This project is founded by the European Union.

Enhancement of Participatory Democracy in Turkey:
Monitoring Gender Equality Project Phase II

Gender Equality in the Fields of Science, Technology, Engineering and Mathematics (STEM)

Mapping and Monitoring Study

Extended Summary

Fatma Umut Beşpınar
Ezgi Pehlivanlı Kadayıfçı

ceidizler
TÜRKİYE'DE CİNSİYET EŞİTLİĞİNİN İZLENMESİ PROJESİ

ceid
CİNSİYET EŞİTLİĞİ İZLEME DERNEĞİ

Enhancement of Participatory Democracy in Turkey:

Monitoring Gender Equality Project Phase II

Gender Equality in the Fields of Science, Technology, Engineering and Mathematics (STEM)

Mapping and Monitoring Study

Extended Summary

Fatma Umut Beşpınar

Ezgi Pehlivanlı-Kadayıfçı

CEİD PUBLICATIONS

Gender Equality in the Fields of Science, Technology, Engineering and Mathematics (STEM) Mapping and Monitoring Study – Extended Summary

December 2021

Yıldızevler District 721. St, Apt:4/9 Çankaya, 06550
Ankara, Turkey
Phone: +90 312 440 04 84

www.ceid.org.tr
www.ceidizler.ceid.org.tr

Cover/Interior Design: Hasan Kürşat Akcan

This publication was produced with the financial support of the European Union. Its contents are the sole responsibility of Association for Monitoring Gender Equality and do not necessarily reflect the views of the European Union.

PROF. DR. FATMA UMUT BEŞPINAR: held graduate and master's degrees in sociology from the Middle East Technical University in 1998 and 2001. She completed her doctoral study again in the field of Sociology in the University of Texas at Austin in 2007. Her research interests include industrial sociology and sociology of labour, gender and social policy. In the period 2014-2017 she participated as a researcher to the EU project titled "Effective Gender Equality in Research and the Academia" (EGERA) in which Middle East Technical University was a project partner. She is one of the founding members of Middle East Technical University, the Unit for Gender Equality Promotion and Sexual Harassment Prevention and presently active as a commission member. She is a Proffesor at the Department of Sociology, Middle East Technical University and at the Gender and Women Studies Programme.

DR. EZGİ PEHLİVANLI KADAYIFÇI: held her doctoral degree from the Department of Sociology, Middle East Technical University, with her thesis titled "Gendered Engineering Culture in Turkey: Construction and Transformation". She has been apostdoc researcher at Lund University Department of Gender Studies in the project titled"Comparative STEM Areas in Sweden and Turkey". She is currently a part-time lecturer at Science and Technology Policy Studies, Middle East Technical University.

Contents

List of Tables

Introduction

Despite the significant achievements at global level in the fields of education and employment, women and other minority groups still face serious obstacles and experience difficulties in some areas. In many societies, natural/physical sciences, technology, engineering and mathematics are regarded as areas where men are more successful. These common ideas are further strengthened given that the pioneers and influential figures in these areas have mostly been men. As a result of established traditional gender roles, girls are not encouraged to develop interest in natural/physical sciences, technology, engineering and mathematics starting from their preschool years. As levels of education rise in general, prejudices and barriers that women face in these fields too increase. Women tend to lose their self-confidence and as a result, many women stay reluctant to participate in these fields as they proceed to higher education. [Cracking the Code: Girls and Women's Education in STEM, UNESCO1 (Cracking the Code: Girls and Women's Education in STEM UNESCO), 2017). As to those selecting these fields as their profession, they still face problems when it comes to recruitment, advanced vocational training and promotion in their career.2 In the upcoming period, as the power of STEM fields to determine the economy and future professions increases, the low representation of women in these areas will deepen the gender inequality in many societies.

It is therefore important to cope with barriers and problems that women face in STEM areas. This report focuses on gender inequality in the fields of STEM (Science, Technology, Engineering and Mathematics).

Objective

The aim of this report is by taking into account the relation between gender and STEM education and employment, to examine the areas gender inequalities occur in STEM fields and how they are experienced.

In this context, which structural factors cause what kind of barriers to the participation to these areas by women and other minority groups will be determined, the nature of these barriers will be discussed, and developments in related issues in both Turkey and other countries will be exposed by noting best practices at international level. In this respect, the report aims to contribute to the monitoring of the effects policies adopted and programmes implemented in Turkey

[1]UNESCO (2017) Cracking the Code: Girls and Women's Education in STEM, https://dspace.ceid.org.tr/xmlui/handle/1/1338
[2] STEM and Gender Advancement (SAGA): Improving Measurement and Policies for Gender Equality in STEM, 2018: 11). https://dspace.ceid.org.tr/xmlui/handle/1/1576

for women's exercise of their rights to education and work which are recognized within the framework of international norms. The mapping of the STEM field can be realized by taking into account interactions between many sub-areas such as access to education, employment and technology. In this report, in addition to the dimensions of the existing indicators and mapping studies[3] that will contribute to the STEM infrastructure, new indicators are proposed for STEM fields. Hence, it is a part of the objective of the report to monitor, map and evaluate what is being done and not done in Turkey.

[3] Göğüş Tan, M. (2018). Eğitimde Toplumsal Cinsiyet Eşitliği Haritalama ve İzleme Çalışması. Cinsiyet Eşitliği İzleme Derneği (CEİD) Yayınları 3: Ankara https://dspace.ceid.org.tr/xmlui/handle/1/182 ; Toksöz, G., & Memiş, E. (2018). İstihdamda Toplumsal Cinsiyet Eşitliği Haritalama ve İzleme Çalışması. Cinsiyet Eşitliği İzleme Derneği (CEİD) Yayınları 5: Ankara https://dspace.ceid.org.tr/xmlui/handle/1/171

I. Brief History for the Development of STEM Area in Turkey

Stress on STEM areas developed particularly after 2009. The Ministry of Industry and Commerce prepared a strategy document and an action plan to enhance Turkey's capacity and international competitive power in scientific research and technology while some state and foundation universities played a pioneering role by launching STEM laboratories and centres. As a mark of importance attached to science and technology, the Ministry of Industry and Commerce changed its name as Ministry of Science, Industry and Technology (Ministry of Science, Industry and Technology, 2011).[4] and developed the Public-University-Industry Cooperation (KÜSİ) Strategy and Action Plan (2015-2018). The Action Plan stated the national vision as "turning the country into an advanced technology base by giving effect to public-university-industry cooperation at the highest level."[5]

Parallel to this, work was given start in universities to build awareness in STEM accompanied by the establishment of centres, laboratories and programmes. Following this pioneering work by universities in STEM, the Ministry of National Education (MoNE), Ministry of Development, and the Scientific and Technological Research Institute of Turkey (TÜBİTAK) set targets related to STEM education and employment with their various projects and extended support to relevant activities.

A. Gender Equality Norms and Standards in the STEM Field

Norms are defined as "fundamental values related to any area subject to monitoring which are set in the course of rights-based struggles, agreed upon and adopted by wide circles." (CEİD, Monitoring Model in the Mechanism for Combating Violence against Women, 2014: 27). Norms may have binding or advisory character. This part deals first with human rights documents related to the STEM area, and then with fundamental norms in education and employment in the context of STEM.

[4] 03.06.2011 tarihli 635 sayılı Kanun Hükmünde Kararnameye göre isim değişikliği gerçekleşmiştir.
[5] Bilim Sanayi ve Teknoloji Bakanlığı, 2015). Kamu Üniversite - Sanayi İşbirliği (KÜSİ) Stratejisi ve Eylem Planı (2015-2018) https://dspace.ceid.org.tr/xmlui/handle/1/1891

B. Human Rights Documents on Gender Equality in the STEM Field

1. United Nations Documents

What follows is a summary of United Nations documents setting goals and standards in ensuring gender equality in education in STEM areas.

Education for All 2015 Goals[6]

Goals 3 and 5 are indirectly related to gender inequalities faced in STEM areas. These goals envisage the promotion of quality education at all levels starting from preschool education and making quality education accessible to all; ensuring, in particular, girls' access to quality education; and ensuring, for both youth and adults, equal access to education environments and life skills programmes responsive to their education needs.

United Nations Millennium Development Goals (2000)[7]

To ensure basic education for all, the United Nations Millennium Development Goal 2 envisages "Ensuring that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling." The Goal 3 is about strengthening the position of women and promoting gender equality: "Eliminating gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015."[8] Goals related to the elimination of gender disparities in secondary education are important in combating inequalities in in the fields of STEM-related education and employment.

