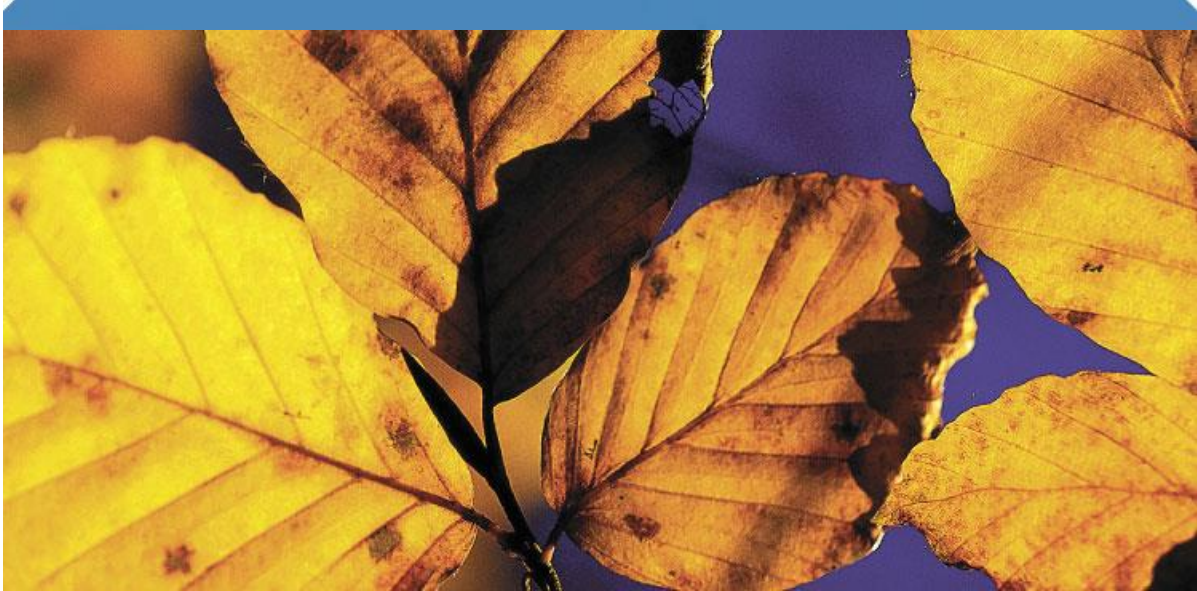


Vestlandsforskning-rapport nr. 14/2019



# Can Statistics Tell Stories about Women in ICT?

*Tracing men and women's participation in fields of ICT through statistics for Norway, Nordic countries and Europe*

Morten Simonsen & Hilde G. Corneliussen

A report for Nordwit – Nordic Centre of Excellence on Women in Technology Driven Careers



## Vestlandsforsking rapport

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<b>Oppdragsgivar</b> Nordforsk	<b>Emneord</b> Statistics, work life, ICT education, ICT work, women, gender

### Samandrag

Denne rapporten gir en grundig introduksjon til og oversikt over statistikk om kvinner og menns deltakelse i IKT-arbeid i Norge, og sammenligner denne med tilsvarende tall fra nordiske land og med internasjonale statistikker. Rapporten er en del av arbeidet for Nordwit som er et Nordic Centre of Excellence med fokus på kvinner i teknologi-drevne karrierer.

### Summary

This report gives an extensive introduction to and overview of statistics of women and men's participation in ICT work for Norway and compares this with Nordic countries and international statistics. The report is part of the research work under Nordwit – a Nordic Centre of Excellence on Women in Technology-driven Careers.

### Andre publikasjoner frå prosjektet

Corneliussen, H. G., Seddighi, G., & Dralega, C. A. (2019). «Women's Experience of Role Models in IT: Landmark women, substitutes, and supporters». In Ø. Helgesen, E. Nettet, G. Mustafa, P. Rice, & R. Glavee-Geo (Eds.), *Modeller: Fjordantologien 2019*: Universitetsforlaget.

Corneliussen, H. G., & Seddighi, G. (2019). «'Må vi egentlig ha flere kvinner i IKT?' Diskursive forhandlinger om likestilling i IKT-arbeid». *Tidsskrift for kjønnsforskning*, 43(4), 273-287.

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**Forord**

Denne rapporten er utarbeidet på vegne av Nordwit, et Nordic Centre of Excellence som har fokus på kvinner i teknologi-drevne karrierer (2017-2022). Takk til Nordforsk som har gjort Nordwit mulig.

Rapporten skal først og fremst være en ressurs for å få tilgang til og innsikt i statistisk materiale på feltet. Rapporten vil således ha interesse for alle som er interessert i et statistisk bilde av kvinner og menns deltakelse i IKT-studier og IKT-yrker i Norge, Norden og internasjonalt.

Forsker Morten Simonsen har hatt ansvar for arbeidet med det statistiske materialet, mens undertegnede har bidratt med oversikt over og kunnskap på feltet knyttet til kvalitativ forskning rundt kvinner og teknologi.

Hilde G. Corneliussen  
Prosjektleder, Nordwit  
11. desember 2019

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# Tracing men and women's participation in fields of ICT through statistics for Norway, Nordic countries and Europe

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## Introduction

The proportion of women in fields of information and communication technology (ICT) education and work is low across the Western World. This has been documented in qualitative (Cohoon & Aspray, 2006; Frieze & Quesenberry, 2019; Misa, 2010) as well as quantitative studies (Charles & Bradley, 2006; Chow & Charles, 2019; Vabø et al., 2012). In the Nordic Countries, this has been identified as part of a "Nordic Gender Paradox": despite a high degree of gender equality, the Nordic countries experience a high level of vertical and horizontal gender segregation in educational fields and the labour market (Gunnes & Hovdhaugen, 2008; Halrynjo & Teigen, 2016; Roivas et al., 2010).

In this report, we will explore how this situation can be understood when we look at it through available numbers. We are interested in statistics for at least two reasons. First, research has identified that the low number of women in fields of ICT creates several challenges for women in ICT. The male dominance in ICT can make women appear "out of place" (Riegle-Crumb & Morton, 2017), it can challenge women's feeling of belonging in the field (Corneliussen, 2011) and make ICT and engineering appear to be "gender in-authentic" work for women (Faulkner, 2009), male dominated environments have created a "chilly culture" for women (Sørensen, 2011). The continuously low number of women in contexts of ICT education and work even has a tendency to reproduce a low expectation towards girls engagement in ICT (Corneliussen & Prøitz, 2016). Researchers' interest for solving the "girls and computing problem" (Gansmo, 2003) has even made Vitores & Gil-Juárez (2016) suggest that the question of why there are so few women working as ICT specialists "has almost become a field of study in its own rights" (p. 2). These studies as well as numerous others have documented that in order to increase gender equality in fields of ICT, it is vital to increase the proportion of women participating (Margolis & Fisher, 2002), thus, it is also important to monitor the situation closely. Second, numbers do not only tell us which groups that participate in the field but can also tell stories about internal hierarchies and work cultures, for instance indicated by an overview of gender distribution in working time and salaries (Belgorodskiy et al., 2012; Padavic et al., 2019; Watts, 2009). Therefore, in the following pages we aim to identify the proportion of women in ICT work as well as other available numbers that can contribute to further understanding of how men and women are positioned in fields of ICT education and work.

## **Nordwit: Nordic Centre of Excellence on Women in Technology Driven Careers**

This report is developed for the Nordic Centre of Excellence, Nordwit, which has a focus on women in technology driven careers<sup>1</sup>, in particular in Norway, Sweden and Finland. The Nordwit work in Norway had led us to explore how women working in and with ICT experience role models (Corneliussen et al., 2019) and attitudes towards gender equality in organizations and among employers engaging ICT specialists (Corneliussen & Seddighi, 2019).

The main goal for this report has been to identify available statistical numbers contributing to explain the situation of women (and men) in fields ICT in Norway, and also to identify potential gaps in the

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<sup>1</sup> <https://nordwit.com/>

available statistics for Norway. For this reason, the main focus here is on national and regional numbers for Norway and the situation in Norway compared to international numbers. Furthermore, the Nordwit work carried out in Norway has been focused on rural regions on the western coast of Norway, and we also include numbers for Sogn og Fjordane, a county with a population of about 110 000.<sup>2</sup>

Nordwit aims to develop our understanding of the situation for women in technology careers in the Nordic countries, and for this reason we have also included statistics from Sweden and Finland. As we will show below, looking at the statistics for the Nordic countries makes visible to which degree these countries monitor similar or different aspects of the gendered landscape of ICT work.

Increasing digitalisation of the EU economies has already been identified, and with that, the importance of monitoring who it is that are part of the changes, opportunities and challenges of this transformation (EIGE, 2018; Ekeland et al., 2015; Pajarinen et al., 2015) in an already highly gender segregated labour market (Sorgner et al., 2017; Statistics Norway, 2017).

