

IT workforce in Europe and level of digital skills 2021-2022

Prepared by : Angela Drucioc
source: Eurostat

Introduction

I am part of a group of Romanian data professionals who regularly engage in monthly challenges analyzing real-world data. This month, our focus was on gaining insights into the **IT workforce** in Romania and comparing it to other European countries. However, I realized that it would be captivating to conduct a general analysis of the **IT workforce in Europe**.

This analysis specifically concentrates on the IT workforce in Europe. We obtained the data sets from *Eurostat*, a trusted source of statistical data for the European Union. To analyze data, I used accessible tools such as Jupyter Notebook/Pandas and Tableau Public.

I analyzed four data sets:

- Individual Level of Digital Skills
- Employed ICT Specialists by Sex
- Employed ICT Specialists by Educational Attainment Level
- Employed ICT Specialists by Age

Through exploratory analysis, I examined the data to clean, arrange and make necessary modifications.

The main objectives were:

1. Identifying European countries with the **highest concentration of digitally**, analytically skilled individuals.
2. Determining the **gender proportion** within the **IT industry** and identifying countries that demonstrate the greatest degree of gender equity within the IT industry, comparing them to the other EU countries.
3. Identifying countries with **high and low education attainment levels** among IT specialists.
4. Exploring the **age distribution** among IT specialists to understand the demographic composition of the industry.

By examining these aspects, we can gain an understanding of Europe's IT workforce, including individuals' digital, analytical, problem solving, safety skills. This analysis also offers valuable

insights into country's preparedness for digitalization. Additionally, we can gather valuable insights regarding gender representation and age distribution within the IT industry.

Analyze

1. Which European countries have the highest concentration of digital skilled people?

I analyzed the dataset representing *individual levels of digital skills*. This data set includes a wide range of surveyed individuals, aged from 16 to 74 years old. The data states for 2021 year.

Through my analysis, I focused on **5 key digital skills** such as:

- **Communication and collaboration** skills: include sending and receiving emails and using social media;
- **Digital content creation** skills: include using word processing or spreadsheet software and editing photos, video or audio files;
- **Information and data literacy** skills: include finding information online about goods or services or reading online newspapers;
- **Problem solving** skills: include selling online, internet banking and installing software or apps;
- **Safety skills**: relate to things like limiting access to profile or content on social media sites and changing internet browser settings.

The data is categorized by 2 levels of proficiency: **Basic** level skills and **Above Basic** level skills .

I explored various **14 categories** within the dataset, including:

All individuals; Employees and unemployed; ICT professionals and non-ICT professionals; Individuals with low formal education; Individuals with medium formal education; Individuals with high formal education; Students; Individuals aged 16–24-year-old; Individuals aged 24-34 year old; Individuals aged 35-44 year old; Individuals aged 45-54 year old; Individuals aged 55-74 year old;

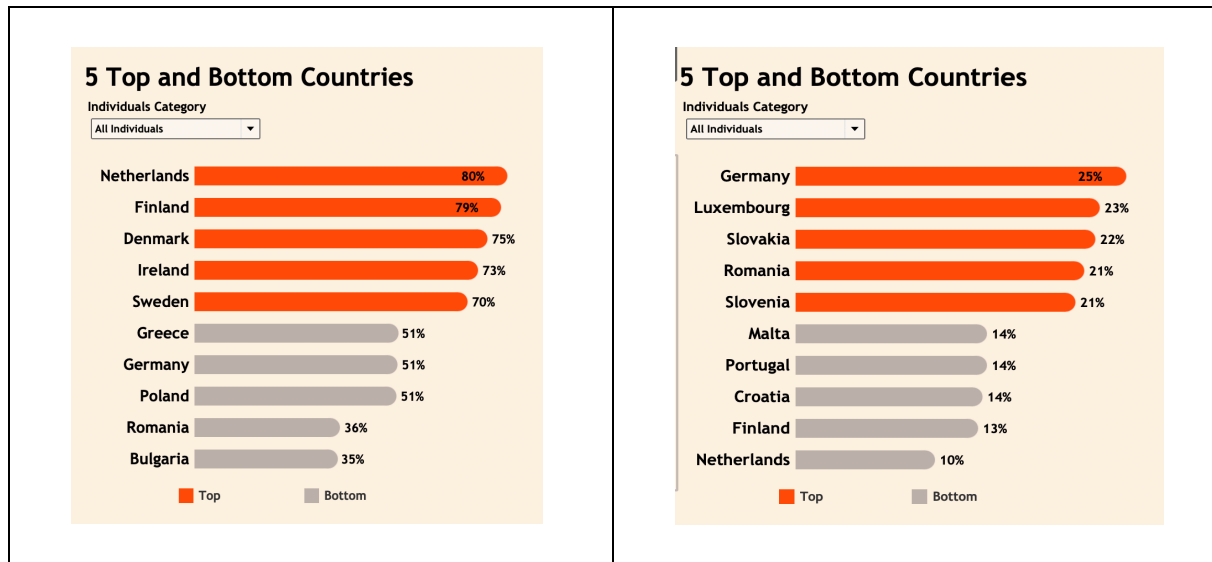
The results revealed the following insights:

