DRŽAVNI ZAVOD ZA STATISTIKU
CROATIAN BUREAU OF STATISTICS

First Release

Year: LXI. Zagreb, 13 December 2024 ZTI-2024-2-3

ISSN 1334-0557

HUMAN RESOURCES IN SCIENCE AND TECHNOLOGY, 2023

In the Republic of Croatia, there were **715 068** persons aged 25 to 64 who we consider to be human resources in science and technology.

The results based on the Labour Force Survey data (LFS) are presented, which show current and potential stocks of human resources in science and technology.

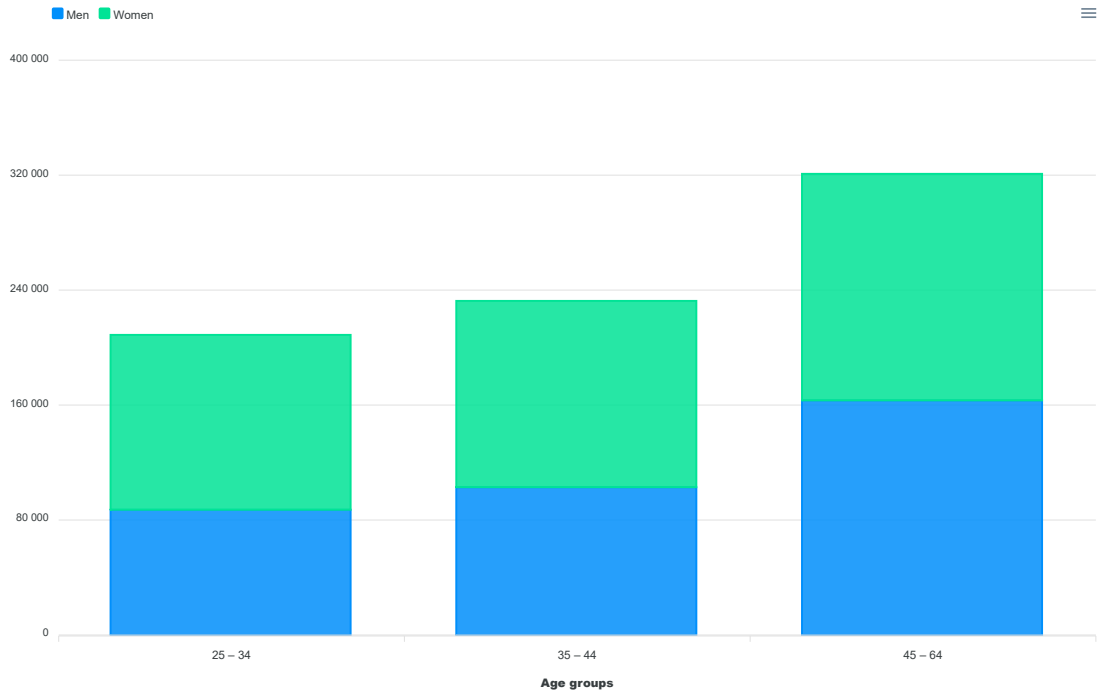
A rapidly-changing economic environment and a growing emphasis on the knowledge-based economy have led to a mounting international interest in the role and measurement of relevant skills. Data on human resources in science and technology (HRST) can improve our understanding of both the demand for, and supply of, science and technology personnel on the labour market.

According to the results of the Labour Force Survey, there were more than 715 thousand persons considered highly qualified – human resources in science and technology (HRST) aged 25 to 64 in Croatia. There were **581 thousand** persons who have successfully completed a university-level education (HRSTE) and **614 thousand** persons who are employed in science and technology occupations as professionals, technicians and associate professionals and managers (HRSTO). There were a little less than **433 thousand** persons in the group that fulfils both criteria (HRSTC).