### **Navigating the statistics: code structures and classification of occupations**

Two code structures are relevant for classification of occupations. One is the NACE code structure developed by the EU<sup>3</sup>, the other is ISCO developed by the International Labour Organization<sup>4</sup>. Occupations related to information and communication technology (ICT) are defined differently in the two structures. SSB (Statistics Norway) uses both structures. For data related to the category occupation (Norwegian "yrke") the ISCO structure is used. For the category industry (Norwegian "næring") the NACE structure is used<sup>5</sup>. Generally, more data is available for the NACE structure than for the ISCO one.

The **ISCO** web site states that<sup>6</sup>:

*The International Standard Classification of Occupations (ISCO) is one of the main international classifications for which ILO is responsible. It belongs to the international family of economic and social classifications. ISCO is a tool for organizing jobs into a clearly defined set of groups according to the tasks and duties undertaken in the job.*

According to Eurostat, **NACE** is<sup>7</sup>

*a statistical classification of economic activities in the European Community and is the subject of legislation at the European Union level, which imposes the use of the classification uniformly within all the Member States. It is a basic element of the international integrated system of economic classifications, which is based on classifications of the UN Statistical Commission (UNSTAT), Eurostat as well as national classifications; all of them strongly related each to the others, allowing the comparability of economic statistics produced worldwide by different institutions.*

Statistics presented in this analysis come from national statistical agencies in Norway, Sweden and Finland as well as the EU statistical agency Eurostat and OECD. We have also used a research report

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<sup>2</sup> From 1/1 2020, Sogn og Fjordane is a part of the county Vestland.

<sup>3</sup> [SSB - Norwegian](#)

<sup>4</sup> <https://www.ilo.org/public/english/bureau/stat/isco/isco08/>  
<https://www.ilo.org/public/english/bureau/stat/isco/docs/groupdefn08.pdf>

<sup>5</sup> <https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF>

<sup>6</sup> [ISCO Web site](#)

<sup>7</sup> [Eurostat, NACE Rev. 2](#)



from EU's Institute for Gender Equality (EIGE, 2018)<sup>8</sup>. These sources all use the ISCO code structure which is the basis for comparison between countries. For regional differences in ICT in Norway and for distribution of part time and wages in ICT sector in Norway, the NACE code structure is used.

### Research questions

The research questions that we approached the statistical sources with were:

- What is the female occupational rate in ICT in Norway?
- How does that occupational rate compare to other European countries, especially the other Nordic countries Sweden and Finland?
- How are the working conditions for female ICT workers in Norway, Sweden and Finland?
- Are there any regional differences in Norway related to female ICT occupational rate?
- How is the distribution of part time and full time employment between genders in ICT in Norway?
- How is the wage distribution between genders in ICT in Norway?
- How are the female participation rate in ICT education in Norway?
- How does it compare to other OECD countries?

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<sup>8</sup> <https://eige.europa.eu/>



## ISCO Structure

### Norway

Table 1<sup>9</sup> shows number of employees in ICT-related occupations in Norway. The major group 25 in the ISCO structure<sup>10</sup> is for "Information and Communications Technology Professionals". The table contains information about the subgroup 251 - Software and Applications Developers and Analysts.

**TABLE 1 NUMBER OF EMPLOYEES IN IT RELATED OCCUPATIONS (1000's)<sup>11</sup>**

	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Men</b>									
2512 Software developers	11	11	12	11	11	10	10	14	17
2513 Web and multimedia Developers	:	:	:	:	:	:	:	:	:
2514 Applications Programmers	:	:	:	:	0	:	:	:	
2519 Others	7	11	13	16	17	19	18	15	15
<b>Women</b>									
2512 Software developers	2	2	1	2	3	2	2	3	6
2513 Web and multimedia Developers	:	:	:	:	:	:	:	:	
2514 Applications Programmers	:	:	:	:	0	:	:	:	
2519 Others	1	2	3	3	4	3	4	5	5
Percentage of women	14%	15%	14%	16%	20%	15%	18%	22%	26%

: = cannot be published <sup>12</sup>

The subgroup 25 also contains a group called 252 - Database and Network Professionals. Employees from this group are not included in Table 1.

A total of 43 000 people was employed in group 251 in Norway in 2019. Of these, 26% were women. There is a clear under-representation of women in these occupations, although the percentage share of women has risen by 8 percentage points in 8 years from 2011.

The codes included in the Table 1 are defined as such:

- 2512 Software developers
- 2513 Web and multimedia Developers
- 2514 Applications Programmers
- 2519 Software and Applications Developers and Analysis Not Elsewhere Classified

<sup>9</sup> <https://www.ssb.no/statbank/table/09792/>

<sup>10</sup> The code structure is based on ISCO-08. For differences to ISCO 1988, see [here](#)

<sup>11</sup> See also <https://www.ssb.no/statbank/table/11411/> for salary earners

<sup>12</sup> According to the Statistical agency in Norway (SSB), numbers cannot be published because the sample uncertainty is too large.

TABLE 2 NUMBER OF SALARY EARNERS IN IT RELATED OCCUPATIONS <sup>13</sup>

<b>Men</b>	2015	2016	2017	2018
2512 Software developers	3351	3500	3769	4155
2513 Web and multimedia Developers	149	137	155	180
2514 Applications Programmers	92	116	149	170
2519 Others	10441	10567	10991	11718
<b>Women</b>				
2512 Software developers	391	405	407	460
2513 Web and multimedia Developers	36	44	45	49
2514 Applications Programmers	34	49	48	51
2519 Others	2868	2775	2904	3076
Total	17362	17593	18468	19859
Women percentage	19%	19%	18%	18%

Table 2 shows number of salary earners for the same ISCO codes. The total number is lower than in Table 1, since employees also includes self-employed <sup>14</sup>. The percentage of women is also lower for salary earners, indicating that more women are self-employed.

TABLE 3 <sup>15</sup> MEDIAN SALARY FOR ICT SECTOR DISTRIBUTED ON WORKING TIME, GENDER AND SECTOR

Median salary	Men		Women	
	Full time	Part time	Full time	Part time
2512 Software developers				
Sum all sectors (private, state, municipality)	56 190	47 080	52 080	
Private sector and public corporations	56 220	47 080	52 080	
2519 Other software and applications developers				
Sum all sectors (private, state, municipality)	56 040	45 830	51 820	46 250
Private sector and public corporations	57 430	46 750	52 740	46 760
Municipal administration	45 050		43 400	

Table 3 shows median <sup>16</sup> monthly salary for the minor groups 2512 and 2519 distributed on working time (full time or part time), gender and sector for Norway 2018. The sectors are private (including public corporations) and public employed. Women earn less than men measured by the median both for full time and part time jobs. The female salary for full time workers varies from 93% to 96%. The difference between men and women are smallest where the salary level is lowest ("Kommuneforvaltningen", municipally employed).

<sup>13</sup> <https://www.ssb.no/statbank/table/11411/>

<sup>14</sup> See definitions [here](#)

<sup>15</sup> <https://www.ssb.no/statbank/table/11418/>

<sup>16</sup> The median is used since the average salary level is more sensitive for very high or very low salaries. This means the average may fluctuate more because of more variation even if the median salary (middle income level) has not changed very much.

EU's Institute for Gender Equality (EIGE) has released a report <sup>17</sup> studying number of employees in ICT sector in different EU countries distributed on gender. The ISCO occupational categories included are 133 Professional managers, ICT professionals defined as sub-group 25 (see above) and ICT technicians defined as subgroup 35. Together, they form the category ICT specialists.

Table 4 shows number of employees in the EIGE definitions in Norway 2018, distributed by gender. All in all, 77 000 people are employed in these categories. Of these, 27 000 worked as ICT professionals as defined by EIGE. This group also includes code 2511 - System Analytics and System architects. This group is not included in the tables above, therefore the sum of people employed in subgroup 25 in Table 4 is larger than the groups used above.