Sustainable Development Goals (2015)[9]

The Goal 4 in "2030 Sustainable Development Goals" is related to education and it envisages **"ensuring inclusive and equitable quality education and promote lifelong learning opportunities for all"** which is one of the main issues of the

[6] https://www.unesco.org.tr/Pages/13/47/Herkes-i%C3%A7in-E%C4%9Fitim-(EFA) Retrieved: 26.07.2020
[7] Birleşmiş Milletler'in Binyıl Kalkınma Hedefleri (2000)
https://www.tr.undp.org/content/turkey/tr/home/mdgoverview/millennium-development-goals.html Retrieved: 28.07.2020
[8] DPT (2010). Binyıl Kalkınma Hedefleri Raporu Türkiye 2010. Devlet Planlama Teşkilâtı. (https://dspace.ceid.org.tr/xmlui/handle/1/1348)
[9] Sürdürülebilir Kalkınma Hedefleri (2015)
https://www.unicefturk.org/yazi/SHK2018?gclid=EAIaIQobChMIuIT8gtnD6wIVhIxRCh319ABpEAAYASAAEgJWjPD_BwE
Retrieved:28.07.020

education sector in UNESCO.[10] At the Social Good Summit 2019, indicators were developed to make these targets measurable.[11]

2. European Union and European Council Documents

This part addresses major headings in various documents including the 1957 Rome Treaty, 1997 Treaty of Amsterdam, Treaty on European Union, Treaties on the Functioning of the European Union (2009), European Union Annual Reports (2018-2019) and the Strategic Plan 2020-2025.

Gender Stereotypes and Intersectionality

According to the European Union 2019 Annual Report [12] it is necessary to look beyond simple measures to understand the reasons behind gender-based wage differentials. It is considered that the male dominant culture in high-paid occupations mostly held by men is one of the major reasons why women are underrepresented in these areas.[13] Gender is not a concept that merely consists of two categories; it embodies different sexual orientations and identities. Thus, discrimination faced by each individual has its own course. The concept of intersectionality is important in understanding the layers of discrimination. For instance, a migrant woman with disability may face three-dimensional discrimination.[14]

Underrepresentation of Women in STEM Professions

The European union Annual Reports of 2018 and 2019 underline the tendency of women to keep up jobs that are traditionally considered as fit for their gender. In this vein, the document "Striving for a Union of Equality: The Gender Equality Strategy 2020-2025" that defines strategies for increasing women's representation in STEM occupations and improving working rights and conditions emphasizes the importance of promoting women's presence particularly in the sector of informatics and in natural sciences.

[10] https://www.unesco.org.tr/Pages/14/52/S%C3%BCrd%C3%BCr%C3%BClebilir-Kalk%C4%B1nma-%C4%B0%C3%A7in-E%C4%9Fitim Retrieved: 27.07.2020
[11] http://www.sgsistanbul.org/#hedefler Retrieved: 27.07.2020
[12] https://dspace.ceid.org.tr/xmlui/handle/1/1365
[13] Ibid: 20.
[14] Striving for a Union of Equality: The Gender Equality Strategy 2020-2025, March 2020 EU, 2019: 3 https://dspace.ceid.org.tr/xmlui/handle/1/1604 .

3. Beijing Declaration and Action Platform [15]

The Beijing Action Plan adopts the approach that the combat against inequalities between women and men must be waged within the framework of human rights and fundamental freedoms. In the Declaration, Articles 35 and 76 are directly related to STEM.

In Article 35, science and technology, vocational training, information and communication are mentioned as means to further the advancement and empowerment of women and girls. Science and technology and equal access to vocational training and sources of information are important in overcoming barriers that women face in STEM education and employment.

Article 76 in the Declaration is also directly related to STEM areas. This article stresses the importance of access for and retention of girls and women at all levels of education, including the higher level, and all academic areas with respect to equal opportunities in employment. Indeed, the lack of access to education including in STEM areas by girls and women stands as a barrier to their access to opportunities of employment in STEM areas.

4. International Labour Organization (ILO) Conventions and Recommendations

The ILO is a United Nations agency and its activities are based on a tripartite structure in member states. In other words, its activities are carried out by the decisions and participation of workers' and employers' organizations as well besides governments. Conventions and recommendations as international labour standards are the means of the ILO in its efforts to improve working and living conditions. ILO standards are applied equally for all women and men. The only exception is about issues related to the maternity and reproductive role of women.

Discrimination (Employment and Occupation) Convention No. 111[16]

The most comprehensive ILO Convention against discrimination is the Discrimination (Employment and Occupation) Convention No. 111 adopted in 1958. Turkey acceded to the document in 1966. States Parties to the Convention commit to pursue national policies supporting equal opportunities and treatment in order to prevent discrimination in employment and occupation. Article 1 in the

[15] Pekin Deklarasyonu ve Eylem Platformu (1995) https://dspace.ceid.org.tr/xmlui/handle/1/733
[16] https://dspace.ceid.org.tr/xmlui/handle/1/657

Convention defines discrimination by gender in employment or in jobs and occupations that are held. The definition of discrimination in working life is important in ensuring gender equality in STEM areas.

C. List of Norms about Gender Equality

1. Equality / Gender Equality

Equality is defined in three ways in national and international legislative arrangements as de jure equality, de facto equality and transformative equality.

The European Union Charter of Fundamental Rights (2000) stresses that all should be accorded equal rights in having an education, selecting an occupation and working and enjoying vocational and continuous training
Examining the **2030 Sustainable Development Goals (2015)** we find that Goal 4 is about ensuring and supporting inclusive, equalitarian and quality education for all. Goal 5 lays down that gender equality can be attained by empowering all girls and women and giving effect to legislative frameworks that encourage equality and make it possible in practice.

The ILO Convention no. 111 on Discrimination (Employment and Occupation) points out to the importance of equality in employment and occupations and equal treatment in these matters. Article 5 in the Convention states that gender-based positive discrimination is not to be considered as discrimination, and this provision is the indication of the adoption of de facto equality. ILO's Equal Remuneration Convention no. 100 seeks to eliminate gender inequality deriving from inequalities in wages.

The right to equality in education is also stressed in **European Council** documents. These documents too underline equality as a principle in occupational orientations and vocational training. The European Commission's Gender Equality Strategy 2020-2025 states that gender equality can be achieved by keeping away from stereotypes as well as gender-based vertical and horizontal segregation and ensuring equality in digital technologies.

2. Prohibition of Discrimination - Non-discrimination

Non-discrimination is directly related and supplementary to the principle of equality. Discrimination occurs not only in cases where people in equal status are not treated equally but also in others where people who are not actually in equal status are

treated equally.[17] *Formal equality* is an understanding of equality in which "With the assumption that all are equal with their given circumstances, people in equal status must be treated equally and the maintenance of the existing state is sufficient for equality unless there is any discrimination."[18]

The presence of the principle of non-discrimination in human rights documents is important to combat breaches of rights and freedoms on the basis of age, race, gender, colour, faith and political or some other opinion. It is one of the dimensions of gender discrimination and may be associated with other dimensions of discrimination in the context of intersectionality. Examples include discrimination by age and sex or by race and sex. What comes to the fore at this point is *multiple discrimination* experienced particularly by women. Multiple discrimination can be defined as especially vulnerable position of "certain groups of women, due to the combination of their sex with other factors, such as their race, colour, language, religion, political or other opinion, national or social origin, association with a national minority, property, birth or other status."[19]

[17] Toksöz, G., & Memiş, E. (2018). İstihdamda Toplumsal Cinsiyet Eşitliği Haritalama ve İzleme Çalışması CEİD Yayınları 5: Ankara: 61 https://dspace.ceid.org.tr/xmlui/handle/1/171
[18]Gül, İ. I., Karan, U., Yeşiladalı, B., & Ayata, G. (2011). *Ayrımcılık yasağı: kavram, hukuk, izleme ve belgeleme*. İstanbul Bilgi Üniversitesi yayınları.:5 https://dspace.ceid.org.tr/xmlui/handle/1/1040
[19] Council of Europe Committee of Ministers Recommendation CM/Rec (2007) 17 on Gender Equality Standards and Mechanisms, 12. Bölüm, 59. paragraf

D. Standards in STEM Fields

Standards are nationally and internationally accepted principles that determine the content, scope, form and function of enforcement. Standards set concrete criteria in relation to enforcement and are based on norms. The existence of norms-based standards is important with respect to monitoring.[20]

Besides these, documents mentioned include some other standards as well including, for example, those related to empowerment, awareness building, support to participation and informed preference. Empowerment denotes a status for girls and women where they can also enjoy some other rights is association with a specific right. Awareness building is about ensuring mentality change in adopting gender equality in the context of the transformative equality norm.

