# Benefits of studying STEM disciplines

## IN ITALY

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# WHY THIS REPORT

A world that is constantly changing, in which technological advances have an immediate impact on the different areas of our lives. The development of artificial intelligence (AI) is surely the clearest example we can look at. But, beyond tracing the various ways in which technology arrives and modifies our daily lives, our aim is to take a step back and reflect on the professionals who make this reality possible—we are referring to STEM professionals.

In a digitalized economy, we must recognize the importance of cutting-edge scientific and technical knowledge in ensuring business competitiveness in this sense, it is essential to educate and train in STEM disciplines, and NOT only from the compulsory educational stages. STEM training at intermediate and higher levels must be attractive and accessible, ensuring a sufficient number of professionals to meet the growing labour market demand.

We need to accelerate training in technical talent, the business world needs more STEM professionals than it currently finds in the labour market. At Amazon Future Engineer we aimed to understand young people's perspectives when choosing their education and career paths, with the aim of finding convincing arguments in favour of an increase in the choice of a STEM training and professional path.

**This project has been developed by Telling Insights in collaboration with Comillas University. The detailed and in-depth analysis provided insights into the benefits of studying STEM professions for both the professionals themselves and the Italian economy.**

In this sense, we have carried out an analysis of what happens once training is completed, when these young people face the labour market, asking, beyond beliefs and assumptions: what really happens to STEM workers in Italy? What are their working conditions, their pay levels and how do their careers evolve? What about women in STEM? What is their reality? As a result of this research, we have identified strong arguments that can contribute to encourage training in STEM disciplines over other options.

# OBJECTIVE

The aim of this project was to analyse the main benefits of studying a STEM (Science, Technology, Engineering and Mathematics) subject in Italy. The analysis has explored the available data in different areas to deepen this objective, such as:

**Analysis of the impact of STEM workers on the economy**

**Labour market integration of STEM graduates**

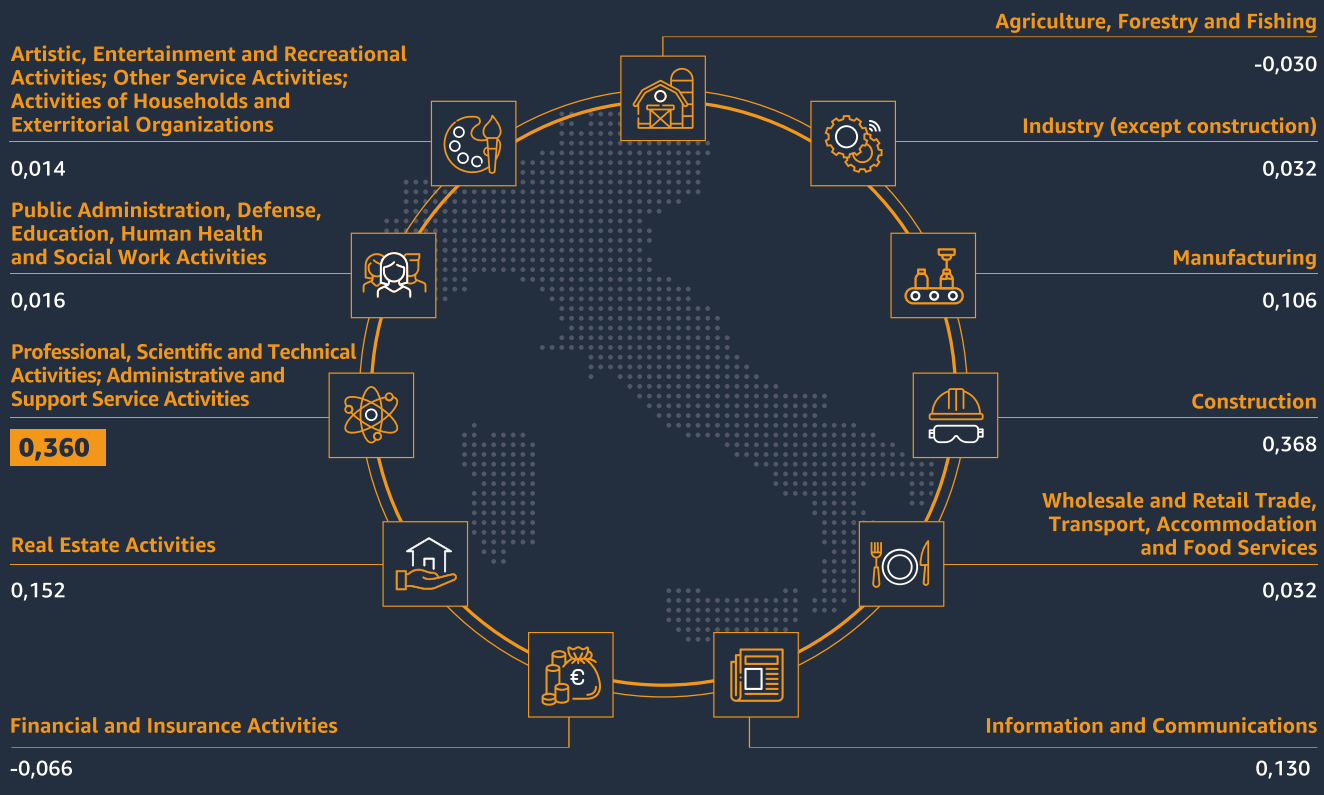
**Analysis of the working conditions of STEM professionals compared to those of non-STEM professionals**

