee the generation of successful innovation and enhanced firm performance, companies that invest heavily in R&D are more likely trying to compete on the basis of innovativeness' (p.5). If the government aims to make R&D and innovation activities one of its strategic priorities, this statement is obviously not backed by budget cuts.

Last but not least, the public sector was the leading sector for the gross domestic spending on R&D in 2006, and accounted for 50.6 percent compared to the private sector (41.3 percent) and other sources (8.1 percent) (Europa, 2006).[162] However, the share of the private sector on R&D expenditure (54.2 percent) was higher than that of the public sector (45.8 percent) in 2016 (Figure 8.2).

Figure 8.2: Gross Domestic Expenditure on R&D by Sector (2006-2016)



Source: Turkstat (2018)

[162] Despite there being inconsistencies in the data with regards to GERD by performing sectors national vs international, the share of public sector remained higher in 2006.

Table 8.3 reveals that significant progress was made in the number of R&D and research personnel over the last decade. A substantial portion of these changes were private-led. TÜBİTAK targets are to reach 3 percent of GDP for GERD and 2 percent of GDP for BERD[163] (business enterprise expenditure on R&D) by 2023, as part of the new National STI strategy 2017-23.

TABLE 8.3: Developments and Targets in R&D and Innovation

Targets	2006	2012	2013	Projected (2018)	Actual (2017)
Share of R&D Expenditure in GDP (%)	0.60	0.86	0.92	1.80	0.96
Share of Private Sector in R&D Expenditures (%)	37.0	43.2	46.0	60.0	56.9
Number of FTE R&D Personnel	54,444	92,801	100,000	220,000	153,552
Number of FTE Research Personnel	42,663	72,109	80,000	176,000	111,893
Share of Private Sector in R&D Personnel (%)	33.1	48.9	52.0	60.0	-

Source: The Tenth Development Plan 2014-2018, p.86 & OECD MSTI database Eurostat for actual values.

Mazzucato (2015a,b) illustrates how governments across the globe continue to intervene in the economy. She argues that the US government has acted as a strategic investor by facilitating the knowledge economy through a decentralised network of public institutions such as NASA, the Defense Advanced Research Projects Agency (DARPA), the Small Business Innovation Research program (SBIR), and the National Science Foundation, not to mention providing funding for R&D in different areas such as technology, health, energy and life sciences. Similarly, early-stage funding was provided to selected companies in Israel by the publicly supported venture capital fund, Yozma. Likewise, Sitra, a public innovation fund, provided Nokia's early funding in Finland. In East Asia, China has been following a similar approach by offering loans to the country’s most innovative companies such as Huawei and Yingli Solar via its state-owned development bank. It is clear that, in recent years, the driving force behind Turkey's R&D expansion has not been the government but the business sector. The state’s support through R&D incentives, exemptions, allowances and innovation-focused activities and development in the TDZs, along with the constantly growing number of technology providers and end-users, has served as a push-factor to encourage enterprises to invest more in R&D activities and employ R&D personnel. The R&D expenditure by sectors

[163] BERD (Business enterprise expenditure on R&D) represents the component of GERD incurred by units belonging to the Business enterprise sector, which is all resident corporations, including not only legally incorporated enterprises, regardless of the residence of their shareholders. It is the measure of intramural R&D expenditures within the Business enterprise sector during a specific reference period (OECD, 2015).

of the most technologically developed countries also demonstrates that the business sector is a key driver of progress of these countries in advancing R&D.

However, in Turkey, the public and private sectors are not inherently aligned towards achieving national or strategic development targets. Collaborative efforts in implementation of policies and practices play an instrumental role in the introduction of new technologies and encourage socially beneficial R&D (Link, 2006). Instead of isolated science and technology policies, better use of public-private collaborations speeds up responsiveness to the rapid transformation of innovation processes and encourages efficient and cost-effective technology and innovation policies (OECD, 2004). Risks can be shared; the use of existing knowledge and resources can be optimised (Sagalyn, 2007; Stolk, 2013).

8.2.3 ICT Sector-Specific Incentives

Regardless of their size, all economies today are highly dependent on investments in technological advancements and R&D. Countries that have not fully completed their transition from agricultural to industrial societies are expected to rapidly shift from industrial to knowledge societies. According to the *2012 International Investors Association Report* (YASED, 2012, p.3), '*one unit of ICT sector growth in Turkey leads to a 1.8-unit growth of the national economy*'. Economic growth correlates favourably with job creation (Kapsos, 2006; Khan, 2007), indicating that the ICT sector may become a driving source for future job growth. This is also evidenced in our study, which shows sectoral growth has a positive effect on female employment because shortages of technically skilled labour effect gender pay gap outcomes (Chapter VII). The impact of ICT sector-specific incentives on technological growth and innovation on jobs will thus be discussed in this section.

As a developing nation, Turkey is no exception to the uncontrollable information revolution. In *2023 Vision of Turkey*[164] *(Tenth Development Plan),* the Turkish government has introduced various policies to promote ICT development and speed the transition from an industrial to information society. Some of these policies include developing infrastructure for the communication industry to allow adequate quality and prices and the dissemination of next-generation fixed and mobile networks; providing tender processes for ICT products and services in public projects, incentives for R&D innovation and exports; supporting use of smart

[164] The year 2023 is also a symbolic milestone for Turkey, as it marks the centenary of the founding of the Turkish Republic.

and mobile applications; emergence and development of high value-added Internet initiatives; and delivering a sustainable technical, legal and administrative infrastructure.

The significance of knowledge-based growth with human capital investments and agency technical infrastructure is acknowledged in the *Tenth Development Plan*. The ICT sector is one of the few sectors – along with education, health, justice and defence – that are specifically targeted in the development plan, both directly and indirectly. Of these sectors, on average, education (13 percent) and defence (5 percent) represent comparatively large contributions of the general budget compared to the ICT sector between 2013 and 2018. This is demonstrated by the total funds allocated to both the Ministry of Commerce (0.42 percent) responsible for incentives in the ICT sector and the Ministry of Industry and Technology (0.71 percent) over the same period, which were far below the funds allocated to education and defence. One may argue that the funds allocated to TÜBİTAK were on average 3.88 percent of the total over the same period. This number, however, still remains below the education and defence budget, and not all of the resources allocated by TÜBİTAK directly go to the ICT sector. Within the scope of the industrial strategy, the policies targeting the ICT sector have been implemented through various forms and sector-specific incentives delivered mostly via the Ministry of Economy and also through KOSGEB and İGEME.[166] These incentives are provided to companies that are settled in Turkey and operating in the fields of software, Internet, computer games or microchips, whether domestic or foreign.

[166] IGEME stands for Export Development Centre.

Table 8.4: The Scope of ICT Sector-Specific Incentives

Scope of ICT Sector-Specific Incentives	Authority	Min	Max	ICT company	Collaborator	Frequency (in a year)
Incentives for the expenses related to the purchases or receipts of the sector, country, international legislation or investment issues of ICT companies or collaborative organizations	Ministry of Economy	60% 70%	USD100,000 USD300,000	✓	✓	
Incentives for the market entry costs for the marketing of computer games abroad	Ministry of Economy	50%	USD100,000			Once
Incentives for the commission expenses for foreign sales of the application that are developed to be used on tablet computers, mobile phones or mobile devices	Ministry of Economy	50%	USD50,000			
Incentives for the sponsorship, advertising, promotion, consulting, participation and organization expenses generated regarding the promotions made within the scope of the fairs, congresses, conferences and / or independent promotion programs organized abroad	Ministry of Economy	50% 70%	USD300,000 USD500,000	✓	✓	
Incentives for the participation costs related to trade fairs, congresses or conferences organized by informatics companies and collaborators abroad	Ministry of Economy	70%	USD15,000			Ten times
Incentives for the search engines advertisement and promotional expenses of ICT companies and collaborators	Ministry of Economy	50%	USD100,000			
Incentives for the rent expenses of the units that ICT companies or collaborators open directly or through companies or branches operating abroad	Ministry of Economy	60% 70%	USD200,000 USD300,000	✓	✓	10 times each year, for 4 years
Incentives for the rent expenses of each information centre or liaison office of Technoparks opened abroad	Ministry of Economy	80%	USD600,000			
Incentives for certificate or accreditation, purchase, renewal and consultancy expenses that ICT companies in order to comply with the international technical legislation and to enter international markets.	Ministry of Economy	50%	USD50,000			
Incentives for transportation and accommodation expenses of each participants as well as the programme, advertising, marketing, consulting, promotion and organization expenses within the scope of a trade delegation or procurement committee programme	Ministry of Economy	70%	USD150,000			

Incentives for the expenses related to the consultancy services purchased by the ICT companies on the issues approved by the Ministry of Trade	Ministry of Economy	50%	USD200,000			
R&D and innovation support programme	KOSGEB		TRL 750,000			
Entrepreneurship development support programme, depending on the entrepreneurship	KOSGEB		TRL 360,000			
Support for the provision of computer software in order to increase the competitiveness of the enterprises in national and international platforms	KOSGEB	50%	TRL 8,000			
E-commerce guidance support	KOSGEB	100%	TRL 3,000			
Market research and marketing support depending on the activity	İGEME	50% or USD10,000	80% or USD30,000			
Incentives for the membership expenditures for e-commerce sites	İGEME DTM	Below USD3,000 Above USD3,000				
Incentives for training and consultancy	İGEME	90%	USD50,000			6 months, domestic
R&D support	TÜBİTAK TTGV	-	60%			3 years + 6 months
Employer and employee share of the social security premiums of those companies who employ a three-month unemployed	Ministry of Treasury and Finance	100%				For 12 months, +6 months if female.

Source: Author's own elaboration from various sources (Ministry of Economy, n.d.; Garanti BBVA, n.d.; Ticaret, n.d; Denge Müşavirlik, n.d; Stephen, 2015; KPMG, 2018)

Although the incentive and support schemes are welcomed by the ICT sector, these are insufficient in terms of technological development and innovation, because they are both limited and poorly targeted. The incentives dependent on the geographical regions – i.e., deprived regions with relatively low-skilled labour receiving higher funding – might result in more restricted allocation of resources to developed regions due to relatively high supply levels of skilled labour, leading to competition. As a consequence, R&D and innovation may not be fully realised in developed regions due to insufficient resources nor in the deprived areas owing to a lack of skills and expertise and limits on the overall consumer demand for domestic technological products. In order to break this vicious cycle and bring about a systemic transition for the manufacture and export of high-tech and high-value-added goods, public agencies should not hesitate to provide a significant amount of funding for the ICT sector, which often entails large-scale capital, intangibility, complexity and risk in the production process. However, once the potential is realised and the products are commercialised, the benefits will exceed the costs covered by public funds. Greeven (2006) demonstrates that China's ICT sector was promoted by state participation through substantial incentives, making the country a strong competitor against its developed counterparts. Turkey is far from achieving what China has achieved in the last decade with the current level of incentives.

The requirements needed to benefit from ICT development are also difficult and not necessarily accessible by all groups in society. For instance, talented individuals, start-ups or SMEs may not have the initial capital to seek further funding from a public agency. According to the TOBB (2012) study, these issues can be mitigated by offering pre-payments before the project begins, particularly for software projects that are important components of ICT development or granting full funding as well as monitoring and evaluating the impacts of these projects. Thereby, the current incentives structure for the ICT sector excludes certain groups or companies within it.