- For the "All individuals" category, the **top 5 countries** with the highest concentration of skilled individuals (above basic skills level) are the **Netherlands, Finland, Denmark, Ireland, and Sweden**.

Fig 1. Top and bottom 5 countries ranked by level of digital skills among **All individuals** categorized into two proficiency levels: above basic and basic.

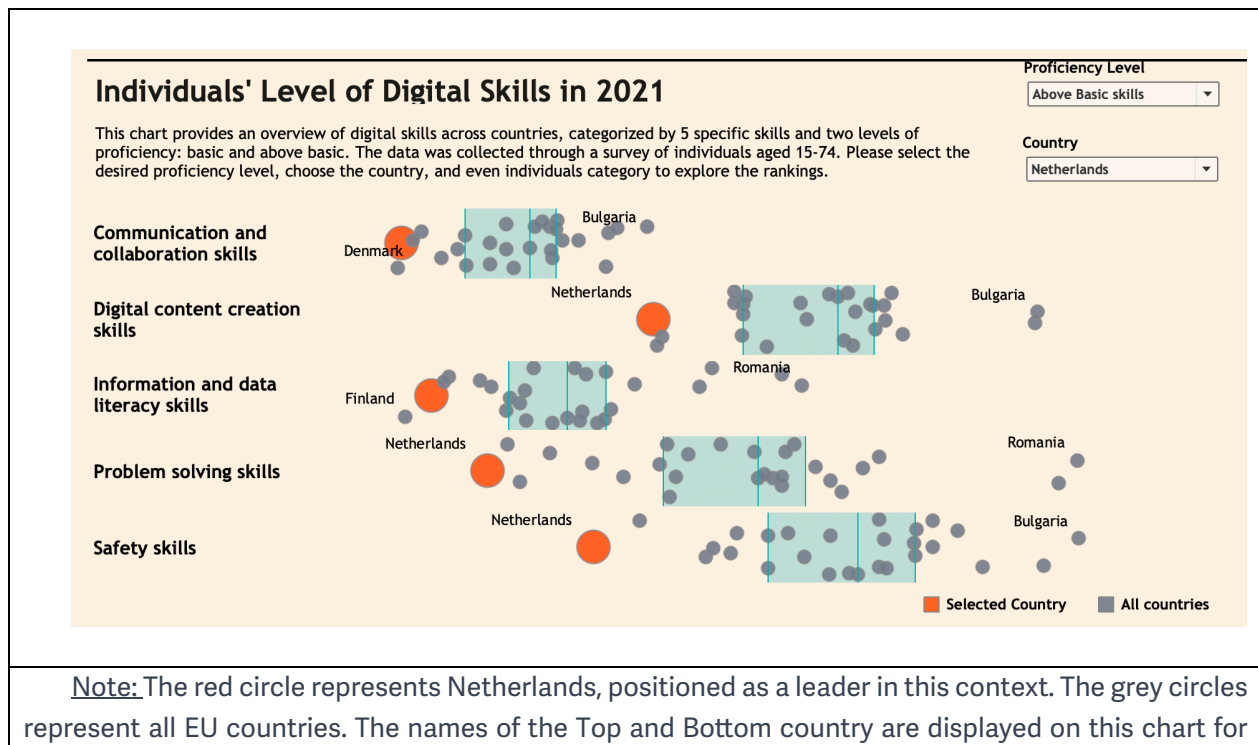
Above Basic Skills Level

Basic Skills Level



These countries demonstrated the first positions for mostly all key digital and analytical skills.

Fig 2. Level of digital skills for **Netherlands**, Above Basic proficiency level, category **All individuals**



easy identification. The blue area represents the upper and lower quartiles, dividing the countries into halves. The upper and lower quartiles indicate that **half** of the countries fall within this range.