The standard on supporting informed preference is important in encouraging girls and women in particular to prefer education and employment in STEM areas. Given that there are social stereotypes and norms that regard STEM education and employment as engagements for men, preference of these areas by girls can be possible only through a guidance that is based on gender equality with respect to these areas.

[20] Kurtoğlu, A. (2015). Hak Temelli İzleme ve Değerlendirme Ve Toplumsal Cinsiyet Anaakımlaştırmasl. https://dspace.ceid.org.tr/xmlui/handle/1/92

II. Analysis of the Current Turkish Context

This part includes the following: Gender sensitive and rights-based monitoring and evaluation of STEM areas in Turkey; identification gender inequalities that exist in related public policies and practices; examination of the contribution of civil society organizations to policy development processes; and checking whether domestic legislation is in conformity with human rights documents related to education and employment in STEM areas.

A. Development of Rights in the STEM Field in Turkey

Initiatives in Turkey to ensure gender equality in STEM-related education and training processes have come to the fore especially within the last 30 years. These initiatives and efforts have been supported by other initiatives taken up by relevant international agencies (i.e. UNICEF), national institutions (i.e. MoNE), and civil society organizations (i.e. MESS Education Foundation and TAPV).

We see the first instance of seeking rights in STEM areas, particularly in engineering in Turkey around the mid-1990s. It was when the Union of the Turkish Chambers of Architects and Engineers (TMMOB) launched an initiative to protect the rights of its women members including their right to representation. Women make up one-fifth of the members of the TMMOB, and Union's activities to prevent gender discrimination is continuing as supported by the Directive on the Establishment and Working of Gender Discrimination Follow-up Secretariat. This directive is based on the Resolution no. 5 adopted during the 40th Ordinary General Assembly Meeting of the TMMOB held on 29 May – 1 June 2008. With the support of this document, women's commissions and working groups are presently active in identifying ways of countering gender discrimination and all forms of gender-based negative policies and practices.

B. Related Policy Documents regarding STEM

As stated earlier, education and employment together constitute a large part of infrastructure for a mapping work in STEM. While evaluating legislation related to education and employment in STEM in the table below, there is some overlapping

with "Gender Equality in Education: Mapping and Monitoring Work" by Göğüş Tan, and "Gender Equality in Employment: Mapping and Monitoring Work" by Toksöz and Memiş[21] In spite of this, relevant pieces of legislation and articles are still given considering that full exposition and examination of legislative provisions that may directly or indirectly affect STEM areas in education and employment has its importance in respect to mapping work. In addition to this category of legislation and articles, others related to STEM are also given.

Table 1 Legislation Directly Related to the STEM Area

Legislation	**Related Norms**
Law no. 4691 on Technology Development Zones (06/07/2001)	These are two pieces of legislation covering education and employment in the field of STEM, but without any reference to norms related to gender equality, equality and non-discrimination.
Law no. 278 on the Establishment of Scientific and Technological Research Institute of Turkey (17/07/1963)	

[21] Göğüş Tan, M. (2018). Eğitimde Toplumsal Cinsiyet Eşitliği Haritalama ve İzleme Çalışması. Cinsiyet Eşitliği İzleme Derneği (CEİD) Yayınları 3: Ankara https://dspace.ceid.org.tr/xmlui/handle/1/182 ; Toksöz, G., & Memiş, E. (2018). İstihdamda Toplumsal Cinsiyet Eşitliği Haritalama ve İzleme Çalışması. Cinsiyet Eşitliği İzleme Derneği (CEİD) Yayınları 5: Ankara https://dspace.ceid.org.tr/xmlui/handle/1/171

1. Other Legislation Related to Education and Employment in the STEM Field

As mentioned earlier, education and employment constitute the infrastructure of STEM area and legislation that directly put stress on STEM areas is limited. Thus, considering its importance in mapping work, some pieces of legislation that may indirectly affect STEM areas are also covered. In addition to this category of legislation and articles, others related to STEM are also given.

Table 2 Other Legislation Related to Education and Employment in the STEM Field

Legislation	Related Norms
Directive on the Organization and Duties of the Ministry of Family and Social Policies, General Directorate on Women's Status	Transformative equality, non-discrimination, empowerment, awareness building, non-formal education, commitment to comply with relevant provisions of international conventions
Ministry of National Education (MoNE) Regulations on Secondary Education Institutions (07.09.2013)	It is a legislation on education and employment policies in the field of STEM, but there is no reference to norms related to gender equality, equality or non-discrimination. The preference is for "adopting universal values" which is vague.
Ministry of National Education Regulations on Awards and Discipline in Secondary Education Institutions (19/012007)	Non-discrimination
Regulations on Non-formal Education Institutions (21.05.2010)	Right to occupational-technical education, non-discrimination, education responsive to talents
Ministry of National Education Regulations on Textbooks and Education Tools (12/09/2012)	Non-discrimination

MoNE Quality Framework (06.03.2015)	There is stress on the need for scientific approach in professional development of teachers which is important for STEM areas. There is stress on financial infrastructure which is important for STEM areas. There is stress on physical infrastructure which is important for STEM areas. There is stress on school environment which is important for STEM areas. (Data about the distribution of branch teachers by gender is missing) There is stress on participation to higher education which is important for STEM areas (without disaggregation by gender). There is gender disaggregated data on school dropouts, non-attendance and enrolment. There is information on transitions which is important for STEM areas, but not disaggregated by gender.
Prime Ministerial Circular on Promoting Women's Employment and Ensuring Equal Opportunities (25//5/2010)	Equality, gender equality checks, mainstreaming, non-discrimination, trainings for occupational skill building in women

C. Local Legislation Concerning STEM Field

This part examines legislations, statuses, regulations and directives related to education and employment in STEM areas. Education in STEM areas encompasses secondary education, vocational and technical schools, and higher education. Education policies are also examined in this part. Also examined are regulations and directives that govern the process of transition from education-training to employment in STEM areas. Majority of these documents related to STEM include no gender equality approach, which is specifically stressed in the assessment. Below you can find a list of related laws first and then other pieces of legislation including statutes, regulations and directives.

1. Legislation Related to Education and Employment in STEM Area

As stated earlier, related legislation and provisions are given considering that listing and examination of all articles that may directly or indirectly affect STEM areas in education and employment is important in respect to mapping work. In addition to this category of legislation and articles, others related to STEM are also given. Relevant parts of legislative articles are underlined to facilitate monitoring..

Table 3 Legislation Related to Education and Employment in STEM Area

Legislation	**Related Norms**
Constitution of the Republic of Turkey (09/11/1982)	Gender equality, transformative equality, De facto equality by provisional special measures, State's obligation to adopt the principle of equality before the law and to give effect to equality
National Education Basic Law (14/06/1973)	De jure equality, gender equality, non-discrimination, right to education according to talents and preferences, state's responsibility of orienting citizens in line of their interests and capacities, right to education, gender equality, empowerment, special support and measures

Law Decree on the Organization and Duties of the Ministry of National Education (25/8/2011)	Equal opportunities, right to access to education, empowerment, special support and measures
Higher Education Law (04/11/1981)	Non-discrimination, gender equality, combating cross-cutting inequalities
Labour Code no. 4857 (22/05/2003)	Non-discrimination, principle of equal treatment
Law no. 5763 on Amendments to the Labour Code and Some Other Laws (15/05/2008)	Transformative equality
Law no. 6701 on Human Rights and Equality Institution of Turkey (06/04/2016)	State's obligation to prevent discrimination and end discriminatory practices
Law no. 5840 on Equal opportunities for Women and Men (25/02/2009)	Gender equality, commitment to comply with relevant provisions of international conventions
Law no. 4691 on Technology Development Zones (06/07/2001)	It is a legislation on education and employment in the area of STEM, but without any reference to norms relating to gender equality, equality or non-discrimination.
Law no. 278 on the Establishment of Scientific and Technological Research Institute of Turkey (17/07/1963)	It is a legislation on education and employment policies in the area of STEM, but without any reference to norms relating to gender equality, equality or non-discrimination.