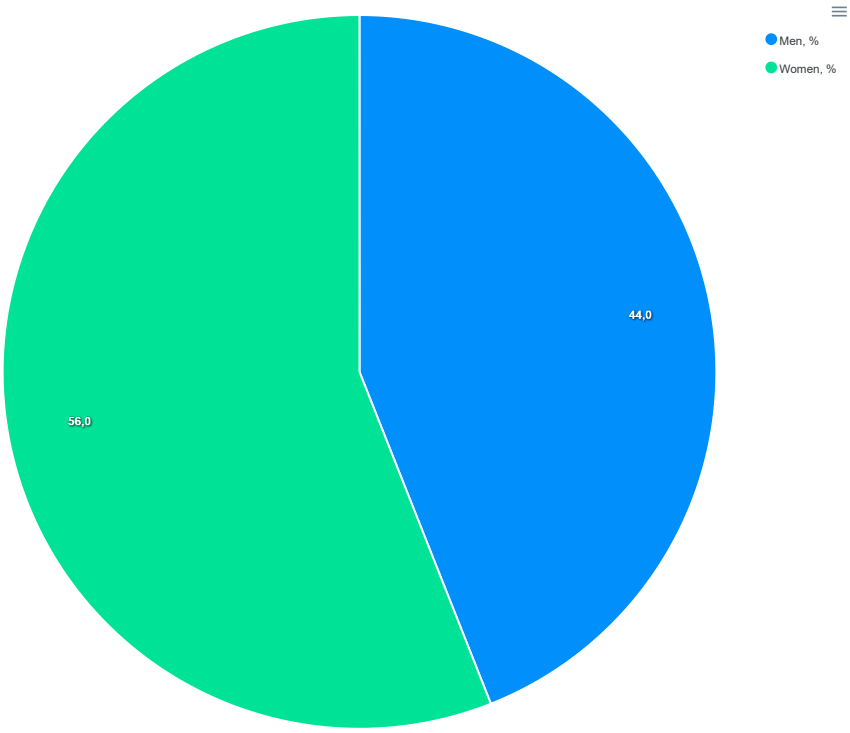
The share of human resources in science and technology (HRST) aged 25 to 64 in the active population of the same age group was **46.0%**, while the share of the HRSTC was **27.8%**.

The analysis of the population of human resources in science and technology (HRST) by age groups and sex shows that the share of women was 7.3 percentage points higher than that of men. The most represented age group was 45 to 64 with slightly less than 321 thousand persons. The share of women was the highest in the 25 to 34 age group (58.3%), while in the 45 to 64 age group the share of women was the lowest, amounting to 49.1%.

