

Rebooting the National qualification platforms and Roadmaps

towards implementation of
nearly Zero Energy Buildings
and support for Renovation Wave

BUILD UP
SKILLS

BuildUpSkills

(BUS) initiative in **CZ** and **SK**

Rebooting the National qualification
platforms and Roadmaps towards
implementation of nearly Zero Energy
Buildings and support for Renovation Wave

2024



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The world's
construction sector
is
rapidly
evolving.

What's our
response going
to be?



Executive Summary

DoubleDecker: Strategic basis for the transformation of the construction sector

The main objective of the project running from 2022 to 2024 was to identify and develop measures for increasing construction capacity in the Czechia and Slovakia endorsed by key public authorities and other relevant stakeholders. The initial phase involved conducting an in-depth Status quo analysis, followed by the development of National Plans for Construction Education (here called Roadmaps). Afterwards, the project also involved replicating and sharing the outcomes with other EU countries.

National Qualification Platform

Status quo analysis

Roadmap

Project goals

- conducting market research and gathering data on the current state of the workforce and existing qualifications
- bringing together major stakeholders in the fields of energy, education, and construction
- identifying future requirements for 2030
- proposing measures to improve the workforce in the construction sector in the Czechia and Slovakia
- assessing challenges that must be addressed
- involving and endorsing the Roadmap by relevant stakeholders

Common barriers in the Czech and Slovak construction sector

Executive Summary



Executive Summary

Identified measures for increasing construction capacity in the Czechia and Slovakia

Measures for Czechia

- 1 Develop and implement strategy for sustainable vocational trainings in the construction sector
- 2 Use the existing funds in an efficient way in order to support newcomers to the construction sector and finance trainings for EE and RES professions
- 3 Prepare a Strategy for development of the construction sector
- 4 Develop the Concept of Lifelong Learning as its importance will increase rapidly
- 5 Set up an effective Public Procurement focusing on improved quality
- 6 Support the research in the construction sector because involvement of construction companies in on site innovations is still low
- 7 Involve women in the construction sector via improved working conditions and higher opportunities to grow up
- 8 Support the structurally weaker regions because there are still strong regional discrepancies and different construction capacities
- 9 Change the face of the construction sector and focus on attractive features of the upcoming changes in construction sector
- 10 Introduce systematic data collection in education

Identified measures for increasing construction capacity in the Czechia and Slovakia

Executive Summary

Measures for Slovakia

Update existing and create new fields of study to adapt to technical progress and the needs of the transformation of the construction sector	1
Support scholarships for pupils in disciplines that are in short supply and needed to cope with the current changes resulting mainly linked with EE and RES	2
State support for the creation of new educational programmes for pupils and adults	3
State support for companies involved in the educational process	4
Providing additional training for teachers on the new skills requirements	5
Making the teaching profession more attractive and creating the conditions for a significant increase in the interest of young people and professionals in the teaching profession	6
Review and increase the financing of schools and material and technical provisioning, to create a network of schools with a smaller number of schools, which will be supra-regional and specialised in the construction sector, so that they are provided with the required material and technical provision	7
Ensuring effectively sufficient data collection on the education system needed for its management, including the employability of graduates	8
Creation of national campaigns on the employability of education in the construction sector and systematic promotion of the sector by the state in the media	9
State support of continuing education scheme	10

Executive Summary

145 organizations in the Czech Republic and 200 in Slovakia expressed their interest in participating in the project activities of which the main stakeholders created **National Qualification Platforms (NQP)**. The NQPs established the governance and expert groups needed to support the development of the project. The NQP reached a consensual outcome of a broad discussion on the analysis findings and conclusions and supported key assumptions for developing the final Roadmaps.

Activities of the project also included 13 workshops, conferences, surveys with experts and public consultations.

A total of 1,082,312 persons have been reached through the communication activities of the project.

Overall, 75 organizations (36 in the Czech Republic and 39 in Slovakia) from governmental bodies, construction sector, professional associations, investors, and education, research and academia have **endorsed the Roadmaps**.

The endorsement ensures continuation of the implemented measures after the project concludes.

The project was unique in the way that all activities were replicated in both **the Czech Republic and Slovakia**. This allowed for comparison of the results and maximized the synergies of activities between the two countries. Although both countries were aiming to the same goal, the Roadmaps' approach differed slightly, reflecting the identified barriers in the Status quo analysis of each country.

Initiatives in Slovakia primarily focused on education in the construction sector. The most significant achievement was the initiation of discussions and improved collaboration among stakeholders with a focus on developing **new educational programmes and implementing specific measures in school practices**.

Measures in Czechia addressed a broader range of topics, with a particular emphasis on enhancing capacities across the entire construction sector. The most important aspect was the established **collaboration with the governmental bodies** that will play a crucial role in implementing measures.




The project Double Decker is part of the Build Up Skills (BUS) initiative which aims to support the desired level of knowledge and skills in craft and technical blue collar workers across the public and private sectors who are needed for implementation of nearly Zero Energy Buildings and support of the Renovation Wave.