D. The Capacity of Civil Society Organizations and Other Public Actors

Most of the projects related to STEM in Turkey are carried out under state-private sector or state-private sector- civil society organization partnerships. This part will first address activities carried out by other public actors such as civil society organizations and professional chambers. In some activities, civil society organizations are in cooperation with private companies active in related sectors. The list of activities in this context is given below:

- Flying Broom Women's Communication and Research Association, FORD OTOSAN, MoNE; Honeybees are Becoming Engineers Project, 2015[22]
- Flying Broom Women's Communication and Research Association; My Madam Curie Project, 2015-2016[23]
- Flying Broom Women's Communication and Research Association, Civil Society Support Foundation and Turkey Mosaic Foundation; "My STEAM Network Project",2019[24]
- Kaos GL; Report on the State of Lesbian, Gay, Bisexual, Trans and Intersex Employees in the Private Sector in Turkey 2020[25]
- Kaos GL; 2019 Study on the State of Lesbian, Gay, Bisexual, Trans and Intersex Employees in the Public Sector in Turkey[26]
- Union of the Turkish Chambers of Architects and Engineers – Women's Group[27]
- Association of Women in Mathematics, Women and Science Activities[28] and Women in STEM Education Platform[29], 2012
- Automotive Industry Association (OSD) and Deloitte; Women in Automotive Industry in Turkey: Attracting Women to the Automotive World and Supporting Women in their Career, 2017[30]
- Deloitte and ELDER (Electric Power Distribution Association), EÜD (Association of Electricity Producers), ETD (Energy Trade Association), GAZBİR (Turkish Union of Natural Gas Distributors), PETFORM (Petroleum and Natural Gas Platform Association); Women in the Sector of Energy: Attracting Women to the Energy Sector in Turkey and Supporting Women in their Career, 2018[31]
- TÜBİSAD (Informatics Industry Association of Turkey) and Deloitte; Women in the Sector of Technology: Report on Attracting Women to the Technology Sector and Supporting Women in their Career, 2018[32]
- TÜSİAD; Study on Demand for and Expectations Related to Labour Force Trained in STEM (Science, Technology, Engineering and Mathematics), 2014[33]
- TÜSİAD; Digital Technologies and Economic Growth: Turkey's Position, Opportunities and Choices in Digital Technology Sectors, 2018[34]
- Education Monitoring Report by the Educational Reform Initiative (ERG) 2019[35]
- TÜSİAD and PWC Report on Turkey's STEM Need towards 2023[36]

[22] https://ucansupurge.org.tr/bal-arilari-muhendis-oluyor-projesi-2015/
[23] https://ucansupurge.org.tr/benim-madame-curiem-projesi-2015-2016/
[24] https://www.benimsteamagim.com/
[25] https://dspace.ceid.org.tr/xmlui/handle/1/1146
[26] https://dspace.ceid.org.tr/xmlui/handle/1/1150
[27] http://www.tmmob.org.tr/sayfa/tmmob-kadin Retrieved:13.07.2020
[28] https://tkmd.org/ Retrieved:13.07.2020
[29] https://www.bilimsenligi.com/stem-egitiminde-kadin.html/ Retrieved:13.07.2020
[30] https://www2.deloitte.com/tr/tr/pages/manufacturing/articles/Turkiye-otomotiv-sanayiinde-kadin.html Retrieved: 13.07.2020
[31] https://www2.deloitte.com/tr/tr/pages/energy-and-resources/articles/enerji-sektorunde-kadin-2018.html Retrieved: 13.07.2020
[32] https://dspace.ceid.org.tr/xmlui/handle/1/1401
[33] https://dspace.ceid.org.tr/xmlui/handle/1/1402
[34] https://tusiad.org/tr/yayinlar/raporlar/item/download/9081_e9393819361ee52de0c1923defb77efe
[35] https://dspace.ceid.org.tr/xmlui/handle/1/852
[36] https://dspace.ceid.org.tr/xmlui/handle/1/1392

- Automotive Industry Association and KPMG Report on Breaking the Lock in Technology in Automotive Industry, 2019[37]
- TOBB, TOBB Board of Women Entrepreneurs and Turkcell; The Project "Women Writing the Future, 2019[38]
- Limak Foundation: Project on Turkey's Engineer Girls, 2015[39] (presently in progress)

Reports and Studies by Civil Society Organizations Active in the fields of STEM and Gender Equality

- Science Heroes Association, 2014[40]
- Women in Technology Association (Wtech), 2019[41]

[37] https://assets.kpmg/content/dam/kpmg/tr/pdf/2019/04/otomotiv-sanayisinde-teknolojide-kilidi-kirmak.pdf Retrieved 19.07.2020
[38] https://gelecegiyazanlar.turkcell.com.tr/gelecegiyazankadinlar Retrieved 19.07.2020
[39] https://www.turkiyeninmuhendiskizlari.com/tmk-hakkinda.php Retrieved: 02.08.2020
[40] https://www.bilimkahramanlari.org/ Retrieved: 02.08.2020
[41] https://www.teknolojidekadin.org/ Retrieved: 02.08.2020

III. Sources of Indicators and Data in STEM Field

A. International Indexes and Indicators Regarding STEM Field

- UNESCO Report on Science, Technology and Gender, 2007.
- SAGA Science, Technology and Innovation Gender Objectives List – STI Goal Preliminary Report, UNESCO, 2016[42]
- SAGA Toolkit Preliminary Report 2 (Measuring Gender Equality in Science and Engineering: The SAGA Toolkit Working Paper 2), UNESCO, 2017[43]
- SAGA Survey (SAGA Survey of Drivers and Barriers to Careers in Science and Engineering – Working Paper 4) UNESCO, Preliminary Report 4, 2018[44]
- UNESCO UIS Database Indicators[45]
- National Science Foundation Science and Engineering Indicators 2020[46]

Indicators in the STEM area compiled by international agencies are summarized in the table below.

Table 4 International Indicators Collected in the Field of STEM

Indicators	Institution/Data
Rates of female/male children attending preschool education (in public and private infant schools and creches)	EU
Rates of female and male children access to education (primary, secondary and higher education)	OECD
	European Commission
	UNICEF
Rates of dropping out in education and training by gender	OECD
	European Commission
	UNICEF
Rates of female and male school enrolment by the type and level of education (primary, secondary and higher education)	OECD
	European Commission
	UNICEF

[42] https://dspace.ceid.org.tr/xmlui/handle/1/1422
[43] https://dspace.ceid.org.tr/xmlui/handle/1/1423
[44] https://en.unesco.org/saga Retrieved: 21.08.2020
[45] http://data.uis.unesco.org/ Retrieved: 21.08.2020
[46] https://ncses.nsf.gov/pubs/nsb20201 Retrieved: 21.08.2020

Population in two-year higher education by gender	UNDP
Population attending graduate and post-graduate education by gender	
Average duration in education by gender	
Literacy in mathematics	
Literacy in sciences	
Reading skills	
Rate of exposure to bullying in education	UNICEF, OECD
Percentages by gender of youth aged 15-19 in education	
Rate of children (age 15) enjoying few out of 6 education tools (by gender and regions)	
Number of female students per teacher according to levels in education	European Commission
Number of male students per teacher according to levels in education	
Number of female students per class by levels in education	
Number of male students per class by levels in education	
Percentages of female school dropouts by reasons of dropping out	EU
Percentages of male school dropouts by reasons of dropping out	
Rates of female students enrolled to higher education in the fields of STEM	UN
Rates of male students enrolled to higher education in the fields of STEM	
Rates of female students newly placed in higher education institutions in the fields of STEM	
Rates of male students newly placed in higher education institutions in the fields of STEM	
Average age (by gender)	UNDP, SDR
Labour force participation rate (by gender)	
Rate of participation to STEM labour force (by gender)	SDR
Number of scientists and engineers in Turkey	OECD

B. Indicators Collected in Turkey in the STEM Field

Data kept in Turkey in the field of STEM is summarized in the table below.