# 1. CONTRIBUTION OF STEM OCCUPATIONS TO THE ITALIAN ECONOMY

The last decade has seen continued growth of the Italian economy in terms of GDP, except for the year of the pandemic, from which it has recovered strongly. Scientific and technical professional activities have been one of the main drivers of this growth. If we take as a reference the contributions to GDP growth of the different areas of economic activity and their variation in percentage points with respect to the previous period, it is the scientific and technical professional activities that, together with construction, have contributed most to growth, namely an average of 0.360 percentage points in the period 2019-2023.

## CONTRIBUTION BY AREA OF ACTIVITY TO GDP GROWTH AND ITS VARIATION IN PERCENTAGE POINTS FROM THE PREVIOUS PERIOD

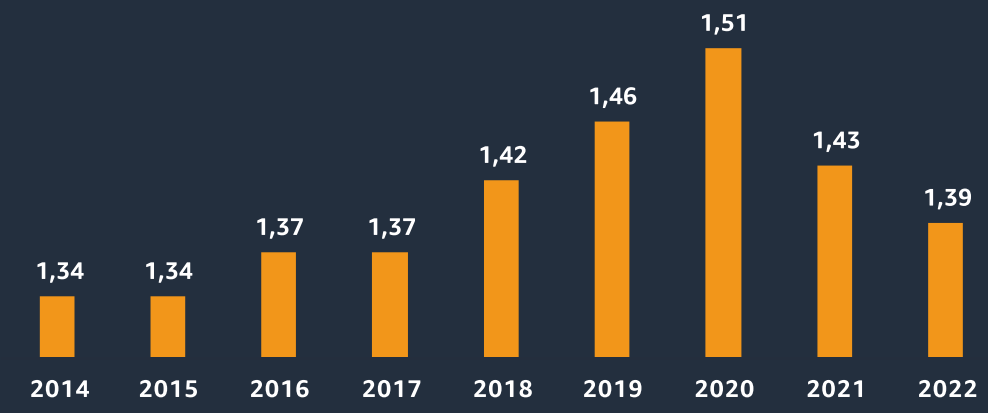
(AVERAGE OF THE LAST 5 YEARS)




Source: Eurostat.

On the other hand, investment in research and development, an area with a high demand for STEM professions, has grown steadily in Italy over the last decade, except for the pandemic years. However, after the pandemic, investment has grown in monetary terms (millions of euros), but its contribution to GDP has decreased.

**GRAPHIC 4.** RESEARCH AND DEVELOPMENT EXPENDITURE IN ITALY AS A PERCENTAGE OF GDP (2014-2022)




Source: Eurostat.

## Estimated contribution of STEM occupations to GVA in the Italian economy

The contribution of STEM occupations to the GVA of the Italian economy has been estimated to be around **15% of the total**, with STEM occupations accounting for 9% of the total number of employed. This figure therefore highlights the impact of these occupations on productivity and economic competitiveness.