The first Roadmap under this initiative was the National Construction Education Plan introduced in 2013. Its objective was to increase the number of qualified construction workers who should be able to perform construction and renovation of buildings with high energy efficiency or with almost zero energy efficiency energy consumption. The first National Plan contained quantified goals and specific measures for which they were set at the time in which it was to be implemented.

Given the significant changes occurring, it is necessary evaluate the initial plan from today's point of view and meeting the currently set goals.

As a result, the assessment of the 2013 National Roadmaps measures' implementation in Slovakia and the Czech Republic marked the beginning of the present project. Through the use of predetermined criteria, the effectiveness of the measures was assessed. The findings presented the basis for the current Status Quo analysis and formed the development of new measures, schedule, funding proposal, and other components of new National Action Plans in the construction industry.



A photograph of a construction site. In the foreground, a worker wearing a yellow hard hat, a grey t-shirt, and grey shorts with a tool belt is walking away from the camera on a dirt path. To the left is a large pile of sand. To the right are stacks of yellow wooden pallets and metal pipes. The background is filled with a dense network of metal scaffolding and rebar structures, with red and white striped safety barriers. The sky is clear and blue.

The construction sector is faced with a number of issues at once...

...it must prepare for the rapid advancement of technology and the growing awareness of products' carbon footprints. And that in the whole supply chain.

...to complement the missing workers and at the same time increase the attractiveness of the industry.

Process: development of Roadmaps

The implementation of the Double Decker project required the involvement of a large number of experts from the public administration, private companies, educational institutions and the non-profit sector.

The key stakeholders formed newly established **National Qualification Platforms** (NQP) in the Czech Republic and Slovakia. Their main tasks included gathering feedback from all relevant stakeholders, organizations and coordination of workshops and public consultations.

Additionally, NQP members also created governance and expert groups to support the development of technical deliverables: The first step involved conducting an in-depth **Status quo analysis**. The key results from this analysis were used as the basis for developing National Action Plans within the construction industry in the Czech Republic and Slovakia, also known as **Roadmaps**.



A series of 13 workshops took place from 8 December 2022 to 5 February 2024, with a total of 279 participants (210 in Slovakia and 69 in the Czech Republic). The workshops aimed to support the project's development and its technical deliverables.

During the project's later stage, NQP members had the opportunity to endorse relevant measures resulting from the development of the Roadmap.


Overall, 75 organizations (36 in the Czech Republic and 39 in Slovakia) from governmental bodies, construction sector, professional associations, investors, and education, research and academia have endorsed the Roadmaps. Furthermore, some key stakeholders engaged in bilateral discussions, leading to the definition of follow-up activities.

The endorsement ensures continuation of the implemented measures after the project concludes.



A total of
1,082,312 persons
have been
reached through the
communication
activities of the
project.

The communication initiatives of the DoubleDecker project played a pivotal role in its success. The campaign contributed to increasing awareness about the importance of energy efficiency and renewable energy sources in buildings, stimulating demand for high-quality buildings, and enhancing capacity building in education and training within this sector.



**The final
Czech conference**
on 11 March 2024
in Prague

**The final
Slovak conference**
on 21 March 2024
in Bratislava

Photos from the Workshops
and the Final Czech and Slovak conferences

A photograph of a construction site featuring a complex network of metal scaffolding and formwork. In the foreground, there is a large, light-brown pile of sand or soil. A large, semi-transparent green hexagon is centered over the image, containing white text. The background shows more of the construction structure under a clear sky.

**Status quo
analysis of the
Czech Republic**



National Qualification Platform

Status quo analysis

Roadmap

The primary objective of the status quo analysis (SQA) was to thoroughly analyze the current state of the construction sector in the Czech Republic and evaluate its preparedness to meet both EU and national climate and energy targets, as well as targets related to building construction and renovation.

Topics of the SQA



National policies
and strategies contributing
to the EU's energy and
climate targets in the building
sector



Key data
on the construction
and energy sectors

Mapping the workforce
and existing retraining
programs

Current situation
in the field of education
and training



Skill gaps between
the current situation
and needs by 2030

Relevant construction
skills and projects

Barriers



Current situation

Need to adapt to the transformation

The Czech construction sector is undergoing significant societal changes. A key obstacle is the insufficient construction of new apartments, which hinders the achievement of national energy saving goals. The construction industry plays a crucial role in mitigating the impacts of climate change. Implementing new technologies and practices will require an increase in qualified workers in the construction sector. Mainly, it will be crucial to address the shortage of workers in the field and improve the attractiveness of the sector.

Low level of innovation

Compared to other industries, the construction sector is the least innovative and also has the lowest labor productivity. This has a significant impact on the state and progress of the Czech economy as well as the overall societal environment, including related environmental and socio-cultural aspects of development.