Table 5 Indicators Kept in Turkey in the Field of STEM

Indicators	Institution/Data
Distribution of employment by sectors	Ministry of Family and Social Policies
Distribution of employment by occupations	
Distribution by positions held in employment	
Distribution by workplace status (public/private)	
Reasons leading women to part-time work	
Rate of women employed in temporary status	
Percentage of STEM graduate employees by company size (enterprises employing 20-49, 50-99, 100-149 and 150 persons and over)	TÜSİAD
Percentage of STEM graduate employees by sectors (manufacturing and heavy industry, services, and retail)	
Reasons of STEM graduates in preferring their areas of employment according to HR directors	
Comparative pays for STEM graduates in their employment areas by their professional levels	
Comparative status of STEM graduates employed in and out of STEM areas in terms of their side benefits	
Positioning of STEM graduates (i.e. status and titles) (%)	
State of STEM graduates in meeting industrial expectations with respect to qualifications required	
Presence of qualified labour force shortage in STEM areas	
Level of schooling in which there is shortage of qualified labour force in STEM areas	
Direction of demand for employment in STEM areas by company size	
Direction of demand for employment in STEM areas by sector	
Areas in which there is need for STEM graduates by company size (enterprises employing 20-49, 50-99, 100-149 and 150 persons and over) (i.e. marketing, sales, R&D, application consultancy)	
Opinion of employers about difficulties in finding qualified labour force in STEM (positive/negative)	
Time period for the HR department in responding to labour force demand in STEM areas	

Status in employment in STEM areas of graduates of vocational and technical high schools and colleges by company size	
Status in employment in STEM areas of graduates of vocational and technical high schools and colleges by sectors	
Present jobs of STEM graduates in their STEM areas (engineering, technicians, process description, application development consultancy)	
Frequency in internet use within the last three months by individuals by gender (almost every day, once a week, less frequent than once a week)	
Rate of internet use within the last 12 months in communicating with government agencies/institutions by gender	
Activities carried out in case internet is used within the last 12 months in communicating with governmental institutions/agencies by gender (i.e. obtaining information from webpages, downloading some official forms and documents, filling out and sending forms)	
Types of goods and services that individuals ordered or purchased on the internet for personal use within the last 12 months by gender (food, household items, medicine, clothing, sports materials, additional computer supplies, etc.)	
Rates of computer and internet use by the last time of use (within the last 3 months, 3 months to 1 year ago, earlier than 1 year ago) and gender	
Rate of individuals regularly using internet (almost every day or at least once a week withing the last 3 months) by statistical classification of regions in Turkey and gender	
Computer use by individuals by occupational groups (ISCO-8 groups) and gender	
Internet use by individuals by occupational groups (ISCO-8 groups) and gender	
Rates of computer use by individuals within the last three months by their educational status and gender	
Rates of internet use by individuals within the last three months by their educational status and gender	
Rates of computer use by individuals by their employment status (**Included in labour force:** Wage and salary earners, daily paid workers, employers, self-employed, unpaid family workers, jobless; **Not included in labour force**: Engaged in domestic household work, retired, student, does not want to work, disabled and others) and gender within the last three months	

Rates of internet use by individuals by their employment status (**Included in labour force:** Wage and salary earners, daily paid workers, employers, self-employed, unpaid family workers, jobless; **Not included in labour force**: Engaged in domestic household work, retired, student, does not want to work, disabled and others) and gender within the last three months within the last three months	

C. Indicators Suggested for Turkey in the STEM Field

As in other areas in STEM too observation of transformations taking place is not possible unless quantitative measurements are made through indicators. It is therefore important to develop and effectively use measurable and realistic indicators that are associated with a specific goal/strategy while reflecting relevant international norms and standards. As stated, an indicator must be measurable and quantitatively comparable. In this context, the table below gives indicators suggested for measuring and monitoring developments in the area of STEM.

Table 6 Indicators Suggested for Turkey in the STEM Field

	Indicator Name/Definition	Unit of Measure (percentage , number)	International Classification	Data Sources		Suggested Data Collection Frequency
				Institution / Data	Source of Data in Turkey	
STEM-Education						
1	Number of students in vocational and technical secondary education (state and private) by gender	#	ISCED-11		MoNE, TURKSTAT	1 year
2	Number of students graduating from vocational and technical secondary schools by gender	#	ISCED-11		MoNE, TURKSTAT	1 year
3	Rate of enrolment to STEM areas in higher education by gender	%	ISCED-11		MoNE, TURKSTAT	1 year
4	Rates of undergraduate STEM students by gender	%	ISCED-11		MoNE, TURKSTAT	1 year
5	Rates of postgraduate STEM students by gender	%	ISCED-11		MoNE, TURKSTAT	1 year
6	Rates of PhD students in STEM by gender	%	ISCED-11		MoNE, TURKSTAT	1 year
7	Rates of faculty members with doctoral degree in higher education STEM areas by gender	%	ISCED-11		MoNE, TURKSTAT	1 year
8	Average fee in internet access	TL	ISCED-11		MoNE, TURKSTAT	1 year

9	Duration of internet connection by age and gender	#	ISCED-11		MoNE, TURKSTAT	1 year
10	Number of full and part-time students (in primary and secondary education)	#	ISCED-11		MoNE, TURKSTAT	1 year
11	Percentages by gender of young persons in the age group 15-19 who are in education	%	ISCED-11		MoNE, TURKSTAT	1 year
12	Rate of children (age 15) enjoying few out of 6 education tools (by gender and regions)	%	ISCED-11		MoNE, TURKSTAT	1 year
13	Number of girls in education per teacher by levels in education	#	ISCED-11		MoNE, TURKSTAT	1 year
14	Number of boys in education per teacher by levels in education	#	ISCED-11		MoNE, TURKSTAT	1 year
15	Number of girls in education per class by levels in education	#	ISCED-11		MoNE, TURKSTAT	1 year
16	Number of girls in education per class by levels in education	#	ISCED-11		MoNE, TURKSTAT	1 year
17	Gender distribution of secondary education students by MS – TM – F preferences (MS: mathematics and science; TM: Turkish and mathematics; F: science)	#	ISCED-11		MoNE, TURKSTAT	1 year
18	Science High School graduation rates by gender	%	ISCED-11		MoNE, TURKSTAT	1 year
19	Vocational and Technical High School graduation rates by gender	%	ISCED-11		MoNE, TURKSTAT	1 year
20	Vocational and Technical High School rates of success by gender	%	ISCED-11		MoNE, TURKSTAT	1 year
21	Rates of success in Science High Schools by gender	%	ISCED-11		MoNE, TURKSTAT	1 year

22	Distribution by gender of YÖK/MoNE/TÜBİTAK scholarships awarded in higher education STEM areas	%			YÖK, MoNE, TÜBİTAK	1 year
23	Rates of preference for STEM areas of students in the first thousand by gender	%			YÖK, ÖSYM, TÜBİTAK	1 year
24	Percentage distribution by gender of primary school age children who pass four-level difficulty test in mathematics (suggested international test)	%			YÖK, ÖSYM, TÜBİTAK	1 year
25	Percentage distribution by gender of primary school age children who pass four-level difficulty test in sciences	%			YÖK, ÖSYM, TÜBİTAK	1 year
26	Rates of higher education student enrolment in STEM areas by gender (Sciences, Mathematics, Engineering and Technology)	%			YÖK, ÖSYM, TÜBİTAK	1 year
27	Rates of undergraduate students in STEM areas by gender (Sciences, Mathematics, Engineering and Technology)	%			YÖK, ÖSYM, TÜBİTAK	1 year
28	Rates of postgraduate and PhD students in STEM areas by gender (Sciences, Mathematics, Engineering and Technology)	%			YÖK, ÖSYM, TÜBİTAK	1 year
29	Distribution of faculty members in nigher education institutions by gender separately by each STEM area (Sciences, Mathematics, Engineering and Technology)	%			YÖK, ÖSYM, TÜBİTAK	1 year
30	Rate of publications in the field of STEM based on international cooperation by gender	%			YÖK, ÖSYM, TÜBİTAK	1 year
31	Prevalence of exposure to bullying in education	%			YÖK, ÖSYM, TÜBİTAK	1 year

32	Number of mentors per female student in engineering fields	#			YÖK, ÖSYM, TÜBİTAK	1 year
33	Rates of Science High School graduates enrolling to STEM areas in higher education by gender	%			YÖK, ÖSYM, TÜBİTAK	1 year
34	Graduation time in higher education STEM areas by gender	#			YÖK, ÖSYM, TÜBİTAK	1 year
35	Rates of internship in higher education STEM areas by gender	%			YÖK, ÖSYM, TÜBİTAK	1 year
36	School achievement by gender in higher education STEM areas	#			YÖK, ÖSYM, TÜBİTAK	1 year
37	Rates of researchers in higher education STEM areas using large-budget research funds (EU, TÜBİTAK, BAP, etc.) by gender	%			YÖK, ÖSYM, TÜBİTAK	1 year
38	Rates of researchers in higher education STEM areas using large-budget national research funds (TÜBİTAK, BAP, etc.) by gender	%			YÖK, ÖSYM, TÜBİTAK	1 year
39	Rates of researchers in higher education STEM areas using large-budget international research funds (EU, etc.) by gender	%			YÖK, ÖSYM, TÜBİTAK	1 year
40	Rates of higher education department heads/deans/institution directors/vice-presidents/president advisors/presidents who are graduates in STEM areas (by gender)	%			YÖK, ÖSYM, TÜBİTAK	1 year
41	Rates of faculty members in STEM areas with seats in university administrative boards (by gender)	%			YÖK, ÖSYM, TÜBİTAK	1 year
42	Rates of Science High School dropping out by gender	%			YÖK, ÖSYM, TÜBİTAK	1 year