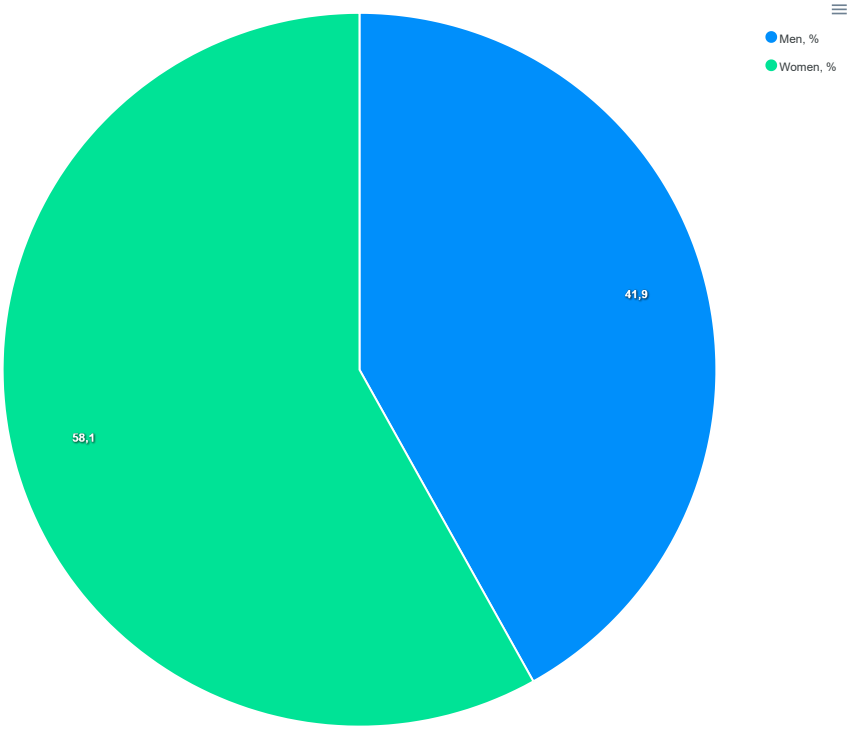
G-1 HUMAN RESOURCES IN SCIENCE AND TECHNOLOGY (HRST) BY AGE GROUPS, 2023



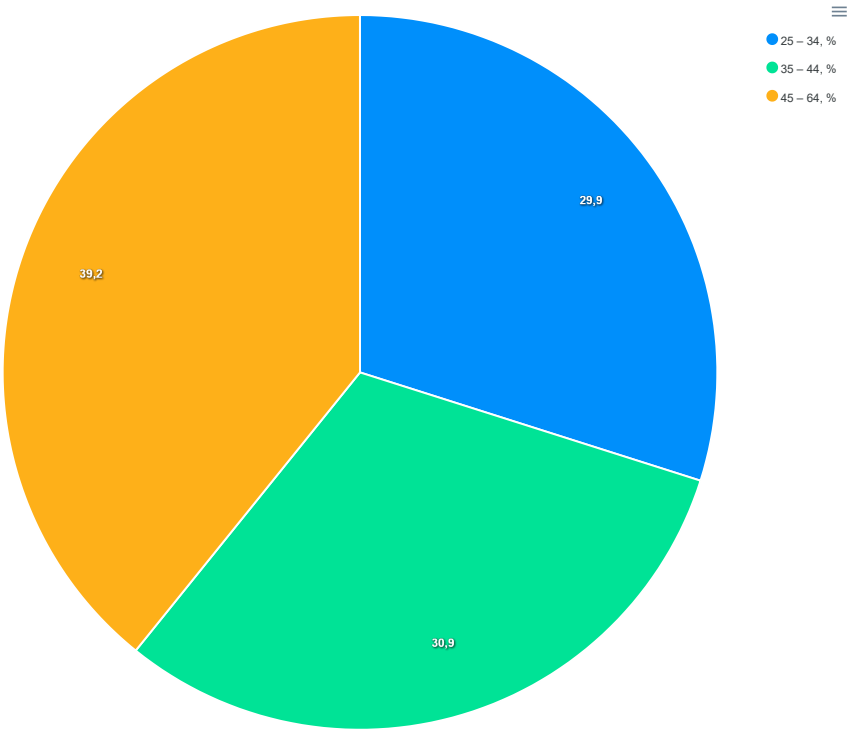
G-2 HUMAN RESOURCES IN SCIENCE AND TECHNOLOGY (HRST) BY SEX, 2023



G-3 HUMAN RESOURCES IN SCIENCE AND TECHNOLOGY HRSTE BY SEX, 2023

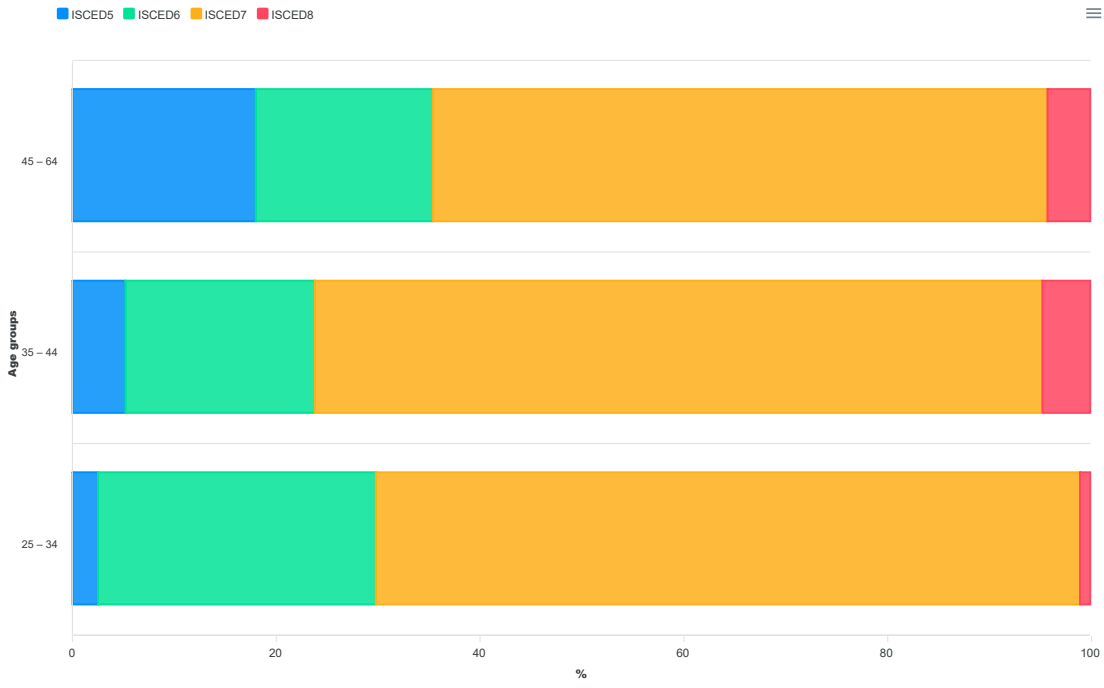


G-4 HUMAN RESOURCES IN SCIENCE AND TECHNOLOGY HRSTE BY AGE GROUPS, 2023



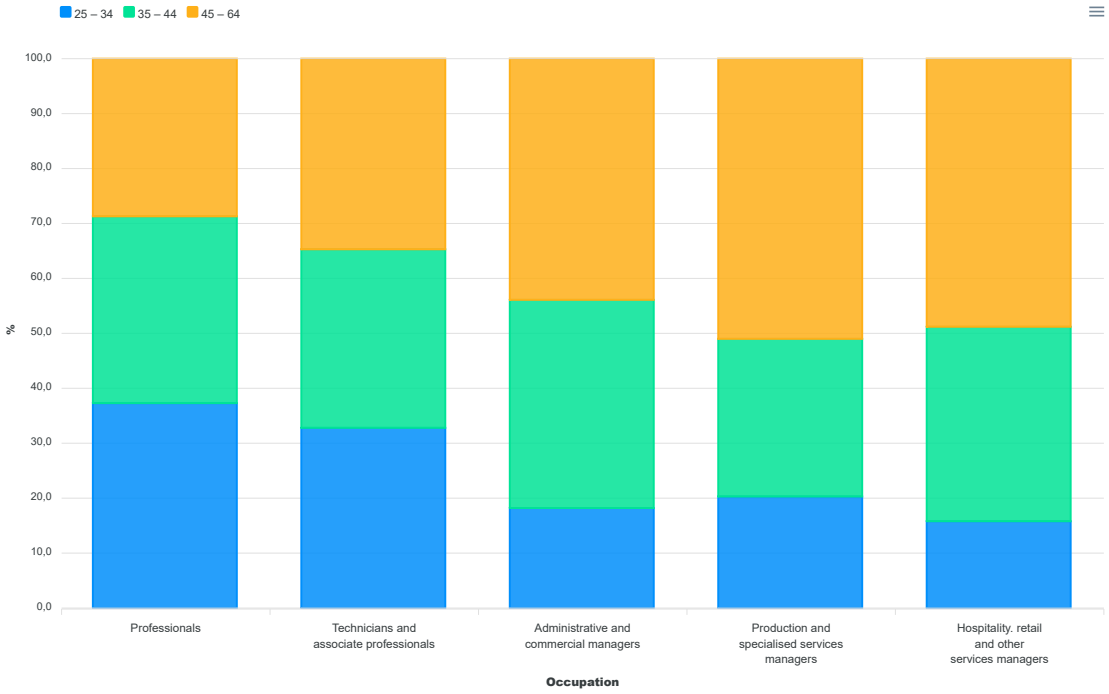
The analysis of the population of human resources in science and technology by education (HRSTE) by age groups shows that persons aged 45 and over were the most prevalent, accounting for 39.2% of the total number, while the share of persons in the 35 to 44 age group was 30.9%. The smallest share was calculated for the 25 to 34 age group, 29.9%. The share of women in the HRSTE population was 58.1%. There are more women than men in all three age groups. The share of women in the age group 25 to 34 is the highest at 61.6%, in the 35 to 44 age group, there were 60.2% of women, while the share of men and women in the 45 to 64 age group was almost the same, 46.3% for men and 53.7% for women. In all age groups, persons with educational attainment equal to ISCED level 7 had the highest share (69.2% of persons in the 25 to 34 age group and 71.5% of persons in the 35 to 44 age group). The largest number of persons who have earned the academic title of Doctor of Science (ISCED level 8), 4.7% of them, were in the 35 to 44 age group.