Lack of workforce

The construction industry in the Czech Republic has been facing a long-term challenge of labor shortage, in both skilled and unskilled workers. The proportion of employment in small businesses within the industry is high. In 2021, 67% of the workforce in the construction sector was employed in businesses with fewer than twenty employees, while only 9% were in businesses with more than 250 employees.

Environmental aspects

The construction sector consumes a significant share of raw materials and energy resources. More than 50% of the overall domestic extraction is attributed to the extraction of building and non-ore raw materials for building material production. Buildings account for approximately 40% of total energy consumption as well as greenhouse gas emissions and solid waste production.

Requirements for low energy demand buildings

The construction industry's need for energy-efficient buildings, along with the overall requirement for higher labor productivity, results in new and diverse demands for advancing education within the sector.

Needs of the construction sector

Education of professionals in the construction industry (and related professions) is still very fragmented in terms of content and organization in the Czech Republic.

There is an increasing demand for knowledge and skills, particularly as changes are anticipated in the standards for working with new products, technologies and design concepts.



The construction industry in the Czech Republic has long faced the problem of labor shortage.

Adapting the construction industry in the Czech Republic to new challenges, such as increasing demands for energy-efficient construction, is largely tied to the advancement of skills in craft professions.

Supporting policy

Energy Efficiency Directive

The Energy Efficiency Directive (EED) requires reduction of energy consumption in buildings by at least 1.9% annually. At the same time, it introduces the energy efficiency first principle, determines energy savings in public administration, energy audits, monitoring of energy efficiency in data centers and increases awareness and strengthens protection energy consumers. It also emphasizes increasing efficiency in heat supply and defines roles of energy experts.

Renewable Energy Directive

The Renewable Energy Directive (RED) outlines direction of reducing emissions of greenhouse gas emissions by 55% in 2030. It supports the integration of renewable energy sources in the construction industry, both in new buildings and during renovations.

Energy Performance of Buildings Directive

The Energy Performance of Buildings Directive (EPBD) defines zero-emission buildings and minimum energy efficiency requirements for existing buildings.

Long-term building renovation strategy

The long-term building renovation strategy supports the renovation of the national stock of residential and non-residential buildings, public and private, with the aim of having by 2050 a high-efficiency fund of buildings without carbon emissions.



The construction sector is **changing...**

Robotization
and industrialization

Virtual reality

3D
printing of buildings

Digitalization
in the construction sector



Future Requirements

The transformation of the construction industry involves **digitalization and industrial modernization** as crucial factors for adapting to the changing ecosystem. At the same time, the construction sector plays a vital role in adjusting to climate change. To maintain its significant role in society and the economy, the construction industry needs structural changes throughout the entire value chain, with a focus on enhancing labor productivity, expediting construction processes, and making the industry more appealing to new workers.

The **construction and energy sectors** are closely linked. Continuous preparation and the implementation of various **innovations** are necessary for construction companies to achieve energy-saving construction.

energy

technology

education

The next decade will see important developments in educational processes. One of the crucial activities will be the growth of workers' qualifications in construction companies. A key role will be played by the education system and long-life learning.



Main barriers

Unpredictability
of legislative environment

Low interest
of young people about
education in the field

Low level
of management

Missing
strategic management
of the sector

Low level
of productivity
in the construction
industry

Missing legislation
and financial support
for life-long learning



Low interest
about education
in craft fields

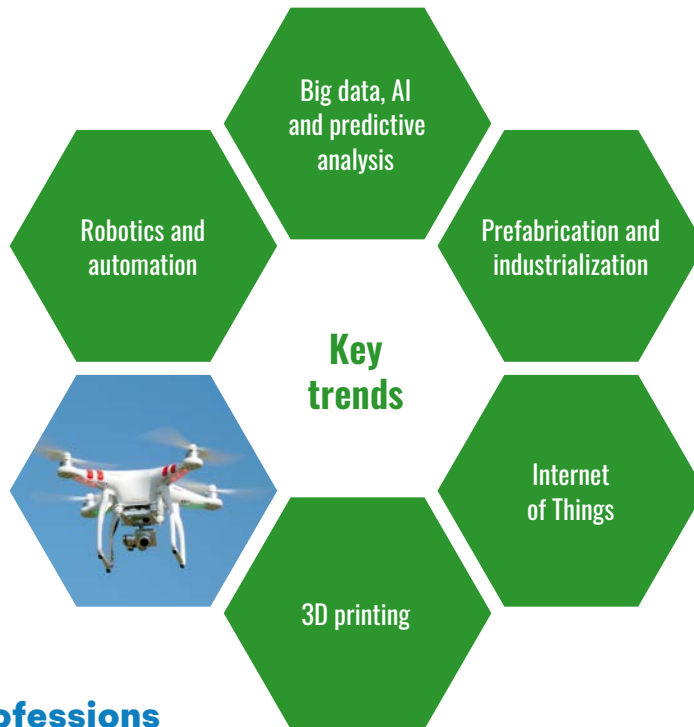
Lack of system
support for schools
and students in the field

