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# Educate for future **EDU4future**



## **IO 2: Country report**

**Slovenia**

**version (EN)**

**HOW ARE INDUSTRY 4.0 REQUIREMENTS IMPLEMENTED  
IN THE VOCATIONAL EDUCATION AND TRAINING SYSTEM  
OF YOUR REGION AND/OR COUNTRY?**

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## 1 INTRODUCTION

The current situation created by the Covid-19 pandemic has exacerbated some of the challenges industry is facing and is accelerating the need to align industrial practices with the fourth industrial revolution: Industry 4.0. In this context, the training of qualified professionals is vital to effectively support the transformation processes. Transferring new competencies into effective training programmes is a complex process in which different countries can learn a lot from each other through the exchange. However, these processes are often difficult to grasp and different in each country. This International Methodology seeks to capture relevant aspects of these processes in different countries to enable a comparative analysis of approaches, initiatives, and solutions. Based on the gained insights, meaningful recommendations will be formulated.

This document was produced as part of the Edu4Future project, which aims to answer the overarching question: [How are Industry 4.0 requirements implemented in different European Vocational Education and Training systems?](#)

To adequately answer this question, considering the multitude of perspectives and actors in the VET system, we need to capture the insights and contributions of stakeholders. This input needs to be collected in a structured way to perform a meaningful comparative analysis of the material. EDU4future has opted to create Country Reports to ensure the comparability of the collected data.

The Country Report created will be primarily descriptive, and its primary value is that it is comparable to other Country Reports.



## 2 BASIC INFORMATION ABOUT THE COUNTRY AND ITS EDUCATION SYSTEM

At this point, we describe the current situation in the Republic of Slovenia.

Please identify the author(s) and association of this Country Report:

G&P svetovanje Gregor Jagodič s.p.

Please identify your country (and/or region):

Slovenija

The document serves as a guide for authoring reports, which can be of two types: a) Country (or regional) report across sectors or b) Sector report, which analyses 1 selected sector or sub-sector in more depth.

In the Report, we have selected all the sectors with the significant impact on the technologies associated with Industry 4.0 and to which VET should respond or is already responding as a matter of priority.

Please identify your applicable industry sector(s) by providing the NACE (Nomenclature of Economic Activities) Code(s). For details, please check <https://nacev2.com/en>:

### Section A - Agriculture and hunting, forestry, fishing

- A01 Agricultural production and hunting and related services
- A02 Forestry
- A01.3 Plant propagation

### Section C - Manufacturing

- C10 Manufacture of food products
- C11 Manufacture of beverages
- C13 Manufacture of textiles
- C14 Manufacture of wearing apparel
- C15 Manufacture of leather, leather, and related products
- C16 Treatment and processing of wood; Manufacture of articles of wood, cork, straw, and plaiting materials, except furniture
- C17 Manufacture of paper and paper products
- C18 Printing and reproduction of recorded media
- C20 Manufacture of chemicals and chemical products
- C21 Manufacture of pharmaceutical raw materials and preparations
- C27 Manufacture of electrical equipment
- C29 Manufacture of motor vehicles, trailers, and semi-trailers
- C30 Manufacture of other transport equipment
- C31 Manufacture of furniture
- C32 Manufacture of jewellery, bijouterie, and related articles
- C33 Repair and installation of machinery and equipment

### Section D - ELECTRICITY, GAS AND STEAM SUPPLY

- D35 Electricity, gas, and steam supply

### Section E - WATER SUPPLY; SEWERAGE AND WASTE MANAGEMENT; ENVIRONMENTAL REHABILITATION

- E36 Water collection, treatment, and supply
- E37 Sewage treatment
- E38 Waste collection and disposal activities; extraction of secondary raw materials
- E39 Environmental remediation and other waste management





## **Section F - CONSTRUCTION**

- F41 Construction of buildings
- F42 Construction of civil engineering works
- F43 Specialized construction activities

## **Section G - TRADE; MAINTENANCE AND REPAIR OF MOTOR VEHICLES**

- G45 Sale, maintenance, and repair of motor vehicles
- G46 Wholesale trade, except motor vehicles and motorcycles
- G47 Retail trade, except motor vehicles and motorcycles

## **Section H - TRANSPORT AND STORAGE**

- H49 Land transport; pipeline transport
- H50 Water transport
- H51 Air transport
- H52 Warehousing and support activities for transportation

## **Section I - HOSPITALITY**

- I55 Catering activities

## **Section J - INFORMATION AND COMMUNICATION ACTIVITIES**

- J58 Publishing
- J59 Activities relating to films, video, and sound recordings
- J60 Radio and television activities
- J61 Telecommunications activities
- J62 Computer programming, consultancy, and related activities
- J63 Other information service activities

## **Section K - FINANCIAL AND INSURANCE ACTIVITIES**

- K64 Financial services, except insurance and pension funding
- K65 Insurance, reinsurance, and pension funding, except compulsory social security
- K66 Activities auxiliary to financial and insurance services

## **Section M - PROFESSIONAL, SCIENTIFIC, AND TECHNICAL ACTIVITIES**

- M69 Legal and accounting activities
- M70 Business management activities; business and management consultancy
- M71 Architectural and engineering activities; technical testing and analysis
- M72 Scientific research and development
- M73 Advertising and market research
- M74 Other professional and technical activities

## **Section N - OTHER MISCELLANEOUS BUSINESS ACTIVITIES**

- N78 Employment activities
- N79 Travel agency, tour operator and other reservation service and related activities
- N80 Security and investigation activities
- N81 Supply of buildings and surroundings
- N82 Office and business support service activities

## **Section P - EDUCATION**

- P85 Education

## **Section Q - HEALTH AND SOCIAL WELFARE**

- Q86 Healthcare

## **Section R - CULTURAL, ENTERTAINMENT AND RECREATIONAL ACTIVITIES**

- R90 Cultural and entertainment activities
- R92 Gambling activities
- R93 Sports and other leisure activities

## **Section S - OTHER ACTIVITIES**

- S95 Repair of computers and personal and household goods
- S96 Other service activities



## 2.1 Covering some basic information

### 2.1.1 VET System in SLOVENIA

In the Republic of Slovenia, the education system is organised mainly as a public service. Public and private institutions and private individuals with a concession implement publicly valid programs.

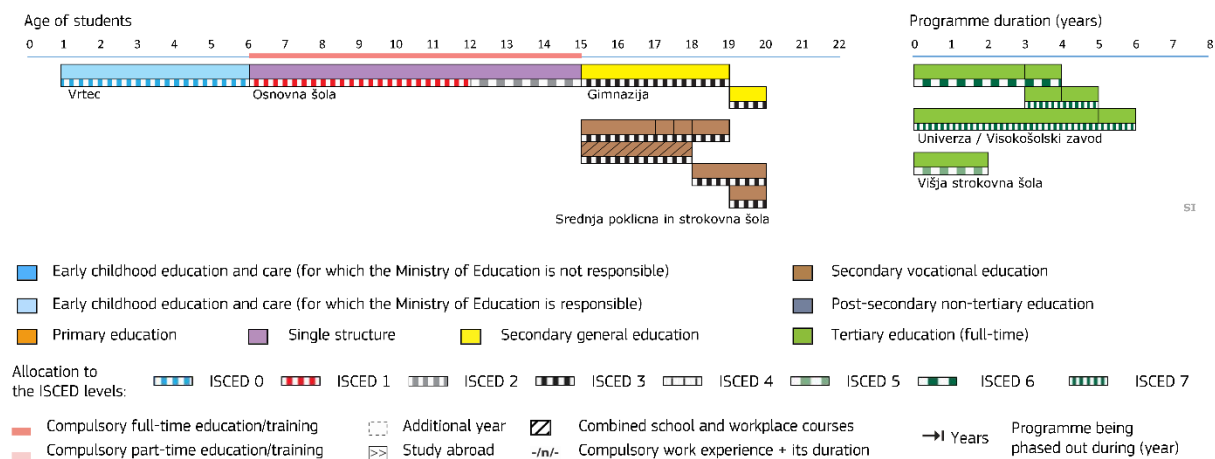
The state controls public institutions through mechanisms such as the appointment of its representatives to governing bodies, public funding, the pay system, the adoption of general rules and guidelines on public services, a centrally adopted training program, and so on. In addition, the school inspection in Slovenia supervises the implementation of regulations.

After compulsory nine-year primary education, students continue their education in secondary education programs. The differentiation of children begins in high school, usually at the age of 15. Students choose between general and vocational programs. If there are more candidates than there are vacancies, schools limit enrolment in the first year.

At the end of high school, students take final exams. In two-year or three-year vocational programs, students take a final exam. Pupils at the end of general or vocational secondary education take a general or vocational Matura, i.e. national external testing. Pupils who successfully pass the Matura exam can continue their education in tertiary study programs.

There is a wide selection of different programs and institutions for adult education in Slovenia. In addition to formal programs, there are also publicly valid informal programs for individual groups of adults, especially people who need to improve their basic skills or literacy or people who are trying to find their place in society and need help.

### Slovenia – 2020/21



Secondary education is divided into:

- general education, which includes various types of gymnasiums and a Matura course and is intended to prepare for continuing education at universities, and
- Vocational and professional education is intended to acquire a profession for entering the labour market and professional education for continuing education in tertiary education programs.

Secondary schools provide secondary education; these may specialise in only one type of education (grammar schools) or run several programs. Due to their programmatic diversity and size, they can be uniform or organised as multi-unit school centres.



The secondary education system is centralised; the establishment and financing of schools and the adoption and deployment of educational programs are decided at the national level. Schools and teachers are (subject to the relevant regulations) autonomous in the concretisation of learning content, the choice of teaching methods, staffing and regulation of employment relationships and the enrolment of newcomers.

High schools can implement only one program, which is rarer and typical, especially for larger cities, or several programs within the same or different types of complexity. Schools with a single program are most often gymnasiums. However, schools are more familiar to offer various programs to cover broader educational interests in a particular geographical area. Therefore, as a rule, schools implement several programs, from lower and secondary vocational to secondary vocational. Still, they can also implement a grammar school program in addition to vocational and professional.