The calculation was based on ISTAT data on the Gross Value Added (GVA) of the Italian economy by sector of economic activity (according to the ATECO classification) and differentiating in each sector the share of STEM and non-STEM workers according to data from the ISTAT Labour Force Survey (2024) and according to the International Standard Classification of Occupations (ISCO) classification of occupations.

# 2. STUDYING STEM, GREATER EMPLOYMENT OPPORTUNITIES FOR YOUNG PEOPLE

## STEM graduates' profile

Of the total number of graduates in Italy in 2023, 28% were STEM graduates, which implies that it is the second most important area only behind Economics, Law and Social Sciences. It is important to note that compared to 2015 (according to data from the ISTAT 2015 Graduate Employability Survey), there has been a 10-point increase, from 18% to 28%.

### 2023 GRADUATES

**Health and Agro-Veterinary**
18%

**Artistic, Literary and Educational**
21%

**Economic, Legal and Social**
33%

**STEM**
**28%**

Source: Consorzio Interuniversitario AlmaLaurea, 2023. Own elaboration.

### % STEM GRADUATES EVOLUTION

**18%** 2015 →  **28%** 2023

Source: Consorzio Interuniversitario AlmaLaurea, 2023. Graduate Employability Survey, 2015. ISTAT Own elaboration.

## Women outweigh men in all areas of study except for STEM, but STEM has moved towards parity

The gender analysis of graduates in the different fields highlights a larger gender gap in STEM disciplines than in the rest of the fields of study. Indeed, in STEM, the ratio is 60% men and 40% women, while in areas such as Economic, Legal and Social sciences or Health and Agro-Veterinary, the ratio is the opposite (60% women and 40% men), not to mention the arts, where 80% are women. However, in the 8 years from 2015 to 2023, the progress towards parity is significant, with the percentage of women in STEM increasing by 9 points (in 2015, the gender distribution of STEM graduates was 32% women against 68% men).

### PERCENTAGE DISTRIBUTION OF GRADUATES BY GENDER IN EACH STUDY AREA

**Total graduates**

Men 40% Women 60%

**Health and Agro-Veterinary**

Men 38%
Women 62%

**Artistic, Literary and Educational**

Men 20%
Women 80%

**Economic, Legal and Social**

Men 39%
Women 61%

**STEM**

Men 59%
Women 41%

Source: Consorzio Interuniversitario AlmaLaurea, 2023 Graduate Employability Survey, 2015. ISTAT Own elaboration.

## Highest employment rates within four years of graduation in STEM (91%) vs. non – STEM (87%)

With an average of 88% of graduates working within five years of completing their studies, among STEM graduates the percentage increases to 91%, while among non-STEM graduates it stands at 87%. The employment rate of STEM graduates is the same as that of Health graduates, while the Artistic, Literary and Educational field is the worst performer, with only 83% employed. On the other hand, it is important to highlight that, according to data from the 2015 Graduate Employability Survey (ISTAT), the employment rate of STEM and non-STEM graduates was similar at the time (71%), so the benefits of studying STEM are clearly being promoted.

## EMPLOYMENT RATE 5 YEARS AFTER GRADUATION: STEM VS. NON-STEM

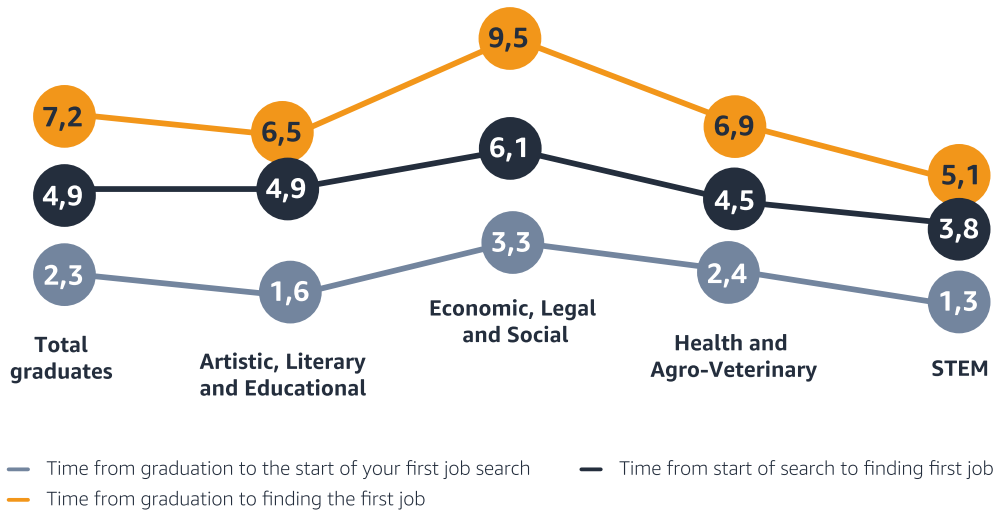
Source: Consorzio Interuniversitario AlmaLaurea, 2023.