Companies are pushing
to employ untrained workers
in order to reduce labor
expenses

The vocational
education and lifelong
education vary depending on the
specialization, but this variation
is not evident in educational
practice



Increased use of alternative techniques



New professions

New professions and roles in the construction industry will have to quickly shift from **Industry 4.0** to **Industry 5.0**. This shift will require the development of socially oriented skills and involves social taxonomy, which must be integrated into ESG programs. Furthermore, it will result in an emphasis on **sustainability in building design** and construction techniques, as well as the need to develop more human-centric skills and competencies **complementing efficient, intelligent, and precise machines**. Consequently, this will lead to the emergence of new types of professions, new qualifications, and the requirement for new skills, knowledge, and competencies for existing roles, thereby necessitating the search for the most talented individuals available.

Incentives lead to innovation in construction through industrial construction, which is a connecting system trends and characteristics of nD BIM, CDE and digital twins.



Final Czech Roadmap

National Qualification
Platform

Status quo analysis

Roadmap

The Roadmap outlines long-term priorities and suggests actions to enhance workforce capabilities in the Czech construction industry in line with European Directive requirements. The selected measures include its purpose, objectives, target group, estimated total costs and implementation timeline.

Action plan measures





Development and implementation of a strategy for the sustainability of vocational training in the construction sector

The problem of adaptation of the Czech construction industry to new challenges, including the growing demands for energy-efficient construction, is primarily related to the growth of qualifications of craft and specialized professions. Virtually all disciplines will need to implement content innovations in education by 2030.

The first step involves a thorough analysis of the current state of education in the construction sector. It is necessary to define objectives and priorities for the sustainability of vocational training based on the analysis. This may include a focus on environmental sustainability, occupational safety, innovation and other key areas. Involvement of industry partners is the key for successful implementation.

Key areas are:

- Development of new education programmes
- Support to teachers and lecturers to be trained in modern teaching methods, technologies and topics related to sustainability in construction
- Implementation of a strategy for practical applications and real projects which will enable students and workers to gain experience in sustainable practices directly on construction sites and in working environments.

TARGET GROUP:

Secondary schools, regions universities, Ministry of Education, Youth and Sports

OPTIMAL DATE OF IMPLEMENTATION: 2025

ESTIMATED TOTAL COSTS:

5 million CZK – strategy development

10 million CZK/year – implementation



Increasing the number of hours of compulsory practice

Projects that will allow students and workers to gain experience with sustainable practices directly on construction sites and in the work environment

Cooperation with construction companies, architectural studios and other players

Definition of sustainable goals

Training of pedagogues in modern teaching methods, technologies and topics

Evaluating the effectiveness of new educational programs

Mechanisms for continuous updates



Efficient use of existing funds



The purpose of the measure is to reinforce the position of the construction sector so that more workers come into the sector, the number of skilled workers increases and sufficient access is provided to new workers from other sectors. Improving knowledge and awareness of national and European funds that can be used to train construction workers. Facilitate the use of funds for construction firms to improve the skills and knowledge of their workers.

- Modernization fund
- OP Just Transformation
- OP Jan Amos Komenský
- OP Integrated Regional Operational Program
- OP Employment Plus
- OP Technology and Applications for Competitiveness
- OP Technical Assistance
- OP Educational infrastructure

Education, information, consultation

- Providing appropriate training and education for people interested in entering the construction sector.
- Raising awareness of the various career opportunities in the construction sector can attract people who are unaware of the wide range of career options the sector offers.
- Provide businesses with clear and accessible information on available grants, application processes and conditions for benefiting from funding. Organizing workshops and seminars to help them understand the procedures and rules.
- Provide expert consulting support to businesses in the preparation of grant applications for projects they wish to implement. Experts can help with project design and documentation. Obtain feedback from businesses that benefit from subsidies. Learn from mistakes and experiences gained from previous projects and adjust procedures when needed.

TARGET GROUP: Non-construction workers, Construction workers, Workers in education, Construction companies
OPTIMAL DATE OF IMPLEMENTATION: 2025–30
ESTIMATED TOTAL COSTS: 100,000 CZK/year





Preparation of a strategy for development of the construction sector

The Czech Republic does not have any officially developed construction strategy that would be the result of a systematic effort and that would be systematically discussed and adopted both by official institutions and the main stakeholders in the field. The strategy should define a vision for the future of the construction industry and to set clear guidelines for its development.

The principal starting point for the preparation of the strategy is the Status Quo Analysis of the Czech Republic, a document that characterizes known and recognizable trends and influences in the Czech Republic. The particular SQA will, however, need to be supplemented by other surveys concerning:

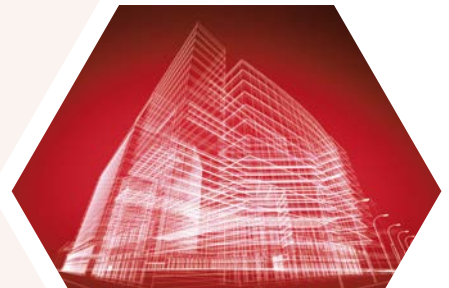


At the same time, the strategy will have to find a response to the current crisis trends in employment.