When the program offer is very diverse and at the same time dictates the size of the school, it can be organised as a school centre. An internal division characterises it into organisational units. Organisational units are relatively independent in managing the pedagogical process, and financial, material and personnel management is organised at the level of the institution.

The public network of schools with a total number of advertised enrolment places at the state level provides secondary education to all those who have completed primary education. By deploying programs to the regional environment, the state tries to provide a program offer that should satisfy the interests of schoolchildren and, at the same time, give the economy the need for staff. Larger regional centres also have a larger program offer. Those who go to school in more remote places can stay in student dormitories.

Anyone who has completed primary school can enrol in grammar school educational programs. Additional enrolment conditions may be set for some programs, such as knowledge of classical or foreign languages or artistic talents. For enrolment in sports departments, they must have proof of sports achievements.

Anyone who has completed primary school or lower vocational education can enrol in secondary vocational education. Anyone who has completed primary school or lower vocational education can enrol in secondary vocational education.

Anyone who has completed secondary vocational education can enrol in two-year vocational education programs.

Anyone who has completed the 4th year of grammar school or the final year of the educational program for obtaining a secondary professional education can enrol in one-year vocational training programs.

Pupils who have fulfilled the primary school obligation and have completed at least the 7th grade of primary school or completed primary school according to an educational program with a lower academic standard adapted for special-needs children may enrol in lower vocational education.

The vocational and professional education program may also determine unique talents or psychophysical abilities necessary for successful education and performance of work in a specific activity or profession.

Secondary vocational education is organised in departments with a maximum of 30 students. However, if there are special-need students in the group, the number of students is reduced: one student with special needs to a maximum of 26, two to 23 and three or more to 20.





In practical classes in-school workshops, students are usually divided into groups of 10 to 17 students, depending on the nature of practical courses in each program; in particular, the safety aspect shall be considered. In addition, smaller groups are formed in specific programs in the exact contents of practical lessons (forestry, mining, glassmaking, agriculture, mechanical engineering, woodworking, health care, and dentistry).

Secondary professional education can also be obtained by successfully passing a master's, foreman's, or manager's exam.

Candidates conduct the master's exams before the examination boards, which are appointed by the minister responsible for secondary education for four years on the proposal of the Chamber of Craft and Entrepreneurship of Slovenia. After successfully passing the exam, the candidate receives the title of "master" in a particular field of activity and a master's degree.

Candidates conduct candidates and managerial examinations before examination committees appointed by the minister responsible for secondary education for six years on the proposal of chambers of commerce, business associations or companies. After successfully passing the exam, the candidate receives the title of "foreman" or "manager" from a particular field of activity and "Certificate of foreman exam" or "Certificate of the managerial exam".

With additionally completed general education subjects of the vocational Matura (Slovene and mathematics or a foreign language), masters, managers and forepersons acquire the right to enrol in higher professional education.

At the national level, the primary responsibility and competence for adult education and training lie with the Ministry of Education, Science and Sport, where a special Directorate for Secondary and Higher Education and Adult Education operates.

The general law in this area is the Adult Education Act (amended in 2006). It regulates the education, training, education and learning of persons who have fulfilled primary school obligations and wish to acquire, update, expand and deepen knowledge but do not have the status of a pupil, high school, or college student. The law stipulates that adult education is carried out based on a national program adopted by the National Assembly. The vision of this program is that every adult in Slovenia will have equal opportunities for quality education at all stages of life.

The network of adult education providers includes both specialised institutions and various organisations that provide adult education as a complementary activity. These include adult education units in primary and secondary schools and higher education institutions; human universities; universities for the third age; training centres for companies and other business entities whose main activity is not education, such as private adult education institutions and private non-profit institutions, societies, associations of organisations, libraries, museums, galleries; chambers of commerce, crafts and other, driving schools (driving schools).

Publicly subsidised adult education programs in Slovenia include programs that develop basic knowledge and skills; programs aimed at obtaining formal educational qualifications; programs for the unemployed or those whose employment is at risk; and general non-formal adult education programs.

Several programs have been developed with public funds to raise basic knowledge and skills. A vital framework program designed at a national level is "Training for Life Performance". This Framework Program aims to increase adult literacy, strengthen social skills, promote active citizenship, and adult education programs targeted explicitly at migrants.

Adults can acquire all levels of formal education. Acquisition of primary education is a legally guaranteed right, so primary education is accessible regardless of age. Adults wishing to complete secondary education may enrol in programs with special organisational adjustments if they meet the requirements for primary education or any other formally defined specific enrolment criteria. Adults can also enrol in higher levels of education as part-time students.

Three forms of general non-formal adult education have been permanently funded from public funds for many years, namely study circles, centres for independent learning and knowledge exchange. Recognition of non-formally acquired knowledge covers all levels of education and enables the acquisition of a profession through the National Vocational Qualification (NPK).

However, the training and education system differs significantly for the programs of the 2nd and 3rd-year schools, and in some parts also for the programs 4 or 5-year schools, especially when it comes to specific craft professions.

More than 90% of young people aged 15 to 18 are involved in secondary education, or about 93% if we also consider those 15-18-year-olds included in adult secondary education. In addition, about 35% of all students are enrolled in secondary general education, about 46% are enrolled in secondary technical and vocational education, and about 18% are enrolled in lower and secondary vocational education.

Boys are involved in vocational and professional education more than girls. For example, almost three quarters (74%) of all male students chose programs in engineering (about 39%) and computer science (about 11%). On the other hand, female students opted for vocational and professional programs in smaller numbers, namely for programs in the field of health care (around 12%), personal services (approximately 13%) and business sciences (about 10%).

Slightly more women (around 52%) than men (approximately 48%) attend adult secondary education programs. The vast majority of those involved (about 85%) are under 26, with around 5% seeking secondary general education, approximately 60% technical and other vocational education, and around 34% lower and secondary vocational education.

Which of these options best describe the VET system in your country (C) and specific to your sector(s) [INSERT applicable NACE code(s)]?

	General (national / region)
dual system or very similar	
mostly school-based	X
mostly work-based	
differs greatly between sectors	X
differs greatly between occupations	X
other [insert here]	

Please provide an estimate on the approximate ratio between work- and school-based learning in the VET system of your country generally and your sector (if applicable).

	General (national / region)
work-based learning	< 10%
school-based learning	> 90%
	100%

Which types of vocational schools exist to train workers in the industry sector in your country?



Would you please provide detailed information for each type of vocational school in the following table (please copy and paste the table for further entries)?

Training for the occupation of following NACE sector(s):	<b>Apprenticeship</b> (carpenter, stonemason, toolmaker, gastronomic and hotel services, glazier, papermaker, painter, mechanic, bricklayer, electrician, mechatronic operator, roofer, car repairman)	<b>Vocational training in craft activities</b> (bricklayer, carpenter, construction machinery operator, tiler-roofer, painter, letter painter, floor tiler, stove, chimney sweep, glazier, stonemason, mechanical installer, toolmaker, goldsmith, metallurgist, carpenter, upholsterer, car mechanic, mechatronic operator, electrician, graphic operator, florist, gardener, hairdresser, clothing manufacturer, grocer, butcher, baker, confectioner, gastronomy, hotelier, cosmetic technician, optician technician, photographic technician)	<b>General vocational education</b>
Ratio between work- and school-based learning:	33% / 67%	14% / 86%	5% - 10% / 90% - 95%
Initial or further education:	X / -	X / X (partly)	X / X
EQF Level of school-leaving qualification:	SQF 4	SQF4 and 5	SQF 4 and 5
Entry requirements:	Completed primary school	Completed primary school, as well as some 2- or 3-year high school program	Completed primary school
Additional information:			

Does the law regulate VET in your country?

yes	X
no	

If applicable, provide details regarding the law(s) to regulate VET in your country and/or sector(s). For example, which aspects of VET are regulated?

The management of vocational and technical education is centralized; Decisions on the establishment of vocational and technical schools or the distribution of vocational and technical education programs among schools are taken at the national level. The Ministry of Education, Science and Culture regulates, financing, and manages vocational education for young people and adults. While the Ministry of Education deals with vocational and technical education at the system level, the Centre of the Republic of Slovenia for Vocational Education and Training plays an essential role in developing and supporting vocational and professional education at the practical level (Cedefop, 2021a). In addition, the MDDSZ is responsible for adopting professional standards, the system of national professional qualifications and the training of the unemployed and jobseekers.

Vocational education and training in Slovenia are regulated by the Gymnasium's Act (1996, amendments 2007, 2017, 2018, 2019); Vocational and Professional Education Act (2006, amendments 2017 and 2019); Matura Act (2003, amendments 2007 and 2016); and the Apprenticeship Act (2017).

The purpose of vocational and technical education is to provide the knowledge, skills, professional competencies, and abilities necessary for the performance of the chosen profession and further education (Article 2 of the Vocational and Professional Education Act, 2006).

Most vocational and technical education programs are available at the secondary level; two-year postgraduate study programs are also available at the tertiary level. All secondary and tertiary



vocational and technical education programs are considered initial formal and technical education programs leading to nationally recognized vocational qualifications. The programs are free for regular participants in the training, and participants who attend the part-time program (adults) pay tuition fees.

Initial vocational and technical education programs are competence-based and modular at the secondary and tertiary levels. Completion of a certain number of professional modules leads to a professional qualification. Vocational and technical education modules describe the learning outcomes through learning theory and practical lessons in school workshops or inter-company training centres. A catalogue of knowledge has been prepared for each professional module at the national level. The catalogues include guidance objectives, professional competencies and learning outcomes to be achieved at the end of the module.

Tertiary vocational education programs focus on vocational modules. At the same time, secondary vocational and technical education programs also include general education subjects (for example, mother tongue and foreign language, mathematics, science and social sciences) at various levels. In addition, all vocational and technical education programs also develop key competencies, which are defined in national knowledge catalogues and included in all subjects and professional modules.