G-5 HUMAN RESOURCES IN SCIENCE AND TECHNOLOGY HRSTE BY LEVELS OF EDUCATION AND AGE GROUPS, 2023



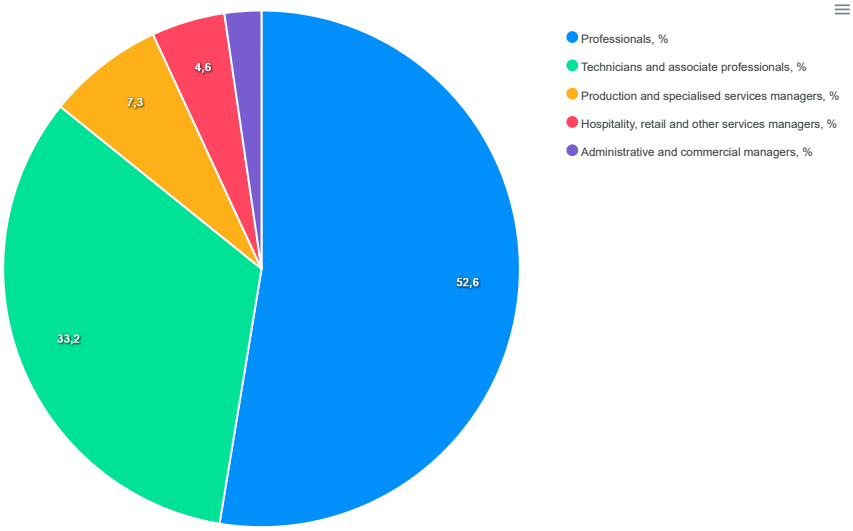
Within the HRSTE population, 88.0% of persons were employed, 3.2% unemployed and 8.8% inactive. The share of employed women in the HRSTE population was 57.8%. Most persons (97.2%) were employed full-time in science and technology activities, while 2.8% of them were employed part-time (2.7%) or did not answer the question (0.1%).