The Construction 4.0 as a revolutionary change in the centuries-old tradition of the industry is therefore linked to the change in the requirements for buildings brought about by the changing needs of their users, the change in materials and technologies, driven by technical developments, but also by the requirements for the availability of resources and the consequences of the planet's climate change and the possibilities of digitalization and artificial intelligence. An accompanying feature is the dramatic change in employment and the need for various new skills.

The strategy, or the basis for its elaboration, will have to respond to the “renovation wave” announced by the European Union, which should increase the level of construction effort in the renovation of existing buildings and their adaptation to new requirements by up to 3 times. This brings about new strategic changes. Many decisions will require rethinking the question of resources, not only in terms of energy, but also in terms of materials and human resources.

TARGET GROUP: **Ministry of Industry and Trade**
OPTIMAL DATE OF IMPLEMENTATION: **2024–2025**
ESTIMATED TOTAL COSTS: **20 million CZK**



The concept of Lifelong Learning

Construction industry is a field where technological progress is very rapid. Lifelong learning enables workers to keep up with ever-changing technologies, working methods, new legislation and technical standards.



With regard to the dynamics of development in the construction sector lifelong learning is a key step towards meeting the objectives of the BUILD UP Skills programme in the Czech Republic. It is also crucial to strengthen the education system of teachers themselves in the light of the forthcoming changes in society. The objectives of the measure within the concept of lifelong learning are diverse and aim to support the personal and professional development of individuals across age groups:

- Measures should promote the idea of lifelong learning, which means that people are motivated to continue learning and developing after they have completed their formal education.
- The measures should enable people to acquire new professional skills, develop their professional knowledge and improve their work skills.
- Lifelong learning should include non-formal learning activities such as workshops, seminars and other forms of learning outside the traditional school environment.
- Its aim is to enable people to gain higher qualifications and certificates that are relevant to the labour market and improve their employability.
- It is important to develop soft skills such as communication, teamwork, creativity and problem-solving skills.
- Measures should motivate and support employers to invest in the training of their employees and promote their professional growth.
- Lifelong learning should be flexible and responsive to the needs of the labour market to provide the skills that are in high demand at the time.
- Education should support entrepreneurship and innovation, creating the conditions for the establishment of new businesses and development of innovative ideas.
- Lifelong learning can contribute to the personal development, self-satisfaction and overall quality of life of individuals.

4

TARGET GROUP: **Craft and technical professions**
OPTIMAL DATE OF IMPLEMENTATION: **2025**
ESTIMATED TOTAL COSTS: **10 million CZK for the preparation,**
400 million CZK/year implementation






Effective public procurement


The National Strategy for Public Procurement in the Czech Republic, approved by the Government of the Czech Republic on February 21, 2024, promises to set the public procurement towards maximizing the so-called value for money. Practice will show whether public contracting authorities will apply procedures in the intended sense of the law to public contracts.

The aim is to provide public procurers with better quality input for the procurement of construction works. Ensuring that design or construction contracts are managed by qualified contractors.



The standard is an essential basis to ensure a clear assignment of work

Competitive dialogue will provide the contracting authority with a clearer specification of the projectwork, including all risks



To ensure more qualified contractors



TARGET GROUP: Municipalities, Public procurers, Authorized persons
OPTIMAL DATE OF IMPLEMENTATION: 2024
ESTIMATED TOTAL COSTS: These are soft measures

Support for research in the construction sector



*Not enough attention is paid to innovations that would enable adaptation and overcoming barriers. Meanwhile, the construction sector is one of the pillars of the economy. It is crucial to meeting the goals of energy saving, climate protection and accelerating the decarbonization of our economy. Support for research, development and innovation in the areas of **robotics**, **digitalization of construction processes**, **3D printing on specific construction sites**, with the aim of adopting new techniques, and other areas is therefore essential.*

The support for innovations can be carried out through the Technology Agency of the Czech Republic (TACR), ideally through a public support programme structured similarly to the THĚTA energy support programme. That is, in two axes, namely for research projects initiated by the public sector, in particular by Ministry of Industry and Trade, Ministry of Environment and Ministry of Regional Development, and those initiated by enterprises themselves – in analogy to sub-programmes 1 and 2 of the THĚTA programme. The programme's objective would be to introduce **new technologies** and practises on specific sites as well as increase of **competitiveness, efficiency, technological equipment** and so far low **productivity** of the sector. A positive result of the programme would be the creation of modern attractive positions in the construction industry.