Initial programs of secondary vocational and technical education are:

- a) two-year programs - lower vocational education (NPI);
- b) three-year programs - secondary vocational education (SPI);
- c) four-year professional and technical programs - secondary vocational education (SSI);
- d) two-year vocational-technical programs - vocational-technical education (PTI);
- e) one-year vocational (bridging) courses (PT).

The Slovenian education and training system also includes that people learn in many ways; therefore, there are different ways of verification and certification regulated by law. There are two regulated ways or two primary purposes of recognizing non-formal learning: identifying vocational competencies (national vocational qualifications system) in the labour market and enabling individuals to engage in further formal education (continuing education or continuing higher education, etc.) (CPI, 2020).

The system of national vocational qualifications, which is included in the National Vocational Qualifications Act of 2000 and is under the jurisdiction of the Ministry of Labour (MDDSZ), is the oldest system of verification and certification (Pavkov, 2019). It enables the recognition of competencies acquired in different learning environments and the acquisition of a formal professional qualification, a publicly valid document (NPK certificate), which is transferable to different work environments (CPI, 2020). The system of national professional qualifications is included in the Slovenian Qualifications Framework (SQF), which covers EQF levels from 2 to 5 (Pavkov, 2019). The backbone of this system is the national register of national professional qualifications; in 2020, it comprised 316 national professional qualifications.

The certification system for national professional qualifications covers a network of institutions and committees. It follows the rules and specific principles for quality assurance (QA), including the impartiality, transparency and comparability of an individual's skills.

The NPK catalogue is used for the verification and certification process. In addition to the requirements for candidates, it also sets out the requirements for providers of identification and certification procedures and members of the examination and certification committee (Drofenik, 2017):

- a) The providers of systems for the identification and certification of NPK provide the appropriate infrastructure, are included in the register and are supervised by the National Examination Centre



(RIC);

- b) The verification and certification committee members are experts with appropriate education and work experience. After training for this role, the RIC grants them a four-year license, which can be renewed based on proof of further professional training or other conditions required by a particular NPK catalogue (Knavs and Schlander, 2019).

In addition to the system of national vocational qualifications, which enables the acquisition of a full NPK based on verification and certification of non-formal education and informal learning, since 2006, verification and certification of non-formal education and informal learning are possible in all educational subsystems, 2019).

The Vocational and Professional Education Act regulates verification and certification in secondary vocational and technical education (amendments in 2017). They stipulate that schools providing part-time education may adapt educational programs to the needs of individual participants, taking into account previously formally acquired knowledge or non-formal knowledge demonstrated by an examination or otherwise. Furthermore, the Minister responsible for education prescribes the manner and procedure of verification and assessment of the ability, acquisition of credit points, verification and certification of non-formal knowledge and the form and content of public documents confirming completed education (Pavkov, 2019).

The deregulation process of professions began in 2010; the original number of 323 regulated professions was reduced to 220. In 2021 (Ministry of Labour, Family, Social Affairs and Equal Opportunities, MDDSZ, 2021; SPOT, 2021), deregulation focused on all industries, although mostly in tourism, construction, veterinary, trade, social security, salesman and trade manager. This policy aims to obtain easy access to the labour market. In addition, it will reduce administrative burdens to facilitate the integration of young people, migrants and other vulnerable groups into the labour market. It will also increase market flexibility (facilitate career changes, speed up the activation of the unemployed) and ensure the smooth provision of services (e.g. reducing the number of licenses or permits required for certain professions) (Cedefop and CPI, 2019).

### 2.1.2 Workers' competencies needed for the Industry 4.0 work environment

Workers need particular competencies to succeed in the Industry 4.0 work environment. Therefore, it is helpful to organise competencies into four overarching competency levels: technical skills, data and IT skills, social competence, and personal skills. In a comparative analysis of 26 studies and research reports, critical competencies of relevance for Industry 4.0 were identified<sup>1</sup>. These are used in the following section as a basis for the questions. In addition, you can use the ESCO classification of occupations for support regarding occupation-specific competencies.

**Technical competencies** are all those skills that relate to primary and specialist knowledge from a particular discipline, sector, or job profile (e.g., understanding of processes, production system knowledge, process management, quality assurance).

Related to your sector(s), which specific technical competencies have been identified as particularly relevant to Industry 4.0?

General technical competencies (please identify general technical competencies relevant to all occupations).

Understanding processes  
Process management  
Quality Assurance

<sup>1</sup> For more, see Schmid (2017) [What type of competencies will Industry 4.0 require?](#)



Use of virtual reality  
Understanding the business environment  
Entrepreneurial knowledge and skills

**Data and IT competencies** are all types of knowledge and skills related to data collection, analysis, and protection as well as the monitoring, usage, and maintenance of data-based systems (e.g., documentation, cloud-computing, use of research and digital tools, programming, software development, artificial intelligence, 3D printing, IT support, user experience design).

Related to your sector(s), which specific data and IT competencies have been identified as particularly relevant to Industry 4.0?

General Data and IT competencies (please identify general technical competencies relevant to all occupations).

Knowledge of IT hardware  
Knowledge and use of IT software  
Knowledge of software packages  
Knowledge of information systems  
Knowledge of online tools  
Use of video conferencing systems  
Knowledge of programming languages and programming  
Understanding networks  
Artificial intelligence  
Management of computer-controlled machines and devices  
Use of virtual reality

**Social competencies** are skills related to communication and collaboration activities (e.g., interdisciplinary and intercultural collaboration, translation and transfer competencies, user-oriented engagement, motivating innovation and performance).

Related to your sector(s), which specific social competencies have been identified as particularly relevant to Industry 4.0?

General social competencies (please identify general social competencies relevant to all occupations).

Interdisciplinary knowledge  
Ability to connect with others  
Teamwork  
Intercultural cooperation  
Ability to transfer knowledge and skills - mentoring  
Employee leadership skills  
Ability to motivate  
Ability to manage projects  
Finding niche markets  
Innovativeness and acceptance of change

**Personal competencies** are all types of knowledge and skills related to emotional dispositions and capacities (e.g., willingness for continuous improvement and lifelong learning; holistic, analytical, and creative thinking; problem-solving; self-guided learning, recognition of transferable skills; tolerance of ambiguity; flexibility).

Related to your sector(s), which specific personal competencies have been identified as particularly relevant to Industry 4.0?

General personal competencies (please identify general emotional competencies relevant to all occupations).



Lifelong learning  
Creative thinking  
Analytical thinking  
Ability to solve problem situations  
Interest in independent learning  
Tolerance  
Flexibility  
Understanding  
Empathy (understanding) in the situations of others

### 2.1.3 Labour market requirements

This section is dedicated to collecting labour market requirements on a general (European or even global) and country-specific or regional level.

How are labour market requirements related to Industry 4.0 generally identified **in your country/region?**

Technological change will require a more skilled workforce, which will require a greater focus on adult education and training of the workforce. Therefore, raising adults' level of knowledge and skills is increasing. The Slovenian population is ageing, and about 26% of workers are at high risk of having their jobs automated; for comparison: in the PIAAC (International Adult Competence Assessment Program) countries, such workers average 14% (OECD, 2018).

The education and training system will have to prepare for long-term demographic challenges that could harm the number of students in vocational and technical education (PSIU) programs. The state responded by adopting an active ageing strategy (Long-Term Society Strategy, IMAD, 2018) and comprehensive support to companies for the active ageing of employees to increase the professional competencies of the adult population.

The Ministry of Labour and the Ministry of Education play a key role in anticipating key skills activities. The ESS, labour market intermediaries and employers' organizations related to skills anticipation are also active. The Slovenian government has invested resources and work to develop skills anticipation activities and improve appropriate tools. The ESF has co-financed many methodological improvements (Cedefop, 2017).

Skills anticipation skills data are mainly available to policy makers and key stakeholders and are not wide open and represented to the public. However, information on skills anticipation in developing vocational standards and vocational training programs is well developed (Cedefop, 2017). The importance of monitoring and anticipating skills needs and offerings has been recognized. The Ministry of Labour has prepared a project for a competency forecasting platform (Cedefop, 2021a), which was approved in May 2021. The project aims to develop a comprehensive and harmonized competency forecasting system to identify short-, medium- and long-term gaps in occupations and competencies in the labour market. This system will help institutions and other stakeholders in the labour market and education development programs that will help strengthen the competencies of all participants in education (youth and adults) according to the needs of the labour market. By developing new tools and connecting key stakeholders in the labour market, the project will better match supply and demand in the labour market and ensure more excellent responsiveness to increasingly demanding and changing economic conditions.

Models of individualization of pedagogical processes are being developed in secondary vocational and technical schools, and efforts in this direction will continue (Cedefop and ReferNet, 2020a).



With the strategy for developing higher professional education adopted in 2019, the Ministry of Education has enabled higher education professional programs to be well integrated into the economic environment and respond to its needs. The strategy emphasizes the importance of including digital and green competencies, developing specialized and in-service training programs, an adapted way of financing higher vocational schools, and better practical training and career guidance.

Since 2010, the MDDSZ has been co-financing competence centres for human resources development; their goal is to revive the Slovenian industry, companies and individuals with financial support to various sectors to strengthen the development of employee competencies (Cedefop and ReferNet, 2020a). Companies from the same economic sector or 10 areas defined in the Smart Specialization Strategy 2017 will be connected to the competence centre. Employees are trained to follow the needs of the company. With the help of experts, a competency model is prepared, deficit areas are identified, and an employee training plan is ready.

In April 2021, the government adopted a national plan to strengthen the education system by enhancing digital and green transition competencies, responding more quickly to the economy's needs and supporting people in the transition from education to the labour market (SVRK, 2020).

What have specific labour market requirements related to Industry 4.0 been identified **in your sector(s)**?

Skills anticipation skills data are mainly available to policy makers and key stakeholders and are not widely available to the public. However, information on skills anticipation in developing vocational standards and vocational training programs is well developed (Cedefop, 2017).