To explore the positions for all countries please access this interactive viz https://public.tableau.com/app/profile/angela.drucioc/viz/ICT_16839739821400/Dashboardnew3

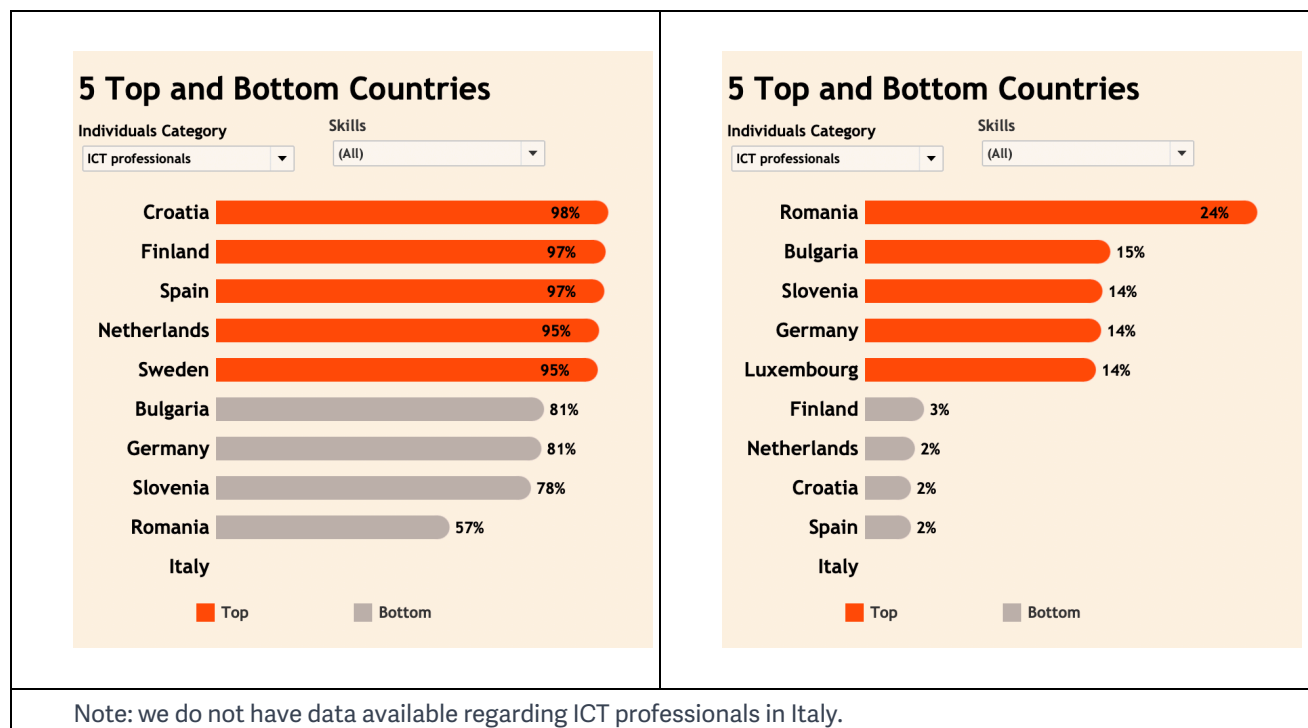
Skill level by group category

During my analysis of skill levels, I focused on identifying countries with highly skilled **ICT professionals**. Interestingly, Croatia emerged as the top performer in the above skills category, while Romania stood out in the basic skills category.

Fig 3. Top and bottom 5 countries ranked by level of digital skills among **ICT Professionals**