A plan to support investment incentives for the introduction of cutting-edge innovations



Support of training and construction process digitalization



Strategic investment in the industrialization of construction manufacturing



TARGET GROUP: **Construction companies, Employees in the construction industry**
OPTIMAL DATE OF IMPLEMENTATION: **2025–2030**
ESTIMATED TOTAL COSTS: **0.5 billion CZK/year**



Involving women in the construction sector

Women in the construction industry are rare. There are several reasons for this – from minor obstacles such as inadequate safety equipment at work to deeply ingrained social norms – there is a lack of support and acceptance in predominantly male teams, and more physically demanding jobs are traditionally considered inappropriate.

Measures by target groups:

- **Motivate them to enter the construction industry** – a targeted campaign for Primary schools' students and their parents, Secondary schools and Universities.
- Measures targeting to facilitate **the return to a qualified job** on/after parental leave.
- **Retraining courses** are an opportunity to bring unemployed women into the construction industry, especially women working on construction sites doing manual jobs that do not require physical strength.

The effect of gender diversity on the construction industry:

- Better problem solving and decision making, different perspectives and experience
- Increased creativity and innovation
- Strengthening the company's reputation and competitiveness in the market (adopting gender diversity can improve the company's reputation, attract top talents, clients and investors).



Supportive and inclusive work environment

Improving access to education and skills development

Facilitating work-life balance



Use of technologies to overcome differences between men and women

TARGET GROUP: Graduates – women educated in construction professions of universities and colleges. primary and secondary school pupils and students, parents
Unemployed women – adepts for retraining for a construction profession
OPTIMAL DATE OF IMPLEMENTATION: 2025–2030
ESTIMATED TOTAL COSTS: 20 million CZK/year

Support for structurally weaker regions



Support for structurally weaker regions in relation to education in Czech construction and the possibility of shifting employment from the primary sector to the construction sector.

The purpose of this measure is to bring new employees to the construction sector in weaker regions. These regions in the Czech Republic include particularly North-West Bohemia (Ústí nad Labem and Karlovy Vary region) and North Moravia (Moravian-Silesian Region). It is a long-term process that requires a comprehensive approach.

The key aspects are:

- **Investment in infrastructure and modernization of transport, telecommunications and other key areas** – The establishment of infrastructure projects requires a large amount of workforce, which can significantly increase employment in the region.
- **Education** – An educated workforce is more likely to get quality jobs in the construction sector. Regions should invest in vocational education and training to ensure that local people have the necessary skills and qualifications to work in the construction industry.
- **Innovation and technological development** – It is vital to provide financial support for start-ups and small-sized enterprises in the area of construction that focus on innovations and technological development.



TARGET GROUP: Construction workers, employees, self-employed persons
People from other fields, unemployed
OPTIMAL DATE OF IMPLEMENTATION: 2025–2030
ESTIMATED TOTAL COSTS: 200 million CZK/year





Changing the face of the construction sector

The construction industry faces a negative reputation at times. In public opinion, it is often perceived as the three Ds – ‘dirty, dangerous and degrading’. There is a need to introduce the new face of Construction 5.0, as a new approach to building and managing construction projects that uses modern technologies and digital tools to improve efficiency, sustainability and safety in the construction industry, integrating modern technologies such as artificial intelligence (AI), the Internet of Things (IoT), augmented reality (AR), virtual reality (VR) and big data.

Modern technology offers revolutionary ways to approach construction projects and enables the construction industry to move from being just an industry of physical labour to one of innovations. This is manifested both by the creation of new professions (e.g., installers of solar units and heat pumps or robotic masonry operator) and also by the expansion of the content of existing professions. Fields related to digitalization bring significant opportunities - artificial intelligence, various types of virtual reality, automation and robotization in the production of materials and elements and the construction of buildings itself, where operators of new technologies will be necessary.

Every project in this sector is unique, which is why the construction industry is also a laboratory of innovation and creativity.

New technology allows for a creative approach to solving construction challenges.

Information campaign on the construction industry

Career counseling for students

Workshops and seminars

Promoting the modernization of teaching

Workshop sessions for parents to inform them about the benefits of building careers for their children

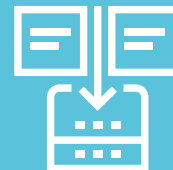
Preparatory courses and week-long internships in partnership with construction companies

Creating a platform to share experience and stories of successful people in the construction industry

TARGET GROUP: Public, Workers in the construction sector
OPTIMAL DATE OF IMPLEMENTATION: 2025–2030
ESTIMATED TOTAL COSTS: 100 million CZK/year



Introducing systematic data collection in education



A significant obstacle to the quality management of skills development in the construction industry is the lack of commonly available, reliable and according to a uniform methodology long-term statistical data concerning number of students in secondary vocational schools by individual trades and number of people working in the construction industry by individual trades.

The objective of the measure is to ensure the common availability of statistical data on trends in the number of vocational secondary school students and the number of people working in construction, both in a 'fine' structure of disciplines and skills.