Similarly, despite the promising incentives listed above, for almost a decade, employment and the economic growth have not been realised in the ICT sector. To demonstrate, in 2017, the size of the Turkish ICT sector was $32.1 billion, which accounted for only 3.8 percent of the country's GDP[167]. The share of ICT sector employment against total

[167] GDP of Turkey ($851.1bln, 2017). Several reports suggest that the size of global ICT sectors accounts for 6.5% of the global GDP.

employment was only 1.8 percent[168] and the share of ICT goods exports against total goods exports was realised at 1.25 percent, according to World Bank data for the same year. For almost a decade (2009-2017), the share of ICT employment remained at 1.74 percent and the share of ICT goods exports at 1.58 percent, on average. For a comparison, the share of ICT goods exports during 2009-2017 was significantly higher in East Asia and the Pacific (23.7 percent), Latin America and the Caribbean (6.6 percent) and Europe (5.5 percent).[169] Furthermore, 18,766 companies were founded, while 3,713 companies closed in the ICT sector between 2010 and 2018, according to TOBB (2019). However, it is not clear whether those companies went into liquidation, were newly established start-ups or the existing ICT companies. Therefore, the issues that generate this undesired outlook in the Turkish ICT sector require further discussion.

The growth of the sector is the one aspect that has managed to lower the gender wage gap among technical occupations. However, the strategic plan of the Ministry of Economy also acknowledges that the current mechanisms and tools are not effective enough to follow up on the technical or commercial success of these incentives or measure their impact. These structures inhibit the advancement of technology and innovation in TDZs and create barriers to sector-specific incentives in ICT. This issue should therefore be addressed as a matter of urgency, not only at the sectoral level, but at the national level. Once a successful mechanism has been checked and authorised, step-by-step guidelines should be shared with all fund providers in both public institutions and business. If the sector is not adequately supported in the future, it could put this progress in terms of gender equality in jeopardy.

8.3 Conclusion

This chapter has demonstrated the efforts of the Turkish state in increasing women's employment and fostering gender-equality practices as well as the state's role in the ICT sector, both of which have an impact on the gender wage gap outcomes that have been the focus of this thesis. With regards to employment for women and gender equality practices, the state indirectly promotes women's employment in the private sector by offering various incentives and subsidies. The gendered effects of these subsidies, however, may not be sufficient to substantially increase female employment in the long term, because by their very nature, these

[168] The figure was even lower (1.57 percent) in 2017 if 'number of employees' taken into account rather than the 'number of persons employed'.
[169] Lack of data for the MENA region in World Bank development indicators

subsidies do not address gender wage disparities in general or in the ICT sector, but are primarily aimed at increasing female employment and indirectly reducing informal employment. As long as the subsidies are provided for employers, they may impact female employment but do not address the gender wage gap issue as it stands. Furthermore, in the context of gender equality, the government's rhetoric often does not add up to tangible actions. Gender equality and the state’s industrial policies are categorised as distinct areas and few, if any, links are made between the two. Although there are broad objectives to increase the participation of women in the labour market, in STEM industries etc., these policies are neither concrete nor observable.

With regards to the state’s role in ICT sector development, the evidence from various sources above suggests that Turkey has implemented a significant number of projects over the last two decades to support the production of technological knowledge and innovation and to achieve its goal of an information society through medium-term programmes. Incentive schemes have aimed at increasing and steering investments into high-value generating activities, boosting FDI and exports. Over the years, the share of R&D expenditure in GDP, the share of private sector investment in R&D spending and total numbers of R&D personnel have significantly increased. The increase in R&D activities has been driven mostly by the private sector . The defence industry’s significant contribution to R&D also indicates Turkey’s determination to achieve its *Vision 2023*. Incentives specifically designed for TDZs have enabled the business sector as well as new start-ups to produce high-tech and high value-added products, ultimately boosting the share of the business sector in GERD on R&D.

Overall, the role of the Turkish state in the triangle of the ICT sector, employment policies and gender equality is insufficient, despite the improvements described above. There are issues with the funding as distributed from the three primary channels: TDZs, TÜBİTAK and ICT sector-specific incentives. Regarding technoparks, the failure in commercialisation of R&D products and innovations, insufficient state support for R&D, and limited academia-industry collaboration prevent technopark companies from fully utilising potential innovative ability and capacity. Moreover, despite a year-on-year increase in the number of operating technoparks, 87 percent of total technoparks exports are produced by only three technoparks in İstanbul and Ankara, suggesting that the growth in the number of technoparks has not translated into output or productivity growth in Turkey. In relation to TÜBİTAK incentives for R&D, despite the generous support the ICT sector received, the export contribution of the ICT sector was lower than the machinery manufacturing industry that received lower TÜBİTAK funding (MÜSİAD, 2017). Furthermore, there is also a lack of complete assessment, monitoring or reporting on the efficacy and impact of the designated funds, which challenges the legitimacy and the quality of the projects as well as the integrity of the state funding institutions. There is also a popular belief among the public that TÜBİTAK funds are allocated on ideological or political grounds rather than on the basis of the scientific merit of the projects. The third channel for state support to the ICT sector, ICT sector-specific incentives, are also problematic and exclusionary, in that they require qualifying companies to meet specific conditions such as high starting capital or being in a certain geographical area. Finally, the total funding provided for the ICT sector through these channels still remains a small portion of the government's budget, according to the General Directorate of Budget and Fiscal Control (2019) statistics. Planned budget cuts suggest the amount of funding that will be allocated to the ICT sector will diminish further in coming years. Therefore, it can be concluded that the state acts more as an indirect agent to promote employment in the private sector in generic terms. However, the lack of policies explicitly aimed at promoting employment for women or improving working conditions in the ICT sector suggest that gender equality in the ICT sector is currently not a priority for the Turkish state.

CHAPTER IX

CONCLUSION

9.1 Research Summary

This thesis has presented a detailed analysis of the gender wage gap in the fast growing and value-adding ICT sector in Turkey. It addressed three questions: (1) *What is the extent and nature of the gender pay gap in Turkey's ICT sector?;* (2) *What is the distinction between the technical and non-technical gender pay gaps? What is the role of labour market distortions in explaining this distinction?;* and (3) *What is the role of the state and state policies in shaping the gender pay gap?* This concluding chapter summarises the main arguments and the answers to these questions. It will begin by contextualising the findings in terms of the existing literature and research as well as reflecting on the approach and methods used. The findings will then be reviewed by considering the potential limitations and some areas for further research.

The thesis both theoretically and empirically argues that gender earnings differences in labour market outcomes can only partially be explained by conventional supply-side theories regarding earnings differentials among groups. These theories neglect labour market distortions (labour supply shortages and unusual sectoral rapid growth) and demand-side factors, which are found to be significant in this study in determining the nature and extent of the gender wage gap. For instance, Bergmann's crowding hypothesis argues that certain groups in the labour force, e.g., ethnic minorities and women, can be crowded into specific low-skilled occupations as an outcome of labour market discriminations, leading to higher labour supply and lower wages in these occupations. This thesis modifies Bergmann's theory by bringing labour demand into the equation. Shortages of technically skilled labour and the high growth and profitability of the Turkish ICT sector have created different gender wage gap outcomes. Specifically, this has resulted in a gender wage gap in the ICT sector that is significantly lower for technical positions than non-technical ones. Labour market distortions have dampened the impact of other explanations of the gender wage gap for technical occupations. Technically unskilled female ICT professionals have been penalised with lower wages and a larger gender pay gap with the following factors standing out as primary contributors: the motherhood penalty, social norms and resultant discrimination, and the enactment of the marriage compensation law. However, the above factors were often overcome by strong labour demand for those technical occupations, so that women in technical jobs received wages very close to those of their male counterparts. Therefore, gender wage gap analysis that does not take into account labour market distortions in any industry, sector or economy-wide level may result in under- or overestimation of gender pay differentials. Overall, this thesis makes a threefold contribution to the gender wage gap literature. *First*, on a theoretical level it modifies Bergmann's crowding hypothesis by bringing in labour demand and social norms as factors that lead to different gender wage gap outcomes in the Turkish labour market. It demonstrates that traditional explanations of the gender pay gap can be overcome in circumstances of high labour demand for certain occupations and sectors. *Second*, at a methodological level the thesis has generated new primary quantitative and qualitative data, demonstrating the value of mixed methods for assessing and understanding the gender pay gap at the industry level. *Third*, at an empirical level this thesis provides important new insights into the nature and extent of the gender pay gap in Turkey at an industry level as well as a deeper understanding of the broader growth and development context of the ICT sector in Turkey.

Chapter II presents a critical literature review of the orthodox and heterodox theories of the gender wage gap issue and demonstrates gender and labour market trends in the Turkish context. The chapter argues that although human capital theory still remains one of the most significant, despite its weaknesses, owing to its potential to determine the wage differentials among groups. Other streams of thoughts such as labour market discrimination, the motherhood penalty and occupational segregation are considered leading explanations for the gender wage gap. There are also newer responses to be taken into account such as differences in the psychological traits and non-cognitive skills, as well as older structural theories (e.g., patriarchal feminist theory) that may provide underpinnings for such observed psychological differences, as well as expose bias prior to reaching the labour market. Provided that there are traditional and newer explanations for the gender wage gap, this thesis contributes to the current literature by offering a synthesis of theoretical ideas through which to analyse the phenomenon by extending Bergmann's crowding hypothesis. It also locates the question within the historical trajectory and social context of Turkey, questioning the extent, nature, causes and implications of the gender wage gap in a growing and value-creating Turkish ICT sector. The current gender wage gap literature focuses on wage gap differences in various settings, including in the economy as a whole, as well as across specific sectors and occupations; it primarily ignores the nature of the gender wage gap in a growing and value-adding sector such as ICT. Thus, this thesis also provides another missing piece to the gender wage gap puzzle by bringing in labour market distortions as one of the most significant factors in determining the nature and the extent of the earning differentials between groups.

At the empirical level this chapter has investigated female LFPR in Turkey, which remains low overall by international standards and compared to men's participation but has increased steadily since 2008. However, closer analysis reveals that such an increase in female participation and employment has not been shared equally, those with university-level degrees being the main new labour-market entrants. The percentage of female employment in the Turkish ICT sector is similar to the national average and follows a similar trajectory over time.

Chapter III provides an overview of the Turkish ICT sector in order to contextualise the findings of the thesis. One of the challenges of carrying out empirical research in this sector is the difficulty of defining it due to its constantly evolving nature. For that reason, the chapter provides an OECD definition of the ICT sector with past and present modifications throughout the years. The chapter then zooms in on the Turkish ICT sector and sketches a detailed gender profile. The sector has more than doubled in nominal terms (from ₺61.6 → ₺131.7 billion) during the period of 2013-2018, the number of employees and firms increased significantly during the last decade. However, the share of the ICT sector in GDP remains relatively small at less than 5 percent between 2013-2018, the share of ICT in the services sector is less than 9 percent and the share of ICT employment as of total employment was less than 2 percent in 2018.