Above Basic Skills Level

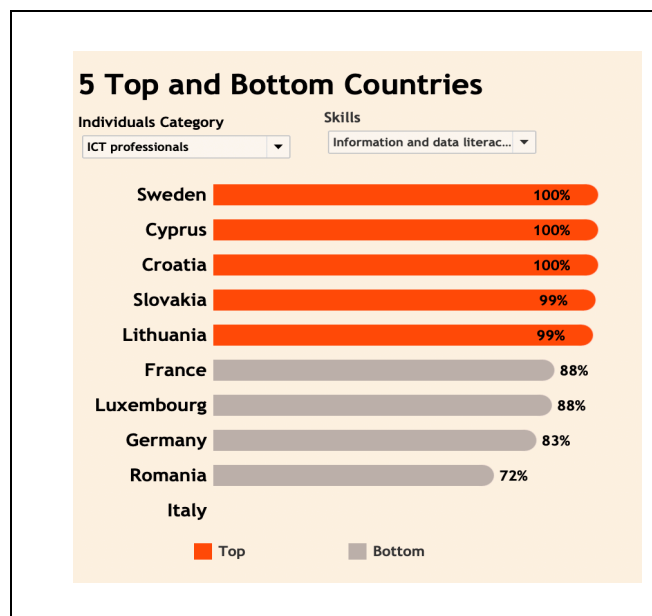
Basic Skills Level



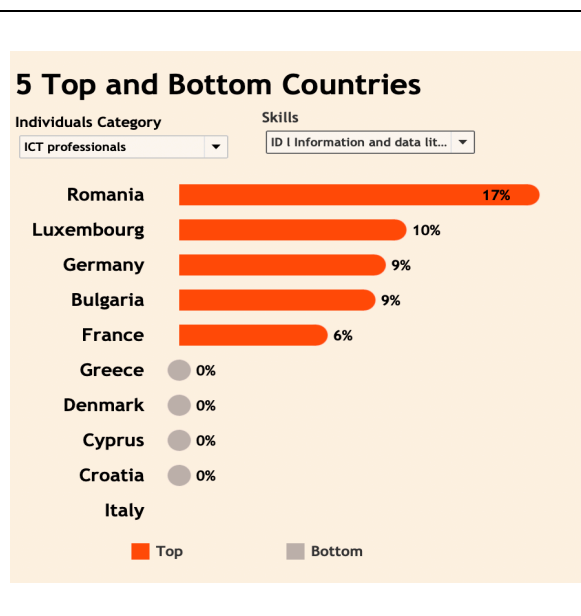
Let's explore the geographical distribution of ICT specialists in **information and data literacy**.

Fig 4. Top and bottom 5 countries ranked by level of **Information and data literacy skills** among ICT professionals

Above Basic Skills Level



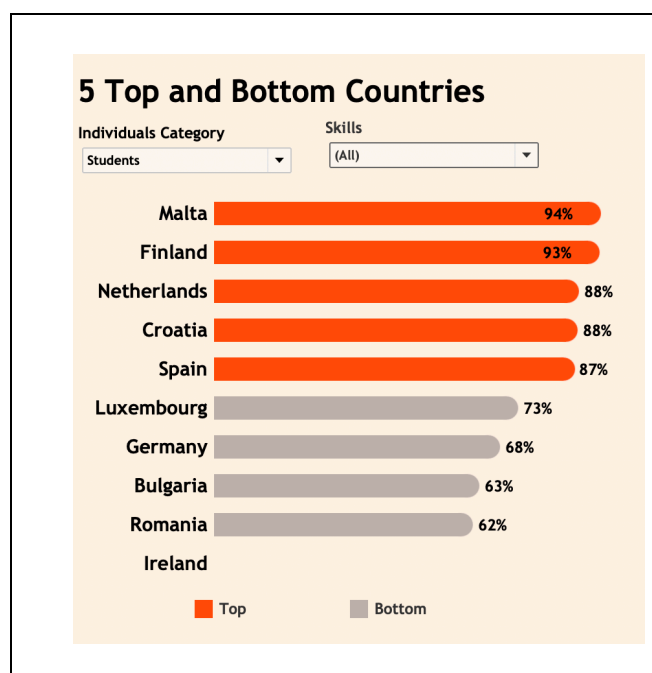
Basic Skills Level



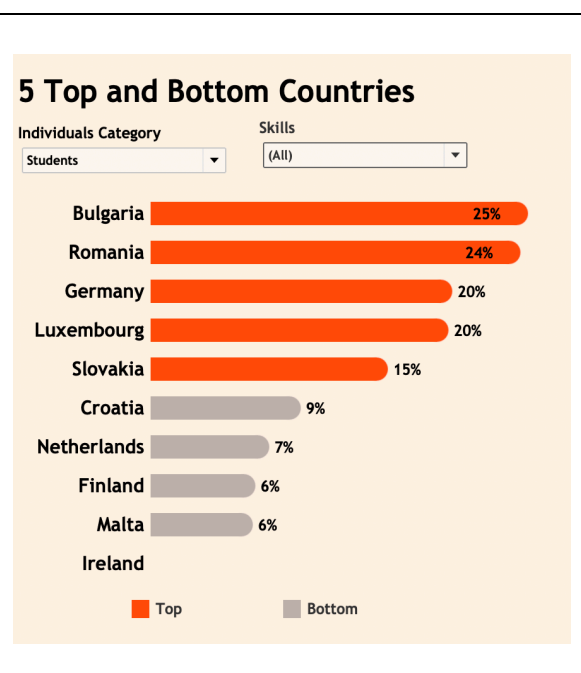
Let's delve into the future IT workforce and explore the group of **students** who holds the potential to shape the industry.