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<sup>17</sup> [Women and men in ICT: a chance for better work-life balance](#), EIGE, Luxembourg 2018, ISBN ISBN 978-92-9470-542-6

**TABLE 4** <sup>18</sup> NUMBER OF EMPLOYEES IN DIFFERENT ICT SUBGROUPS ACCORDING TO ISCO STRUCTURE AND EIGE DEFINITIONS, BY GENDER, NORWAY 2018 <sup>19</sup>

Men	Number of employees (1000's)	Percentage of total per gender	Percentage of total workforce
1330 Leaders of ICT <sup>20</sup> -units	5	8%	6.5%
2511 Systems analysts	16	26%	20.8%
2512 Software developers	14	23%	18.2%
2513 Web and multimedia developers	:		
2514 Applications programmers	:		
2519 Software and applications developers and analysts not elsewhere classified	15	25%	19.5%
2521 Database designers and administrators	:		
- Sum group 25	45	74%	
3511 Information and communications technology operations technicians	11	18%	14.3%
3512 Information and communications technology user support technicians	:		
3513 Computer network and systems technicians	:		
3514 Web technicians	:		
3521 Broadcasting and audio-visual technicians	:		
3522 Telecommunications engineering technicians	:		
- Sum group 35	11	18%	
Sum men	61	100 %	79.2%
<b>Women</b>			
1330 Leaders of ICT <sup>21</sup> -units	1	6%	1.3%
2511 Systems analysts	4	25%	5.2%
2512 Software developers	3	19%	3.9%
2513 Web and multimedia developers	:		
2514 Applications programmers	:		
2519 Software and applications developers and analysts not elsewhere classified	5	31%	6.5%
2521 Database designers and administrators	:		
- Sum group 25	12	75%	
3511 Information and communications technology operations technicians	3	19%	3.9%
3512 Information and communications technology user support technicians	:		
3513 Computer network and systems technicians	:		
3514 Web technicians	:		
3521 Broadcasting and audio-visual technicians	:		
3522 Telecommunications engineering technicians	:		
- Sum group 35	3	19%	
Sum women	16	100%	20.8%
Sum both genders	77		

<sup>18</sup> <https://www.ssb.no/statbank/table/09792/>

<sup>19</sup> ISCO codes and definitions <http://www.ilo.org/public/english/bureau/stat/isco/docs/d2434.pdf>

<sup>20</sup> Information and Communication Technology

<sup>21</sup> Information and Communication Technology

According to Table 4, 21% of the total ICT workforce in Norway 2018 are women. According to NCWIT Scoreboard <sup>22</sup>, 26% of all employed in Computer and Mathematical Occupations in USA in 2017 were women. Bailey et al <sup>23</sup> claim that women occupy 25% of all IT jobs in USA in 2018. These categories are not directly comparable to Table 4 since job definitions may vary. Still they give the impression that women in Norway account for a smaller percentage of employees in the ICT sector than women in USA.

However, the increase of women in ICT jobs are higher in Norway than in USA. In 2011, the percentage of US women in ICT jobs, defined as Computer and Mathematical Occupations, was 25%. Thus, the increase from 2011 to 2018 is only 1 percentage point, while the same figure in Norway was 8 percentage points according to Table 1.

In Norway 2018, 1 268 000 women were employed in total across all occupations and sectors. The same figure for men was 1 427 000 <sup>24</sup>. Based on these figures and Table 4 we can construct Table 5 that shows the percentage of ICT specialists of the total workforce.

**TABLE 5 PERCENTAGE OF TOTAL WORKING FORCE EMPLOYED AS ICT WORKERS IN 2018 ACCORDING TO EIGE DEFINITIONS**

	Women	Men	Total	EU total <sup>25</sup>
Total employed	1 268	1 427	2 695	
133 ICT managers	0.08%	0.35%	0.22%	0.1%
25 ICT professional	0.95%	3.15%	2.12%	1.4%
35 ICT technicians	0.24%	0.77%	0.52%	0.8%
Total ICT specialists	1.26%	4.27%	2.86%	2.3%

From Table 5, we observe that the percentage of men is larger than the corresponding percentage of women in each EIGE subgroup. The difference is largest for ICT professionals.

According to Table 1 in the EIGE document, the figures for Norway is almost identical with EU average. We may also calculate the percentage each EIGE subgroup make up of total employed in the ICT sector for each gender and for totals. This is done in Table 6. Compared to EU figures (Table 1) there seems to be more employed as ICT professionals and less as technicians compared to average EU figures. For managers, the figures are more in line with EU average.

**TABLE 6 PERCENTAGE OF EMPLOYED IN EIGE ICT SUBGROUPS NORWAY 2018 DISTRIBUTED ON GENDER.**

	Percent of all ICT employees			Percent of group	
	Women	Men	Total	Women	Men
133 ICT managers	6%	8%	8%	17%	83%
25 ICT professional	75%	74%	74%	21%	79%
35 ICT technicians	19%	18%	18%	21%	79%
Total ICT specialists	21%	79%	100%	21%	79%

<sup>22</sup> DuBow, W. & Pruitt, A.S. (2018) [NCWIT Scorecard: The Status of Women in Technology](#). Boulder, CO: NCWIT, spreadsheet NCWITScoreboard2019\_Workforce\_062919.xlsx

<sup>23</sup> Bailey, M., Riley, S.: [2018 Women in Tech: Unconscious Bias, Parity and the Path Forward](#).

<sup>24</sup> <https://www.ssb.no/statbank/table/11153/>

<sup>25</sup> EIGE, [Women and men in ICT: a chance for better work-life balance](#), Table 1

According to EIGE <sup>26</sup>, the highest share of women among ICT professionals in 2016 is found in Bulgaria with 34% followed by Romania with 28%. This is subgroup 25 in the table above. As the table shows, the corresponding figure for Norway in 2018 is 21%.

### Sweden

Table 7 shows the number of employees in subgroup 251 - Software and Applications Developers and Analysts in Sweden from 2014 to 2017 <sup>27</sup>. The figures are distributed on gender and shows that the female percentage of total employees in the group has decreased slightly from 22.2 to 21.9 percent. This is roughly the same distribution among genders as in Norway for this group.

**TABLE 7 NUMBER OF EMPLOYEES IN SUBSECTOR 251 - SOFTWARE AND APPLICATIONS DEVELOPERS AND ANALYSTS, SWEDEN 2014-2017 BY GENDER**

Year	Female	Male	Percent female
2014	22518	79025	22.2%
2015	22956	81631	21.9%
2016	24421	87304	21.9%
2017	26035	92794	21.9%

Table 8 shows number of employees in subsector 251 - Software and Applications Developers and Analysts in Sweden by gender and occupational status <sup>28</sup>. The occupational status is distinguished by public and private sphere where the public sphere is also divided into administration and publicly owned corporations.

**TABLE 8 NUMBER OF EMPLOYEES IN SUBSECTOR 251 - SOFTWARE AND APPLICATIONS DEVELOPERS AND ANALYSTS, SWEDEN 2014-2017, BY GENDER AND OCCUPATIONAL STATUS**

	2014		2015		2016		2017	
	Female	Male	Female	Male	Female	Male	Female	Male
Public administration	4110	7868	4350	8309	4321	8545	4341	8123
Private	17381	68732	17577	70836	18996	76108	20605	82034
Public corporations	661	1780	697	1873	746	2040	736	2012
Others	366	645	332	613	358	611	353	625
Total	22518	79025	22956	81631	24421	87304	26035	92794

Table 9 shows the same distribution in percentages. The table shows that more men than women are employed in the private sector. Women on the other hand dominate public administration in general, even if there are relatively more both women and men employed in private sector. For public corporations there are only minor differences but among both genders only a small share is working in these corporations.

<sup>26</sup> EIGE, 2018, p. 17.

<sup>27</sup> [http://www.statistikdatabasen.scb.se/pxweb/sv/ssd/START\\_AM\\_AM0208\\_AM0208B/YREG61/](http://www.statistikdatabasen.scb.se/pxweb/sv/ssd/START_AM_AM0208_AM0208B/YREG61/)

<sup>28</sup> [http://www.statistikdatabasen.scb.se/pxweb/sv/ssd/START\\_AM\\_AM0208\\_AM0208B/YREG62/](http://www.statistikdatabasen.scb.se/pxweb/sv/ssd/START_AM_AM0208_AM0208B/YREG62/)

**TABLE 9 PERCENTAGE OF EMPLOYEES IN SUBSECTOR 251 - SOFTWARE AND APPLICATIONS DEVELOPERS AND ANALYSTS, SWEDEN 2014-2017, BY GENDER AND OCCUPATIONAL STATUS**

	2014		2015		2016		2017	
Percentages	Female	Male	Female	Male	Female	Male	Female	Male
Public administration	18.3%	10.0%	18.9%	10.2%	17.7%	9.8%	16.7%	8.8%
Private	77.2%	87.0%	76.6%	86.8%	77.8%	87.2%	79.1%	88.4%
Public corporations	2.9%	2.3%	3.0%	2.3%	3.1%	2.3%	2.8%	2.2%
Others	1.6%	0.8%	1.4%	0.8%	1.5%	0.7%	1.4%	0.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

### Finland

Table 10 shows number of ICT professionals by gender in Finland from 2013 to 2019<sup>29</sup>. The group is defined as subgroup 25 in the ISCO-08 code structure. The table shows that the percentage of women has risen marginally from 22.2 percent in 2013 to 23.2 percent in 2019.

**TABLE 10 EMPLOYED (1000'S) FEMALE AND MALE ICT PROFESSIONALS (ISCO-08 GROUP 25) 2013-2019**

Year	Female	Male	Total	Percent female
2013	18	62	81	22.2%
2014	17	62	79	21.5%
2015	18	61	79	22.8%
2016	18	66	84	21.4%
2017	19	71	89	21.3%
2018	20	73	93	21.5%
2019	22	73	95	23.2%

Statistics Finland also has information about wage salary earners distributed on occupational groups and gender. This statistic also includes information about their family status<sup>30</sup>. The groups are defined according to Classification of Occupations 2010 which "is based on the ISCO-08 compiled by ILO and confirmed by the UN"<sup>31</sup>. Table 11 shows the percentage of women with family for selected occupational groups. The table shows that the percentage of women with family is lower among ICT groups than among other traditional female occupational groups, especially among educators.