It is necessary to equip competent public administration authorities at central and regional level, business associations, professional associations and educational institutions in the construction industry with a high-quality and commonly available data base, enabling them to provide long-term information on the development of the structure of professions in the construction industry and thus to equip these institutions with the ability to respond strategically and tactically to the development of the labour market in the construction industry.

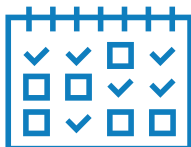
TARGET GROUP:

- Managers of public administration institutions with competences in relation to construction and construction education (Ministry of Education, Youth and Sports, Ministry of Industry and Trade, Ministry of Labour and Social Affairs, The Czech Statistical Office and Association of Regions),
- Officials of occupational associations and business federations
- Principals of secondary vocational schools and other educational and research organizations related to the construction industry.

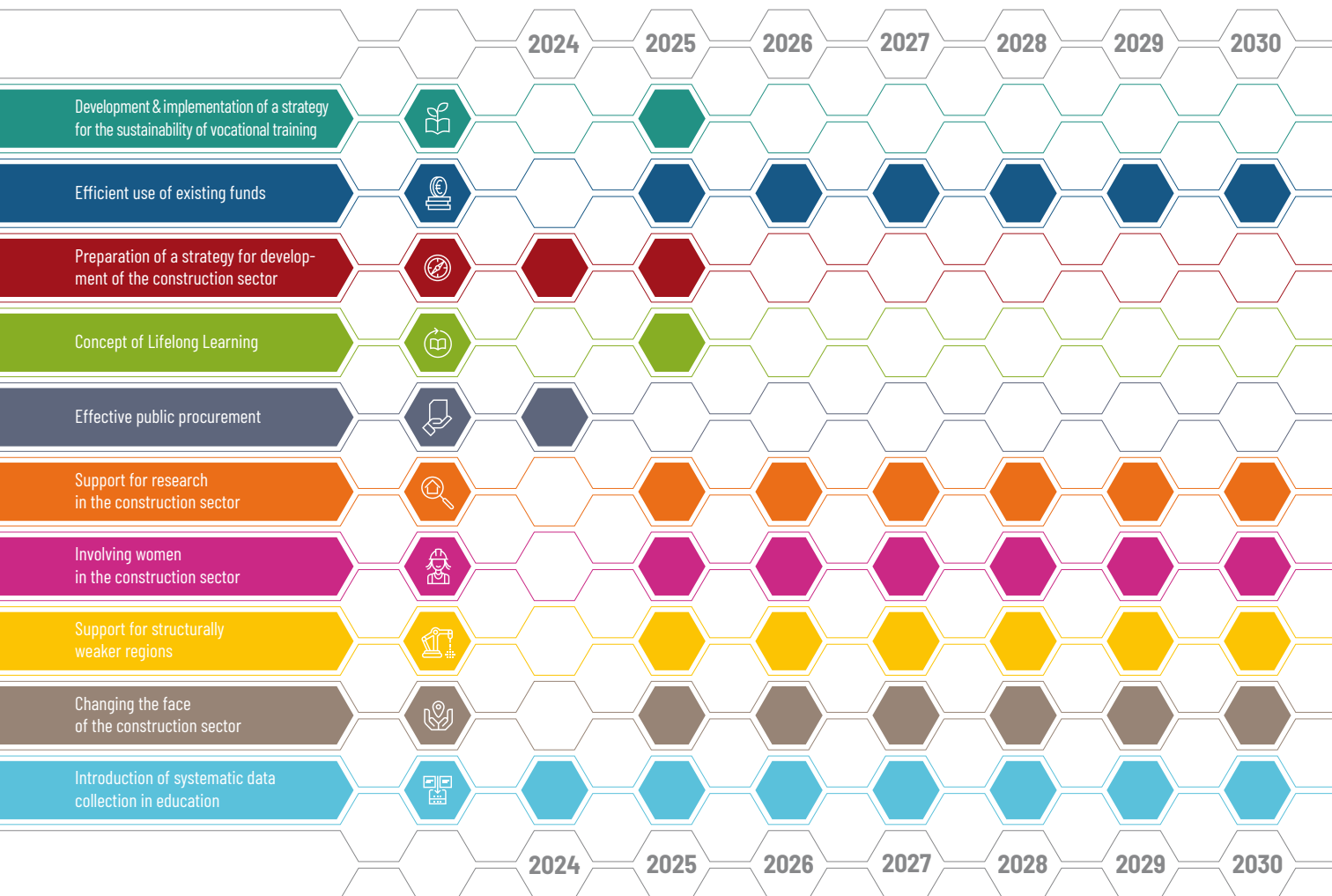
OPTIMAL DATE OF IMPLEMENTATION: 2025–2030


ESTIMATED TOTAL COSTS: Preparatory works 2.1 million CZK
Implementation CZK 12.5 million CZK/year





Schedule of the Action Plan





Status quo analysis of Slovakia


National Qualification Platform

Status quo analysis


Roadmap

The primary objective of the status quo analysis (SQA) was to thoroughly analyze the current state of the construction sector in Slovakia and evaluate its preparedness to meet both EU and national climate and energy targets, as well as targets related to building construction and renovation.