Fig 5. Top and bottom 5 countries ranked by level of digital skills among Students

Above Basic Skills Level



Basic Skills Level



Note: We do not have data available regarding students in Ireland

Note: To explore the top and bottom countries by different level of skills please access this interactive viz https://public.tableau.com/app/profile/angela.drucioc/viz/ICT_16839739821400/Dashboardnew3

2. Which countries demonstrate the greatest degree of gender equity within the IT industry in European Union

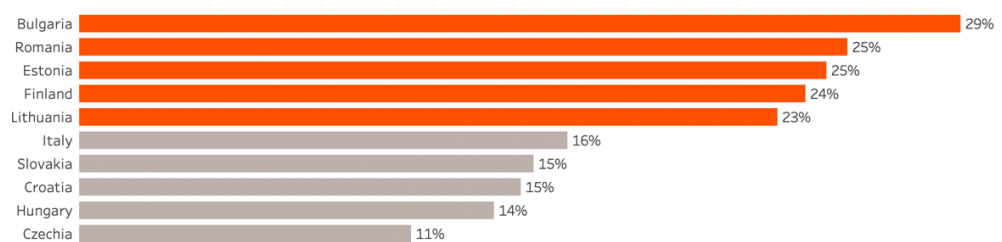
The women representation in IT industry in EU is 19%.

The chart below illustrates the 5 Top & Bottom countries by **proportion of women in the IT industry**.

Bulgaria, Romania, Estonia, Finland, and Lithuania demonstrate greater gender equality in the IT industry. However, it's important to note that the overall percentage of women in these countries is below 30%.

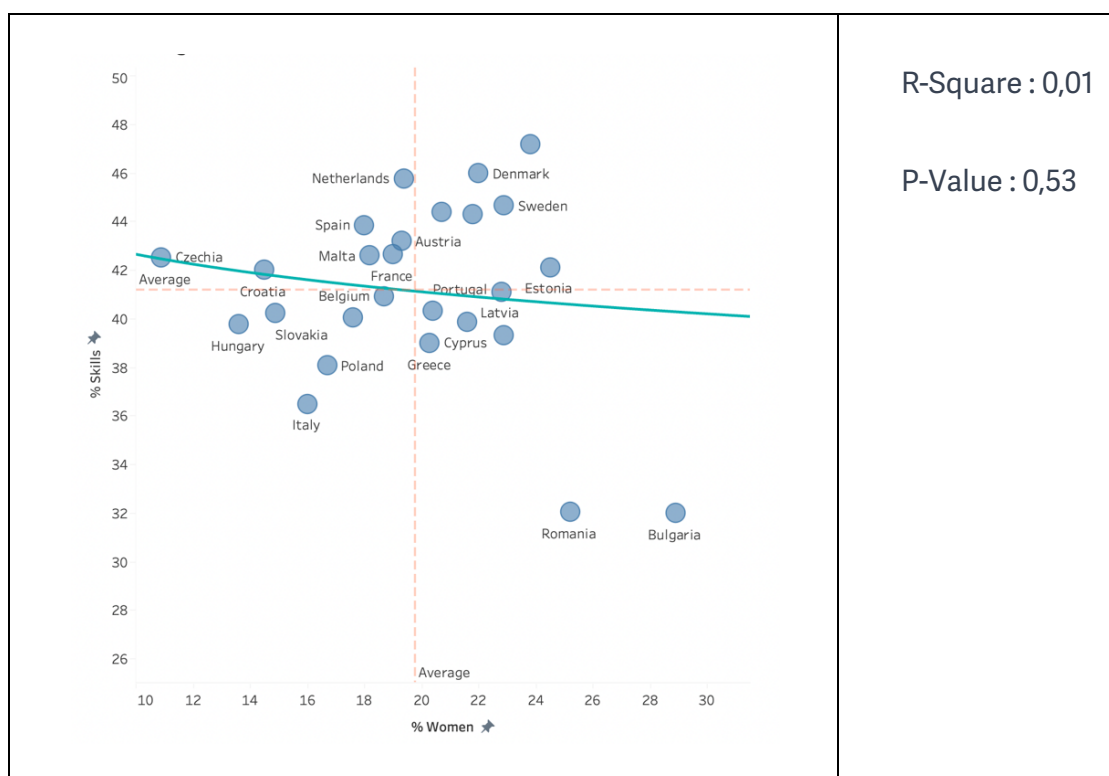
This chart can also be **interpreted inversely** to represent the percentage of **men**. For example, if the chart shows that **Czechia** is positioned at the bottom 5 countries representing the percentage of women in the IT industry, it implies that Czechia would be among the **Top** countries representing the percentage of men in the IT industry. Czechia demonstrates the worst gender equity.