G-6 HUMAN RESOURCES IN SCIENCE AND TECHNOLOGY HRSTO BY AGE GROUPS AND OCCUPATION, 2023

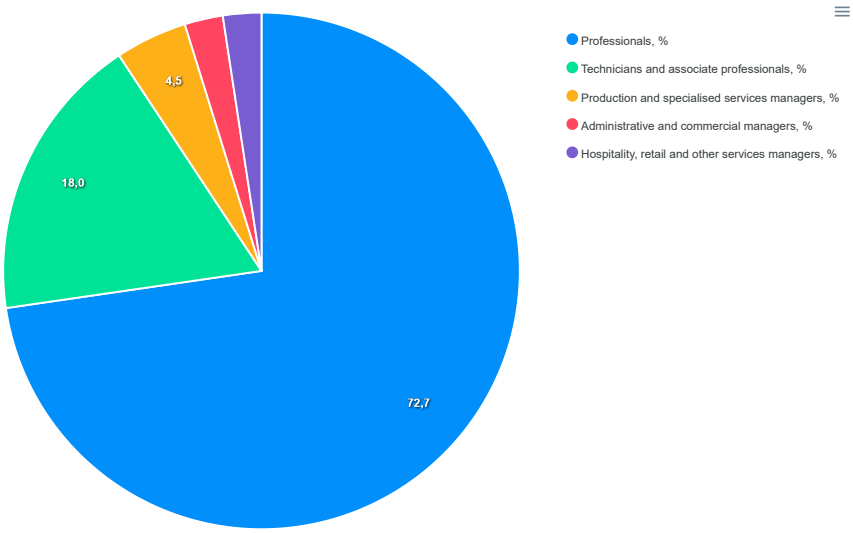


Human resources in science and technology by occupation (HRSTO) is a group of people that actively participate in science, technological development and innovation. This graph shows that persons in the 45 to 64 age group prevailed in all HRSTO occupations, while the smallest number of persons was recorded in the 25 to 34 age group. The youngest age group, 25 to 34, was the most prevalent in the Professionals category, with 28.4%. The distribution of the HRSTO population by occupation shows that slightly more of half of persons (52.6%) were employed as Professionals, as opposed to 72.7% of persons employed as Professionals in the HRSTC population.

G-7 HUMAN RESOURCES IN SCIENCE AND TECHNOLOGY HRSTO BY OCCUPATION, 2023



G-8 HUMAN RESOURCES IN SCIENCE AND TECHNOLOGY HRSTC BY OCCUPATION, 2023



Human resources in science and technology by education and occupation (HRSTC) is a group of persons who have successfully completed a university-level education and are employed in science and technology occupations. This group is crucial for the development of knowledge and innovation. The share of women in the HRSTC population was 58.1%. The majority of persons employed in science and technology area were professionals (72.7%), followed by technicians and associate professionals (18.0%), while administrative and commercial managers, production and specialised services managers and hospitality, retail and other services managers accounted for 9.3%. In the HRSTC population, 72.9% of persons have successfully completed education at the ISCED level 7.

NOTES ON METHODOLOGY

Data sources

Data in this First Release are a part of Labour Force Survey results[1)]. The methodology for the Survey is fully harmonised with the one prescribed by the Statistical Office of the European Union (Eurostat) and, therefore, enables the comparison of the Republic of Croatia with all EU Member States.

Coverage and comparability

Since the beginning of 2016, the earlier method of data collection on printed questionnaires was replaced by interviewing methods using laptops and telephones.

Since the beginning of 2021, the new Regulation (EU) 2019/1700 has entered into force, which repealed the Council Regulation (EC) No. 577/98, which was, until then, the fundamental legal basis for conducting the Labour Force Survey.

According to the methodology of the Survey, the population residing in institutions (such as homes, convents, hospitals for long-term treatments, etc.) is not included in the sample frame.

The overall non-response rate for 2023 was 42.9% and the refusal rate was 24.3%.

For the purposes of analysing data on human resources in science and technology, the coverage includes persons aged 25 to 64.

Definitions and explanations

The harmonised concepts, methods and definitions used to analyse and report data on human resources in science and technology originate from the Manual on the Measurement of Human Resources devoted to Science and Technology, the Canberra Manual[2)] (OECD, UNESCO, International Labour Organisation, the European Commission Directorate-General for Research and Innovation and the Eurostat).