43	Rates of dropping out of Vocational and Technical Anatolian High Schools by gender	%			YÖK, ÖSYM, TÜBİTAK	1 year
44	Reasons for dropping out of vocational and technical schools by gender	%			YÖK, ÖSYM, TÜBİTAK	1 year
45	Reasons for dropping out of higher education in STEM areas by gender	Qualitative Data			YÖK, ÖSYM, TÜBİTAK	1 year
46	Rates of scholarship given in higher education STEM areas by gender	%			YÖK, ÖSYM, TÜBİTAK	1 year
47	Rates of scholarship given in STEM areas by private institutions by gender	%			YÖK, ÖSYM, TÜBİTAK	1 year
48	Rates of attendance to higher education by gender and grade	%			YÖK, ÖSYM, TÜBİTAK	1 year
49	Number of guidance teachers receiving training in STEM	#			YÖK, ÖSYM, TÜBİTAK	1 year
50	Number of teachers receiving training in STEM	#			YÖK, ÖSYM, TÜBİTAK	1 year
51	Number of teachers receiving training in STEM and gender	#			YÖK, ÖSYM, TÜBİTAK	1 year
52	Number of guidance teachers receiving training in gender	#			YÖK, ÖSYM, TÜBİTAK	1 year
53	Number of teachers receiving training in gender	#			YÖK, ÖSYM, TÜBİTAK	1 year
54	Rate of teachers having specialization in information processing in their schools	%			MoNE	1 year
55	Rate of teachers qualified in information processing by school levels	%			MoNE	1 year
56	Rate of girls/boys attending preschool education (public and private infant schools and creches)	%			MoNE	1 year

57	Rates of access/attendance to education by female and male children (primary education, secondary education and higher education)	%			MoNE, ÖSYM, TURKSTAT	1 year
58	Early dropping out of education and training by gender	%	ISCED-11		MoNE, TURKSTAT	1 year
59	Percentages of female dropouts by reasons of dropping out	%	ISCED-11		MoNE, TURKSTAT	1 year
60	Percentages of male dropouts by reasons of dropping out	%	ISCED-11		MoNE, TURKSTAT	1 year
61	Rates of school enrolment of girls and boys by type and level of education (primary education, secondary education and higher education)	%	ISCED-11		MoNE, TURKSTAT	1 year
62	Population in associate degree studies by gender	%	ISCED-11		MoNE, TURKSTAT	1 year
63	Population in graduate and postgraduate studies by gender	%	ISCED-11		MoNE, TURKSTAT	1 year
64	Average duration in education by gender	#	ISCED-11		MoNE, TURKSTAT	1 year
65	Average score in mathematics literacy by gender and NUTS Level 1	#	ISCED-11		MoNE, TURKSTAT	1 year
66	Average score in sciences literacy by gender and NUTS Level 1	#	ISCED-11		MoNE, TURKSTAT	1 year
67	Average score in reading skills by gender and NUTS Level 1	#	ISCED-11		MoNE, TURKSTAT	1 year
68	Rates of female students attending higher education in STEM areas	%			YÖK	1 year

69	Rates of female students attending higher education in STEM areas	%			YÖK	1 year
70	Rates of female students recently placed in STEM areas in higher education	%			YÖK	1 year
71	Rates of male students recently placed in STEM areas in higher education	%			YÖK	1 year
72	Rate of students opting for mathematics in secondary education by gender	%	ISCED-11	UNDP, SDG, SAGA	MoNE	1 year
73	Rate of students opting for sciences in secondary education by gender	%	ISCED-11	UNDP, SDG, SAGA	MoNE	1 year
74	Rate of enrolment to vocational and technical education by gender	%	ISCED-11	UNDP, SDG, SAGA	MoNE	1 year
75	Science high schools graduation rate by gender	%	ISCED-11	UNDP, SDG, SAGA	MoNE	1 year
76	Rate of dropouts in science high schools by gender	%	ISCED-11	UNDP, SDG, SAGA	MoNE	1 year
77	Rate of graduation from Vocational and Technical Anadolu High Schools by gender	%	ISCED-11	UNDP, SDG, SAGA	MoNE	1 year
78	Rate of dropouts in Vocational and Technical Anadolu High Schools by gender	%	ISCED-11	UNDP, SDG, SAGA	MoNE	1 year

79	Rate of graduation from vocational and technical education by gender	%	ISCED-11	UNDP, SDG, SAGA	MoNE	1 year
80	Rate of school dropping out in vocational and technical education by gender	%	ISCED-11	UNDP, SDG, SAGA	MoNE	1 year
81	Rate of success in Vocational and Technical Anadolu High Schools by gender	%	ISCED-11	PISA	MoNE	1 year
82	Rate of success in Science High Schools by gender	%	ISCED-11	PISA	MoNE	1 year
83	Rete of enrolment in higher education STEM areas by gender	%		UNDP, SDG, SAGA, SHE FIGURES	ÖSYM/YÖK	1 year
84	Rate of dropouts in higher education STEM areas by gender	%		UNDP, SDG, SAGA	ÖSYM/YÖK	1 year
85	Reasons of school dropping out in higher education STEM areas by gender	Qualitative data		UNDP, SDG, SAGA	ÖSYM/YÖK	1 year
86	Rate of students enrolling in STEM areas after graduating from vocational and technical high schools (by gender)	%		UNDP, SDG, SAGA	ÖSYM/YÖK	1 year
87	Rate of students enrolling in STEM areas after graduating from science high schools (by gender)	%		UNDP, SDG, SAGA	ÖSYM/YÖK	1 year
88	Rate of scholarships in higher education STEM areas by gender	%		UNDP, SDG, SAGA	MoNE, ÖSYM	1 year

89	Rate of YÖK scholarships in higher education STEM areas by gender	%		UNDP, SDG, SAGA	MoNE, ÖSYM	1 year
90	Rate of private scholarships in higher education STEM areas by gender	%		UNDP, SDG, SAGA	MoNE, ÖSYM	1 year
91	Rates of STEM area preference by students in the first 2,000 (by gender)	%		UNDP, SDG, SAGA	MoNE, ÖSYM	1 year
92	Rate of attendance of higher education students by gender and grade	%		UNDP, SDG, SAGA, SHE FIGURES	MoNE, ÖSYM	3 years
93	Percentage distribution by gender of persons from age groups 25-29/30-34 who have completed their at least two / four years of higher education	%		UNDP, SDG, SAGA, SHE FIGURES	MoNE, ÖSYM	5 years
94	Employment status of higher education STEM graduates in age groups 25-29 / 30-34 (by gender)	%		UNDP, SDG, SAGA	İŞKUR	1 year

95	Rates of female and male higher education STEM graduates in total unemployed youth (by gender)	%		UNDP, SDG, SAGA, SHE FIGURES	İŞKUR	1 year
96	Percentage distribution by gender of primary school age children who pass four-level difficulty test in mathematics (suggested international test) [1]	%	-	UNDP, SDG, SAGA	MoNE, ÖSYM	4 years
97	Percentage distribution by gender of secondary school age children who pass four-level difficulty test in mathematics	%		UNDP, SDG, SAGA	MoNE, ÖSYM	4 years
98	Percentage distribution by gender of high school age children who pass four-level difficulty test in mathematics	%		UNDP, SDG, SAGA	MoNE, ÖSYM	4 years
99	Percentage distribution by gender of primary school age children who pass four-level difficulty test in sciences [2]	%	-	UNDP, SDG, SAGA	MoNE, ÖSYM	4 years
100	Percentage distribution by gender of secondary school age children who pass four-level difficulty test in sciences	%		UNDP, SDG, SAGA	MoNE, ÖSYM	4 years