**91%** STEM

**87%** Non STEM

STEM graduates are not only more employable, but also take less time to enter the labour market. Three indicators illustrate this reality. On the one hand, STEM graduates have the shortest time to find a job since starting their search, with an average of 3.8 months, compared to an average of 6.1 months for graduates in Business, Law and Social Sciences. At the same time, they have the shortest time to find a job since graduating, with an average of 5.1 months, as opposed to 7.2 months for all graduates or 9.5 months for graduates in Business, Law and Social Sciences (which have the longer average). Finally, STEM graduates also have the shortest time to start looking for a job, with an average of 1.3 months, compared to 2.3 months for all graduates or 3.3 months for Business, Law and Social Sciences graduates.

## EMPLOYED: TIME TO ENTER THE LABOUR MARKET (AVERAGES, IN MONTHS)

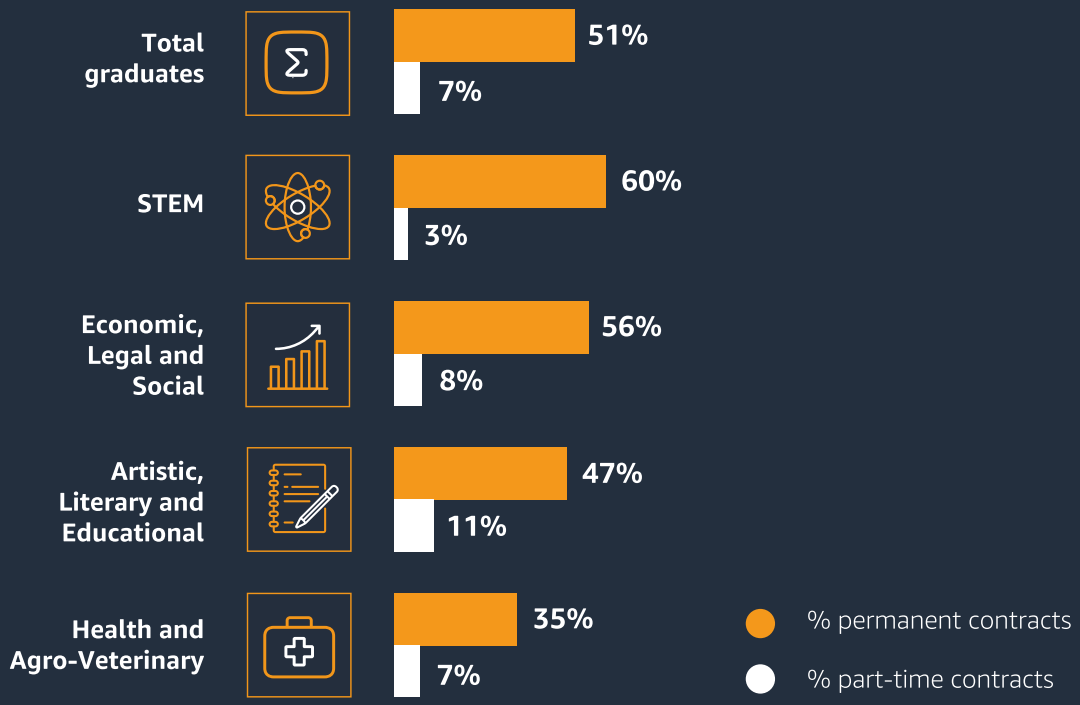



Source: Consorzio Interuniversitario AlmaLaurea, 2023.