<sup>29</sup> [http://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin\\_tym\\_tyti\\_vv/statfin\\_tyti\\_pxt\\_11ql.px/](http://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin_tym_tyti_vv/statfin_tyti_pxt_11ql.px/)

<sup>30</sup> Appendix table 2b. [http://www.stat.fi/til/tyokay/2015/04/tyokay\\_2015\\_04\\_2017-10-20\\_tau\\_005\\_en.html](http://www.stat.fi/til/tyokay/2015/04/tyokay_2015_04_2017-10-20_tau_005_en.html)

<sup>31</sup> [https://www.tilastokeskus.fi/meta/luokitukset/ammatti/001-2010/kuvaus\\_en.html](https://www.tilastokeskus.fi/meta/luokitukset/ammatti/001-2010/kuvaus_en.html)



TABLE 11 FEMALE WAGE AND SALARY EARNERS IN FINLAND BY OCCUPATION AND FAMILY STATUS

	Family	No family	Percent with family
23411 Primary education teaching professionals	12864	1856	87.4%
2342 Early childhood educators	15780	2670	85.5%
2352 Special needs teachers	5356	878	85.9%
2512 Software developers	2989	827	78.3%
2511 Systems analysts	2898	709	80.3%
2422 Policy administration professionals	7195	2016	78.1%

### European Union

Eurostat provides statistics for ICT specialists distributed on gender<sup>32</sup>. From 2011, Eurostat uses ISCO-08 which has the same structure as the tables above<sup>33</sup>. In the Eurostat table, some other groups are included that are not included in the analysis above. These are

- 2152 Electronic engineers
- 2153 Telecommunication engineers
- 2166 Graphic and multimedia designers
- 2356 Information technology trainers
- 2434 ICT sales professionals
- 3114 Electronics engineering technicians
- 7421 Electronics mechanics and servicers
- 7422 ICT installers and servicers

Including these groups, there are 123 800 employed ICT specialists in Norway in 2018. Using this definition for ICT specialists, the share of ICT specialists of total employed in Norway 2018 was 5.1%, slightly above EU average of 4.7%, but well below Finland (8.4%) and Sweden (7.8%). Table 12 shows that of ICT specialists in Norway 2018, 20.3% are women. The largest percentage of women is in Bulgaria with 28.3% followed by Lithuania and Romania. The lowest percentage is found in Czechia (9.9%) and Hungary (8.5%). The average for 28 EU countries is 16.5%.

<sup>32</sup> <https://ec.europa.eu/eurostat/en/web/products-eurostat-news/-/DDN-20190513-1>

<sup>33</sup> [https://ec.europa.eu/eurostat/cache/metadata/en/isoc\\_skslf\\_esms.htm#meta\\_update1554210955863](https://ec.europa.eu/eurostat/cache/metadata/en/isoc_skslf_esms.htm#meta_update1554210955863)

TABLE 12 ICT SPECIALISTS(1000's) BY GENDER IN EU, EFTA AND TURKEY 2018 <sup>34</sup>.

Gender	Male		Female		Total employed all sectors <sup>35</sup>	Percent ICT specialists
	Thousands	Percentage	Thousands	Percentage		
GEO/UNIT						
European Union <sup>36</sup>	7 562.6	83.5	1 493.5	16.5	192872	4.7%
Belgium	193.2	84.5	35.4	15.5	4112.4	5.6%
Bulgaria	68.8	71.7	27.1	28.3	2721.6	3.5%
Czechia	196.2	90.1	21.5	9.9	4329.7	5.0%
Denmark	98.6	80.7	23.6	19.3	2536.3	4.8%
Germany	1 349.9	83.2	272.7	16.8	37299.7	4.4%
Estonia	29.7	78.2	8.3	21.8	579.9	6.6%
Ireland	83.1	81.7	18.7	18.3	1920.5	5.3%
Greece	61.2	88.7	7.8	11.3	2542	2.7%
Spain	519.5	83.8	100.1	16.2	16363.2	3.8%
France	887.0	83.0	181.3	17.0	23737.5	4.5%
Croatia	49.5	85.7	8.2	14.3	1444.2	4.0%
Italy	695.7	85.1	121.8	14.9	17650.8	4.6%
Cyprus	10.5	81.8	2.3	18.2	347.5	3.7%
Latvia	13.0	85.6	2.2	14.4	775	2.0%
Lithuania	28.0	74.6	9.5	25.4	1176.8	3.2%
Luxembourg	13.7	87.9	1.9	12.1	262	6.0%
Hungary	151.5	91.5	14.1	8.5	3982.3	4.2%
Malta	9.5	82.6	2.0	17.4	207.6	5.5%
Netherlands	396.5	83.4	79.0	16.6	7275.5	6.5%
Austria	156.5	81.6	35.2	18.4	3794	5.1%
Poland	418.3	86.0	68.0	14.0	12853.8	3.8%
Portugal	98.4	85.3	16.9	14.7	3992.4	2.9%
Romania	145.4	76.5	44.7	23.5	6456.6	2.9%
Slovenia	32.6	83.7	6.3	16.3	835.9	4.7%
Slovakia	71.7	87.7	10.0	12.3	2177	3.8%
Finland	144.8	79.7	36.9	20.3	2171.7	8.4%
Sweden	274.1	79.1	72.4	20.9	4469.3	7.8%
United Kingdom	1 365.8	83.7	265.2	16.3	26857	6.1%
Iceland	6.5	84.5	1.2	15.5	167.9	4.6%
Norway	98.6	79.7	25.2	20.3	2443.9	5.1%
Switzerland	203.2	85.5	34.6	14.5	3943.4	6.0%
Turkey	244.8	89.6	28.5	10.4	19324.2	1.4%

TABLE 13 shows development of percentage of female ICT specialists in EU plus EFTA and Turkey from 2015 to 2018. The table also shows the difference in percentage points during the period and the ranking of countries according to this difference. In all 14 countries have a negative trend, less

<sup>34</sup> Eurostat: [Employed ICT specialists by sex](#) , EFTA=European Economic Area

<sup>35</sup> [https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsg\\_eegais&lang=en](https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsg_eegais&lang=en), Q4 2018

<sup>36</sup> 28 countries (2013-2020)

women are relatively seen employed as ICT specialists. The most positive development is found in Lithuania with an increase of 5.3 percentage points. The most negative development is found in the neighbouring country Latvia with a decrease of -10.3 percentage points. Norway has the fourth most positive trend with an increase of 3.3 percentage points.

According to these definitions, there were 6 100 more women employed in the ICT sector in Norway in 2018 compared to 2015. For all countries in EU, EFTA plus Turkey, about 1.6 million women were employed in the ICT sector in 2018, this is an increase of about 250 000 from 2015. For comparison, 1.1 million more men were employed in the ICT sector over the period with a total of 8.1 million men working in the sector in 2018.

**TABLE 13 DEVELOPMENT IN PERCENT OF FEMALE ICT SPECIALISTS FROM 2015 TO 2018.**

	2015	2016	2017	2018	Difference 2018- 2015	Rank difference
European Union	16.2	16.7	17.2	16.5	0.3	17
Belgium	15.1	14.1	18.2	15.5	0.4	14
Bulgaria	27.7	30.2	26.5	28.3	0.6	10
Czechia	9.9	11.2	9.3	9.9	0	20
Denmark	18.4	19.6	19.1	19.3	0.9	8
Germany	16.3	16.6	16.6	16.8	0.5	11
Estonia	20.3	18.7	19.4	21.8	1.5	6
Ireland	19.7	21.1	20.9	18.3	-1.4	26
Greece	13.2	12.7	10.9	11.3	-1.9	28
Spain	17.4	15.4	16.1	16.2	-1.2	24
France	16.6	18.1	19.6	17	0.4	15
Croatia	16.6	13.3	13	14.3	-2.3	30
Italy	13.8	14.2	16	14.9	1.1	7
Cyprus	19.7	23	17.4	18.2	-1.5	27
Latvia	24.7	24.8	21.3	14.4	-10.3	34
Lithuania	20.1	24.8	25.7	25.4	5.3	1
Luxembourg	12.6	13.7	12.5	12.1	-0.5	22
Hungary	11.9	13.1	8.9	8.5	-3.4	31
Malta	17	12.1	10.2	17.4	0.4	15
Netherlands	13	15.6	16.6	16.6	3.6	3
Austria	14.2	17.2	15.6	18.4	4.2	2
Poland	13.5	14.5	14.8	14	0.5	11
Portugal	15.3	16.1	14.4	14.7	-0.6	23
Romania	27.2	26.3	25.7	23.5	-3.7	32
Slovenia	16	17.3	16.1	16.3	0.3	17
Slovakia	11.4	9.2	13.7	12.3	0.9	9
Finland	22.4	21.9	21.8	20.3	-2.1	29
Sweden	18.9	20.8	20.9	20.9	2	5
United Kingdom	16.2	16.2	17.6	16.3	0.1	19
Iceland	22.6	21.9	16.3	15.5	-7.1	33
Norway	17	19.4	19.5	20.3	3.3	4
Switzerland	14.6	14.9	14.9	14.5	-0.1	21
Turkey	11.6	9.9	10	10.4	-1.2	24

## NACE codes

In the NACE code structure, subgroup 61 is defined as telecommunication, subgroup 62 is defined as services associated with information technology (programming, system management) and subgroup 63 is defined as information services (data processing, data storing and management of web portals)<sup>37</sup>. The last subgroup also includes information services such as news agencies.