Chapter IV first provides the gender wage gap outcomes by using HLFS data between 2005 and 2019 for selected years. The HLFS data is valuable as it addresses the concerns over selection bias. The analysis of HLFS data indicates that during the selected period, the sector has remained male-dominated, but the presence of women has significantly increased by 5 percent to 24 percent (2019). Sectoral growth is reflected in higher demand for technical professionals over the years. ICT sector gender wage gap dropped from 9.3 percent (2005) to 5.4 percent (2019), which is smaller than our estimation of 23 percent. The difference in the gender wage gap outcomes between HLFS and our primary data might be explained by our using wage brackets with large intervals in our estimations as well as the response bias associated with self-reported wages. However, the sample size in the HLFS data is too small to draw any firm conclusions for the possible drivers of the wage gap and the differences between occupational groups (technical vs non-technical), which confirms the contribution of the current study to the literature. The chapter then explains the methodological framework used to carry out this study. Quantitative and qualitative research techniques were integrated to help conceptualise the gender wage gap phenomenon and deepen our understanding of it. Findings in relation to causes of the pay gap were triangulated, permitting a deeper consideration of the causes identified by the quantitative research and some analysis of the implications of the gender pay gap for female professionals and the sector as a whole. In addition, this chapter outlines survey design and data collection methods, explaining how non-probability sampling methods were deployed to collect the online questionnaire and purposive sampling for the semi-structured interviews. The chapter also compares the survey sample relative to the Turkish ICT sector as a whole, highlighting the difficulty in judging how representative the survey in this study is, given that only limited information is available concerning the target population of ICT employees. The chapter concludes with the limitations associated with the methods deployed in this study, which will be detailed below, including the self-reporting nature of the online questionnaire and the way in which wage information was collected.

Chapter V reviews the descriptive survey results from the empirical analysis. Crude wage data analysis shows more women in the lower wage scale and more men in the higher scale of salary ranges. For example, there were three times more men than women in the highest wage bracket. The Index of Dissimilarity indicated that roughly one-fifth of the male and female ICT professionals would have to move to a different position in order to achieve a uniform distribution. The participants' overtime patterns, job turnover attitudes and motivations for working in the ICT sector were also explored. No significant gender differences are observed in the overtime patterns of technical and non-technical professionals. However, when the Logit model is applied for working overtime, technical positions as opposed to non-technical positions and higher paid professionals were more likely to work overtime. Single ICT professionals were also more likely to work overtime compared to their married counterparts.

Chapter VI carries out the empirical analysis of the gender wage gap in the Turkish ICT sector by applying the Blinder-Oaxaca decomposition, one of the most frequently applied methods to test earning disparities between different groups. This method divides the total gender wage gap into two elements: explained and unexplained. The former refers to the gender wage gap that is explained by the variables used in the model, while the latter refers to labour market discrimination or unobserved variables. The expanded decomposition resulting from this study reveals that there is a gender wage gap in the fast-growing ICT sector of Turkey. The gap is 23 percent, 69 percent of which can be explained, while the remaining 31 percent can be attributed to labour market discrimination. The gender wage gap in the Turkish ICT sector is not as big as anticipated, compared to other studies. However, the most striking result from this study emerges once the sample has been divided into technical and non-technical sub-populations. The gender wage gap decreased from 23 percent to 10.4 percent for purely technical positions and nearly doubled from 23 percent to 40.5 percent for non-technical positions. Furthermore, our model explains the reasons for 91.8 percent of the wage gap in technical roles (10.4 percent) but only 65 percent of the wage gap in non-technical roles (40.5 percent). Therefore, the empirical analysis indicates a notable discrepancy between the technical and non-technical positions in relation to the gender wage gap and its causes.

Chapter VII explores the findings of the previous chapter and analyses the reasons behind the severe gender wage gap differences between technical and non-technical positions. Discrimination in the hiring practices of Turkish ICT firms – such as perceived direct and indirect costs of hiring women, hierarchies of discrimination and bargaining power and wage negotiations, and occupational segregation were found to be the conventional causes of the gender wage gap for the non-technical positions. However, these factors were overcome for technical occupations due to labour supply shortages and higher wage returns on ICT skills for women, resulting in a smaller gender wage gap for technical positions. The chapter then concludes that studies that neglect labour market distortions when analysing gender wage gaps could be incomplete and misleading. Gender wage gap analysis should be understood in the context of both the supply- and demand-side forces as well as growth conditions to unveil the real earning differentials between groups.

Chapter VIII looks at the role of the state in relation to ICT sector development, employment and gender equality. The state's actions and rhetoric, along with various policy documents, were examined to determine existing policies that aim to prevent persisting discriminatory factors. These factors are found to be the drivers of higher gender wage gaps, particularly for non-technical professions in the ICT sector. Turkey has implemented a significant number of projects over the last two decades to produce technological knowledge and innovation, with the aim of transitioning Turkey from an industrial to an information society that is internationally competitive. The state has been using three primary channels to directly promote the ICT sector in the economy: TDZs through tax deductions and exemptions by special laws; TÜBİTAK is predominantly used for R&D spending; and ICT sector-specific incentives via industrial development policies. With regards to employment and gender, public sector employment has not been a priority for the state since the 2000s, and a higher employment rate is now targeted via the private sector. Overall, the chapter concludes that the links between employment, industrial policies and gender equality were not very strong before 2000 and have weakened even further after the 2000s. The state does not provide long-term effective policies to promote women's presence within the traditionally male-dominated ICT sector, to combat gender pay differentials, occupational segregation and the motherhood penalty, all of which are mostly neglected in current development plans.

Finally, there are some limitations in the design of this study that need to be acknowledged. One limitation is that the wage data used is self-reported by the research participants via an online survey; thus, it may be subject to response bias. However, the selection bias and other problems associated with non-randomness of the data is addressed by carrying out gender wage gap analysis with the secondary data (HLFS) that is considered to be random and representative. Considering that the existing secondary wage data for the ICT sector in Turkey was not sufficient to provide explanations for the underlying gaps or discrimination, the web-based online survey can be considered as an appropriate second-best technique for data collection. The second limitation concerns the structure of the wage data. To avoid a low response rate to the online questionnaire, earnings information from the participants is collected in categorical rather than continuous forms, which may lead to measurement errors in the subsequent wage gap calculations. This method of wage data collection was used in order to tackle the low response rates that are common for sensitive topics such as wages in the Turkish context. The third limitation relates to the sample itself and potential sampling bias resulting from the use of LinkedIn to approach respondents. Furthermore, as this was a self-reporting anonymous questionnaire, it is not guaranteed that the respondents were indeed exclusively ICT professionals.

However, conducting semi-structured interviews can ameliorate any effects of the above limitations while triangulating the findings from the survey data. The gender wage gap in ICT sectors, both national and global, is understudied. The study could have been improved with an increased number of semi-structure interviews or a further in-depth examination of an individual ICT company in the sector to confirm the findings of this study. Similar to this study, primary sector data can be collected to carry out such research in other economies, and the cost and time efficiencies can be increased through utilising online data collection tools. Furthermore, the wage data can be collected in a continuous form to achieve more robust results and to increase generalisability of results. Considerably more studies need to be carried out to enable a broader understanding of gender wage gaps in growing sectors with or without the labour market distortions discussed in this chapter. However, as a result of the time frame attached to this thesis, the current methodology and approaches are applied in this study. Overall, this study should be regarded as suggestive rather than conclusive due to the above limitations.

9.2 Theoretical and Policy Implications

The findings of this thesis suggest largely three courses of action for the ICT sector development and gender equality in the Turkish context. The conventional causes of the gender wage gap are found to be less rigid; that is, it is relatively easier for ICT firms in Turkey to alter their conventional attitudes towards female labour when the labour market distortions have a negative impact on their bottom lines. This implies that, broadly speaking, gender inclusion in the Turkish labour markets is relatively high for the technical occupations, particularly in areas where there are shortages of technically skilled labour. Removing barriers and promoting female inclusion in these well-paid sectors represent a promising start for gender equality. Furthermore, our findings also exhibit that women are treated more equally in technical occupations with regards to pay. However, fundamental reforms are still needed to achieve gender equality both in relation to higher representation of women and also equal pay in technical areas.

Firstly, there are a remarkably small number of women – this is called the pipeline problem – pursuing engineering and computing degrees in the country, primarily as a result of gendered stereotypes in relation to engineering degrees that emerge at early ages, which lower girls' desire to pursue careers in these fields. Furthermore, even if they pursue careers and graduate in these fields, not all of them will end up working in these technical areas like ICT owing to the biases in hiring practices, perceived barriers to entry, the glass ceiling, marriage and childcare, and the lack of female role models. This leaves an even smaller pool of female job applicants who compete with their more numerous male counterparts. For this reason, closing the gender gap in the sector should start from education, challenging gender stereotypes via parents, teachers and the media, promoting female role models and proactively supporting female inclusion in these fields. In order to fix this pipeline problem in the ICT sector, educational gender equality in technical fields is a must, not only for the wellbeing of women as an outcome of better careers, pay and working conditions, but also for today's economies which heavily rely on services sectors, technological knowledge and innovation, but face talent shortages.

Secondly, discrimination in the hiring processes as a result of motherhood and the marriage compensation law is another significant factor affecting gender wage differentials. Single (or married) women are often questioned on their marriage (or pregnancy) plans. Although it is unlawful to discriminate against women on the basis of marriage or pregnancy, the current policies are not fully effective in preventing act of sex discrimination during hiring. More social and state awareness of the issue may put pressure on the discriminating employers and those who discriminate may be fined to discourage such acts in the labour markets. Similarly, the marriage compensation law, which can be exercised only by women, is an important factor in determining both women's presence and gender wage differentials in the sector. It is evidenced in the semi-structured interviews that single female applicants of marriageable age or newly-married ICT professionals may be systematically discounted during the hiring processes by employers who fear that the marriage compensation law may be exercised by these women, since the employers pay for the severance pay rather than the Turkish state. As a result, although marriage compensation law aims at improving women's financial status by providing them with severance pay, it becomes a tool that promotes male employment and undermines female employment in the sector. Thus, the marriage compensation law brings more harm than benefits to ICT sector female professionals. Marriage compensation law may be a great benefit for some sectors with greater women presence such as textiles, it creates a handicap for ICT women from the start by limiting their access to the sector which has already limited women's share. Even if they are hired, female bargaining power in a wage negotiation decreases when compared to their male counterparts, which leads again to gender wage gaps. As a result, it can be suggested that women in the ICT sector may be excluded from exercising the marriage compensation law. This may not necessarily be very practical in nature, considering that there is still no consensus on the definition of the ICT sector and also could be exploited by some employers; however, it is crucial to acknowledge and act accordingly if the state wants to increase women's presence and reduce the gender wage gap in the ICT sector.

Thirdly, although a significant number of projects have been implemented in the country for ICT development and various significant subsidies provided in efforts to increase female employment, the Turkish state has long neglected the issue of gender inequality. It is evidenced in the past and present development plans that ICT development and gender inequality are taken as separate issues and not sufficient attention given to gender inequality in ICT sector, let alone the issue of the gender wage gap. Not only should the systematic inclusion of gender equality be included in the state's agenda, but also forming partnerships with the private sector for increasing female employment in technical areas should be included in the state's agenda. To demonstrate, considering that the gender wage gap in technical areas is small in the sector, an increase in female employment in the technical fields would reduce the gender wage gap, since women in technical roles are paid an amount close to that of their male colleagues, which is one of the reasons why the gender wage gap is smaller in the whole sector. Similarly, shared parental leave should be encouraged to decrease career interruptions for women due to childbirth and childcare facilities should be established, which addresses one of the most significant factors behind women's lower LFP. Along with such actions, legal action should be taken against discriminatory employers to promote female inclusiveness and diversity in these sectors.