## Better labour contracts

Another key benefit of STEM graduates over non-STEM graduates in their initial years of employment is the nature of the contracts they secure. In this respect, we have studied three variables: the weight of permanent contracts, the weight of part-time contracts, and the weight of involuntary part-time contracts (i.e. workers who would like their contracts to be full-time). The results demonstrate that within five years of graduation, 51% of Italian students have permanent contracts, while the figure for STEM graduates is 60%. Furthermore, while 7% of total graduates have part-time contracts, this figure drops to 3% among STEM graduates. The prevalence of involuntary part-time contracts is 4% for total graduates, compared to 1% for STEM graduates. When benchmarked against the Economic, Legal and Social Services field, which is ranked second, 56% of Italian students from this areas secure permanent contracts five years post-graduation, 8% obtain part-time contracts, and 4% face involuntary part-time employment.

### % PERMANENT AND PART-TIME CONTRACTS




Source: Consorzio Interuniversitario AlmaLaurea, 2023.

# The average monthly income in STEM occupations is 14% higher than in non-STEM

In terms of net monthly salary (2023 data), the average among STEM graduates is €1,893, while among non-STEM graduates the average drops to €1,664. This means the monthly net salary of STEM graduates is €229 higher than that of non-STEM graduates. This indicates that to achieve a comparable salary, a non-STEM graduate would need to increase their earnings by 13.8%. When the analysis is broken down by field, the following order is observed: Health and Agro-veterinary graduates (1.793€), Economic, Legal and Social graduates (1.727€), and Artistic, Literary and Educational graduates (1.473€).

In addition, the wage gap between STEM and non-STEM monthly salaries has widened in recent years: according to the available data, in 2015 the average salary of STEM graduates five years after graduation was 9.5% higher than that of non-STEM graduates, while in 2023 the difference increased to almost 14%.

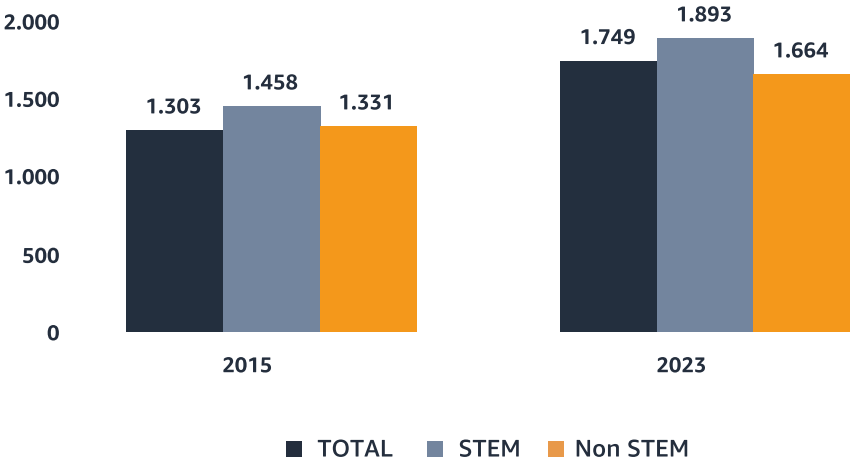
## NET MONTHLY SALARY

Source: Consorzio Interuniversitario AlmaLaurea, 2023.

**1.893€** STEM

**1.664€** Non STEM

## EVOLUTION 2015 – 2023: NET MONTHLY SALARY (€)




Source: Consorzio Interuniversitario AlmaLaurea, 2023 Graduate Employability Survey, 2015. ISTAT
Own elaboration.

# 3. STEM OCCUPATIONS, BETTER WORKING CONDITIONS

We now turn to analyze the situation of professionals working in STEM occupations in Italy (as opposed to university graduates analyzed in the previous chapter). We will provide data from the ISTAT Labour Force Survey, bearing in mind that we will now refer to both university and vocational graduates ([1]).

STEM occupations account for 9% of total employment compared to 91% for non-STEM occupations, but if we focus on those with tertiary education, the percentage rises to 19%, and falls to 9% for those with higher VET or upper secondary education.

## STEM AND NON-STEM OCCUPATIONS IN ITALY

Source: Consorzio Interuniversitario AlmaLaurea, 2023. Own elaboration.