### Regions in Norway

Table 14 shows employees in these subgroups for counties in Norway 2018 distributed by gender. The employees are distributed on the counties where they work, not where they reside. Based on the table, we can construct Table 15 which shows percentage of employees in ICT sector of total number of employees and of total number of ICT employees, distributed on gender. The table shows that there are some variations in percentage of employees in the ICT sector. Oslo and the surrounding county Akershus have the highest proportions. The northern counties Nordland and Finnmark have the lowest percentages. The percentage in Oslo is almost 10 times higher than the percentage in Finnmark, the northernmost county.

**TABLE 14** <sup>38</sup> EMPLOYEES IN ICT ACCORDING TO NACE GROUPS DISTRIBUTED BY GENDER AND COUNTIES IN NORWAY 2018.

	Men			Women			Total			Total
	61	62	63	61	62	63	61	62	63	All employees
01 Østfold	107	882	92	26	201	27	133	1083	119	120672
02 Akershus	2681	5693	486	1050	1790	163	3731	7483	649	279481
03 Oslo	1873	16055	1771	699	4930	888	2572	20985	2659	482567
04 Hedmark	58	524	34	56	114	3	114	638	37	88133
05 Oppland	378	463	74	123	150	16	501	613	90	88947
06 Buskerud	114	795	60	36	143	28	150	938	88	127536
07 Vestfold	61	1297	123	6	292	61	67	1589	184	108823
08 Telemark	125	349	48	77	66	8	202	415	56	75667
09 Aust-Agder	129	316	4	23	56	4	152	372	8	49162
10 Vest-Agder	283	488	46	115	111	17	398	599	63	89157
11 Rogaland	550	2935	432	141	891	102	691	3826	534	244156
12 Hordaland	380	2476	182	164	719	101	544	3195	283	259878
14 Sogn og Fjordane	85	267	19	25	76	4	110	343	23	55043
15 Møre og Romsdal	207	650	24	42	149	9	249	799	33	129245
50 Trøndelag	554	2438	133	220	557	38	774	2995	171	232129
18 Nordland	154	346	59	40	94	21	194	440	80	117288
19 Troms - Romsa	224	373	40	55	68	8	279	441	48	86443
20 Finnmark	82	93	3	19	12	0	101	105	3	37835
Total	8045	36440	3630	2917	10419	1498	10962	46859	5128	2672162

<sup>37</sup> <https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF>

<sup>38</sup> <https://www.ssb.no/statbank/table/08536/>

The percentages of women working in ICT sector are less than corresponding number for men in all counties. The difference between the genders are largest in Finnmark (5.74 times more men) and Aust-Agder (5.41) and lowest in Akershus (2.95) and Oslo (3.02). This is also shown in the last column which shows percentage of women of total ICT employed. The average for all counties is 24%, the largest percentage is in Akershus and Oslo (both 25%) and the lowest are in Aust-Agder (15%) and Finnmark (15%). This means that on average, only one-fifth of all ICT employees in Norway are women.

**TABLE 15 PERCENTAGES EMPLOYED IN ICT SECTOR DISTRIBUTED ON GENDER NORWAY 2018**

	Percentage of ICT employed of total, both genders	Percentage of ICT employed of total, men	Percentage of ICT employed of total, women	Percentage women of all ICT employed
01 Østfold	1.1%	0.9%	0.2%	19%
02 Akershus	4.2%	3.2%	1.1%	25%
03 Oslo	5.4%	4.1%	1.4%	25%
04 Hedmark	0.9%	0.7%	0.2%	22%
05 Oppland	1.4%	1.0%	0.3%	24%
06 Buskerud	0.9%	0.8%	0.2%	18%
07 Vestfold	1.7%	1.4%	0.3%	20%
08 Telemark	0.9%	0.7%	0.2%	22%
09 Aust-Agder	1.1%	0.9%	0.2%	16%
10 Vest-Agder	1.2%	0.9%	0.3%	23%
11 Rogaland	2.1%	1.6%	0.5%	22%
12 Hordaland	1.5%	1.2%	0.4%	24%
14 Sogn og Fjordane	0.9%	0.7%	0.2%	22%
15 Møre og Romsdal	0.8%	0.7%	0.2%	19%
50 Trøndelag	1.7%	1.3%	0.4%	21%
18 Nordland	0.6%	0.5%	0.1%	22%
19 Troms - Romsa	0.9%	0.7%	0.2%	17%
20 Finnmark - Finnmarku	0.6%	0.5%	0.1%	15%
Total	2.4%	1.8%	0.6%	24%

Table 16 shows number of employees in ICT sector in county Sogn og Fjordane in 2018. The figures are distributed on municipalities and gender. Table 17 shows the percentages of employees in ICT sector in municipalities in Sogn og Fjordane, distributed on gender 2018. There are some striking differences. The municipality Fjaler has a very high percentage of total employees in the ICT sector. This is due to the fact that an ICT company has established itself in the municipality. The same is also true for Vik but the percentage is much lower than in Fjaler. Except for Årdal and Førde, the percentage of total employees in the other municipalities are not above 1%, in many municipalities it is zero.

**TABLE 16<sup>39</sup> EMPLOYEES IN ICT ACCORDING TO NACE GROUPS DISTRIBUTED BY GENDER AND MUNICIPALITIES IN SOGN OG FJORDANE 2018.**

2018	Men			Women			Sum			Total	
Municipality	61	62	63	61	62	63	61	62	63	Total	employed
1401 Flora	0	14	0	0	3	0	0	17	0	17	5409
1411 Gulen	3	0	7	0	0	0	3	0	7	10	1263
1412 Solund	0	0	0	0	0	0	0	0	0	0	351
1413 Hyllestad	0	0	0	0	0	0	0	0	0	0	655
1416 Høyanger	0	5	0	0	3	0	0	8	0	8	1723
1417 Vik	0	12	0	0	15	0	0	27	0	27	1254
1418 Balestrand	0	0	0	0	0	0	0	0	0	0	539
1419 Leikanger	0	0	0	0	0	0	0	0	0	0	1873
1420 Sogndal	14	16	0	4	3	0	18	19	0	37	4681
1421 Aurland	0	0	0	0	0	0	0	0	0	0	932
1422 Lærdal	0	0	0	0	0	0	0	0	0	0	1059
1424 Årdal	10	12	3	0	0	4	10	12	7	29	2658
1426 Luster	0	3	0	0	0	0	0	3	0	3	2067
1428 Askvoll	3	0	0	0	0	0	3	0	0	3	1166
1429 Fjaler	0	87	0	0	17	0	0	104	0	104	1370
1430 Gaular	0	0	0	0	3	0	0	3	0	3	1040
1431 Jølster	0	3	0	0	0	0	0	3	0	3	967
1432 Førde	33	60	0	18	13	0	51	73	0	124	9422
1433 Naustdal	0	0	0	0	0	0	0	0	0	0	668
1438 Bremanger	0	0	0	0	0	0	0	0	0	0	1573
1439 Vågsøy	15	34	9	0	7	0	15	41	9	65	3183
1441 Selje	4	0	0	3	0	0	7	0	0	7	1153
1443 Eid	0	15	0	0	9	0	0	24	0	24	2982
1444 Hornindal	0	0	0	0	0	0	0	0	0	0	431
1445 Gloppen	3	3	0	0	3	0	3	6	0	9	2791
1449 Stryn	0	3	0	0	0	0	0	3	0	3	3833

The percentage of women employed in ICT sector vary a lot between municipalities. It is 100% in Gaular, but the municipality only has 3 employed in ICT sector. In Vik the percentage is 56%, in Selje it is 43% but the municipality only have 7 employed in the ICT sector while Vik has 27.