9.3 Avenues for Future Research

This research highlights two major areas in need of further investigation. Findings from this study show that conventional causes for the gender wage gap are not rigid in the Turkish ICT sector and can be overcome when they interact with other factors. As a result, technical professionals witness a narrower gender wage gap compared to the non-technical professionals, despite both being in the same sector. Therefore, the first area of interest could be that the gender wage gap and the rigidness of the conventional causes of the gap in other economies can be investigated under different labour-market conditions. In the case of a lack of data availability, the gender wage gap in traditional sectors which have a higher chance of having wage data, can be investigated under labour market distortions to observe whether other sectors respond to these distortions in the same manner in relation to the gender wage gap.

Second, it would be interesting to compare the gender wage gap for ICT specialists across sectors in a specific economy or across countries with solid (administrative) wage data. The gender earnings differential for ICT specialists can then be compared with the gender wage gap among the technical positions in ICT sectors in order to see whether the narrower gender wage gap is ICT sector-specific or talent-specific.

APPENDICES

APPENDIX 1

R&D Centres

R&D Centres in Turkey are defined by Law No. 5746. The purpose of the law is to support and encourage the production of technological knowledge, increase international competitiveness, assist with the development of innovative capacity, establish an industrial infrastructure that is suitable for technological developments in the world and configure R&D units of foreign capital companies in Turkey by focusing on R&D and innovation, enhancing R&D personnel and skilled workers, producing high value-added products, hence ensuring an efficient and competitive economic environment.[170] In order to be considered as an R&D centre, the unit is expected to be exclusively engage in R&D activities and required to employ a minimum 50 full-time equivalent personnel.[171]

Allowance, Exemption, Support and Incentive in R&D Centres (Law No. 5746)

The state also provides allowances, incentives and exemptions for activities carried out in R&D centres. The law allowed taxpayers to benefit from primarily R&D deduction, allowances and incentives since it came into force on the 28 February, 2008. Some of the advantages of R&D centres are listed below:[172]

- *R&D deduction*: All innovation and R&D expenditures made by beneficiaries of technopreneurship capital support in technology centres, R&D centres, public institutions and bodies are deductible from corporate income until 31/12/2023. R&D centres are required to employ at least 15 (up to 30 for specific sectors) full-time equivalent R&D personnel.
- *Income tax withholding incentive*: Except public sector personnel, the remunerations received by R&D and support personnel in return for R&D and work can be exempt from income tax at the rates of 95 percent (for a doctorate degree), 90 percent (for a master's degree) and 80 percent (others).
- *Insurance premium support*: Except public sector personnel, half of the social security employer's share calculated on the remunerations received by R&D and support personnel in return for R&D, design and support work can be paid from the fund to be placed in the Ministry of Finance budget.

[170] https://btgm.sanayi.gov.tr/Handlers/DokumanGetHandler.ashx?dokumanId=44420e70-a1b2-4906-bdc6-d39f709dd643. Accessed: 20/11/18

[171] https://www.teknoparkistanbul.com.tr/dosyalar/concerning_the_support_of_research_and_development_activities.pdf. Accessed: 20/11/18

[172] http://www.gib.gov.tr/fileadmin/beyannamerehberi/taxincentives.pdf.
https://www.teknoparkistanbul.com.tr/dosyalar/concerning_the_support_of_research_and_development_activities.pdf.
https://www.ey.com/gl/en/services/tax/international-tax/alert--turkey-s-r-d-reform-package-increases-current-r-d-incentives.

- *Stamp duty exemption*: The papers arranged on all sorts of R&D and innovation activities within the scope of this Law are exempt from the stamp duty tax until 31/12/2023.

TABLE: Research and Development Centres in Turkey, 2018

R&D Centres of Turkey	2018
Number of R&D Centres	1,026
Machinery and Equipment Manufacturing	14.1%
Automotive supply industry	9.9%
Software	9.4%
ICT technologies	7.3%
Textile	6.5%
Electrical and Electronics	6.1%
Chemistry	6.0%
Food	4.7%
Defence industry	3.2%
Medicine	2.9%
Iron and Non-Ferrous Metals	2.4%
Energy	2.3%
Other	25.2%
Total Employment	54,471
University	56%
Master	20%
PhD	2%
Other	22%
Location	
İstanbul	36.2%
Kocaeli	10.7%
Bursa	10.0%
Ankara	9.1%
İzmir	7.2%
Tekirdağ	4.6%
Other	22.2%
Number of Completed and Ongoing Projects	32,992
Number of Patents	9,522
Number of Foreign Companies	141

Source: Ministry of Science, Industry and Technology (2018)

APPENDIX 2

Design Centres

Along with technoparks and R&D centres, Turkey has also implemented design centres within the scope of the Law No. 5746 to encourage R&D and innovation. Design activities comprise all innovative activities that have the potential to create added-value and competitive advantage and to increase the functionality, development, improvement and differentiation of the products. Designers who hold engineering, architecture and design degrees are involved in the management and realisation of the projects with the support of the design personnel in the design centres. Some of the advantages of the design centres are listed below:[173]

- *Design deduction:* All design and innovation expenditures are deductible from the corporate income until 31/12/2023.
- *Income tax withholding incentive*: Salaries of design and support personnel are exempt from income withholding tax at the different percentages (80-95 percent) depending on the educational level.
- *Social security premium*: Half of the employer's contribution of social security premiums for design and support personnel is supported by the Ministry of Finance.
- *Stamp duty exemption:* All documents made out with regards to design activities are exempt from stamp duty tax until 31/12/2023.

TABLE: Design Centres in Turkey, 2018

Design Centres in Turkey	2018
Number of Design Centres	275
Textile	20.7%
Manufacturing industry	12.4%
Machinery & equipment manufacturing	9.5%
Engineering / architecture	8.7%
Construction	8.4%
Furniture	5.5%
Automotive supply industry	4.4%
Other	30.5%
Total Employment	5,721
University	57%
Master	8%
PhD	1%
Number of Completed and Ongoing Projects	4,174
Number of Patents	141
Number of Foreign Companies	10

Source: Ministry of Science, Industry and Technology (2018)

[173] https://agtm.sanayi.gov.tr/Upload/SingleFile/Dosya-237-455.pdf.
https://assets.kpmg.com/content/dam/kpmg/tr/pdf/2018/05/investment-in-turkey-2018.pdf. Accessed: 20/11/18

APPENDIX 3A

Blinder-Oaxaca Decomposition with Simple Model

Source	SS	df	MS
Model	355.554809	3	118.51827
Residual	655.867176	1,912	.343026765
Total	1011.42198	1,915	.528157694

Number of obs	=	1,916
F(3, 1912)	=	345.51
Prob > F	=	0.0000
R-squared	=	0.3515
Adj R-squared	=	0.3505
Root MSE	=	.58568

lnwage	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Experinyears	.1952569	.0113364	17.22	0.000	.1730239	.2174899
Exp2	-.0070893	.0005471	-12.96	0.000	-.0081623	-.0060164
Edu	.1358284	.0081525	16.66	0.000	.1198397	.1518171
_cons	5.661231	.1387958	40.79	0.000	5.389024	5.933438

Blinder-Oaxaca decomposition

Group 1: Gen = 0
Group 2: Gen = 1

Number of obs	=	1,916
Model	=	linear
N of obs 1	=	1473
N of obs 2	=	443

lnwage	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
overall						
group_1	8.815655	.0188304	468.16	0.000	8.778748	8.852562
group_2	8.586515	.0338532	253.64	0.000	8.520164	8.652866
difference	.2291404	.0387379	5.92	0.000	.1532155	.3050652
explained	.1854621	.0253096	7.33	0.000	.1358563	.235068
unexplained	.0436782	.0309033	1.41	0.158	-.016891	.1042475
explained						
Experinyears	.6119557	.0713032	8.58	0.000	.472204	.7517074
Exp2	-.4178695	.0552008	-7.57	0.000	-.526061	-.309678
Edu	-.0086241	.0117594	-0.73	0.463	-.0316721	.0144239
unexplained						
Experinyears	-.3059955	.1730462	-1.77	0.077	-.6451598	.0331688
Exp2	.1819094	.10511	1.73	0.084	-.0241023	.3879212
Edu	.5357902	.5516574	0.97	0.331	-.5454385	1.617019
_cons	-.3680259	.5553671	-0.66	0.508	-1.456525	.7204736

Multiple Linear Regression

Source	SS	df	MS			
				Number of obs	=	1,882
				F(11, 1870)	=	124.91
Model	412.708079	11	37.5189163	Prob > F	=	0.0000
Residual	561.67903	1,870	.300363118	R-squared	=	0.4236
				Adj R-squared	=	0.4202
Total	974.387109	1,881	.518015475	Root MSE	=	.54805

lnwage	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Experinyears	.1531203	.0114205	13.41	0.000	.130722	.1755187
Exp2	-.0055888	.0005382	-10.38	0.000	-.0066442	-.0045333
Edu	.1254414	.0079216	15.84	0.000	.1099053	.1409775
Gen	-.0723456	.0313085	-2.31	0.021	-.1337488	-.0109423
Marital	.0720382	.0329106	2.19	0.029	.0074929	.1365835
Location	.2306204	.0273721	8.43	0.000	.1769372	.2843035
Position	-.0820268	.0282178	-2.91	0.004	-.1373686	-.0266851
Employment	.6240392	.0749042	8.33	0.000	.4771345	.7709439
Children	.0887961	.0360544	2.46	0.014	.018085	.1595072
Ownership	-.1426871	.0267537	-5.33	0.000	-.1951574	-.0902168
Overtime	.0095705	.0020169	4.75	0.000	.0056149	.0135261
_cons	5.290827	.1553684	34.05	0.000	4.986113	5.595541

APPENDIX 3B

Blinder-Oaxaca Decomposition with Expanded Model, by Groups

Model for group 1

Source	SS	df	MS			
				Number of obs	=	1,447
				F(10, 1436)	=	92.80
Model	290.57875	10	29.057875	Prob > F	=	0.0000
Residual	449.631616	1,436	.313113939	R-squared	=	0.3926
				Adj R-squared	=	0.3883
Total	740.210366	1,446	.511902051	Root MSE	=	.55957

lnwage	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Experinyears	.1386802	.0139571	9.94	0.000	.1113017	.1660587
Exp2	-.0049923	.0006498	-7.68	0.000	-.0062669	-.0037177
Edu	.1210128	.0090337	13.40	0.000	.1032921	.1387336
Marital	.0597964	.0394284	1.52	0.130	-.017547	.1371398
Location	.2343416	.0312807	7.49	0.000	.1729808	.2957023
Position	-.1494429	.0330052	-4.53	0.000	-.2141865	-.0846994
Employment	.5431295	.0851752	6.38	0.000	.3760483	.7102107
Children	.0890216	.0412934	2.16	0.031	.0080198	.1700235
Ownership	-.1802466	.0313586	-5.75	0.000	-.2417601	-.1187331
Overtime	.0092035	.0022367	4.11	0.000	.0048159	.0135911
_cons	5.571057	.180987	30.78	0.000	5.216029	5.926084

Model for group 2

Source	SS	df	MS			
				Number of obs	=	435
				F(10, 424)	=	46.72
Model	113.355989	10	11.3355989	Prob > F	=	0.0000
Residual	102.867003	424	.242610855	R-squared	=	0.5243
				Adj R-squared	=	0.5130
Total	216.222992	434	.498209659	Root MSE	=	.49256

lnwage	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Experinyears	.1838121	.0194285	9.46	0.000	.145624	.2220002
Exp2	-.0068079	.0009639	-7.06	0.000	-.0087025	-.0049132
Edu	.1290659	.0164838	7.83	0.000	.0966657	.161466
Marital	.0829135	.0572023	1.45	0.148	-.0295219	.1953488
Location	.1980842	.0553342	3.58	0.000	.0893207	.3068478
Position	.1133157	.0538252	2.11	0.036	.0075183	.2191132
Employment	.935661	.1545173	6.06	0.000	.6319458	1.239376
Children	.10111	.0733871	1.38	0.169	-.0431379	.2453579
Ownership	-.0246314	.0494669	-0.50	0.619	-.1218622	.0725994
Overtime	.0092949	.0048282	1.93	0.055	-.0001952	.0187851
_cons	4.58237	.3041629	15.07	0.000	3.984516	5.180225

Note: The group 1 is for males and the group 2 is for females.