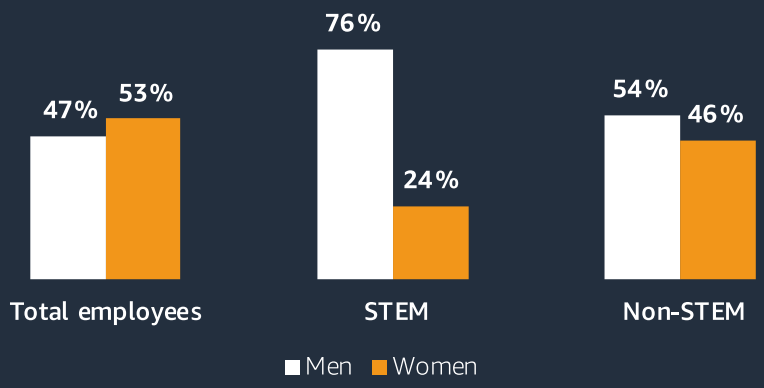
**9%**
**STEM**

**91%**
**Non STEM**

STEM occupations in Italy are highly masculinized. While the workforce is nearly evenly split (47% men, 53% women), in STEM occupations men account for 76% and in non-STEM occupations men account for 54%, so that the gender gap is much wider in STEM than in non-STEM occupations. If the scope is narrowed to university graduates only, the gender balance in STEM improves but is still very high.

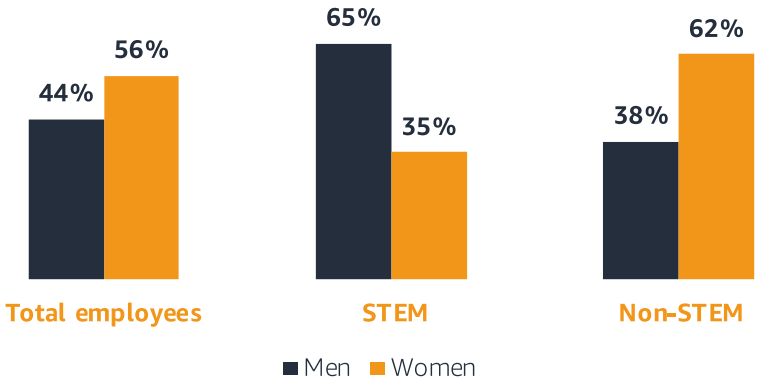
[1] To carry out the comparison, we have identified as STEM employed those individuals in the survey who, in the variables profession, area of studies and level of education, meet the following conditions: they work in intellectual, scientific and highly specialised professions or in technical professions, who hold degrees in the areas of computer and ICT technology, industrial and information engineering, architecture and civil engineering, and scientific degrees, and who have a secondary education level of VET, Baccalaureate and VET that allows access to university (grouped as 'VET or upper secondary graduates'), university diploma or degree, master's degree and doctorate (grouped as 'university graduates').

## GENDER DISTRIBUTION OF STEM AND NON-STEM EMPLOYED




Source: Labour Force Survey, 2024. ISTAT Own elaboration.

## AMONG THOSE WITH UNIVERSITY DEGREE GENDER DISTRIBUTION OF STEM AND NON-STEM EMPLOYED



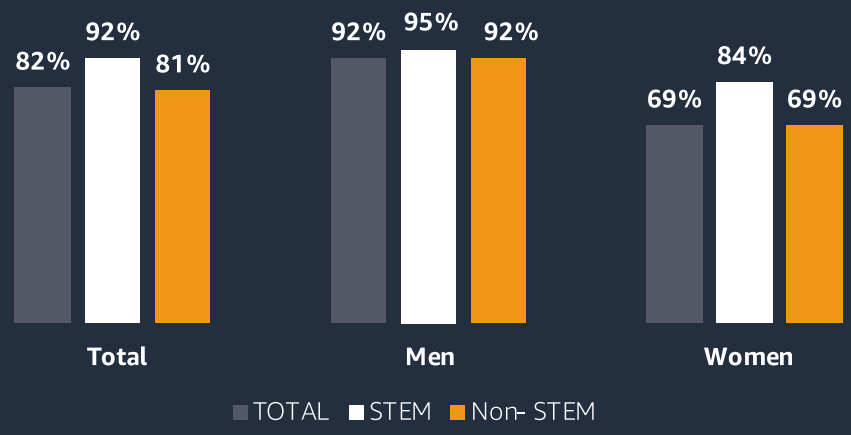

Source: Labour Force Survey, 2024. ISTAT Own elaboration.