Fig. 6 Top and Bottom 5 countries in terms of **Women representation** in IT industry in European Union



Is there any correlations between level of skilled individuals and women representation in IT industry?

Fig. 7 Correlation analysis: % of IWomen in IT industry vs. % of individuals digital skills



We can interpret the results as follows:

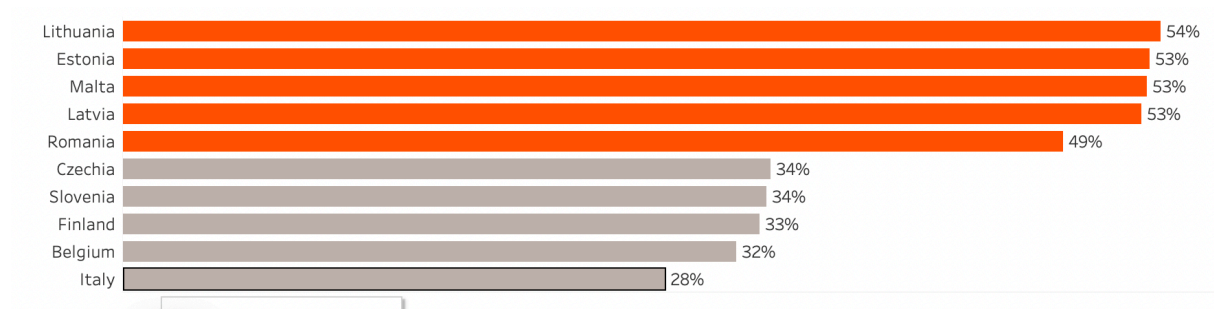
- The R-square value of 0.01 indicates that only 1% of the variability in the representation of women in the IT industry can be explained by the level of skills. This suggests that the level of skills alone has a limited impact on the percentage of women in the IT industry.
- The p-value of 0.53 suggests that the correlation between the variables is not statistically significant at the conventional significance level of 0.05. Therefore, we cannot reject the null hypothesis, which states that **there is no relationship between these variables**.

3. What is the distribution of IT specialists across the age ranges of 15-34 and 35-75?

The proportion of **young IT specialists** aged 15-34 years in EU is **39 %**.

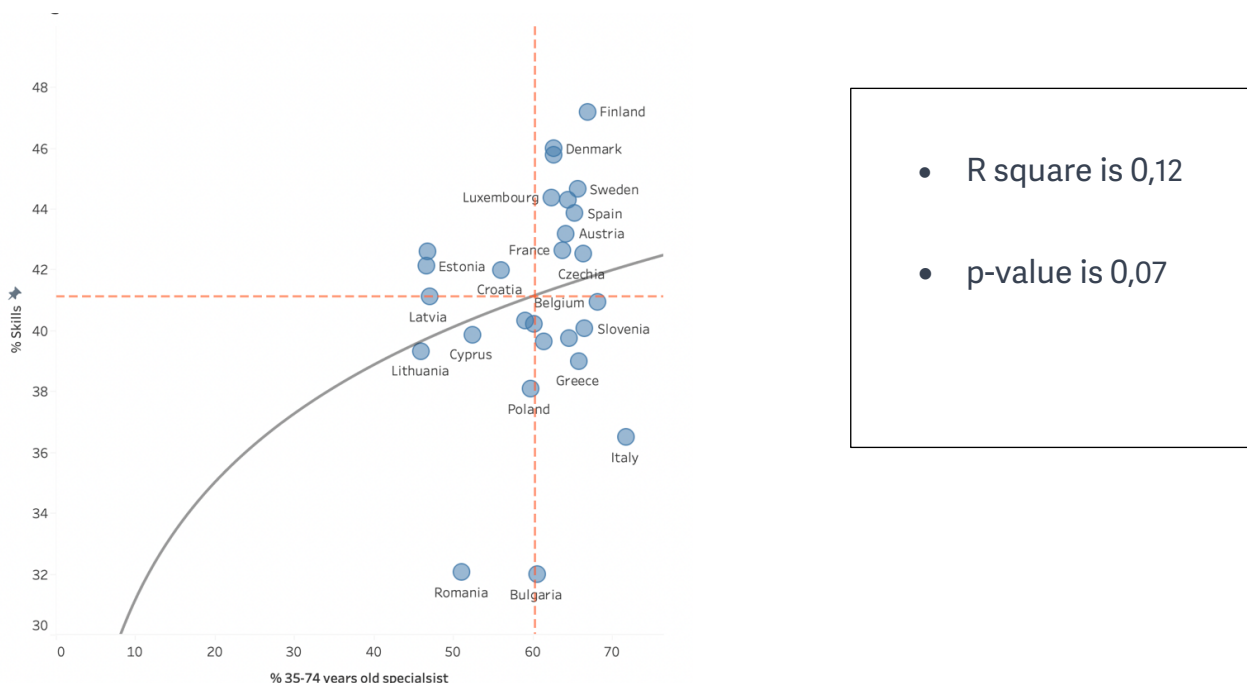
The chart below illustrates the Top and Bottom 5 countries in relation to the proportion of young IT specialists. **Lithuania, Estonia, Malta, Latvia, and Romania** have a higher concentration of **young IT specialists**. Additionally, the chart reveals that the bottom 5 countries: **Italy, Belgium, Finland, Slovenia, and Czechia** have the higher representation of **older IT specialists** aged 35-74 years old.