Twofold Blinder-Oaxaca Decomposition

Blinder-Oaxaca decomposition	Number of obs	=	1,882
	Model	=	linear
Group 1: Gen = 0	N of obs 1	=	1447
Group 2: Gen = 1	N of obs 2	=	435

lnwage	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
overall						
group_1	8.822623	.0188078	469.09	0.000	8.78576	8.859486
group_2	8.590932	.0338282	253.96	0.000	8.52463	8.657234
difference	.2316907	.038705	5.99	0.000	.1558302	.3075511
explained	.1593451	.0273018	5.84	0.000	.1058345	.2128557
unexplained	.0723456	.029422	2.46	0.014	.0146795	.1300116
explained						
Experinyears	.4930516	.0610217	8.08	0.000	.3734512	.6126519
Exp2	-.3382306	.0478198	-7.07	0.000	-.4319558	-.2445055
Edu	-.0115763	.0103961	-1.11	0.265	-.0319522	.0087996
Marital	.013782	.0063385	2.17	0.030	.0013588	.0262051
Location	-.0204151	.0061327	-3.33	0.001	-.032435	-.0083951
Position	-.0009268	.0022505	-0.41	0.680	-.0053378	.0034841
Employment	-.0040578	.0055625	-0.73	0.466	-.0149601	.0068444
Children	.016444	.006937	2.37	0.018	.0028478	.0300403
Ownership	-.0037034	.0038247	-0.97	0.333	-.0111998	.003793
Overtime	.0149776	.0043558	3.44	0.001	.0064404	.0235149
unexplained						
Experinyears	-.3405295	.1724859	-1.97	0.048	-.6785956	-.0024635
Exp2	.1730231	.1022274	1.69	0.091	-.027339	.3733852
Edu	-.1314761	.3684741	-0.36	0.721	-.8536721	.5907199
Marital	-.0113232	.0290421	-0.39	0.697	-.0682447	.0455984
Location	.0267594	.0482257	0.55	0.579	-.0677613	.1212801
Position	-.1481482	.0377678	-3.92	0.000	-.2221718	-.0741246
Employment	-.3820793	.2068505	-1.85	0.065	-.7874989	.0233402
Children	-.0025148	.022654	-0.11	0.912	-.0469158	.0418861
Ownership	-.0989945	.0383167	-2.58	0.010	-.1740939	-.0238951
Overtime	-.0010575	.0347061	-0.03	0.976	-.0690802	.0669652
_cons	.9886862	.4179326	2.37	0.018	.1695533	1.807819

Note: A + sign indicates advantage for males and a – sign indicates advantage for females.

Threefold Blinder-Oaxaca Decomposition

```
Blinder-Oaxaca decomposition                    Number of obs      =      1,882
                                                  Model            =     linear
Group 1: Gen = 0                                  N of obs 1       =       1447
Group 2: Gen = 1                                  N of obs 2       =        435
```

lnwage	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
overall						
group_1	8.822623	.0188485	468.08	0.000	8.785681	8.859565
group_2	8.590932	.0340318	252.44	0.000	8.524231	8.657633
difference	.2316907	.0389028	5.96	0.000	.1554426	.3079387
endowments	.1941152	.0336108	5.78	0.000	.1282392	.2599912
coefficients	.0867514	.0308241	2.81	0.005	.0263374	.1471654
interaction	-.049176	.0238687	-2.06	0.039	-.0959578	-.0023942
endowments						
Experinyears	.5918799	.0862712	6.86	0.000	.4227914	.7609684
Exp2	-.4120092	.0731833	-5.63	0.000	-.5554458	-.2685726
Edu	-.0119108	.0107733	-1.11	0.269	-.033026	.0092045
Marital	.0158626	.0111662	1.42	0.155	-.0060228	.0377479
Location	-.0175349	.0068684	-2.55	0.011	-.0309968	-.004073
Position	.0012803	.0031353	0.41	0.683	-.0048648	.0074255
Employment	-.0060842	.0083285	-0.73	0.465	-.0224078	.0102394
Children	.0187244	.0137957	1.36	0.175	-.0083146	.0457635
Ownership	-.0006393	.0014384	-0.44	0.657	-.0034585	.0021799
Overtime	.0145464	.0080476	1.81	0.071	-.0012266	.0303193
coefficients						
Experinyears	-.2940319	.1563467	-1.88	0.060	-.6004658	.012402
Exp2	.1369255	.0882232	1.55	0.121	-.0359887	.3098398
Edu	-.1318848	.3078379	-0.43	0.668	-.735236	.4714665
Marital	-.0089811	.0269966	-0.33	0.739	-.0618935	.0439313
Location	.0270888	.0474962	0.57	0.568	-.0660021	.1201797
Position	-.1473865	.0359646	-4.10	0.000	-.2178758	-.0768971
Employment	-.3826054	.1720019	-2.22	0.026	-.7197229	-.045488
Children	-.0025566	.0178109	-0.14	0.886	-.0374653	.0323521
Ownership	-.0980197	.0370676	-2.64	0.008	-.1706709	-.0253684
Overtime	-.0004832	.0281224	-0.02	0.986	-.055602	.0546357
_cons	.9886862	.3539369	2.79	0.005	.2949825	1.68239
interaction						
Experinyears	-.145326	.0783985	-1.85	0.064	-.2989843	.0083323
Exp2	.1098761	.0713321	1.54	0.123	-.0299323	.2496844
Edu	.0007432	.0018579	0.40	0.689	-.0028983	.0043846
Marital	-.0044226	.0133059	-0.33	0.740	-.0305016	.0216564
Location	-.0032096	.0056954	-0.56	0.573	-.0143724	.0079532
Position	-.0029689	.0071678	-0.41	0.679	-.0170175	.0110797
Employment	.0025525	.0036533	0.70	0.485	-.0046079	.0097128
Children	-.0022386	.0155967	-0.14	0.886	-.0328077	.0283304
Ownership	-.0040389	.0043702	-0.92	0.355	-.0126044	.0045266
Overtime	-.0001431	.0083275	-0.02	0.986	-.0164646	.0161784

Note: A + sign indicates advantage for males and a – sign indicates advantage for females.

APPENDIX 3C

Blinder-Oaxaca Decomposition Analysis: Sample (Technical Positions)

```
Blinder-Oaxaca decomposition                  Number of obs     =     1,072
                                                Model           =    linear
Group 1: Gen = 0                                N of obs 1      =       828
Group 2: Gen = 1                                N of obs 2      =       244
```

lnwage	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
overall						
group_1	8.642053	.0225394	383.42	0.000	8.597877	8.686229
group_2	8.537663	.0375607	227.30	0.000	8.464046	8.611281
difference	.1043898	.0438044	2.38	0.017	.0185347	.1902449
explained	.0958018	.0300428	3.19	0.001	.036919	.1546847
unexplained	.0085879	.0344745	0.25	0.803	-.0589809	.0761568
explained						
Experinyears	.5234415	.0656537	7.97	0.000	.3947627	.6521203
Exp2	-.3780852	.0522845	-7.23	0.000	-.4805609	-.2756095
Edu	-.0201324	.0122675	-1.64	0.101	-.0441761	.0039114
Marital	.0106136	.0057716	1.84	0.066	-.0006987	.0219258
Location	-.0223098	.0078636	-2.84	0.005	-.0377222	-.0068973
Employment	-.0087621	.0056141	-1.56	0.119	-.0197655	.0022413
Children	-.0080001	.0074971	-1.07	0.286	-.0226942	.0066939
Ownership	-.0038307	.005981	-0.64	0.522	-.0155533	.0078919
Overtime	.002867	.002707	1.06	0.290	-.0024386	.0081726
unexplained						
Experinyears	-.1057323	.1322733	-0.80	0.424	-.3649833	.1535187
Exp2	.0546361	.0625157	0.87	0.382	-.0678925	.1771647
Edu	.0725869	.5258238	0.14	0.890	-.9580089	1.103183
Marital	-.0462747	.0269333	-1.72	0.086	-.099063	.0065136
Location	.048833	.0599399	0.81	0.415	-.068647	.1663131
Employment	-.2462891	.4289678	-0.57	0.566	-1.087051	.5944723
Children	.0184056	.0173793	1.06	0.290	-.0156573	.0524684
Ownership	-.0770883	.0445687	-1.73	0.084	-.1644414	.0102649
Overtime	-.0247802	.0416772	-0.59	0.552	-.106466	.0569056
_cons	.3142909	.7134794	0.44	0.660	-1.084103	1.712685

Note: A + sign indicates advantage for males and a – sign indicates advantage for females.

APPENDIX 3D

Blinder-Oaxaca Decomposition Analysis: Sample (Non-Technical Positions)

Blinder-Oaxaca decomposition	Number of obs	=	810
	Model	=	linear
Group 1: Gen = 0	N of obs 1	=	619
Group 2: Gen = 1	N of obs 2	=	191

lnwage	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
overall						
group_1	9.064161	.0293301	309.04	0.000	9.006675	9.121647
group_2	8.658983	.0599988	144.32	0.000	8.541387	8.776578
difference	.4051779	.0667841	6.07	0.000	.2742835	.5360724
explained	.2636293	.0491956	5.36	0.000	.1672077	.360051
unexplained	.1415486	.0498952	2.84	0.005	.0437559	.2393413
explained						
Experinyears	.5544303	.118969	4.66	0.000	.3212553	.7876052
Exp2	-.3775724	.0944829	-4.00	0.000	-.5627554	-.1923894
Edu	-.0007361	.0177526	-0.04	0.967	-.0355306	.0340585
Marital	.0184419	.0146482	1.26	0.208	-.0102681	.0471519
Location	-.0170407	.0094474	-1.80	0.071	-.0355573	.0014759
Employment	.0070737	.011763	0.60	0.548	-.0159813	.0301287
Children	.0484998	.0145539	3.33	0.001	.0199746	.077025
Ownership	-.0035173	.0047995	-0.73	0.464	-.0129242	.0058895
Overtime	.0340502	.0111376	3.06	0.002	.0122208	.0558796
unexplained						
Experinyears	-.8626719	.5084903	-1.70	0.090	-1.859295	.1339509
Exp2	.5431372	.3358361	1.62	0.106	-.1150895	1.201364
Edu	-.434637	.5065593	-0.86	0.391	-1.427475	.558201
Marital	.0614508	.060744	1.01	0.312	-.0576053	.1805069
Location	.0244619	.0722291	0.34	0.735	-.1171046	.1660284
Employment	-.3197066	.2553397	-1.25	0.211	-.8201632	.18075
Children	-.0330072	.0490377	-0.67	0.501	-.1291193	.0631049
Ownership	-.1127139	.0636878	-1.77	0.077	-.2375396	.0121119
Overtime	.0551613	.0588647	0.94	0.349	-.0602114	.1705339
_cons	1.220074	.5518004	2.21	0.027	.1385651	2.301583

Note: A + sign indicates advantage for males and a – sign indicates advantage for females.