No significant differences between sectors were identified. All of them are mainly about raising competencies using IT and artificial intelligence. In April 2021, the government adopted a national plan to strengthen the education system by enhancing digital and green transition competencies, responding more quickly to the economy's needs and supporting people in the transition from education to the labour market (SVRK, 2020).

#### 2.1.4 Fair opportunities

This section provides space for descriptions of changes and/or trends in the labour market regarding the provision of fair opportunities and their relevance for Industry 4.0.

If applicable, which types of programmes have there been in the last 5-7 years that deal with the gender gap or changing demographics (particular focus on age) concerning Industry 4.0?

Name of the programme:	
Initiator/creator of the programme:	
Which sector does the programme come from?	
How does it address Industry 4.0 or relevant competencies?	
Transfer potential of the GP:	
What are the results achieved by or recommendations of this programme?	
Link (website, where to find more information):	
Additional information:	

Although the planning of implementing the new national program for adult education for the period 2021–2030 is still ongoing, the aim of introducing this program is to provide every adult population in Slovenia with equal opportunities for quality education at all stages of life. In addition, the national program will also offer counselling services available to employees who need additional training, qualifications or additional training due to the needs of the labour market and the workplace. In

Slovenia, there are no differences regarding gender and the possibility of schooling and training, so we do not have any special programs for this purpose.

## 2.2 Actors involved in VET reform processes

### 2.2.1 Decision-making bodies

Rank these decision-making bodies according to the level of responsibility in transferring Industry 4.0 competencies to the VET sector? (1 = most involved, x = not involved at all)

Ministry of education	1
Ministry of economy	2
school board	5
trade unions	X
employer associations	5
agency of labour/employment office	X
teacher associations	5
student representation	5
VET providers (school-based)	2
VET providers (work-based)	2
industry (representatives)	3
Academies and other research institutions	3
International stakeholders (EU Commission, EU Regional Development Fund, UE Enterprise Network, Digital Europe)	4

### 2.2.2 Cooperation between different actors

In your desk research and exchange with stakeholders, which general and specific **strengths or achievements** have been identified in collaboration and/or communication between the different actors involved in VET reform processes?

The management of vocational and technical education is centralized; Decisions on the establishment of vocational and technical schools or the distribution of vocational and technical education programs among schools are taken at a national level. The Ministry of Education, Science and Culture regulates, financing, and manages vocational education for young people and adults. While the Ministry of Education deals with vocational and technical education at the system level, the Centre of the Republic of Slovenia for Vocational Education and Training plays an essential role in developing and supporting vocational and professional education at the practical level (Cedefop, 2021b). In addition, the MDDSZ is responsible for adopting professional standards, the system of national professional qualifications and the training of the unemployed and jobseekers.

The social partners are involved in four national expert councils, which have an advisory role to the Ministry of Education:

- a) Expert Council for Vocational and Technical Education;
- b) Council of Experts for General Education;
- c) Expert Council for Adult Education;
- d) Council of the Republic of Slovenia for Higher Education.

Eight state public institutes are responsible for implementing the regulations of the Ministry and supporting the implementation and/or development of vocational and technical education:

- a) The CPI monitors and directs the development of vocational and technical education, recognise non-formal competencies and ensures the continuous professional development of teachers and the curricula for vocational and technical education. The CPI also acts as a link between ministries,



- schools and social partners (Cedefop, 2021b);
- b) ZRSŠ is responsible for the quality and development of general education subjects in secondary vocational and professional education programs;
  - c) ACS is the central national institute for adult education; is responsible for the development and quality of adult education, including vocational and technical education, the development of the quality of providers and the training of adult education providers;
  - d) The RIC is responsible for carrying out the part of the vocational matura covering general education subjects. The RIC also has a vital role to play in verifying and validating non-formal and informal learning, such as the development of methodologies and procedures for the assessment and certification of national professional qualifications;
  - e) The Pedagogical Institute (PI) is a national research institution for education, implementation of national projects and participation in international research and development projects;
  - f) The Centre of the Republic of Slovenia for Mobility and European Education and Training Programs (CMEPIUS) is responsible for mobility programs and other EU programs;
  - g) the National School of Principals (SR) is responsible for the initial and continuing professional development of principals, including principals of vocational and technical schools;
  - h) The National Agency of the Republic of Slovenia for Quality Assurance in Higher Education (SQAA) is responsible for the external evaluation procedures of higher vocational schools to assess whether they meet the criteria for accreditation and renewal of certification.

The government appoints the members of the governing bodies of the institute. All these institutions are publicly funded and must follow standard rules and guidelines from the public sector.

Following the Vocational Education and Training Act (2006, amended in 2017 and 2019) and the Higher Vocational Education Act (2004, amended and amended in 2013), schools implement initial vocational and professional education programs in cooperation with companies. Public secondary and higher vocational schools can be merged into a school centre.

Additional qualifications are acquired in further and supplementary training on the labour market (related to the supplementation of skills and competencies) and are not regulated at the national level; are intensely focused on the labour market and are awarded by the employer, a group of employers or the Employment Service of Slovenia.

In your desk research and exchange with stakeholders, which general and specific **challenges or barriers** have been identified in collaboration and/or communication between the different actors involved in VET reform processes?

Despite the set goals, there are not enough activities and incentives to implement the activities. Occasionally there is a lack of understanding of school or company management who are unwilling to invest in knowledge transfers and new IT skills. There is a lack of initiative in schools to involve companies, and on the other hand, companies do not even have enough staff to connect with schools.

In your desk, research and exchange with stakeholders, what **suggestions and/or recommendations** were identified to improve collaboration and/or communication between the different actors involved in VET reform processes?

More interest from companies to get involved in cooperation with schools, adding IT and industry 4.0 content to the curriculum by the Ministry. There can also be more training for teachers in these areas, more frequent checking of how teachers use what they have learned in their work, involvement of state institutions in support teachers and the organisation of cooperation and projects, between secondary schools and institutions and companies.

## 2.3 Processes

This section focuses on the various processes involved in the (re)shaping of the VET sector across your country/region, more generally as well as your particular Industry (s).

### 2.3.1 Revision and reform processes

Under revision and reform processes, we mainly understand the processes involved in revising existing VET programmes and reforming them with new VET programmes.

Which actors are generally the **drivers of innovation** (e.g., instigating change and making proposals for VET reforms)? Would you please assign the approximate percentages to show the different levels of contribution from the various actors?

Ministry of education	40%
Ministry of economy	10%
school board	2%
trade unions	2%
employer associations	10%
agency of labour/employment office	5%
teacher associations	2%
student representation	1%
VET providers (school based)	5%
VET providers (work based)	8%
industry (representatives)	15%
	100%

What mechanisms are in place to ensure the revision of **existing VET programmes** in your country? For example, do modifications take place regularly and at specified intervals?

According to the same procedure, professional standards and NPK catalogues are revised every five years. Vocational and technical education programs are based on:

- one or more professional standards leading to an educational qualification at EQF levels 4 and 5;
- curricular standards for each type of program, defining, for example, the minimum number of hours for general education subjects and vocational modules and the proportion of open curricula;
- indicative national curricula developed and adopted at a national level.

Educational qualifications are awarded after completing formal education programs at all levels of formal education (general, vocational, professional and higher).

A certificate of acquired NPK issued by the national regulations governing NPK or another document confirming the completed training or further education under laws governing secondary and higher professional education shall be awarded for the professional qualification.

SQF level descriptors are used in accreditation procedures for new educational programs and NPK catalogues, examination catalogues, or accreditation extensions. In addition, the SQF and EQF levels are listed on Europass certificates, diplomas and annexes at all levels of education and training and in the SQF register. By 2020, more than 1,600 qualifications (Cedefop, 2020b) were included in the Slovenian Qualifications Framework, and all were described with learning outcomes.

According to the Slovenian Qualifications Framework Act, the MDDSZ, in cooperation with the Ministry of Science, Education and Sports, is fully competent and responsible for developing and implementing the SQF. However, the leading institution at the operational level is the CPI. As the National EQF Coordination Point, the CPI works with SQAA - the institution responsible for the quality of higher



education qualifications - on all higher education issues (Cedefop, in preparation).

Briefly describe the review and revision process of **existing VET programmes** in your country. In which way(s) are adjustments brought forward, considered, implemented? How long can these processes(es) take? Are the conditions set for it in the law or by-laws? Feel free to visualise this process in a flow chart.

In Slovenia, occupational standards influence the development of vocational and professional education programs, which better adapt to the needs of the labour market. A national vocational qualification can be obtained based on verification and validation of non-formal education and non-formal learning. The vocational standard is the basis for developing a national vocational qualification catalogue. Both vocational qualifications acquired through formal education and qualifications obtained through the verification and validation of non-formal and informal learning apply a learning-based approach.

A professional standard is a standardized description of various jobs or tasks in work processes. It defines the expected knowledge, skills and competencies that the qualification holder must have at a certain difficulty level. Professional standards are developed in social dialogue, with employers and field professionals contributing to the knowledge and skills requirements that a capable professional must respond appropriately to the technical and other needs of the profession. Professional standards are also forward-looking to enable qualification holders and employers to better adapt to future labour market challenges. The National Professional Qualifications Act (2007) describes the procedures for developing professional standards, and the CPI defines the methodology for this procedure.



A proposal for a new professional standard is submitted to the CPI by a natural or legal person. The proposal should include information on labour market needs, a study on the comparability of relevant standards in the EU Member States, and compliance with EU rules and regulations.

If the CPI score is positive, the proposal is submitted to one of the ten sectoral committees (POs) set up by the Ministry of Labour. It involves experts from chambers, ministries and trade unions. The Sectoral Committee approves and classifies professional qualifications and appoints experts who will develop a draft professional standard with the methodological support of the CPI. Once the Council has approved the professional measure of Experts for Vocational and Technical Education, the standard is submitted for acceptance to the minister responsible for labour.

Based on the professional standard, the CPI develops a vocational and professional education program and/or prepares a draft NPK catalogue. When the professional council approves the vocational or professional education program, it submits it to the Minister of Education for approval. Then, the NPK catalogue must be considered by the competent sectoral committee, approved by the Expert Council for Vocational and Technical Education and adopted by the minister responsible for labour.