The Canberra Manual describes highly skilled human resources as essential for the development and transfer of knowledge and as a crucial link between technological advancement, economic growth and social development. The aim is to explore basic characteristics of the part of the labour force with highly developed skills and the largest potential to contribute to the knowledge-based society.

In order to obtain the full picture of demand for and supply of human resources in science and technology, the definition is based on two aspects, qualification and occupation. The qualification aspect presents the supply of human resources in science and technology, that is, the number of persons currently or potentially available for work at a particular level. The demand for human resources in science and technology, that is, the number of persons actually needed in science and technology activities at a particular level, is connected with the occupation aspect. Because demand does not always match supply and because skills can be obtained outside the formal education system, the following combined definition is proposed.

The Canberra Manual defines human resources in science and technology as persons fulfilling at least one of the following two conditions:

- human resources by **education** (**HRSTE**): persons who have successfully completed a university-level education (ISCED 5, 6, 7 or 8)

- human resources by **occupation (HRSTO**): persons who are employed in science and technology occupations as professionals, technicians and associate professionals and managers.

The group that fulfils both criteria is called **HRST core (HRSTC).**

In the education system of the Republic of Croatia, the levels of education that we need for the analysis of data on human resources in science and technology by education (HRSTE) are as follows:

- according to the pre-Bologna programme

    - Undergraduate professional study (ISCED level 5)

- Undergraduate university study (ISCED level 7)

- according to the Bologna programme

- Professional short-term study (ISCED level 5)

- Undergraduate professional study (ISCED level 6)

- Specialist professional graduate study (ISCED level 7)

- Undergraduate university study (ISCED level 6)

- Graduate university study (ISCED level 7)

- Integrated undergraduate and graduate study (ISCED level 7)

- Doctorate of science (ISCED level 8)

The Canberra Manual recommends the identification of certain occupation groups as those included in the HRSTO, as follows:

- NKZ 10, major group 2: (professionals) – occupations that increase the existing stock of knowledge, apply scientific or artistic concepts and theories and systematically transfer the mentioned knowledge or combine the mentioned activities.

- NKZ 10, major group 3: (technicians and associate professionals) – occupations that cover mostly technical and related tasks connected with research and the application of scientific or artistic concepts and operational methods as well as state administration tasks.

- NKZ 10, groups 12, 13 and 14: (administrative and commercial managers, production and specialised services managers, hospitality, retail and other services managers).

Classifications used:

a) The International Standard Classification of Education ISCED 2011 was used in coding the education variable.

b) The National Classification of Occupations 2010 (NKZ-10), comparable to the International Standard Classification of Occupations ISCO-08, was used in coding the occupations.

1) For more detailed methodological explanations of the Labour Force Survey, please see the First Release RAD-2024-3-2 Labour force in the Republic of Croatia, 2023 – Annual Average on the website of the Croatian Bureau of Statistics https://podaci.dzs.hr/2024/en/76781

2) Human Resources in Science and Technology – the Canberra Manual – is the fifth manual in the Frascati family on the measurement of scientific and technological activities.

Abbreviations

EU	European Union
OECD	Organisation for Economic Cooperation and Development
UNESCO	United Nations Educational, Scientific and Cultural Organization

Published by the Croatian Bureau of Statistics, Zagreb, Ilica 3, P. O. B. 80
Phone: (+385 1) 48 06 111
Press corner: press@dzs.hr

Persons responsible:
Milenka Primorac Čačić, Director of Business Statistics Directorate
Lidija Brković, Director General

Prepared by:
Matija Škegro Vdović and Vjera Duić

Customer Relations and Data Protection Department

Information and user requests
Phone: (+385 1) 48 06 138, 48 06 154, 48 06 115
E-mail: stat.info@dzs.hr

Subscription
Phone: (+385 1) 21 00 455
E-mail: prodaja@dzs.hr