Fig. 8 Top and Bottom 5 countries in terms of age in IT industry in EU.



Is there any correlations between % of young ICT specialists and % of Women in IT ?

Fig. 9 Correlation analysis: % of ICT specialists aged 34-74 years old vs. % of individuals digital skills



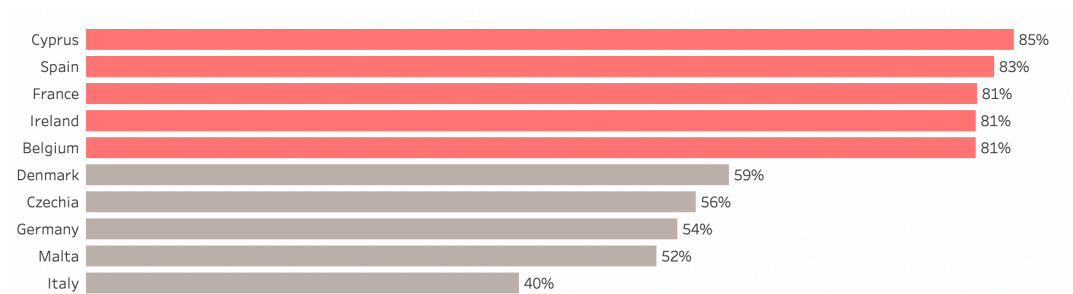
- Visually, we observe that Finland, Denmark and Netherlands exhibit the highest level of skills among the individuals, while also having a relatively higher proportion of senior ICT specialist. However, the statistical test indicates no significant correlation between these variables.
- With an R-squared value of 0.12, it indicates that **only 12%** of the variation in the percentage of young people in IT can be explained by the percentage of women in the IT industry.
- Additionally, with a p-value of 0.07, there is no strong evidence to reject the null hypothesis that the observed correlation is due to chance. In other words, based on the available data, **we do not have** sufficient evidence to conclude that there is a significant correlation between the percentage of women in the IT industry and the percentage of young people in IT.

4. What are the countries that exhibit high and low levels of education attainment among IT specialists?

68 % of IT specialists possess a **Tertiary education level (5-8 levels)**, while the remaining 32 % represent the proportion of IT specialists with non-tertiary level of education (0-4 levels), what means they have less than primary, primary, secondary, post-secondary level of education.