The program can be implemented at the beginning of the next academic year when the procedure is completed. The process takes different lengths but is usually completed within 1 to 2 years.

Briefly describe the introduction process of **new VET programmes** in your country. How long does this process (usually) take? Please include any relevant laws, regulations, and stakeholders. Feel free to visualise this process in a flow chart.

The procedure for introducing new programs is the same as described in the process of reviewing and revising existing VET programs in Slovenia.

In general, as mentioned above, this is primarily the domain of the Ministry of Education. The duration of the procedures depends on various factors and the interest of individual services within the Ministry, and periodic revisions and amendments to the curriculum. The program can be implemented at the beginning of the next academic year when the procedure is completed. The process takes different lengths but is usually completed within 1 to 2 years.

Which of the following aspects are **considered in the revision and reform processes of the VET sector in your country/region** and your sector(s) more specifically?

	General (national / region)
infrastructure	X
technology	
staff availability	X
staff competences	
the wording of job descriptions	X
European standards (e.g., ESCO, ISCO, ...)	X
VET provider needs	X
industry/labour market needs	
staff needs	
student needs	X
evidence-based research	X
European trends	X
international trends	X
local / regional / national politics	X

Which three of the aspects mentioned above receive the **most attention** in the transfer processes in your country or sector(s)?

Technologies  
 Staff competencies  
 Industry/labour market needs

Which three aspects, as mentioned earlier, receive the **least attention** in the transfer processes in your country or sector(s)?

Staff availability  
 Student needs  
 Evidence-based on research

What mechanisms are in place to ensure the **needs of VET providers, teachers and students** are met and their voices are heard? How are their perspectives translated to policy?

In Slovenia, there are some activities in the field of skills forecasting, but there is no comprehensive and harmonized system. Primary forms of predicting abilities used in the country concerned (Cedefop, 2017):

- a) collecting administrative data on job vacancies and unemployment and analysing relevant data,



- such as the Labour Force Survey (LFS);
- b) surveys of employers (conducted by the ESS and employers' organizations), as well as surveys of labour market intermediaries and, more recently, SORS;
- c) forecasts of skills in international networks, in particular, Cedefop (Cedefop, 2020a);
- d) interviews with representatives of key stakeholders.

The Ministry of Labour and the Ministry of Education play a key role in anticipating key skills activities. The ESS, labour market intermediaries and employers' organizations are also active, and numerous projects related to skills anticipation are under way. The Slovenian government has invested resources and work to develop skills anticipation activities and improve appropriate tools. The ESF has co-financed many methodological improvements (Cedefop, 2017).

Skills anticipation skills data are mainly available to policy makers and key stakeholders and are not widely available to the public. However, information on skills anticipation in developing vocational standards and vocational training programs is well developed (Cedefop, 2017).

The importance of monitoring and anticipating skills needs and offerings has been recognized. The Ministry of Labour has prepared a project for a competency forecasting platform (Cedefop, 2021a), which was approved in May 2021. The project aims to develop a comprehensive and harmonized competency forecasting system to identify short-, medium- and long-term gaps in occupations and competencies in the labour market. This system will help institutions and other stakeholders in the labour market and education development programs that will help strengthen the competencies of all participants in education (youth and adults) according to the needs of the labour market. By developing new tools and connecting key stakeholders in the labour market, the project will better match supply and demand in the labour market and ensure more excellent responsiveness to increasingly demanding and changing economic conditions.

Teachers are entitled to 15 days of continuing professional development every three years. However, in-service teacher training is not mandatory, and opportunities are limited. The costs of continuing professional development are partly covered by the Ministry of Education and partly by the employer/school. Schools can work with public or private providers of continuing professional development. The Ministry of Education funds two types of continuing professional development programs for teachers):

- a) in-service training programs that enable teachers to obtain training for specific roles and tasks, such as the role of principal, teacher of students with special educational needs, or to provide academic and andragogic training for non-education professionals;
- b) career development programs (8-24 hours) that support the professional development of teachers, such as didactic courses, modernization of the subject, key competencies. Continuing professional development programs are presented in the national catalogue. The providers are partly public institutions directly involved in the Ministry of Education. One type of career development program, t. i. professional training programs are selected through a public tender to which a public or private institution can apply (MDDSZ, 2017).

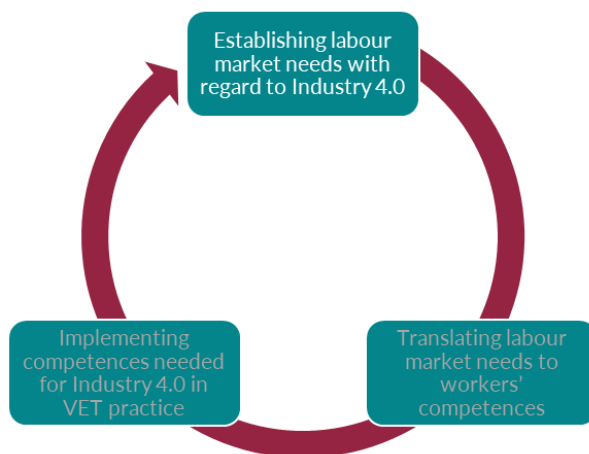
Many national and international projects focus on the continuous professional development of teachers. For example, the Strengthening the Competences of Experts in Leading an Innovative Educational Institution 2018–22 project supports teachers and lecturers to improve their professional skills and attend training on innovative teaching methods, entrepreneurship and working with students with special educational needs. Another recently completed project, POKIT, aims to strengthen teachers' digital competencies.

Training of mentors in companies is also encouraged, primarily through ESF projects. For example, the Mentor Training project (2016–21) offers free 50-hour training for mentors included in the high school



in-service training program and 60-hour training for mentors in the post-secondary in-service training program. This training focuses on pedagogy/andragogy, youth psychology, communication skills, health and safety at work, and monitoring and assessment of students (Cedefop and CPI, 2019).

### 2.3.2 Mechanisms for establishing labour market needs regarding Industry 4.0



Which of the following actors are predominantly responsible for the mechanisms in place to establish labour market needs in your country and in your specific sector(s)?

	General (national / region)
Ministry of education	X
Ministry of economy	
school board	X
trade unions	X
employer associations	
agency of labour/employment office	X
teacher associations	X
student representation	X
VET providers (school-based)	
VET providers (work-based)	
industry (representatives)	
academies and other research institutions	

What **general mechanisms** exist to establish labour market needs in your country and in your specific sector(s)?

With the strategy for developing higher professional education adopted in 2019, the Ministry of Education has given a new impetus to professional education development at the tertiary level. Higher professional programs are well integrated into the economic environment and respond to its needs. The strategy emphasizes the importance of including digital and green competencies, developing specialized and in-service training programs, an adapted way of financing higher vocational schools and better quality of practical training and career guidance.

The Ministry of Science, Education and Sports encouraged and the CPI, in cooperation with companies and schools, developed new training programs for employed graduates of various levels of education to meet employers' needs for skills and competencies. This initiative strengthens opportunities to integrate vocational, technical and technical education into lifelong learning (Cedefop and ReferNet, 2020b).



The state regulates the scholarship system with the Scholarship Act (2013, last amendments 2018), including all educational programs, young people and adults. The government adopts the scholarship policy every five years, thus establishing an implementation framework for the award of scholarships and thus also indirectly influencing the identification of needs in the labour market and specific sectors. The purpose of the scholarship for deficient professions is to attract more students to vocational and technical education, provide appropriate staff according to the needs of the labour market, and encourage enrolment in fields of education that enable faster employability of participants after graduation. The scholarship policy includes lists of professions in demand/deficit professions, updated annually by the ESS, and a list of vocational and technical education programs, updated annually by the Ministry of Education.

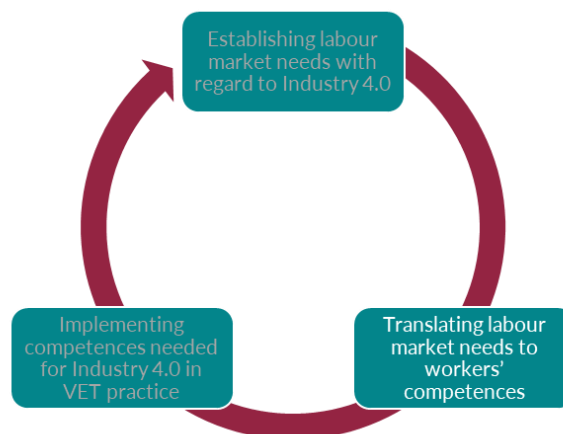
The education and training system will have to prepare for long-term demographic challenges that could harm the number of students in vocational and technical education (PSIU) programs. The state responded by adopting an active ageing strategy (Long-Term Society Strategy, IMAD, 2018) and comprehensive support to companies for the active ageing of employees to increase the professional competencies of the adult population.

A Resolution on the National Adult Education Program in the Republic of Slovenia for the period 2021-30 is being prepared. The resolution will identify several measures for adult education, including the development of skills in response to the challenges of an ageing population and labour market needs (European Commission, 2020a).

If applicable, which **specific mechanisms** were used to establish labour market needs concerning Industry in 4.0 in your country and your particular sector(s)?

While there is no general concept for Industry 4.0, a national policy envisages improving competencies in the cloud, Internet, extensive data management, machine communication, teleworking, and remote management. The Ministry and other stakeholders are aware that there is a significant deficit in the use and understanding of all areas related to Industry 4.0. Still, given the situation in Slovenia, many things change when transferring from high school to colleges, where they have a lot in Industry 4.0. support also from the Jožef Štefan Institute, one of the world's leading centres in this field. Some faculties then cooperate with companies involved in international cooperation and leaders in their field within Industry 4.0.

### 2.3.3 Processes for translating labour market needs to workers' competences



Which of the following actors are predominantly responsible for translating labour market needs to crucial competencies in the VET practice of your country and your specific sector(s)?