APPENDIX 4

INTERVIEW CONTENTS

Interviewees were asked "*Do you think married women with no children/with children are disadvantaged during the hiring processes*?" or "*Are there any concerns amongst employers that they may leave the firm/industry due to child-bearing duties?"* The common view amongst the interviewees was that women were repeatedly discriminated against during the hiring processes due to current/potential motherhood.

A female CEO stated that:

> "These concerns always exist. You cannot ask these questions in the US, but they (employers) are asking in Turkey. '*If single, when are you planning to get married, if married, when are you planning to have baby?*' They think that women cannot travel after having a child. For these reasons, I believe that women are discriminated against."

A female regional sales manager strongly expressed that:

> "Absolutely. 100 percent exist. I have heard many times conversations like…*'Well she is going to get married, let's see if she will continue working after that, if her performance will stay the same* or *let's see if her concentration will be at work during her wedding preparations,* or *after marriage her priority will be her marriage and having children*. Yet, they never think the same for men, they think that men' priority will be always work, since there will be a woman who can look after a child. Fathers are not perceived as primary carers in Turkey, so this perception exists and is spoken openly…and these are all foreign companies."

When asked "What can be done about this?" she explained:

> "I don't think women can do anything about this. If there is a maternity leave for 4 months for mothers, the same way fathers should also be granted paternity leave. Since, this is not only women's responsibility. Once this comes to practice, no one can be discriminated against. If, as a woman, I am being questioned about my family plans such as when I am going to get married or have children, the only way to eliminate these questions, is to grant parental leave for fathers, too."

A female employer, HR professional, who runs a recruitment agency for the ICT sector only, replied:

> "I hear this a lot from the candidates that they are told by employers "*We can work with you, but you will not give birth for the next two-three years*." Have you ever heard of a male candidate is asked this question? Because, even if a man becomes a father, it's not a problem for him, since the wife is taking care of the baby. But, for woman, it (being pregnant/mother) is a risk, getting married is a risk…"

A male employer, HR professional commented:

> "During the hiring processes, female candidates' status is becoming important. *Is the female candidate in the stage of giving a birth? Does she plan to have a baby? If she goes on maternity leave, how would this affect her performance after her return?* These questions are considered a lot."

One male employer noted as:

> "Well…yes. If I'm going to hire women or for the female employees that I have, I would think that they might leave the company. I would think this (employing a woman with children) as workforce loss. We are selling service in this sector. If we don't have a consultant, we cannot sell it. Employers are looking from this perspective. They see pregnancy as 'risk' and they are trying to take precautions. They are making plans accordingly in case she might become pregnant. These questions are not asked directly in the ICT sector, I, for instance, wouldn't ask directly, but absolutely considered."

A female business owner pointed out:

> "Yes, of course! The law is giving parental leave only to women. Flexible working hours, maternity leave, breast-feeding breaks etc. If you hire a pregnant woman, you automatically think about this. Why? If the pregnant woman's performance is low, you cannot fire her. And flexible working hours, breast-feeding breaks…These are all costs. As a result, if there is another candidate who can show higher performance, you would choose this candidate."

Another female business owner put it as:

> "Sure. They (employers) see married woman/woman with children as a burden. Even in some companies, I heard that women are fired when they become pregnant, or they fire a woman who is planning to get married, since they (employers) think that she may practise the marriage compensation law. In short, these are disadvantage for organisations and it is abused (by firms)."

> When asked "*How do you feel about this practice as a female business owner*?" she expresses:

> "Of course, it is not right! However, the burden on employers in Turkey is also too high. The taxes, labour burden, being competitive, costs etc. are all straining employers. Even if the employers know that this is not the right thing to do, they are still doing inhuman practices in order to protect majority's wellbeing."

One female employer expressed her view on this:

> "Yes, employers are considering this. Why? It is because, it is a very heavy burden on employer, particularly for SMEs[175]. When a female employee goes on a maternity leave, in one hand, you are giving her legal right and the state is supporting you,

[175] Small and medium-sized enterprises (SMEs)

> but, on the other hand, you need to hire someone for this position and it is costing me 1.5x more excluding the state's support."

When asked "*What do you think about this practice as a female business owner*?" she explained:

> "The employer has surely justified reasons. Especially, if it is an infant business, these are really big costs. Either you will employ them illegally, which is not acceptable at all, or you will bear the higher costs if you hire them legally. As an infant business, if you don't have financial power to bear these costs, then no one should blame you for this. But this is not a problem for married woman with children, as they already have children."

The comments of male and female employees were also similar to the issue of discrimination against married women with/without children during the hiring processes.

A <u>male director</u> responded as:

> "This is definitely happening. I will call this 'the risk of giving a birth'. Even though giving a birth to a child is not a risk, however during recruitment processes, you look at the candidate and she is married for few years, but does not have children, then it is a risk surely. Since, in any case, there is a loss of almost a year. If the existing female employee gives a birth, that's not a problem, but knowingly, nobody wants to hire a woman who may go on a maternity leave for a year in the six months or so. If I would feel such risk, I would probably behave the same way. In the end, there are jobs to be done and someone whom I hired will be a loss after six months. It wouldn't suit my book."

A <u>female product manager</u> replied:

> "This is considered. I, even, consider how much productivity I might have from the female employee during the hiring process. If I have a replacement for maternity cover, then the state should support it. When you have an employee with a child, you may also not to have a heart to apathy. Yet, the same time you need to think about the production and the productivity of your company."

Another <u>female interviewee</u> stated as:

> "For critical positions (technical or requiring continuity of work…), it is important whether a woman is married or has a child. For example, I had an attempt to start up my own business. I needed to delay getting marriage and having children. In short, they (employers) may not ask about it explicitly, I guess it is not found ethical, but they can see it on my CV that I am single."

Likewise, another <u>female participant</u> reported that:

> "I heard those conversations behind those who went on maternity leave, such as whether she will be able to work after child, whether she may perform the same as before, whether she will be able to stay overtime as much as before."

A <u>male employee</u> also showed similar patterns:

"Generally, employers will prefer single women, since they will not have travel limitations. If a married woman does not have any issue with travelling or staying for overtime, they may prefer a married woman as well. However, a married woman with children will be the last resort, because a child may get sick, she cannot come to work…But, this is not only about our sector. Women will face the same issue in other sectors, too."

Another <u>male interviewee</u> indicated:

"During the recruitment processes, they (employers) think that if a woman is married or have children, she may not give her full energy to work, because companies would like to steal from private time of their employees. In the job posts, they are looking for people who can work in flexible working hours (referring to outside of working hours), are able to keep up with busy working environment, able to work nights etc. These requirements are suitable for single women. In other words, it is suitable for men, because married men can work until very late."

Similarly, another <u>male employee</u> mentioned that:

"I don't think it is an issue after you become employed, but marriage and motherhood are a recruitment criterion for women. For men, being married or having children are seen as advantage, as he is considered to have a stable life."

A <u>female employer</u>, HR professional, who runs a recruitment agency for the ICT sector only and works alongside many companies in the sector, responded as below to the question of '*whether married women with/without children discriminated against during the hiring processes*':

"Of course! This is also the case for single women. *What if they get married, what if they quit, what if they ask for marriage compensation*…It seems like we are protecting women with this law, but actually, it is making women to be questioned even more during the interviews. Even if they (employers) say no, all the employers are considering this."

Although some ICT professionals stated that the potential women employees' marriage and children plans are not explicitly and openly asked during the recruitment processes, however others reported the opposite.

A <u>female software developer</u> shared her experience during a job interview:

"Yes yes…They (employers) would like to know women's plans. They asked me, for example, whether I plan to get married anytime soon. They say, I don't have to answer the question if I don't want. If so, why you ask in the first place!"

A <u>female consultant</u> also told that:

"In one of the job interviews I had more recently, they asked me if I plan to get married in the next three years, and it was a 100 percent foreign company. This situation is affecting which positions we can get. For instance, there is no motion of 'time' in the IT sector. There are days I need to work 18-19 hours per day. This is difficult for me (as a single), for a married even more difficult. They can take advantage of a single employee, so it is difficult for married a woman to find a job in the sector. Particularly, if they are over 35s."

A male SAP consultant said:

"I heard this a lot. I have female friends who have been told, only half in jest, '*No having a child for a while* or *when are you planning to have a baby*?' I also witnessed this in client- site[176] such as '*She (a woman employee) came here (to workplace) to have baby*."

A male employee explained this as:

"If a woman goes on a maternity leave, they (employers) do not fill in her position temporarily, but distribute her responsibilities to other employees….This is a general practice in the sector. In fact, not the employer, but the employees at work are bearing the burden of maternity covers."

A male employer noted:

"Well…yes. If I'm going to hire women or for the female employees that I have, I would think that they might leave the company. I would think this (employing a woman with children) as workforce loss. We are selling service in this sector. If we don't have a consultant, we cannot sell it. Employers are looking from this perspective. They see pregnancy as 'risk' and they are trying to take precautions. They are making plans accordingly in case she might become pregnant. These questions are not asked directly in the ICT sector, I, for instance, wouldn't ask directly, but absolutely considered."

[176] An IT professional sell their products to a client who may be in the ICT sector or not. These professionals often visit clients in their premises. A client-site is referred here is another ICT company which a research participant visited.

APPENDIX 5

ICT SECTOR QUESTIONNAIRE

(Please answer the following questions by crossing the appropriate box.)

1. Do you work in the ICT sector?

- o Yes
- o No

2. Which area of ICT do you work?

- o Information Technologies
- o Communication Technologies (Telecommunication)
- o Mixed of both
- o I don't know

3. What is your gender?

- o Female
- o Male

4. What is your age?

- o Under 18
- o 18-24
- o 25-34
- o 35-44
- o 45-54
- o 55-64
- o 65+

5. What is your marital status?

- o Single
- o Married
- o Divorced/Separated
- o Widowed

6. What is your level of education?

- o Primary
- o Secondary
- o High School
- o Associate Degree
- o University
- o Master's
- o PhD

Other
(Please state): -----------------------

7. Do you have a computer science-related degree?

- o Yes
- o No

8. Please state your English language level.

	Elementary (1)	(2)	(3)	(4)	**Fluent/Bi-lingual (5)**
English					

9. In which sector you work?

- o Public
- o Private

10. In which city do you work?

- o Adana
- o Ankara
- o Antalya
- o Balıkesir
- o Bursa
- o Denizli
- o Eskişehir
- o İstanbul
- o İzmir
- o Kahramanmaraş
- o Kayseri
- o Kocaeli
- o Konya
- o Mersin
- o Samsun
- o Tekirdağ

Other (please state): ……………………………………….

11. The company you work is a:

- o Domestic company
- o Foreign company
- o Domestic/Foreign Partnership
- o Don't know

12. What is the main business activity of your company?

- o **Hardware** (Computer, electronic components, communication equipment, consumer electronics, magnetic and optical media hardware etc.)
- o **Trade** (Retail and wholesale activities)
- o **Services** (Telecommunication, computer programming, consultancy, web portal, data processing and repair activities etc.)
- o Mixture of the above
- o Don't know

Other (please state): ……………………………………….