101	Percentage distribution by gender of high school age children who pass four-level difficulty test in sciences	%		UNDP, SDG, SAGA	MoNE, ÖSYM	4 years
102	Number of guidance teachers who have received training in STEM	#		UNDP, SDG, SAGA	MoNE, ÖSYM	1 year
103	Number of teachers who have received training in STEM	#		UNDP, SDG, SAGA	MoNE, ÖSYM	1 year
104	Number of teachers who have received training in STEM and gender	#		UNDP, SDG, SAGA	MoNE, ÖSYM	1 year
105	Number of guidance teachers who have received training in gender	#		UNDP, SDG, SAGA	MoNE, ÖSYM	1 year
106	Number of teachers who have received training in gender	#		UNDP, SDG, SAGA	MoNE, ÖSYM	1 year
107	Rate of secondary school teachers who have received training in STEM by gender	%		UNDP, SDG, SAGA	MoNE, ÖSYM	1 year
108	Rate of teachers who have received training in STEM by gender	%		UNDP, SDG, SAGA	MoNE, ÖSYM	1 year
109	Rate of persons transferring to working life in the same area after graduating from vocational/technical high school (by gender)	%		UNDP, SDG, SAGA	MoNE, ÖSYM	1 year

110	Rate of students enrolled in STEM areas in higher education by gender	%		UNDP, SDG, SAGA	MoNE, ÖSYM	1 year
111	Rate of students enrolled in respective STEM areas (Sciences, Mathematics, Engineering, Technology) in higher education by gender	%		UNDP, SDG, SAGA	MoNE, ÖSYM	1 year
112	Rate of undergraduate students in STEM	%		UNDP, SDG, SAGA	ÖSYM, Universities	1 year
113	Rate of undergraduate students in respective STEM areas (Sciences, Mathematics, Engineering, Technology) by gender	%		UNDP, SDG, SAGA	ÖSYM, Universities	1 year
114	Rate of postgraduate students in STEM by gender	%		UNDP, SDG, SAGA	ÖSYM, Universities	1 year
115	Rate of PhD students in STEM by gender	%		UNDP, SDG, SAGA, SHE FIGURES	ÖSYM, Universities	1 year
116	Rates of graduate and PhD students in respective STEM areas (Sciences, Mathematics, Engineering, Technology) by gender	%		UNDP, SDG, SAGA, SHE FIGURES	ÖSYM, Universities	1 year
117	Female/male graduates of higher education STEM areas by gender (bachelor's, master's and PhD degrees)	%		UNDP, SDG, SAGA, SHE FIGURES	ÖSYM, Universities	1 year
118	Female/male graduates of respective higher education STEM areas (Sciences, Mathematics, Engineering, Technology) (bachelor's, master's and PhD degrees)	%		UNDP, SDG, SAGA, SHE FIGURES	ÖSYM, Universities	1 year
119	Time that graduation takes in higher education STEM areas by gender	#		UNDP, SDG, SAGA	ÖSYM, Universities	1 year
120	Rate of internship in higher education STEM areas by gender	%		UNDP, SDG, SAGA	ÖSYM, Universities	1 year

121	School success by gender in higher education STEM areas	#		UNDP, SDG, SAGA	ÖSYM, Universities	1 year
122	Number of courses in gender that students in higher education STEM areas took during their undergraduate studies	#		UNDP, SDG, SAGA	ÖSYM, Universities	1 year
123	Number of courses in gender that students in higher education STEM areas took during their postgraduate studies	#		UNDP, SDG, SAGA	ÖSYM, Universities	1 year
124	Rate of research assistants in higher education STEM areas by gender	%		UNDP, SDG, SAGA	YÖK, Universities	3 years
125	Rate of faculty members with doctoral degree in higher education STEM areas by gender	%		UNDP, SDG, SAGA	YÖK, Universities	3 years
126	Rate of associate professors by gender in higher education STEM areas	%		UNDP, SDG, SAGA	YÖK, Universities	3 years
127	Rate of associate professors by gender in higher education STEM areas	%		UNDP, SDG, SAGA	YÖK, Universities	3 years
128	Rates of faculty members by gender in respective areas of STEM in higher education	%		UNDP, SDG, SAGA	YÖK, Universities	3 years
129	Rates of research assistants by gender in respective areas of STEM in higher education (Sciences, Mathematics, Engineering, Technology)	%		UNDP, SDG, SAGA	YÖK, Universities	3 years
130	Rates of faculty members with doctoral degree by gender in respective areas of STEM in	%		UNDP, SDG, SAGA	YÖK, Universities	3 years

	higher education (Sciences, Mathematics, Engineering, Technology)					
131	Rates of associate professors by gender in respective areas of STEM in higher education (Sciences, Mathematics, Engineering, Technology)	%		UNDP, SDG, SAGA	YÖK, Universities	3 years
132	Rates of professors by gender in respective areas of STEM in higher education (Sciences, Mathematics, Engineering, Technology)	%		UNDP, SDG, SAGA	YÖK, Universities	3 years
133	Time required to earn professorship tenure in higher education STEM areas by gender	#		UNDP, SDG, SAGA	YÖK, Universities	3 years
134	Time required to earn assistant professorship tenure in higher education STEM areas by gender	#		UNDP, SDG, SAGA	YÖK, Universities	3 years
135	Time required to earn instructor tenure in higher education STEM areas by gender	#		UNDP, SDG, SAGA	YÖK, Universities	3 years
136	Rate of researchers (working in research centres and institutions) working in higher education STEM areas by gender	%		UNDP, SDG, SAGA	YÖK, Universities	3 years
137	Number of women mentors guiding researchers and instructors in STEM areas in higher education	#		UNDP, SDG, SAGA	YÖK, Universities	3 years
138	Number of researchers in higher education STEM areas involved in international mobility (by gender)	#		SHE FIGURES	YÖK, Universities	3 years

139	Number of researchers in higher education STEM areas involved in international mobility at the beginning of their career (by gender)	#		SHE FIGURES	YÖK, Universities	3 years
140	Number of experienced researchers in higher education STEM areas involved in international mobility (by gender)	#		SHE FIGURES	YÖK, Universities	3 years
141	Rate of researchers in higher education STEM areas benefiting from large-budget research funds (i.e. from EU, TÜBİTAK, BAP, etc.) by gender	%		UNDP, SDG, SAGA	YÖK, Universities	3 years
142	Rate of researchers in higher education STEM areas benefiting from large-budget national research funds (i.e. TÜBİTAK, BAP, etc.) by gender	%		UNDP, SDG, SAGA	YÖK, Universities	3 years
143	Rate of researchers in higher education STEM areas benefiting from large-budget international research funds (i.e. from EU, etc.) by gender	%		UNDP, SDG, SAGA	YÖK, Universities	3 years
144	Rate of research project executors in higher education STEM areas by gender	%		UNDP, SDG, SAGA, SHE FIGURES	YÖK, Universities	3 years
145	Rate of research project consultants by gender (Public/Private)	%		UNDP, SDG, SAGA	YÖK, Universities	3 years
146	Rate of first authorship in STEM by gender	%		SHE FIGURES	YÖK, Universities, WOS, INCITES	3 years
147	Rate of publications in STEM based on international cooperation by gender	%		SHE FIGURES	YÖK, Universities,	3 years

					WOS, INCITES	
148	Rate of department heads/deans/institute directors/vice-presidents/president consultants and presidents who are graduates of higher education STEM areas (by gender)	%		UNDP, SDG, SAGA	YÖK, Universities	4 years
149	Rate of faculty members from STEM areas who have seats in university administrative boards (by gender)	%		UNDP, SDG, SAGA	YÖK, Universities	3 years
150	Rate of faculty members from STEM areas who have seats in university senates (by gender)	%		UNDP, SDG, SAGA	YÖK, Universities	3 years
151	Number of departments/faculties/programmes with gender accreditation	#		UNDP, SDG, SAGA	YÖK, Universities	4 years
152	Number of STEM departments/programmes with courses on gender awareness	#		UNDP, SDG, SAGA	YÖK, Universities	4 years
STEM-Employment						
153	Average wage (by gender)	#	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT	1 year
154	Labour force participation rate (by gender)	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT	1 year
155	Employment by sectors	#	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT	1 year
156	Distribution of employment by occupations	#	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT	1 year