	<b>General (national / region)</b>
--	------------------------------------

Ministry of education	X
Ministry of economy	
Ministry of Labour, Family, Social Affairs and Equal Opportunities	
school board	X
trade unions	X
employer associations	
agency of labour/employment office	X
teacher associations	X
student representation	X
VET providers (school-based)	
VET providers (work-based)	
industry (representatives)	
academies and other research institutions	X

What processes regulate or organise the translation of labour market needs to competencies in your country and your specific sector(s)?

Decisions on the establishment of vocational and technical schools or the distribution of vocational and technical education programs among schools are taken at the national level. The Ministry of Education, Science and Culture regulates, financing, and manages vocational education for young people and adults. While the Ministry of Education deals with vocational and technical education at the system level, the Centre of the Republic of Slovenia for Vocational Education and Training plays an essential role in developing and supporting vocational and professional education at the practical level (Cedefop, 2021a). In addition, the MDDSZ is responsible for adopting professional standards, the system of national professional qualifications and the training of the unemployed and jobseekers.

The Slovenian education and training system also includes the fact that people learn in many ways; therefore, there are different ways of verification and certification regulated by law. There are two regulated ways or two primary purposes of recognizing non-formal learning: identifying vocational competencies (national vocational qualifications system) in the labour market and enabling individuals to engage in further formal education (continuing education or continuing higher education, etc.) (CPI, 2020).

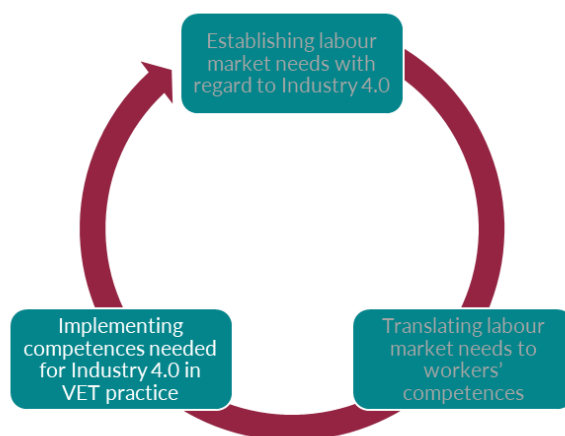
The Ministry of Labour and the Ministry of Education play a key role in anticipating key skills activities. The ESS, labour market intermediaries and employers' organizations related to skills anticipation are also active. The Slovenian government has invested resources and work to develop skills anticipation activities and improve appropriate tools (Cedefop, 2017).

Skills anticipation skills data are mainly available to policy makers and key stakeholders and are not widely available to the public. However, information on skills anticipation in developing vocational standards and vocational training programs is well developed (Cedefop, 2017).

The importance of monitoring and anticipating skills needs and offerings has been recognized. The Ministry of Labour has prepared a project for a competency forecasting platform (Cedefop, 2021a), which was approved in May 2021. The project aims to develop a comprehensive and harmonized competency forecasting system to identify short-, medium- and long-term gaps in occupations and competencies in the labour market. This system will help institutions and other stakeholders in the labour market and education development programs that will help strengthen the competencies of all participants in education (youth and adults) according to the needs of the labour market. By developing new tools and connecting key stakeholders in the labour market, the project will better match supply and demand in the labour market and ensure more excellent responsiveness to increasingly demanding and changing economic conditions.



### 2.3.4 Processes for implementing competencies needed for Industry 4.0 in VET practice



Which of the following actors are predominantly responsible for the processes regulating or organising the implementation of critical competencies in the VET practice of your country and your specific sector(s)?

	General (national / region)
Ministry of education	
Ministry of economy	
Ministry of labour, family, social affairs, and equal opportunities	
school board	
trade unions	X
employer associations	X
agency of labour/employment office	X
teacher associations	X
student representation	X
VET providers (school-based)	
VET providers (work-based)	
industry (representatives)	

What processes **generally regulate or organise** the implementation of new competencies in your country and your specific sector(s)? How are competencies usually transferred from policy to VET practice?

The official continuing vocational training and development programs provided for in the Vocational Education and Training Act (2006, amendments 2017 and 2019) and the Higher Vocational Education Act (2004) are available to a limited extent. The CPI Development of Further Vocational Education and Training Programs 2017-22 (PINPIU project) is one of the projects to fill the gap by developing new formal vocational training and development programs (up to 30 credits) for further training, modernization and development. Specific professional competencies of employees who have completed vocational and technical training (Cedefop and ReferNet, 2020b). Two types of vocational training and development programs are envisaged at EQF levels 4 and 5:

- Training programs: to improve, disseminate, and update vocational and technical education competencies, and that requires a completed initial vocational and technical education program in the relevant field and level of education;
- training programs: to equip individuals with knowledge and skills for professions (or part of a profession) not available in the initial vocational and technical education program. The basis for these programs will be newly adopted professional standards.



By the end of May 2021, the Professional Council for Vocational and Technical Education has adopted six study programs for advanced training in higher professional education. However, the programs are not yet implemented.

Under the Higher Vocational Education Act (2004, last amendments in 2013), vocational colleges also have a quality commission consisting of five lecturers and two students. SQAA is responsible for the quality assurance system in higher professional education and regularly evaluates higher professional schools. The tasks and responsibilities of the quality commissions are:

- a) improve the quality of higher education study programs;
- b) establish quality assurance mechanisms at contractor level;
- c) plan, organize and coordinate quality monitoring and assurance;
- d) cooperate with SQAA and prepare comparisons between schools at the national and international level;
- e) monitor graduates and report on their employability;
- f) suggest, in cooperation with employers, ways to improve programs;
- g) prepare evaluation reports, which are discussed with SQAA experts.

A Resolution on the National Adult Education Program in the Republic of Slovenia for the period 2021-30 is being prepared. The resolution will identify several measures for adult education, including the development of skills in response to the challenges of an ageing population and labour market needs (European Commission, 2020a).

In April 2021, the government adopted a national recovery plan with measures to strengthen the resilience of the education system, strengthening competencies for the digital and green transition to respond more quickly to economic needs and support people in the transition from education to the labour market (SVRK, 2020).

Many national and international projects focus on the continuous professional development of teachers. For example, the Strengthening the Competences of Experts in Leading an Innovative Educational Institution 2018–22 project supports teachers and lecturers to improve their professional skills and attend training on innovative teaching methods, entrepreneurship and working with students with special educational needs.

The importance of monitoring and anticipating skills needs and offerings has been recognized. The Ministry of Labour has prepared a project for a competency forecasting platform (Cedefop, 2021a), which was approved in May 2021. The project aims to develop a comprehensive and harmonized competency forecasting system to identify short-, medium- and long-term gaps in occupations and competencies in the labour market. This system will help institutions and other stakeholders in the labour market and education development programs that will help strengthen the competencies of all participants in education (youth and adults) according to the needs of the labour market. By developing new tools and connecting key stakeholders in the labour market, the project will better match supply and demand in the labour market and ensure more excellent responsiveness to increasingly demanding and changing economic conditions.

If applicable, which **specific processes** regulated or organised the implementation of competencies needed for Industry 4.0 in the VET practice of your country and your specific sector(s)? What were technical, infrastructural and personnel measures provided and by whom to implement these changes at VET institutions?

## 2.4 Examples of good practice (GP)

This section is dedicated to collecting specific examples from your region and/or country. We are interested in any good practice you may already know and the ones you have identified in your desk research and feedback from stakeholders, focusing on upper secondary education (ISCED level 3, equivalent to EQF level 3-4) programmes. These should cover projects, initiatives and programmes that were already in place, as well as those that have been instantiated despite, or precisely because of, the added pressures caused by the Covid-19 pandemic.

### 2.4.1 Revisions of existing VET programmes

How specifically (if at all) did the new labour market needs and requirements of Industry 4.0 translate into changes to existing VET programs in the last 5-7 years? Please identify existing programmes that have been revised to accommodate Industry 4.0 labour market requirements. Please copy and paste the table for additional entries.

Name of the VET programme:	
Initiator/creator of the revised programme:	
Which sector does the programme come from?	
What new elements have been added to this programme that addresses Industry 4.0 or relevant competencies?	
What makes this initiative a GP?	
Transfer potential of the undertaken revisions:	
What are the results achieved by or recommendations of this programme?	
Link (website, where to find more information):	
Additional information:	

The Vocational and Professional Education Act regulates verification and certification in secondary vocational and technical education (amendments in 2017). It stipulates that schools that provide part-time education may adapt educational programs to the needs of individual participants, taking into account previously formally acquired knowledge or non-formal knowledge demonstrated by an examination or otherwise. Furthermore, the Minister responsible for education prescribes the manner and procedure of verification and assessment of the ability, acquisition of credit points, verification and certification of non-formal knowledge and the form and content of public documents confirming completed education (Pavkov, 2019).

Due to the 2017 law, program revisions will be carried out for the first time only after 5 years, and in 2022 it will run exactly 5 years after the adoption of the law, which means that changes in the debate will not take place until next year.

### 2.4.2 New VET programmes

Which new VET programs with a particular focus on Industry 4.0 have emerged in your country's last 5-7 years? Please copy and paste the table for additional entries.

Name of the VET programme:	
Initiator/creator of the new programme:	
Which sector does the programme come from?	
How does it address Industry 4.0 or relevant competencies?	
What makes this programme a GP?	
Transfer potential of the GP:	
What are the results achieved by or recommendations of this programme?	
Link (website, where to find more information):	

Additional information:

Due to the 2017 law, program revisions will be carried out for the first time only after 5 years, and in 2022 it will run exactly 5 years after the adoption of the law, which means that changes in the debate will not take place until next year.

### 2.4.3 Other Projects / Initiatives

What projects or initiatives have taken place in the country aimed at the VET sector at the national, regional and/or sectoral level, which for example:

- identify competencies relevant to Industry 4.0 (perhaps with a focus on a particular sector),
- analyse new labour market requirements regarding Industry 4.0,
- provide instructions on how to implement Industry 4.0 relevant competencies in VET teaching.