13. What is your current position within the company?

14. What is your monthly gross salary (Excluding Overtime)?

- Less than 1,647 TL
- 1,647 TL - 1,999 TL
- 2,000 TL - 2,999 TL
- 3,000 TL - 3,999 TL
- 4,000 TL - 4,999 TL
- 5,000 TL - 9,999 TL
- 10,000 TL - 14,999 TL
- 15,000 TL +

15. What is your current employment status? (Please tick all that apply)

- Full-time
- Part-time
- Seasonal
- Contractual
- Project-based
- Self-employed
- Retired
- Intern

Other *(please state):* -----------------------

16. If you don’t work full-time, please state why.
You can choose more than one answer.

- Full-time job opportunities are not available.
- I take care of the children/ I have other family commitments.
- Part-time / project-based / contract-based work patterns are very common in the ICT sector.
- I am not the main breadwinner in the family.
- It is my personal preference.
- I am a student.

Other *(please state):* -----------------------

17. On average, how many hours a week do you work (Excluding Overtime)?

- Less than 20 hours
- 20-29
- 30-39
- 40-49
- 50-59
- 60+

18. How often do you work overtime?

- Never
- Rarely
- Sometimes
- Often
- Always

19. On average, how many hours per week do you work overtime?

	0 hour	**1-5 hours**	**6-10 hours**	**11-15 hours**	**16-20 hours**	**21+ hours**
Weekdays						
Weekends						

20. How often are you paid for your overtime work?

- o Never
- o Rarely
- o Sometimes
- o Often
- o Always

21. If you are paid for your overtime work, then:

- o I get paid at my regular rate of pay.
- o I get paid more than my regular rate of pay. Please state what % more per hour --------------

Other *(please state):* -----------------------

22. Please specify the <u>three most important reasons</u> you work overtime.

- o My workload is too heavy.
- o The company has staff shortages.
- o I have too many project deadlines.
- o I'm expected to do IT projects outside working hours.
- o I need the wages from overtime work.
- o I'm not as productive as I could be during working hours.
- o During regular working hours I get distracted by routine and admin tasks including meetings.
- o I fear that if I say no, I will lose my job.
- o I am working towards being promoted.
- o The office is noisy/distracting during office hours.
- o I love the work.
- o I'm a workaholic.

Other *(please state):* -----------------------

23. Do you have any children?

- o Yes, all 18 years and over
- o Yes, at least one or more below 18
- o No, I don't have children

24. Who usually looks after your children while you are at work?

- o My husband/wife
- o Other family members
- o Friends and relatives
- o Babysitter
- o Kindergarten

Other (please state): ……………………………………….

25. Do you ever work from home in your current job?

- o Yes
- o No

26. Given the opportunity, would you like to work from home more than you currently do?

- o Yes
- o No

If you choose **Yes,** please state your reasons:

27. In what order does your current job fall into?

- o 1st workplace
- o 2nd workplace
- o 3rd workplace
- o 4th workplace
- o 5th workplace
- o 6th workplace
- o I have forgotten it, as it is so many.

28. What is(are) the reason(s) for your job changes?

- o Low wages and earnings
- o Wage discrimination
- o The idea of "*women cannot be engineers*" is still exist in the sector.
- o Staff shortages
- o Male-dominated corporate culture
- o Physical and psychological deformity due to excessive overtime
- o The way managers work (managerial behaviour, lack of feedback etc.)
- o Low career opportunities (lack of promotions, limited rotations etc.)
- o Poor work-life balance
- o Discrimination due to motherhood and/or pregnancy
- o Companies do not see IT departments at the centre of their work, but as cost centres
- o Due to excessive workload and lack of interest of companies, there is no/limited time for exploring new technologies or implementing projects
- o Job dissatisfaction due to not learning anything new at work
- o Inability to adapt globally due to the insufficient level of English among the ICT professionals
- o End of project or contract
- o Pregnancy/Military Service
- o Education
- o Company shutdown
- o Privatisation
- o Economics crisis

Other (please state) ……………………………………….

29. How long have you worked for this organisation?

- o Less than 1 year
- o 1-3 years
- o 3-5 years
- o 5-10 years
- o 10+

30. What is your total experience in the ICT sector?

- o Less than 1 year
- o 1-3 years
- o 3-5 years
- o 5-10 years
- o 10+

31. What were you doing immediately before you started this role?

- o I was studying.
- o I was working in another role at the same company.
- o I was working in another company in the ICT sector.
- o I was working in another sector.

- I was unemployed and looking for a job.
- I was on maternity leave.
- I was having time out of the labour market

Other (please state): ……………………………………….

32. Please specify up to <u>three factors</u> that explain your decision to work in the ICT sector.

- Love for technology and computers
- Constantly changing/evolving
- High salaries
- State-of-the-art technologies
- Difficulty of finding jobs in other sectors
- Ability to work from home
- High job security
- Prestige
- Global career opportunities
- Flexible working hours
- Business location
- Employer's reputation
- Nursery / kindergarten facilities for children

Other *(please state):* -----------------------

33. What are the <u>three biggest challenges</u> you face in your current role in the ICT sector?

- Low wages and earnings
- Wage discrimination
- The idea of "*women cannot be engineers*" is still exist in the sector.
- Staff shortages
- Male-dominated corporate culture
- Physical and psychological deformity due to excessive overtime
- The way managers work (managerial behaviour, lack of feedback etc.)
- Low career opportunities (lack of promotions, limited rotations etc.)
- Poor work-life balance
- Discrimination due to motherhood and/or pregnancy
- Companies do not see IT departments at the centre of their work, but as cost centres
- Due to excessive workload and lack of interest of companies, there is no/limited time for exploring new technologies or implementing projects
- Job dissatisfaction due to not learning anything new at work
- Inability to adapt globally due to the insufficient level of English among the ICT professionals
- End of project or contract
- Pregnancy/Military Service
- Education
- Company shutdown
- Privatisation
- Economics crisis

Other (please state): ……………………………………….

34. If you could choose any career, would you still pick Information and Communication Technologies sector?

- Yes
- No

Thank you very much for completing the survey.

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APPENDIX 6

BİLİŞİM SEKTÖRÜ ÇALIŞANLARI ANKETİ
(Lütfen her soruyu uygun kutucuğu işaretleyerek cevaplayınız.)

1. Bilişim sektörü çalışanı mısınız?
   - Evet
   - Hayır

2. Bilişim sektörünün hangi alanında çalışıyorsunuz?
   - Bilgi Teknolojileri
   - İletişim Teknolojileri (Telekomünikasyon)
   - Bilgi ve İletişim Teknolojilerinin karışımı
   - Bilmiyorum

3. Yaşınız:
   - 18 yaş altı
   - 18-24
   - 25-34
   - 35-44
   - 45-54
   - 55-64
   - 65+

4. Cinsiyetiniz:
   - Kadın
   - Erkek

5. Medeni Durumunuz:
   - Bekar
   - Evli
   - Boşanmış/Ayrı Yaşayan
   - Dul

6. Eğitim durumunuz:
   - İlkokul
   - Ortaokul
   - Lise
   - Ön Lisans
   - Üniversite
   - Yüksek Lisans
   - Doktora
   - Diğer

7. Bilgisayarla ilgili bir bölümden mi mezun oldunuz?
   - Evet
   - Hayır

8. İngilizce seviyeniz:

	Başlangıç (1)	(2)	(3)	(4)	Akıcı (5)
İngilizce					

9. Çalıştığınız sektör:
   - Kamu
   - Özel

10. Çalıştığınız şehir:
    - Adana
    - Ankara
    - Antalya
    - Balıkesir
    - Bursa
    - Denizli
    - Eskişehir
    - İstanbul
    - İzmir
    - Kahramanmaraş
    - Kayseri
    - Kocaeli
    - Konya
    - Mersin
    - Samsun
    - Tekirdağ
    - Diğer

11. Çalıştığınız şirket:
    - Yerli sermayeli
    - Yabancı sermayeli
    - Yerli/Yabancı sermaye ortaklığı
    - Bilmiyorum

12. Şirketinizin faaliyet alanı:
    - Donanım (Bilgisayar, elektronik bileşenler, haberleşme cihazları, tüketici elektroniği, manyetik ve optik medya imalatı)
    - Hizmetler (Yazılım, telekomünikasyon, bilgisayar programlama, danışmanlık, web portalı, veri işleme, bilgisayar tamir ve
    - onarımı faaliyetleri)
    - Ticaret (Perakende veya toplu satış faaliyetleri)
    - Yukarıdakilerin karışımı
    - Bilmiyorum
    - Diğer

13. İş yerindeki pozisyonunuz:

14. Mesailer hariç, aylık brüt maaşınız (TL):
    - 1.777,50 altı
    - 1.777,50 – 1.999
    - 2.000 – 2.999
    - 3.000 – 3.999
    - 4.000 – 4.999
    - 5.000 – 9.999
    - 10.000 – 14.999
    - 15.000+

15. Çalışma durumunuz: Lütfen geçerli olanların hepsini işaretleyiniz.
    - Tam zamanlı (Full-time)

- Yarı zamanlı (Part-time)
- Dönemsel zamanlı (Seasonal)
- Sözleşmeli (Contract-based)
- Proje bazlı (Project-based)
- Serbest çalışan (Freelance)
- Emekli (Retired)
- Stajyer (Intern)
- Diğer

16. Eğer tam zamanlı çalışmıyorsanız, lütfen bunun sebebini belirtin. Birden fazla seçeneği işaretleyebilirsiniz.
    - Tam zamanlı iş olanakları kısıtlı.
    - Çocukların bakımıyla ben ilgileniyorum.
    - Yarı zamanlı/ proje bazlı/ sözleşmeli çalışma şekilleri Bilişim sektöründe çok yaygın.
    - Ailenin ana geçim kaynağı ben değilim.
    - Kişisel tercihim.
    - Öğrenciyim.
    - Diğer

17. Fazla mesailer hariç, haftada toplam ortalama kaç saat çalışıyorsunuz?
    - 20 saatten az
    - 20-29
    - 30-39
    - 40-49
    - 50-59
    - 60+

18. Hangi sıklıkla fazla mesaiye kalıyorsunuz?
    - Hiçbir zaman
    - Nadiren
    - Ara sıra
    - Sık sık
    - Her zaman

19. Ortalama olarak, haftada kaç saat fazla mesaiye kalıyorsunuz?

	0 saat	1-5 saat	6-10 saat	11-15 saat	16-20 saat	21+ saat
Haftaiçi						
Haftasonu						

20. Fazla mesaileriniz hangi sıklıkla ödeniyor?
    - Hiçbir zaman
    - Nadiren
    - Ara sıra
    - Sık sık
    - Her zaman

21. Fazla mesaileriniz:
    - Normal çalışma ücretinden ödeniyor.
    - Normal çalışma ücretinden daha fazla ödeniyor.
    - Hiçbir zaman ödenmiyor.

22. Lütfen fazla mesaiye kalmanızdaki en önemli 3 sebebi belirtin.
    - İş yüküm çok fazla.

- Şirketteki çalışan sayısı az (Az kişiyle çok iş yaptırılması).
- Teslim etmem gereken proje sayısı çok fazla.
- IT projelerini çalışma saatleri dışında yapmam bekleniyor.
- Fazla mesailerden kazandığım ek ücretlere ihtiyacım var.
- Verimliliğim normal çalışma saatlerinde daha düşük.
- Toplantılar/operasyonel işlerin yoğunluğundan kendi işimi yapmaya zaman kalmıyor.
- Fazla mesai yapmaya hayır dersem işimi kaybederim korkusu yaşıyorum.
- Terfi edilebilmek için fazla mesaiye kalıyorum.
- Ofis ortamı mesai saatleri içerisinde oldukça gürültülü ve dikkat dağıtıcı.
- Yaptığım işi çok seviyorum.
- İşkoliğim.
- Diğer

23. 18 yaşın altında çocuğunuz var mı?
    - Evet.
    - Hayır, hepsi 18 yaş ve üstü.
    - Çocuğum yok.