Having previously established that STEM graduates enjoy better job opportunities at the end of their studies (5 years after graduation), the subsequent focus will be on how these better conditions are maintained in the subsequent years of their working lives. We will focus on a range of job aspects (including contract type, working hours, satisfaction with wages, satisfaction with career opportunities, and satisfaction with the interest of their work) to highlight the more favourable conditions experienced by those in STEM occupations compared to non-STEM occupations.

## The proportion of permanent contracts in STEM occupations is higher than in non-STEM occupations, at 92% and 84% respectively

The higher percentage of permanent contracts in STEM is evident for both men and women; however, the advantage is more pronounced for men. Indeed, the difference in the percentage of those with permanent contracts between STEM and non-STEM occupations is 9 percentage points for men, while for women the difference is 5 percentage points. It is noteworthy that the gender gap is more pronounced in STEM occupations, where the share of permanent contracts is higher for men (93%) compared to women (88%), whereas in non-STEM occupations, the share of permanent contracts is similar for both men and women (84% vs. 83%).

### PERMANENT CONTRACTS AMONG STEM AND NON- STEM EMPLOYED (GENDER SEGMENTATION)



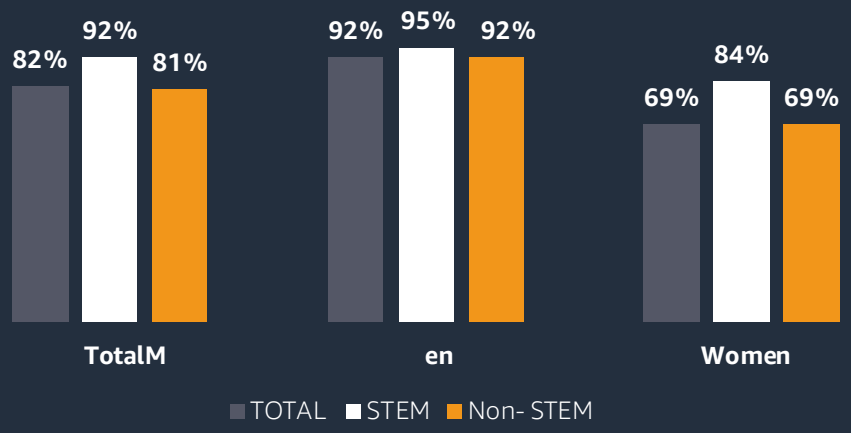

Source: Labour Force Survey, 2024. ISTAT Own elaboration.

## A higher proportion of full-time workers among STEM occupations than among non-STEM

The proportion of full-time workers (a priori more desirable as it allows for higher pay and career development) in STEM occupations is higher than in non-STEM occupations, with 92% of the former being full-time workers compared to 81% of the latter.

In this case, it is among women that the contrast between STEM and Non-STEM is most evident: 84% of STEM women are in full-time employment compared to 69% of non- STEM women.

## FULL-TIME WORK AMONG STEM AND NON- STEM EMPLOYED (GENDER SEGMENTATION)




Source: Labour Force Survey, 2024. ISTAT Own elaboration.

Furthermore, it is notable that more than half (54%) of those in STEM occupations who are employed part-time report that they chose to work part-time. In contrast, the primary reason given by those in non-STEM occupations for working part-time is the lack of full-time employment opportunities.

## STEM workers more satisfied with their wages, with the carrier opportunities their jobs offer and the interest of their works

In the field of STEM occupations, 76% of professionals express a high level of **satisfaction with their wages** (averaging 7.3 on a scale of 1 to 10). This figure stands in stark contrast to the 68% of those working in non-STEM occupations, who report an average satisfaction rating with their salary of 7.

Regarding the **opportunities afforded by their work**, 71% of STEM workers rate themselves as very satisfied or satisfied (scores between 7 and 10), while the corresponding figure for non-STEM employees is 58%. The average score for STEM is 7.1, which is half a point higher than the 6.6 for non-STEM.