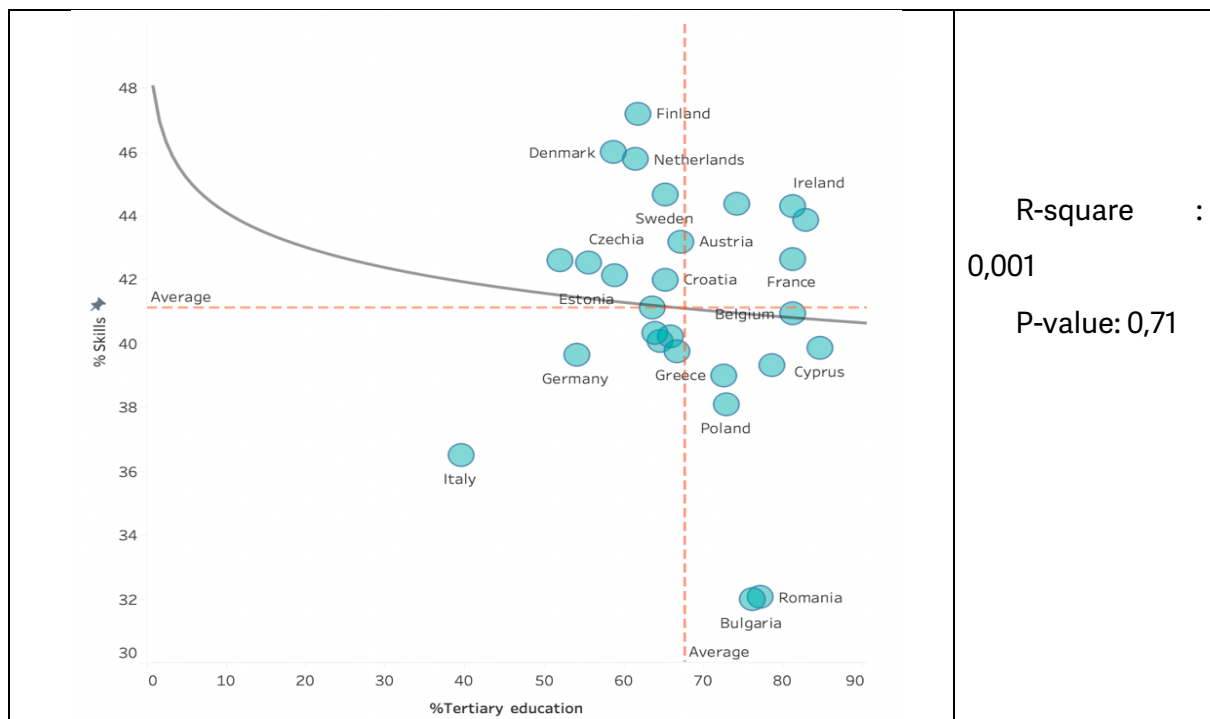
The chart below illustrates the top 5 countries with the highest concentration of IT specialists possessing a high level of education, specifically at the tertiary level. Cyprus, Spain, France, Ireland, and Belgium occupy the top positions in this list. On the other hand, the bottom 5 countries Italy, Malta, Germany, Czechia, and Denmark represent those with the highest concentration of IT specialists having a lower level of education, ranging from levels 0-4.

Fig. 10 Top and Bottom 5 countries in terms of IT specialist education in IT industry in EU.



- Is there a correlation between level of education among IT specialists in a country and the level of digital skills among individuals in that some country?

Fig. 11 Correlation analysis: % of IC specialists with Tertiary level of education vs. % of individuals digital skills



Visually, we can observe an inverse correlation between these variables. Finland, Denmark and Netherlands demonstrate the highest levels of skills among individuals, while their level of tertiary education is comparatively lower than average.

Conversely, Romania and Bulgaria exhibit the lowest levels of skills among the individuals, despite having relatively higher levels of tertiary education among ICT specialists. However, the statistical test reveals no correlation between individual level of digital skills and the tertiary level of education between ICT specialists.

Conclusions:

In this analysis, we focused on gaining insights into the IT workforce in Europe. We analyzed various data sets related to individual skills, employed ICT specialists by sex, age and educational attainment.

Our findings revealed the following key insights:

1. The top five countries with the highest concentration of digitally skilled individuals were the **Netherlands, Finland, Denmark, Ireland, and Sweden**. These countries demonstrated a high level (above basic) of proficiency in key digital skills.
2. **Gender equity** within the IT industry varied across European countries. **Bulgaria, Romania, Estonia, Finland, and Lithuania** showed greater gender equality, while **Czechia, Hungary, Croatia, Slovakia, and Italy** demonstrated the **worst gender equity**. There is no correlation between the level of skills among the individuals and the representation of women in the IT industry.
3. **Lithuania, Estonia, Malta, Latvia, and Romania** had a higher concentration of young IT specialists, while Italy, Belgium, Finland, Slovenia, and Czechia had a higher representation of seniors IT specialists.
4. The top five countries with a tertiary level of education (5-8 levels) attainment among IT specialists were **Cyprus, Spain, France, Ireland, and Belgium**. Conversely, **Italy, Malta, Germany, Czechia, and Denmark** had a higher concentration of IT specialists with a non-tertiary level of education (0-4 levels). **Finland, Denmark, and Netherlands** have high skill levels among the individuals, even though their **tertiary education levels are lower than average**. On the other hand, Romania and Bulgaria have higher levels of tertiary education among ICT specialists but lower levels of skills among individuals. However, there is no correlation between the individual level of digital skills and tertiary education among ICT specialists.