<sup>39</sup> <https://www.ssb.no/statbank/table/08536/>

**TABLE 17 PERCENTAGES EMPLOYED IN ICT SECTOR DISTRIBUTED ON GENDER AND MUNICIPALITIES SOGN OG FJORDANE 2018**

Municipality	Percentage of ICT employed of total, both genders	Percentage of ICT employed of total, men	Percentage of ICT employed of total, women	Percentage women of all ICT employed
1401 Flora	0.3%	0.3%	0.1%	18%
1411 Gulen	0.8%	0.8%	0.0%	0%
1412 Solund	0.0%	0.0%	0.0%	
1413 Hyllestad	0.0%	0.0%	0.0%	
1416 Høyanger	0.5%	0.3%	0.2%	38%
1417 Vik	2.2%	1.0%	1.2%	56%
1418 Balestrand	0.0%	0.0%	0.0%	
1419 Leikanger	0.0%	0.0%	0.0%	
1420 Sogndal	0.8%	0.6%	0.1%	19%
1421 Aurland	0.0%	0.0%	0.0%	
1422 Lærdal	0.0%	0.0%	0.0%	
1424 Årdal	1.1%	0.9%	0.2%	14%
1426 Luster	0.1%	0.1%	0.0%	0%
1428 Askvoll	0.3%	0.3%	0.0%	0%
1429 Fjaler	7.6%	6.4%	1.2%	16%
1430 Gaular	0.3%	0.0%	0.3%	100%
1431 Jølster	0.3%	0.3%	0.0%	0%
1432 Førde	1.3%	1.0%	0.3%	25%
1433 Naustdal	0.0%	0.0%	0.0%	
1438 Bremanger	0.0%	0.0%	0.0%	
1439 Vågsøy	2.0%	1.8%	0.2%	11%
1441 Selje	0.6%	0.3%	0.3%	43%
1443 Eid	0.8%	0.5%	0.3%	38%
1444 Hornindal	0.0%	0.0%	0.0%	
1445 Gloppen	0.3%	0.2%	0.1%	33%
1449 Stryn	0.1%	0.1%	0.0%	0%



### ICT and working time

Statistics Norway has information on employed in ICT sector distributed on working time (full or part time) and gender. This information is only available to 2015 and comprises NACE codes 58-63. This means that in addition to ICT sector, this statistic also contains data on information occupations such as publishing and production of movies, radio and television programmes. Statistics about salary in ICT sector is available for later years but this statistic is not distributed on gender and working time.

**TABLE 18<sup>40</sup> NUMBER OF EMPLOYEES IN ICT AND COMMUNICATION (NACE CODES 58-63) DISTRIBUTED ON WORKING TIME AND GENDER NORWAY.**

Year	Women			Men			Both genders		
	Full time employed	Part time employed	Sum	Full time employed	Part time employed	Sum	Full time employed	Part time employed	Sum
2008	13614	2058	15672	30360	1245	31605	43974	3303	47277
2009	14494	2112	16606	31693	1372	33065	46187	3484	49671
2010	14516	2243	16759	33433	1455	34888	47949	3698	51647
2011	14430	2140	16570	32016	1495	33511	46446	3635	50081
2012	15259	2116	17375	34154	1529	35683	49413	3645	53058
2013	14778	1792	16570	33631	1420	35051	48409	3212	51621
2014	15658	1942	17600	35528	1666	37194	51186	3608	54794
2015	14672	2260	16932	34192	2007	36199	48864	4267	53131

The table shows that for both genders, there has been a 12% growth in this sector from 2008 to 2015. The growth has been largest for part time men (61%) and slowest for full time women (7,7%). Based on Table 18 we can construct Table 19. In 2008, the percentage working part time was 3.3 times larger among women than among men, the corresponding figure in 2015 was 2.4.

**TABLE 19 PERCENTAGES OF GENDERS WORKING FULL TIME AND PART TIME IN ICT AND INFORMATION SECTOR (NACE 58-63) NORWAY**

Year	Women		Men		Both genders	
	Full time employed	Part time employed	Full time employed	Part time employed	Full time employed	Part time employed
2008	87%	13%	96%	4%	93%	7%
2009	87%	13%	96%	4%	93%	7%
2010	87%	13%	96%	4%	93%	7%
2011	87%	13%	96%	4%	93%	7%
2012	88%	12%	96%	4%	93%	7%
2013	89%	11%	96%	4%	94%	6%
2014	89%	11%	96%	4%	93%	7%
2015	87%	13%	94%	6%	92%	8%

<sup>40</sup> <https://www.ssb.no/statbank/table/07597/>

### ICT and salary

Table 20 shows monthly salary for men and women distributed on working hours in ICT and communication sector from 2008 to 2015. The table shows that women are paid less than men, both as full time and part time employed. The difference is largest for full time employed. In 2008 women on average earned 83% of men's salary as full time employed. In 2015 the figure was 86%. In other words, the gap is closing but not very fast. Among part time employed, women's salary on average was 94% of men's in 2008 while the same figure in 2015 shows a negative trend with 91%.

**TABLE 20 MONTHLY SALARY FOR EMPLOYEES IN ICT AND COMMUNICATION SECTOR (NACE 58-63) DISTRIBUTED ON GENDER AND WORKING HOURS NORWAY.**

Year	Women		Men	
	Full time employed	Part time employed	Full time employed	Part time employed
2008	38300	34500	46200	36800
2009	39500	35900	47400	39000
2010	41400	37500	49400	40900
2011	43500	38100	52100	42200
2012	45100	40300	53100	43400
2013	47200	41800	55200	44300
2014	48500	41300	56600	44100
2015	50000	41500	58100	45700

Finally, **TABLE 21** shows monthly salary for employees in ICT and communication sector in Norway in second quarter 2019, distributed on counties. The last column shows the fraction of salary in each county relative to the highest salary which was paid to employees in Akershus county surrounding Oslo. The table shows that Sogn og Fjordane has the lowest monthly salary relative to Akershus. On average, an employee in Akershus in the ICT and communication sector earned 46% more than one in Sogn og Fjordane.

**TABLE 21** <sup>41</sup> **MONTHLY SALARY FOR EMPLOYED IN ICT AND COMMUNICATION SECTOR (NACE 58-63) IN SECOND QUARTER 2019.**

County	Salary	Fraction of max
01 Østfold	54 810	0.78
02 Akershus	70 630	1.00
03 Oslo	62 230	0.88
04 Hedmark	49 070	0.69
05 Oppland	51 260	0.73
06 Buskerud	55 990	0.79
07 Vestfold	54 250	0.77
08 Telemark	53 060	0.75
09 Aust-Agder	58 590	0.83
10 Vest-Agder	50 930	0.72
11 Rogaland	61 800	0.87
12 Hordaland	55 950	0.79
14 Sogn og Fjordane	48 480	0.69
15 Møre og Romsdal	51 340	0.73
50 Trøndelag	59 420	0.84
18 Nordland	50 380	0.71
19 Troms - Romsa	53 890	0.76
20 Finnmark - Finnmarku	51 020	0.72

### ICT and inconvenient working hours

Statistics Norway also provides statistics about inconvenient working hours. Table 22 shows number of employees in NACE codes 58-63 with inconvenient working hours from 2008 to 2019. These codes also include employees working in radio and television broadcasts, motion picture and video production as well as in publishing and news agencies in addition to the ICT sector.

The table shows that the number of employees working inconvenient hours has gone down over the period 2008 to 2019. In 2008, 74 000 employees worked inconvenient hours. In 2019, the same figure was 67 000. The biggest reduction in employees working inconvenient hours was on Saturdays and Sundays, both categories having 3000 less employees in 2019 as compared to 2008.

Most of the inconvenient hours are worked on evenings, the figure for total employees was 24 000 in both 2008 and 2019. Of these, 20 000 worked infrequently and of these again, 14 000 were men. This means 30% of employees working infrequent on evenings were women in 2019, compared to 24% women working in the ICT sector defined as NACE codes 61, 62 and 63, according to Table 15.