157	Distribution by position in jobs	#	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT	1 year
158	R&D human resources by gender, occupation groups and sectors	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT	1 year
159	R&D human resources by gender, educational status and sectors	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT	1 year
160	R&D human resources by gender, educational status and occupation groups	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT	1 year
161	R&D human resources of financial and non-financial companies by gender, economic activity and occupational group	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT	1 year
162	R&D human resources of financial and non-financial companies by gender, economic activity and educational status	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT	1 year
163	R&D human resources of financial and non-financial companies by gender, number of employees, size and occupational groups	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT	1 year
164	Rates of scientists and I-engineers in total labour force by gender	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT	1 year
165	Rate of female/male researchers in the field of research and sciences	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
166	Rate of researchers per 1000 population by gender	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
167	Gender-based wage gap in R&D activities	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
168	Distribution by workplace status (public/private sector)	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
169	Reasons for women's part-time work	Qualitative data	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year

170	Rate of employment of women in temporary status	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
171	Gross domestic R&D spending and human resources according to NUTS Level 2	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
172	Number of scientists and engineers (as potential scientists) in Turkey	#				
173	Percentage of STEM graduate employees by company size (employing 20-49, 50-99, 100-149 and 150 or more persons)	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
174	STEM graduates' preferences in their employment according to HR directors	Qualitative data				
175	Comparative wages of STEM graduates in their respective fields of employment	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
176	Comparative status of STEM graduates working in STEM areas and out of it with respect to side benefits (i.e. health insurance, unemployment insurance, disability benefits and paid leave)	Qualitative data	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
177	Positioning of STEM graduates (status and titles)	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
178	What the industry expects from STEM graduates	Qualitative data	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
179	Status of STEM graduates in terms of meeting the qualifications that their industry requires (rate of response to given choices)	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
180	Expectations of STEM graduates from the sector	Qualitative data	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year

181	Industry's status in responding to STEM expectations (rate of response to choices given)	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
182	Whether there is qualified labour force shortage in STEM areas	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
183	School level for which there is shortage of qualified labour force in STEM areas	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
184	Direction of employment demand in STEM by company size		ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
185	Direction of employment demand in STEM by company size by sectors		ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
186	Areas (marketing, sales, R&D, application consultancy) in which there is need for STEM graduates by company size (enterprises employing 20-49, 50-99, 100-149 and 150 persons and over)		ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
187	Employer opinion regarding the difficulty of reaching qualified labour force in STEM (positive or negative)		ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
188	Period required for the HR department to respond to labour force demand in STEM areas	#	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
189	State of employment of vocational and technical high schools and colleges in STEM areas by company size	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
190	State of employment of vocational and technical high schools and colleges in STEM areas by sectors	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
191	Rate of vocational and technical high school graduates enrolled in STEM areas by gender	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year

192	Number of women executors in R&D projects	#	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT, TÜBİTAK	1 year
193	Number of citations for faculty members in STEM areas (by gender)	#	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT, TÜBİTAK	1 year
194	Participation to conferences abroad by researchers and faculty members in STEM areas (by gender)	Oran	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT, TÜBİTAK	1 year
195	Rates of women and men having their companies in technocities	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT, TÜBİTAK	1 year
196	Rates of women/men employed in technocities	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT, TÜBİTAK	1 year
197	Rate of part-time employed women in STEM	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT, TÜBİTAK	1 year
198	Rate of women employed in temporary status in STEM	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT, TÜBİTAK	1 year
199	Rate of vocational and technical high school and college graduates employed in STEM areas by company size (enterprises employing 20-49, 50-99, 100-149 and 150 persons and over)	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
200	Rate of vocational and technical high school and college graduates employed in STEM areas by sectors (manufacturing and heavy industry, services and retail)	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
201	Number of STEM technicians by gender (in higher education institutions)	#	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
202	Blue-collar STEM workers employed in the public sector (by gender)	%	ISCO-08 /NACE		TURKSTAT, TÜBİTAK	1 year
203	Blue-collar STEM workers employed in the private sector (by gender)	%	ISCO-08 /NACE	SHE FIGURES	TURKSTAT, TÜBİTAK	1 year

204	Rate of women holding CEO/manager positions in STEM	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT, TÜBİTAK	1 year
205	Rates of academic STEM awardees by gender	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT, TÜBİTAK	1 year
206	Rates of STEM awardees in the private sector by gender	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT, TÜBİTAK	1 year
207	Number of women used to work in STEM areas quitting after maternity	#	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT, TÜBİTAK	1 year
208	Number of STEM enterprises implementing flexible working hours for all parents	#	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT, TÜBİTAK	1 year
209	Number of fathers employed in STEM areas using paternity leave	#	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT, TÜBİTAK	1 year
210	Rate of women entrepreneurs in STEM	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT, TÜBİTAK	1 year
211	Rate of women with their start-up firms in STEM	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT, TÜBİTAK	1 year
212	Rate of women using loan in the field of STEM	%	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT, TÜBİTAK	1 year
213	Number of innovations with gender perspective	#	ISCO-08 /NACE	UNDP, SDG, SAGA	TURKSTAT, TÜBİTAK	1 year
214	Number of persons in precarious employment in higher education STEM areas (by gender)	#	ISCO-08 /NACE	IEGE	TURKSTAT, TÜBİTAK	1 year
Access to Digital Technologies						
215	Average cost of internet use	TL		U.S. Department of Education	TURKSTAT, Household Information and Communication Technology	1 year

					(ICT) Usage Surveys	
216	Rate of teachers with expertise in information processing in schools	%		U.S. Department of Education	TURKSTAT, Household ICT Usage Surveys	1 year
217	Rate of teachers qualified in information processing by school levels	%		U.S. Department of Education	TURKSTAT, Household ICT Usage Surveys	1 year
218	Major reasons for using internet	Qualitative data		U.S. Department of Education	TURKSTAT, Household ICT Usage Surveys	1 year
219	Major reasons for using internet (by gender)	Qualitative data		U.S. Department of Education	TURKSTAT, Household ICT Usage Surveys	1 year
220	Age at first use of internet (by gender)	# and %		U.S. Department of Education	TURKSTAT, Household ICT Usage Surveys	1 year

221	Duration of stay on internet by age and gender	# and %		U.S. Department of Education	TURKSTAT, Household ICT Usage Surveys	1 year
222	Number of e-mail accounts owned	#		U.S. Department of Education	TURKSTAT, Household ICT Usage Surveys	1 year
223	Average time in staling on internet for reading (papers, news)	#		U.S. Department of Education	TURKSTAT, Household ICT Usage Surveys	1 year
224	Rate of computer use by individuals by NUTS Level 1 and gender	%			TURKSTAT	1 year
225	Frequency in internet use within the last three months by individuals by gender (almost every day, once a week, less frequent than once a week)	#			TURKSTAT	1 year
226	Rate of internet use in communicating with governmental agencies within the last 12 months by gender	%			TURKSTAT	1 year
227	Activities carried out in case internet is used within the last 12 months in communicating with governmental institutions/agencies by gender (i.e. obtaining information from webpages, downloading some official forms and documents, filling out and sending forms)	%			TURKSTAT	1 year

228	Types of goods and services that individuals ordered or purchased on the internet for personal use within the last 12 months by gender (food, household items, medicine, clothing, sports materials, additional computer supplies, etc.)	%			TURKSTAT	1 year
229	Rates of computer and internet use by the last time of use (within the last 3 months, earlier than last 3 months, 3 months to 1 year, earlier than 1 year ago) and gender	%			TURKSTAT	1 year
230	Rate of individuals regularly using internet (almost every day or at least once a week withing the last 3 months) by statistical classification of regions in Turkey and gender	%			TURKSTAT	1 year
231	Rate of internet use by occupational groups (ISCO-8 occupation groups) and gender	%			TURKSTAT	1 year
232	Rate of internet use within the last three months by individuals' educational status and gender	%			TURKSTAT	1 year
233	Rate of internet use by individuals' educational status and gender	%			TURKSTAT	1 year

234	Rate of computer use by individuals by their employment status (Included in labour force: Wage and salary earners, daily paid workers, employers, self-employed, unpaid family workers, jobless; Not included in labour force: Engaged in domestic household work, retired, student, does not want to work, disabled and others) and gender within the last three months	%			TURKSTAT	1 year
235	Rate of internet use by individuals by their employment status (Included in labour force: Wage and salary earners, daily paid workers, employers, self-employed, unpaid family workers, jobless; Not included in labour force: Engaged in domestic household work, retired, student, does not want to work, disabled and others) and gender within the last three months within the last three months	%			TURKSTAT	1 year

Cinsiyet Eşitliği İzleme Merkezi

e-library

To access the resources in the report and other reports in this area

To access the indicator and index data in the report

data portal

training portal

To access the training video of the report and other CEID training videos

To access the experts who are the authors of the report and our other experts

expert pool