Which GP (projects, initiatives or similar) are you perhaps already aware of or have you identified in your desk research and exchange with stakeholders? Please copy and paste the table for additional entries.

Name of the VET programme:	E-competent VET schools
Initiator/creator of the new programme:	Secondary schools for computer science, engineering, mechatronics
Which sector does the programme come from?	Secondary schools
How does it address Industry 4.0 or relevant competencies?	Artificial intelligence, robotics, multimedia
What makes this programme a GP?	It includes students from this field who transfer knowledge to high school students
Transfer potential of the GP:	Helpful knowledge for high school students and motivation to use IT in practice
What are the results achieved by or recommendations of this programme?	Activities are still ongoing
Link (website, where to find more information):	
Additional information:	

Name of the VET programme:	E+ MegaVET
Initiator/creator of the new programme:	EU programme
Which sector does the programme come from?	Secondary schools
How does it address Industry 4.0 or relevant competencies?	Gamification, training to use a computer in learning by playing, knowledge of functional platforms and Android applications
What makes this programme a GP?	Practical knowledge for the use of IT technology and a better understanding of the operation of games
Transfer potential of the GP:	Knowledge of platforms and development of IT skills
What are the results achieved by or recommendations of this programme?	A handbook for mentors and teachers on how to use game-based learning platforms has been prepared
Link (website, where to find more information):	
Additional information:	

Name of the GP:	POKIT
Initiator/creator of the GP:	CPI - Centre for Vocational Training
Which sector does the GP come from?	The school (VET)



Which general topics or topic areas does this good practice cover?	Pedagogical digital competences
What makes this initiative a GP?	Because it will enable better knowledge of technology by teachers, who then transfer knowledge and skills to students
How does it address Industry 4.0 or relevant competencies?	Raising the digital competencies of teachers and students
Transfer potential of the GP:	Between schools, from institutions to teachers and then to students
What are the results achieved by or recommendations of this GP?	Knowledge of using various IT tools to facilitate work and data retrieval, perform database analysis, and use basic software packages for everyday work
Link (website, where to find more information):	
Additional information:	

Name of the GP:	E-education
Initiator/creator of the GP:	CPI - Centre for Vocational Training
Which sector does the GP come from?	Ministry of Education
Which general topics or topic areas does this good practice cover?	The use of IT technology in teaching and the development of skills in the use of IT tools in practice
What makes this initiative a GP?	Because the implementation was in practice, in-class and different directions, and at the same time, the school's transferred knowledge and experience to each other and made a public presentation of project activities
How does it address Industry 4.0 or relevant competencies?	Virtual reality, 3d modelling/animation
Transfer potential of the GP:	Learning by example, transferring acquired knowledge, mentoring new teachers
What are the results achieved by or recommendations of this GP?	Involvement of a significant number of schools and teachers from different schools throughout Slovenia, improvement of students' knowledge, and development of entrepreneurial and IT skills
Link (website, where to find more information):	<a href="https://feelthefuture.si/o_sejmu/?lang=en">https://feelthefuture.si/o_sejmu/?lang=en</a>
Additional information:	

## 2.5 Conclusion

You can use this chapter to reflect on some of your insights in the description process. These could give you an overview of how Industry 4.0 requirements are implemented in your country's VET system and support the development of recommendations that could improve transfer and implementation processes.

Regarding the effectiveness of the conditions and processes described, what works well (e.g., cooperation between actors) and why?

The social partners are involved in Slovenian vocational and technical education. However, vocational and technical education can still respond flexibly to changes in society and the economy and better adapt to individual needs (Cedefop and ReferNet, 2020a).

The quality of on-the-job practical training and competence-based assessment remains a challenge. Significant efforts have been made by investing in new training facilities (inter-enterprise training





centres) and strengthening practical training by working in companies. With the new Apprenticeship Act in 2017, the implementation of apprenticeships in three-year vocational education programs (ISCED 353) began. The social partners are discussing extending apprenticeships to other levels of education, to adults and the service sectors.

Models of individualization of pedagogical processes are being developed in secondary vocational and technical schools, and efforts in this direction will continue (Cedefop and ReferNet, 2020b).

The state regulates the scholarship system with the Scholarship Act (2013, last amendments 2018), including all educational programs, young people and adults. The government adopts the scholarship policy every five years, thus establishing an implementation framework for awarding scholarships. A state scholarship is available to secondary and tertiary education participants from low-income families. It depends on the material situation of the family. In addition, allowances are available for above-average grades and scholarship holders with special needs. The Zois Scholarship provides incentives for students who achieve outstanding results and performance.

The purpose of the scholarship for deficient professions is to attract more students to vocational and technical education, provide appropriate staff according to the needs of the labour market, and encourage enrolment in fields of education that enable faster employability of participants after graduation. A total of 1,000 scholarships are available annually. In addition, the scholarship policy includes lists of professions in demand/deficit professions, which are updated annually by the ESS, and a list of vocational and technical education programs, which is updated annually by the Ministry of Education.

Staff scholarships are awarded directly by employers to high school or university students. The scholarship is awarded to young people selected by employers, and after completing the training, the employer must employ the scholarship holder for at least one year. The program's purpose is further to bridge the gap between the labour market and education.

This program encourages companies to improve human resource management and plan the professions/profiles they will need soon.

To connect vocational and professional education with the labour market and promote practical training with work by supporting companies participating in it, the state co-finances applicable training costs with assignments for students in secondary vocational and vocational education programs and students of higher education programs. Applications for Vocational and technical training providers apply for co-financing tenders, and the beneficiaries are host companies (Cedefop and CPI, 2019).

The Ministry of Education is responsible for organizing career guidance and counselling in primary, secondary and higher education. The Vocational Education and Training Act (2006, amended in 2017 and 2019) states that vocational and technical education promotes lifelong learning and career planning and management skills (Cedefop, 2020).

Schools have the most significant responsibility for career guidance and education counselling; school counsellors carry it out. Each school employs at least one school counsellor, including vocational and technical schools. ZRSŠ has developed guidelines for school counsellors to guide students in secondary education (Cedefop and CPI, 2019). However, career guidance for students in secondary vocational and technical programs is limited to providing access to the information needed for the transition to make an appropriate decision on further education (Cedefop, 2020a).

Pupils, parents and school staff have access to comprehensive information on the CPI's Mojaizbira.si web portal, which can help them decide on further education and training. Participants in the recently



(2017/18) introduced apprenticeship programs provide information and guidance in finding training places for apprentices to the Chamber of Commerce and Industry and the Chamber of Commerce and Industry. The CPI has established and maintains a central register of learning locations.

In adult education, free guidance is provided by adult education guidance centres and other public education organizations. Adult education guidance centres operate within 14 regional people's universities and are supported by the ACS. They are aimed, in particular, at marginalized groups of adults, who are usually less educated and less involved in lifelong learning. Guidelines for the implementation of counselling activities were adopted in 2020 based on the revision of the Adult Education Act (2018), which encourages counselling for adult participants in the educational process. The Ministry of Labour is responsible for guiding the unemployed and finances guidance through the Employment Service of Slovenia. In addition, 59 area services and career centres provide guidance. Career counsellors in ESS regional services and career centres offer guidance and counselling, e-counselling, group information meetings, job search seminars and guidance on employment programs, mainly for the unemployed (80%), but also for students (15%) (Cedefop, 2020a). In addition, the ESS maintains an online tool (Where and how) for research, development and improvement of career opportunities, which is intended for students and adults.

National coordination and cooperation in career guidance are led by the National Expert Group on Lifelong Career Guidance, which operates informally. The group was appointed by the Ministry of Science, Education and Sports and consists of 17 members, representatives of ministries, public institutes and other relevant stakeholders.

Regarding the effectiveness of the conditions and processes described, what do you think could be improved and how?

The CPI assessment showed space for further improvement of the shared vision of vocational and technical education among stakeholders (Cedefop and ReferNet, 2020b).

Technological change will require a more skilled workforce, which will require a greater focus on adult education and training of the workforce. As a result, raising adults' knowledge and skills is increasing.

The education system's success depends mainly on the quality of teaching, but the teaching profession faces many challenges. For example, although teachers judged that they had achieved their goals, they found the distance learning brought about by the Covid-19 pandemic to be challenging and stressful, with 70% believing that the quality of teaching had deteriorated (Cedefop and ReferNet, 2021). In addition, Slovenia is facing a shortage of teachers in some areas, which is expected to become a severe challenge due to many retiring teachers (European Commission, 2020a).

Did you come across any aspects that are not sufficiently considered when changes in the VET sector are implemented (see 2.3.1)?

The Slovenian population is ageing, and about 26% of workers are at high risk of having their jobs automated; for comparison: in the PIAAC (International Adult Competency Assessment Program) countries, such workers average 14% (OECD, 2018).

With a significant reduction in adult participation in lifelong learning over the last decade (8.4% in 2020), Slovenia must continue its efforts to achieve the national target of 19% adult participation in education by 2030; Opportunities for continuous improvement and retraining of the elderly are necessary and envisaged.

A new national program for adult education for the period 2021-2030 is planned to introduce a program to provide every adult population in Slovenia with equal opportunities for quality education at all life stages and focus on increasing adult participation in lifelong learning. The national program



will also provide funding for information and counselling and the identification and evaluation of knowledge acquired through informal learning before, during and after education or training. In addition, counselling services will be available to employees who need additional training, qualifications or additional training due to the needs of the labour market and the workplace.

In 2019, basic digital skills in the 15-74 age group were slightly below the EU average (58%) at 55%. The EU is working to increase this level for the 16-74 age group to 70% by 2025 and 80% by 2030. Slovenia will thus have to step up investment and focus its development on strengthening digital skills (European Commission, 2020a). Slovenia has updated the national development strategy Digital Slovenia 2020, i.e. an overarching strategy covering fundamental strategic shifts and adopting an action plan for digital education by 2027.

The project, supported by the Recovery and Resilience Facility (RRF), will focus on modernizing vocational education, with the primary goal of adapting education to the digital and sustainable transition and increasing the resilience of the education system. As a result, Digital, green and entrepreneurial competencies will be given a new place in educational programs; the field of computer science and informatics will be strengthened.