<sup>41</sup> <https://www.ssb.no/statbank/table/11654>

**TABLE 22 NUMBER OF EMPLOYEES WITH INCONVENIENT WORKING HOURS BY GENDER AND TYPE FOR NACE CODES 58-63, 2008 TO 2019.**

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Night</b>													
Men	Regularly	0	1	0	1	1	1	2	1	0	0	0	0
Women	Regularly	0	0	0	1	0	1	0	0	0	0	0	0
	% women	0	0	0	1	0	1	0	0	0	0	0	0
Men	Infrequent	6	10	6	7	8	7	6	5	9	5	7	6
Women	Infrequent	2	3	1	1	2	2	2	2	1	2	2	1
	% women	25%	23%	14%	13%	20%	22%	25%	29%	10%	29%	22%	14%
<b>Evening</b>													
Men	Regularly	5	4	2	5	4	5	6	4	4	4	3	3
Women	Regularly	2	1	2	2	1	3	1	2	1	2	2	1
	% women	29%	20%	50%	29%	20%	38%	14%	33%	20%	33%	40%	25%
Men	Infrequent	13	18	14	14	16	15	11	11	15	12	17	14
Women	Infrequent	4	6	6	3	6	4	5	5	5	4	5	6
	% women	24%	25%	30%	18%	27%	21%	31%	31%	25%	25%	23%	30%
<b>Saturday</b>													
Men	Regularly	4	4	3	3	4	3	3	2	4	4	4	3
Women	Regularly	2	2	1	2	2	2	1	1	1	1	1	1
	% women	33%	33%	25%	40%	33%	40%	25%	33%	20%	20%	20%	25%
Men	Infrequent	12	12	10	10	14	12	9	10	12	10	13	11
Women	Infrequent	4	5	6	5	4	4	3	4	4	4	5	4
	% women	25%	29%	38%	33%	22%	25%	25%	29%	25%	29%	28%	27%
<b>Sunday</b>													
Men	Regularly	4	3	3	3	4	4	3	2	3	3	3	3
Women	Regularly	2	1	0	1	1	3	1	1	1	1	1	1
	% women	33%	25%	0%	25%	20%	43%	25%	33%	25%	25%	25%	25%
Men	Infrequent	10	11	10	10	13	10	9	8	11	9	12	10
Women	Infrequent	4	4	5	4	3	4	2	4	3	3	5	3
	% women	29%	27%	33%	29%	19%	29%	18%	33%	21%	25%	29%	23%

The percentages of women working infrequent inconvenient working hours on Saturdays and Sundays are about the same as the percentage working in the ICT sector, defined as NACE codes 61,62 and 63. The percentage of women working inconvenient hours on Saturdays (27%) is a bit larger than the corresponding figure for Sundays (23%).

## Education and employment

### OECD

According to OECD <sup>42</sup>, 3.6 percent of all graduates in Norway in 2017 are in the field of Information and Communication Technologies. This is defined according to ISCED <sup>43</sup> at master's or equivalent level (level 7). For women in Norway, 1.3% of all female graduates are in the same field while the same figure for men was 6.6 percent. This means the gender gap in Norway, defined as female percent minus male, was -5.4 percentage points.

**TABLE 23** shows the distribution for all OECD countries. Among the Nordic countries, Finland has the greatest gap with -9 while Sweden has -2.4. In Sweden the total percentage of all graduates in ICT is the lowest among the Nordic countries when both genders are considered. In only two countries the female percentage is higher than the male, these are Saudi-Arabia and Columbia, both non-OECD countries. Estonia has the largest negative gender gap where the percentage of ICT graduates among men is 9.1 percentage points larger than among women.

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<sup>42</sup> OECD: [Distribution of graduates and entrants by Field](#)

<sup>43</sup> [UNESCO - ISCED 2011](#)

TABLE 23 PERCENTAGE OF GRADUATES AT MASTER'S LEVEL IN ICT BY GENDER

	Female	Male	Total	Gap (Female- Male)
- India (Non-OECD)	9.1	9.4	9.3	-0.3
Denmark	4.4	9.8	6.7	-5.4
Australia	3.5	10.4	6.7	-6.9
Estonia	3.4	12.5	6.8	-9.1
Ireland	3.2	12.0	7.0	-8.8
- Saudi Arabia	3.0	1.3	2.0	1.7
Finland	2.9	11.9	6.6	-9.0
United States	2.7	8.7	5.2	-5.9
Canada	2.7	4.3	3.4	-1.6
Latvia	2.4	7.9	4.2	-5.5
New Zealand	2.1	6.6	4.0	-4.5
Greece	1.8	6.1	3.6	-4.3
- Indonesia	1.7	4.1	3.0	-2.4
Germany	1.6	7.4	4.4	-5.8
- Russia	1.5	4.9	3.1	-3.4
United Kingdom	1.4	5.0	2.8	-3.6
France	1.3	6.1	3.5	-4.8
Norway	1.3	6.6	3.6	-5.4
Czech Republic	1.3	10.1	4.9	-8.8
Netherlands	1.1	3.5	2.2	-2.5
Korea	1.1	5.1	3.0	-4.0
Austria	1.0	7.0	3.8	-5.9
Sweden	1.0	3.4	2.0	-2.4
Lithuania	1.0	4.7	2.3	-3.7
Luxembourg	0.9	4.5	2.8	-3.7
Mexico	0.9	3.7	2.1	-2.8
Slovenia	0.9	5.4	2.4	-4.5
Poland	0.7	7.1	2.9	-6.4
- Brazil	0.7	4.6	2.4	-3.9
- Colombia	0.7	0.5	0.6	0.1
Hungary	0.6	5.3	2.6	-4.6
Chile	0.6	2.1	1.2	-1.4
Spain	0.6	3.7	1.9	-3.1
Portugal	0.6	1.8	1.1	-1.2
- Costa Rica	0.5	4.8	2.3	-4.3
Slovak Republic	0.5	6.2	2.6	-5.7
Israel	0.4	2.6	1.2	-2.1
Turkey	0.4	0.7	0.6	-0.4
Switzerland	0.4	2.7	1.6	-2.4
Belgium	0.2	1.4	0.8	-1.2
Italy	0.1	1.0	0.5	-0.9
Iceland	0.1	2.8	1.0	-2.7

## Norway

Table 24 shows number of applicants for ICT education in Norway 2008-18 by gender <sup>44</sup>. The table shows that the percentage of female applicants have risen by 6.8 percentage points over the whole period. The yearly increase was largest between 2015 and 2017 with an increase of 2.5 percentage points each year.

**TABLE 24 APPLICANTS FOR ICT EDUCATION NORWAY 2008-18<sup>45</sup> BY GENDER**

	Women	Men	Total	% Women
2008	341	1617	1958	17.4%
2009	305	1617	1922	15.9%
2010	359	1678	2037	17.6%
2011	375	1923	2298	16.3%
2012	441	2189	2630	16.8%
2013	450	2297	2747	16.4%
2014	500	2476	2976	16.8%
2015	609	2887	3496	17.4%
2016	756	3039	3795	19.9%
2017	1118	3862	4980	22.4%
2018	1461	4566	6027	24.2%

Table 1 shows that 22% of employed in the ICT sector in Norway in 2018 were women. The percentage of female applicants for ICT education in 2018 is therefore slightly above the percentage of women working in the ICT sector.

## European Union

Eurostat provides information on number and percentage of different genders with ICT education employed anywhere in the economy <sup>46</sup>. The percentage basis is number of people with ICT education employed, not necessarily in the ICT sector <sup>47</sup>.

**TABLE 25** shows the percentage of women with ICT education in any employment situation. The percentage for Norway corresponds roughly to the percentage of women employed in the ICT sector. This means that most women with ICT education in Norway work in the ICT sector.

<sup>44</sup> Samordna opptak sluttstatistikk, Diagram 25,

[https://www.samordnaopptak.no/info/om/sokertall/sluttstatistikker/so\\_sokerstatistikk\\_2017-sluttrapport.pdf](https://www.samordnaopptak.no/info/om/sokertall/sluttstatistikker/so_sokerstatistikk_2017-sluttrapport.pdf)

<sup>45</sup> Data for 2017 and 2018 are taken from statistics documentation in 2018,

<https://www.samordnaopptak.no/info/om/sokertall/sluttstatistikker/>

<sup>46</sup> Eurostat [https://ec.europa.eu/eurostat/web/products-datasets/-/isoc\\_ski\\_itsex](https://ec.europa.eu/eurostat/web/products-datasets/-/isoc_ski_itsex)

<sup>47</sup> "3.3. Coverage - sector Data on persons with ICT education does not use the concept of sectors of economic activities. Persons with ICT education can be employed in any sector or be unemployed. "



**TABLE 25 WOMEN WITH ICT EDUCATION EMPLOYED AS PERCENTAGE OF ALL EMPLOYED WITH ICT EDUCATION**

	2014	2015	2016
Austria		13.7	14.2
Belgium	12.5	9.5	12.7
Bulgaria			29.2
Switzerland	15	16.5	14.6
Cyprus	25	33	32.6
Czechia	9.4	10.8	12
Germany	13.3	13.3	13.4
Denmark	16.1	17.3	15.9
Estonia	26.9	19.6	15.6
Greece	36.9	34.2	26.9
Spain	18.6	23.3	20.4
Finland	33.1	29.4	19.9
France	11.1	14.1	13.6
Croatia	22.6	10.3	6.1
Hungary	13.2	13.8	14.8
Ireland	30.5	27.7	28.8
Iceland		33.6	27.2
Italy	21.4	18.9	18.2
Lithuania	12.1	9.3	19.2
Latvia	19.7		19.5
North Macedonia	32.6	15.5	27.9
Malta	18	19	16.9
Netherlands	14.6	17.1	11
Norway	13.6	21.7	20.7
Poland	11.8	10.8	11.2
Portugal	20.8	24.3	24
Romania	30	27	27.7
Serbia	18.7	19.2	18.9
Sweden	26.1	26.3	25
Slovenia	12.2	15	13.2
Slovakia	14.5		11.6
Turkey	25.8	26.4	23.9
United Kingdom	24.2	23.7	16.9

The table shows that Cyprus has the largest percentage of women among employees with ICT education. Bulgaria, Ireland, Malta and Romania are the countries with the largest percentage after Cyprus. Norway is in 11<sup>th</sup> place, after Sweden but well before Denmark.