24. Siz çalışırken çocuğunuzun bakımıyla genellikle kim ilgileniyor?
    - Eşim
    - Diğer aile bireyleri
    - Arkadaşlar ve akrabalar
    - Çocuk bakıcısı
    - Kreş/Anaokulu
    - Diğer

25. Şu anki işinizle ilgili olarak, evden çalıştığınız oluyor mu?
    - Evet
    - Hayır

26. Fırsat verilmesi halinde, evden daha fazla çalışmak ister misiniz?
    - Evet
    - Hayır

27. Şu anki çalıştığınız iş yeri, kaçıncı iş yeriniz?
    - İlk iş yerim
    - 2. iş yerim
    - 3. iş yerim
    - 4. iş yerim
    - 5. iş yerim
    - 6. iş yerim
    - O kadar çok ki sayısını unuttum.

28. İş yeri değişikliklerinizin neden(ler)i nedir? Birden fazla seçeneği işaretleyebilirsiniz.
    - Düşük ücret ve kazançlar
    - Aynı işe farklı ücret ayrımcılığı
    - "Kadından mühendis olmaz." bakış açısının hala devam etmesi
    - Az kişiyle çok iş yaptırılmaya çalışılması (Çalışan eksikliği)
    - Erkek hakim, ataerkil iş kültürü
    - Fazla mesailerden ötürü yaşanan fiziksel ve ruhsal deformasyon
    - Yöneticilerin çalışma tarzı (Yönetsel davranış, geri bildirim eksiklikleri)
    - Düşük kariyer olanakları (Terfi edilememe, kariyer fırsatları eksikliği, kısıtlı rotasyon olanakları)
    - Kötü iş-özel yaşam dengesi
    - Annelik ve hamilelikten ötürü yaşanan ayrımcılık

- Şirketlerin IT işlerini kendi işlerinin merkezinde kritik/stratejik öneme sahip olarak görmeyip, maliyet merkezi olarak görmesi
- Aşırı iş yükü ve şirketlerin ilgisizliği nedeniyle, sürekli gelişen teknolojileri öğrenecek/uygulamaya geçirecek zaman/projelerin
- kısıtlı olması
- İş yerinin bilgi birikimi olarak size birşey katmaması sonucu yaşanan iş tatminsizliği
- İngilizce yetersizliği nedeniyle globale adapte olamama
- Projenin/sözleşmenin bitmesi
- Askerlik/Doğum
- Eğitim
- Şirketin kapanması
- Özelleştirme
- Ekonomik kriz
- Diğer

29. Bu şirketteki toplam çalışma süreniz:
    - 1 yıldan az
    - 1-3 yıl
    - 3-5 yıl
    - 5-10 yıl
    - 10+

30. Bilişim sektöründeki toplam deneyiminiz:
    - 1 yıldan az
    - 1-3 yıl
    - 3-5 yıl
    - 5-10 yıl
    - 10+

31. Şu anki görevinize başlamadan hemen önce neyle meşguldünüz?
    - Okuyordum.
    - Aynı şirkette başka bir görevde çalışıyordum.
    - Bilişim sektöründe başka bir şirkette çalışıyordum.
    - Başka bir sektörde çalışıyordum.
    - İşsizdim, iş arıyordum.
    - Doğum iznindeydim.
    - İş gücü piyasasında değildim.
    - Diğer

32. Lütfen Bilişim sektöründe çalışmanızda etkili olan en önemli üç faktörü belirtin.
    - Teknoloji ve bilgisayar sevgisi
    - Sürekli değişmesi/gelişmesi
    - Maaşların yüksek olması
    - En son teknolojilerin kullanılması
    - Diğer sektörlerde iş bulma zorluğu
    - Evden çalışma olanağı
    - İş güvencesinin yüksek olması
    - Prestijli olması
    - Global kariyer olanakları
    - Esnek çalışma saatleri
    - İş yerinin konumu
    - İşverenin piyasadaki itibarı
    - Çocuklar için kreş/anaokulu imkanları
    - Diğer

33. Lütfen Bilişim sektöründeki mevcut rolünüzde karşılaştığınız en büyük üç zorluğu belirtin.
   - Düşük ücret, gelir ve ek kazançlar
   - Aynı işe farklı ücret ayrımcılığı
   - "Kadından mühendis olmaz." bakış açısının hala devam etmesi
   - Az kişiyle çok iş yaptırılmaya çalışılması (Çalışan eksikliği)
   - Erkek hakim, ataerkil iş kültürü
   - Fazla mesailerden ötürü yaşanan fiziksel ve ruhsal deformasyon
   - Yöneticilerin çalışma tarzı (Yönetsel davranış, geri bildirim eksiklikleri)
   - Düşük kariyer olanakları (Terfi edilememe, kariyer fırsatları eksikliği, kısıtlı rotasyon olanakları)
   - Kötü iş-özel yaşam dengesi
   - Annelik ve hamilelikten ötürü yaşanan ayrımcılık
   - Şirketlerin IT işlerini kendi işlerinin merkezinde kritik/stratejik öneme sahip olarak görmeyip, maliyet merkezi olarak görmesi
   - Aşırı iş yükü ve şirketlerin ilgisizliği nedeniyle, sürekli gelişen teknolojileri öğrenecek/uygulamaya geçirecek zaman/projelerin
   - kısıtlı olması
   - İş yerinin bilgi birikimi olarak size birşey katmaması sonucu yaşanan iş tatminsizliği
   - İngilizce yetersizliği nedeniyle globale adapte olamama
   - Projenin/sözleşmenin bitmesi
   - Askerlik/Doğum
   - Eğitim
   - Şirketin kapanması
   - Özelleştirme
   - Ekonomik kriz
   - Diğer

34. Şimdi meslek seçimi yapıyor olsaydınız, yine Bilişim sektöründe çalışmayı tercih eder miydiniz?
   - Evet
   - Hayır

Anketimize katıldığınız için çok teşekkür ederiz.
Fadime Şahin, SOAS University of London
fadime_sahin@soas.ac.uk

APPENDIX 7

AN INVITATION LETTER TO PARTICIPANTS

Dear Turkish ICT Sector Employees,

I am an academic who aims to conduct a research in Information and Communication Sector in Turkey. I have prepared a professional survey that will cover many aspects of the sector such as the advantages of working in the sector, the issues within the sector, the sector view from the aspect of women and men.

Participation of every possible ICT sector employee to this anonymous questionnaire will allow an accurate analysis of the sector. I would be pleased if, as an ICT sector employee, you could spare five minutes of your time to fill in the questionnaire as well as sharing with your colleagues.

Thank you very much in advance for your support.

Best wishes,
Fadime Şahin

PS: I would like to express my gratitude to a large number of ICT professionals who have already completed the ICT sector survey.

https://lnkd.in/dr8-9MP

Değerli Bilişim Sektörü Çalışanları,

Bilişim sektörü üzerine araştırma yapan bir akademisyenim. Sektörde çalışmanın avantajları, sektörün sorunları, kadın-erkek boyutundan sektöre bakış gibi birçok konuyu kapsayacak profesyonel bir anket hazırlamış bulunuyorum.

Mümkün olan her Bilişim sektörü çalışanının, anonim olan bu anketi doldurması sektöre ilişkin doğru bir analiz yapılmasını sağlayacaktır. Bilişim çalışanı olarak, 5dk sürecek olan bu anketin doldurulması ve dağıtılması konusunda yardımcı olmanızı rica ederim.

Desteğinize şimdiden çok teşekkür ederim.

İyi çalışmalar dilerim.
Fadime Şahin

NOT: Bilişim Sektörü anketini çoktan doldurmuş olan ve hatta paylaşarak bu araştırmaya destek sağlayan çok sayıda Bilişim çalışanına tekrar teşekkürlerimi iletirim.

https://lnkd.in/dr8-9MP

APPENDIX 8

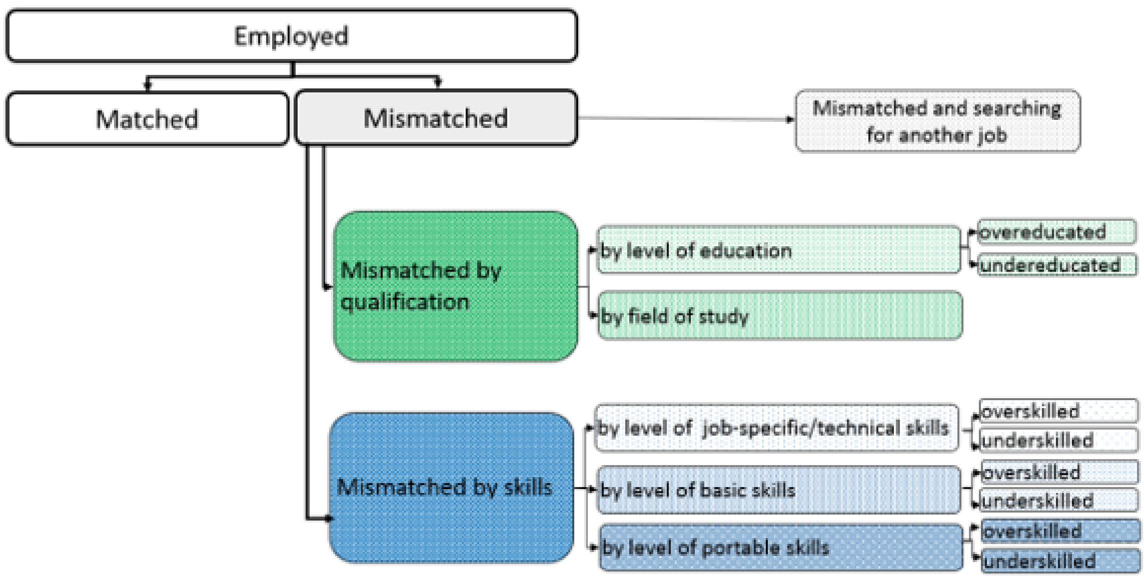
ISCO-08 Classification of Occupations

Educational requirements by occupational group (ISCO and ISCO+): Mapping between 1-digit ISCO-08 groups and level of education

ISCO 08 Occupation	ISCO Mapping		ISCO+ Mapping	
	ISCO skill level	ISCED 2011 required level	Skill level	ISCED 2011 required level
Managers	3, 4	5, 6, 7, 8	3	5, 6, 7, 8
Professionals	4	6, 7, 8	3	5, 6, 7, 8
Technicians and Associate Professionals	3	5	3	5, 6, 7, 8
Clerical Support Workers	2	2, 3, 4	2	3, 4
Services and Sales Workers	2	2, 3, 4	2	3, 4
Skilled Agricultural, Forestry and Fishery Workers	2	2, 3, 4	2	3, 4
Craft and Related Trades Workers	2	2, 3, 4	2	3, 4
Plant and Machine Operators and Assemblers	2	2, 3, 4	2	3, 4
Elementary Occupations	1	x, 0, 1	1	x, 0, 1, 2
Domestic workers	1	x, 0, 1	1	x, 0, 1, 2

Source: ILO (2018, p. 27)

Mismatch of persons in employment



Source: ILO (2018, p. 13)

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