Which existing changes have you identified, and how complex was their implementation (see 2.3.1)?

There are no significant changes, as Slovenia does not have a developed national strategy for training for Industry 4.0. However, the involvement of social partners in Slovenian vocational and professional education is improving, as they are involved in the activities of introducing changes in many ways. Nevertheless, vocational and technical education in secondary and vocational schools should still respond flexibly to changes in society and the economy and develop models to individualize pedagogical processes and thus improve adaptation to individual needs (Cedefop and ReferNet, 2020b).

The quality of practical training through work is also improving, but upgrading competencies remains a challenge. Nevertheless, significant efforts have been made by investing in new training facilities (inter-enterprise training centres) and strengthening practical training by working in companies.



## Matrix of references to the Country report Slovenia

The following table contains a brief description of the key factors (ie. councils, processes, actors, etc., if they exist) at national, regional, local and sector level, which ensure the identification of the changing technological requirements of the labour market (Industry 4.0) and their transfer to vocational training and preparations.

Partner country:		
Level:	Brief description	Note
<b>National:</b>	<p>(Description) At <b>national</b> level, what key factors: (i.e. councils, processes, actors, etc., if any)</p> <p>In Slovenia, we have four national expert councils that have an advisory role to the Ministry of Education:</p> <ul style="list-style-type: none"> <li>• Expert Council for Vocational and Technical Education;</li> <li>• Council of Experts for General Education;</li> <li>• Expert Council for Adult Education;</li> <li>• Council of the Republic of Slovenia for Higher Education.</li> </ul> <p>The key actors at the national level are:</p> <ul style="list-style-type: none"> <li>• Ministry of Education, Science and Sports</li> <li>• Center of the Republic of Slovenia for vocational education</li> <li>• Ministry of Labour, Family and Social Affairs</li> <li>• Ministry of Economy</li> <li>• Chamber of Crafts</li> <li>• Institute of the Republic of Slovenia for Employment</li> </ul> <p>Eight national public institutes are responsible for implementing the Ministry's regulations and supporting the implementation and/or development of vocational and professional education:</p> <ul style="list-style-type: none"> <li>• The CPI monitors and directs the development of vocational and technical education, recognise non-formal competencies and ensures the continuous professional development of teachers and the curricula for vocational and technical education. The CPI also acts as a link between ministries, schools and social partners (Cedefop, 2021);</li> <li>• ZRSŠ is responsible for the quality and development of general education subjects in secondary vocational and professional education programs;</li> <li>• ACS is the central national institute for adult education; is responsible for the development and quality of adult</li> </ul>	<ul style="list-style-type: none"> <li>• Parts of the national report: 2.2.1, 2.2.2 in 2.3.1</li> <li>• Cedefop (2021). <i>Spotlight on VET – 2020 compilation: vocational education and training systems in Europe</i>. Luxembourg: Publications Office. Retrieved from <a href="https://www.cedefop.europa.eu/files/4189_en.pdf">https://www.cedefop.europa.eu/files/4189_en.pdf</a></li> <li>• CPI (2020). <i>Validation of non-formal and informal learning in Slovenia: one-off report</i>. Ljubljana: CPI. Retrieved from <a href="https://www.nok.si/sites/www.nok.si/files/dokumenti/pocilo_cpi_a4_ang.pdf">https://www.nok.si/sites/www.nok.si/files/dokumenti/pocilo_cpi_a4_ang.pdf</a></li> </ul>



	<p>education, including vocational and technical education, the development of the quality of providers and the training of adult education providers;</p> <ul style="list-style-type: none"> <li>• The RIC is responsible for carrying out the part of the vocational matura covering general education subjects. The RIC also has a vital role to play in verifying and validating non-formal and informal learning, such as the development of methodologies and procedures for the assessment and certification of national professional qualifications;</li> <li>• The Pedagogical Institute (PI) is a national research institution for education, implementation of national projects and participation in international research and development projects;</li> <li>• The Centre of the Republic of Slovenia for Mobility and European Education and Training Programs (CMEPIUS) is responsible for mobility programs and other EU programs;</li> <li>• the National School of Principals (SR) is responsible for the initial and continuing professional development of principals, including principals of vocational and technical schools;</li> </ul> <p>The National Agency of the Republic of Slovenia for Quality Assurance in Higher Education (SQAA) is responsible for the external evaluation procedures of higher vocational schools to assess whether they meet the criteria for accreditation and renewal of certification.</p>	
<p><b>Regional</b></p>	<p>(Description) At <b>district/regional</b> level, what key factors:                  (i.e. councils, processes, actors, etc., if any)</p> <p style="text-align: center;"><b>do not exist, as we do not have formal region in Slovenia</b></p>	
<p><b>Local</b></p>	<p>(Description) At <b>local</b> what key factors:                  (i.e. councils, processes, actors, etc., if any)</p> <p>Actors are primarily schools and colleges, regional chambers of commerce, regional units of the Employment Agency of the Republic of Slovenia and local connections between companies and education providers.</p>	<ul style="list-style-type: none"> <li>• Parts of the national report:                      2.2.1, 2.2.2 in 2.3.1</li> </ul>
<p><b>Sectoral</b></p>	<p>(Description) At specific <b>sector</b> levels, what key factors:                  (i.e. councils, processes, actors, etc., if any)</p> <p>These connections are not formally defined anywhere, but often companies, in agreement with incubators and regional chambers of commerce, connect with secondary vocational schools or faculties, and enter into a partnership on cooperation.</p>	<ul style="list-style-type: none"> <li>• Parts of the national report:                      2.2.1, 2.2.2 in 2.3.1</li> </ul>



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## Glossary

**Augmented Reality (AR):** System able to superimpose some additional elements on the visual reality (attributes, explanations, schemes, internal elements not visible). It can be managed most straightforward using the smartphone/tablet camera, but it usually requires special glasses. Since this is a technique based on user experience, the quality of devices and software are essential for the diffusion of technology. (Source: [t2i Glossary](#))

**Competence:** Ability to apply learning outcomes adequately in a defined context (education, work, personal or professional development).

or

Ability to use knowledge, skills and personal, social and/or methodological abilities in work or study situations and professional and personal development. (Source: [Cedefop Terminology of European Education and Training Policy](#))

**Country Report:** Document collects crucial data and country-specific information based on a common methodology. These can then be compared and evaluated to describe how labour market requirements are translated to VET in a given country.

**Industry 4.0** refers to the fourth industrial revolution; the first industrial revolution was the arrival of the steam engine in the 1700s. The second industrial revolution was the invention of electricity and Fordism (which enabled mass production). The third was the appearance of media and computers. This most recent industrial revolution describes the current phase of the transformation of industrial processes, with strong digitisation of production processes and services, the introduction of interconnected sensors, the Internet of things, intelligent machines (robots), artificial vision and autonomous driving systems together with new additive manufacturing technologies, augmented reality and virtual reality. This fourth revolution is called “4.0”, following the revision-numbering model used in the software to emphasise its digital nature. (Source: [t2i Glossary](#))

**Internet Of Things (IoT):** Literally, “internet of things” refers to the connection to the Internet of devices other than computers, tablets, smartphones, smart TVs such as appliances, light bulbs, thermostats, sensors, cameras, air conditioners, cars, street lamps, or any electronic device. The device will be accessible from the network and communicate autonomously with other devices. To have IoT, a “thing” connected to the Internet should have: (a) an IP address (b) a processor capable of handling communications. The term has a certain overlap with the concept of M2M, which is understood as a set of intermediate-level industrial protocols, as is the case with smart meters, for example. (Source: [t2i Glossary](#))

**The Industrial IoT (IIoT):** is a subclass of the IoT that focuses on the particular needs of industrial applications such as manufacturing, the oil sector, utilities. Although they share the same technologies (sensors, cloud, connectivity, analytics), industrial applications have demanding requirements summarized in the following ten criteria: security, interoperability, scalability, precision and accuracy, programmability, low latency, reliability, resilience, automation, maintenance. (Source: [t2i Glossary](#))

**Knowledge:** Ability to apply knowledge and use know-how to complete tasks and solve problems. (Source: [Cedefop Terminology of European Education and Training Policy](#))

**Robot:** Mechanical systems endowed with manipulative abilities (mechanical arms, systems for taking objects) and, in some cases, walking ability (wheels or mechanical limbs for movement). The most advanced robotic technologies are equipped with artificial vision systems capable of recognising objects and possibly taking/manipulating them autonomously according to non-predefined patterns. There are vast differences in models: humanoid robots (such as the famous Japanese Pepper robot, IIT's Italian R1 or social robots), domestic robots (such as the vacuum cleaner robot), drones, logistics robots (such as Amazon's Kivas and similar wheeled cargo robots that now frequent hospitals), robot animals, robot exoskeletons and limbs, combat megabots four meters high, industrial robots (collaborative robots). (Source: [t2i Glossary](#))

**Skills:** Ability to apply knowledge and use know-how to complete tasks and solve problems. (Source: [Cedefop Terminology of European Education and Training Policy](#))

**Stakeholder:** A person or organisation interested in, can influence, be influenced by, or perceive itself as influenced by a decision or activity. Examples: customers, owners, people of an organisation,





suppliers, bankers, legislative authorities, trade unions, partners or communities that may include competitors or opposing pressure groups. (Source: [t2i Glossary](#))

**Vocational Education and Training (VET):** Education and training aim to equip people with and training (VET) knowledge, know-how, skills and/or competencies required in particular occupations or, more broadly, on the labour market. (Source: [Cedefop Terminology of European Education and Training Policy](#))

**Virtual Reality (VR):** Highly immersive visual simulation of artificially generated environments and scenarios through screens or special wraparound glasses. In addition to sounds, the most advanced versions can include tactile sensations and mechanical feedback thanks to special interactive ergonomic devices. Unlike augmented reality, which adds synthetic elements to real ones, the stimuli of the real world are completely replaced by artificial ones in virtual reality. (Source: [t2i Glossary](#))