FIGURE 1 WOMEN AS PERCENTAGE OF ALL ICT SPECIALISTS AND AS PERCENTAGE OF ALL EMPLOYED IN ICT SECTOR

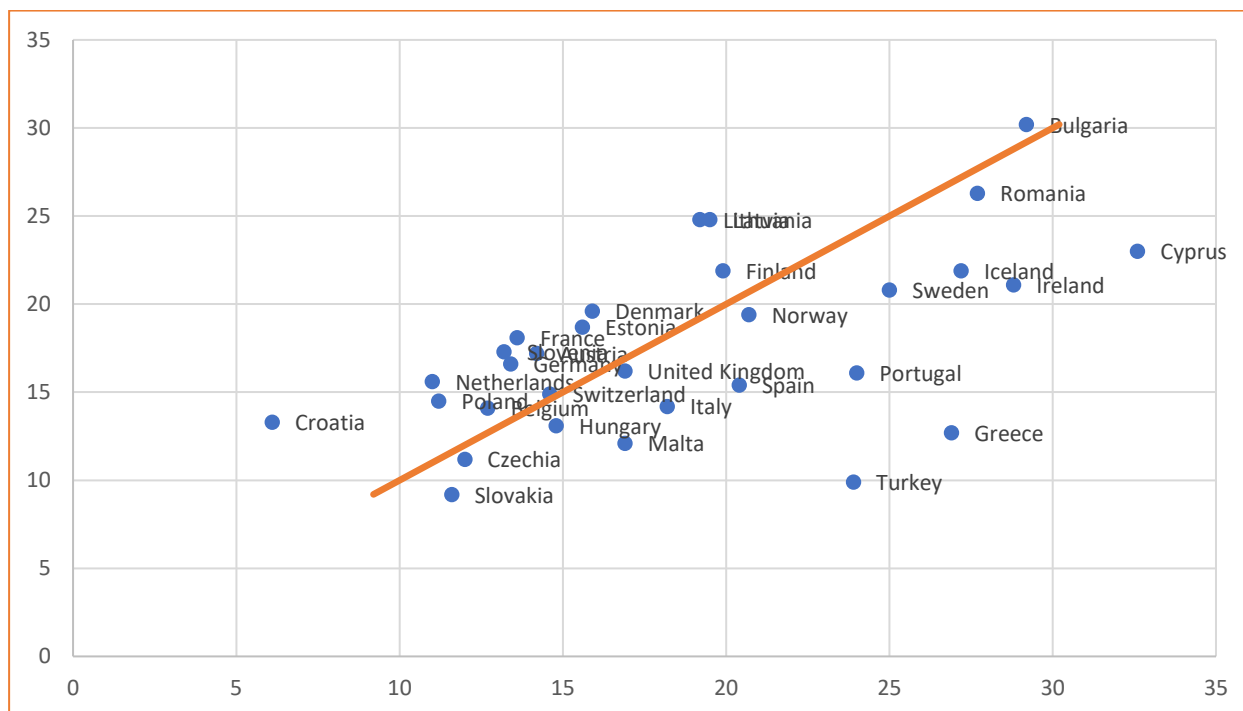


FIGURE 1 shows percentage of women with ICT education vs percentage of women working in the ICT sector in 2016. The red trendline shows the situation if percentage of women employed in ICT sector would be equal to percentage of women with ICT education. In other words, countries where all women with ICT education would be working in the ICT sector would be on the red line. For countries below the red line, women with ICT education is mostly working outside the ICT sector. For countries above the red line, most women working in the ICT sector do not have ICT education.

Norway is slightly below the red line, meaning many women with ICT education, but not all, is working in the ICT sector. It is worth noting that the percentage of women working in the ICT sector has grown in Norway from 2016 to 2018. This may indicate that Norway would be closer to the red line if 2018 data was used instead of 2016 data. Bulgaria, UK and Switzerland are the countries where the two percentages are most equal.

Cyprus has a large percentage of women with ICT education in employment but relatively fewer working in the ICT sector. Greece and Turkey have relatively large percentage of women with ICT education but few of them working in the ICT sector. Lithuania and Latvia have relatively more women working in the ICT sector than women having ICT education.

## Can statistics tell stories about women in ICT?

Which questions can we answer, and which conclusions can we draw from this deep dive into statistics? As we have demonstrated above, it is a challenge to find similar and comparable numbers across regions and nations, as different code structures are used. We have also found gaps in statistics that combine different factors that each have been identified as having gendered patterns, like public vs. private sector, salary, working time, part-time work, suggesting that it is possible to improve the way we use statistics to monitor inequalities and hierarchies in the ICT sector and ICT work.

We set out with a number of questions, but given the complicated nature of the statistics, some of these questions had several and not one answer. Thus, the first and perhaps most important question, “What is the female occupational rate in ICT in Norway?”, was answered through several perspectives as shown below.

Female occupational rate in ICT in Norway:

- Women make up 22% in 2018 and 26% in 2019 for the ISCO subgroup 251 – Software and Applications Developers and Analysts (Table 1)
- 18% in 2018 of salary earners in IT related occupations were women (Table 2)
- 20.8% in 2018 in different ICT subgroups according to ISCO structure and EIGE definitions were women (Table 4)
- 20.3% of ICT specialists in 2018 were women according to Eurostat (Table 12)
- Women employed as ICT workers in 2018 (EIGE definition) were 1.26% of total working force (Table 5)
- 21% in 2018 of all ICT specialists employed in EIGE ICT subgroups were women (Table 6)
- Less women than men work in ICT in all counties in Norway (Table 14, Table 15)
- Based on the numbers for counties, one-fifth of all ICT employees in Norway are women (Table 14-15)
- Number of women in municipalities in Sogn & Fjordane varies from 0% to 100%, however, the numbers are small (Table 17)

Furthermore, we have identified that for the educational sector in Norway:

- Number of women applying to ICT education has increased and is 24,2% for 2018 (Table 24)
- 1.3% in 2017 of all female graduates are in the field of ICT, against 6.6% men, giving a gender gap of -5.4 (Table 23)

Other workforce numbers tell us that:

- A total of 123 800 were employed as ICT specialists in Norway in 2018 (Table 12)
- Women made up 20.7% of all employed with ICT education in 2016 (Table 25)
- Many, but not all women with ICT education work in the ICT sector (Figure 1)
- More women than men work part-time in ICT (3.3 times more in 2008) (Table 18)
- More women in ICT are self-employed (Table 1 and Table 2)
- Women earn less than men for both fulltime and part-time jobs in ICT sector (Table 3, Table 20)
- The percentage of women working inconvenient hours in ICT is higher than the percentage of women working in the ICT sector (Table 22)

On the one side, the list above suggests that precise numbers need a careful consideration of how the source define occupation code structures and which subgroups that are included. On the other side, the gender imbalance in ICT work is significant in all the different statistics we have shown here.

### **Recommendations for further research**

For further research on gender differences in ICT in Norway, the following statistics would be useful:

- Distribution of genders on private/public ICT employment
- Number of employees in ICT with children

These statistics are available in Sweden (private/public employment) and in Finland (ICT employees with families). It would also be useful if these statistics would be available on regional level in Norway.

One important hypothesis regarding gender differences in the ICT sector is that women increasingly find work in the sector without having an ICT education. This statistic would be useful for analysing this hypothesis:

- Number of employees in ICT sector without ICT education by gender

Further, it is a problem that regional differences can only be analysed with the NACE code structure, not the one delivered by ISCO. The last one is more useful for comparisons with other countries.

We would also encourage using a mix of qualitative and quantitative research for research questions raised in this document. We believe that public statistics cannot tell the whole story and that interviews with selected informants would give a broader picture of the challenges faced by women in the ICT sector. This sector is not as standardised as other sectors in Norway, regarding both wage and working conditions. The share of self-employment for women is also larger in the ICT sector. The size of many ICT companies is small in Norway, compared to other sectors. All these features raise special challenges for women working in this sector. These challenges and how they are met by women working in the ICT sector today would be best understood by combining public statistics with interviews going more into the depth of everyday working life for women in the ICT sector.

We also believe that the hypothesis stated above that women to an increasing degree work in the ICT sector without having an ICT education, is best analysed with a combination of quantitative and qualitative research approaches. The quantitative approach can tell us whether there is such a gap, but it cannot tell us why women make other priorities if the gap is real. Are there any barriers for women entering ICT education and if so, how are these barriers perceived by women? To answer these questions, a more in-depth approach based on interviews would be helpful. Thus, combining quantitative and qualitative methods would probably bring more information on the subject.

Furthermore, qualitative research is an important correction to statistical overviews and may reveal factors that alone and together contribute to gender inequalities in ICT.

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