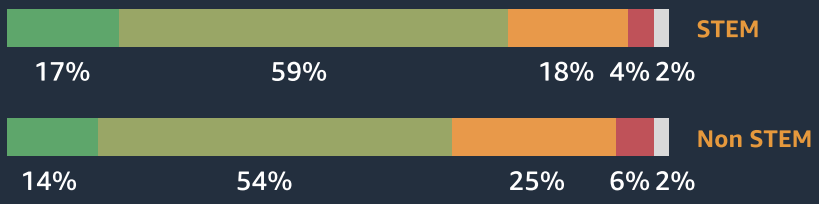
Focusing in the evaluation of the **interest of their jobs**, there is a significantly higher proportion of very and fairly satisfied among STEM (92%) than among non-STEM (84%), a difference of 8 points. Furthermore, the disparity in the proportion of those who are "very satisfied" is pronounced, with 45% of STEM workers and 34% of non-STEM workers achieving a score of 9 or 10 (a difference of 11 points). On average, STEM workers score 8.3, compared to 7.9 for non-STEM.

## SATISFACTION WITH

### WAGES

**78%** STEM

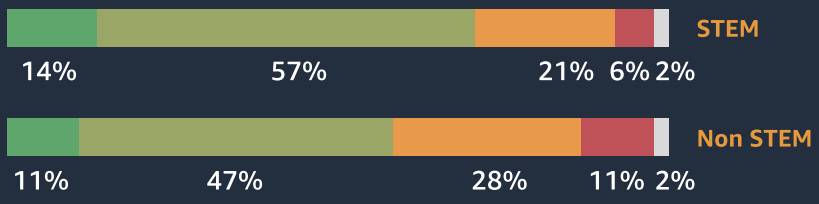
**68%** Non STEM




### CARRIER OPPORTUNITIES

**71%** STEM

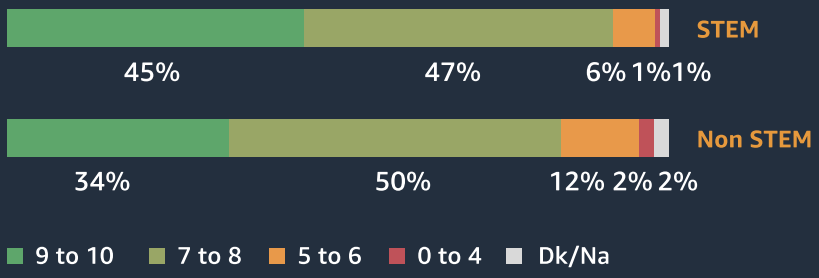
**58%** Non STEM




### THE INTEREST OF THEIR JOB

**92%** STEM

**84%** Non STEM




Source: Labour Force Survey, 2024. ISTAT Own elaboration.

# Key Findings

- The **contribution** of STEM occupations to the Italian GVA is estimated at **15%**, with workers in STEM occupations accounting for a total of 9% of all employees.
- The **data show** that studying STEM fields leads to **more and better employment opportunitie**s. The situation of STEM graduates five years after graduation is objectively better than that of non-STEM graduates in terms of employment rate, proportion of permanent contracts, proportion of full-time contracts or salary levels.
- The **enhanced opportunities** experienced during the **initial years** of graduation persist and are sustained in subsequent years, maintaining the advantages in terms of employability, contract type, salary levels, and job satisfaction.

# Methodology

The research has been based on the consultation, analytical and statistical exploitation of secondary sources.

## Data Collection

Obtaining economic and labour data from reliable sources (ISTAT, Eurostat, Consorzio Interuniversitario AlmaLaurea).

## Data Analysis

The analysis involved the use of statistical databases from ISTAT, as well as ad hoc tabulation and internal exploitation of the microdata from ISTAT's main surveys related to the objective (Rilevazione sulle Forze di Lavoro e Inserimento Professionali dei Laureati). Comparison of key indicators between STEM and non-STEM professions.

An analysis of the statistics provided by Consorzio Interuniversitario AlmaLaurea has been conducted, with particular emphasis on the graduate profile and their employment situation after five years.

## Links

**Rilevazione sulle Forze di Lavoro.** https://www.istat.it/en/microdata/labour-force-survey-cross-sectional-quarterly-data-2/

**Inserimento Professionali dei Laureati.** https://www.istat.it/en/microdata/university-graduates-vocational-integration-year-2011/

**Consorzio Interuniversitario AlmaLaurea.** https://www.almalaurea.it/i-dati/le-nostre-indagini/profilo-dei-laureati

**Eurostat Database.** https://ec.europa.eu/eurostat/web/main/data/database

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