Topics of the SQA




Relevant projects
in building skills




National policies
and strategies to contribute
to the EU's energy and climate
targets in the building sector




Key data on
construction and energy



Skill gaps
between the current situation
and needs by 2030



Current situation
in the area professional
education



Barriers identified
by schools and employers in
the construction industry

Is there a **revolution** on the horizon?

Low level of
innovation and
decreased
productivity

The construction industry is the least innovative compared to other sectors. Following agriculture, construction has the lowest labor productivity, which has remained unchanged over the past decade. Additionally, the quality has fallen behind, while the cost has risen disproportionately.

Pressure on
transformation in
the construction
industry

The construction industry is facing growing pressure to undergo transformation, which requires the introduction of innovative changes and approaches **to enhance work productivity and efficiency.**

Development
of workforce

The labor force's development is impacted by demographic shifts, population aging, increased representation of older age groups in the construction industry, as well as the outflow resulting from retirement and the reduced proportion of individuals under 29, alongside changes in labor market needs. The current labor supply shows inconsistencies with developments, particularly in the number of graduates in relevant fields of study, their knowledge, skills, preparedness for new challenges, innovative trends, and the labor market's quality and quantity needs. It is anticipated that a total of 21,000 high school and university graduates will enter the labor market between 2021 and 2025, having completed their studies in corresponding fields. A study conducted by Trexima revealed that only 9% of graduates find the construction sector attractive and choose to work in it. Consequently, a **shortage of approximately 19,000 graduates** in the sector is projected by 2025. Consequently, the primary aim of the construction sector is to retain craftsman in the industry, rather than increasing the number of pupils.

Lack of
workforce

Due to a shortage of workers, companies must find ways to maintain performance and enhance labor productivity while working with fewer employees. New methods, such as robotization, automation, and digitalization, will play a key role in achieving these goals. Construction companies are in competition with more industrial sectors that offer promising technologies and effectively harness the natural skills of the "Xbox generation," who are accustomed to technology and expect to incorporate it into their careers.

Digitalization in the construction sector

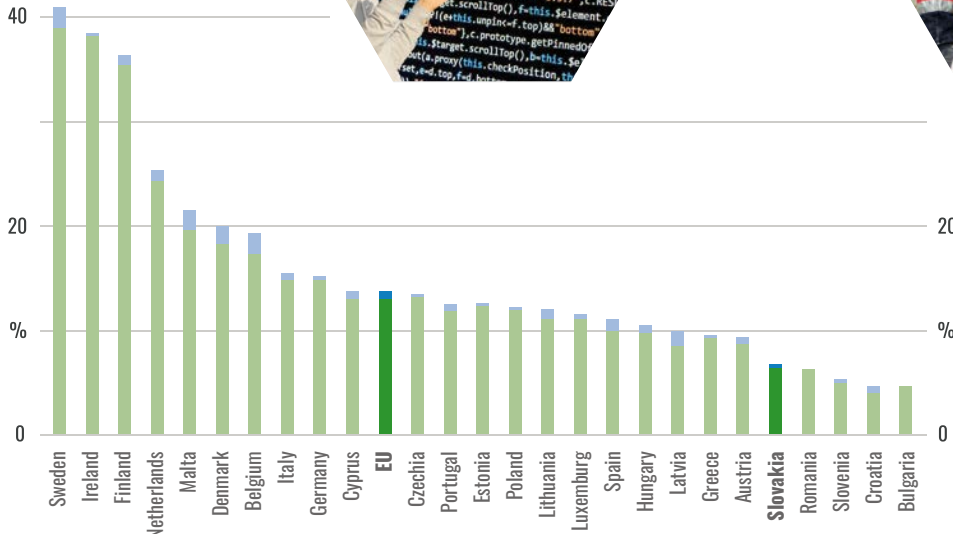
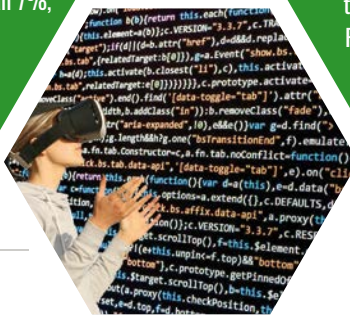


38% of respondents from construction companies want to address the issue of insufficiently skilled workers through the ongoing development of digitalization.

Lack of qualified workers with the necessary digital competences limits the implementation and use of digital technologies in the construction industry.

The current rate of digitalization of the construction industry in Slovakia is less than 7%, while the EU average is 12.7%.

The construction industry's digitalization requires expertise in information technology and digital tools. Professional knowledge and skills are essential for this transformation.



Source: Eurostat

The level of digitalization in the construction industry

the percentage of enterprises that have high and very high levels of digitalization



very high digitalization



high digitalization

Survey

in professional high schools and universities

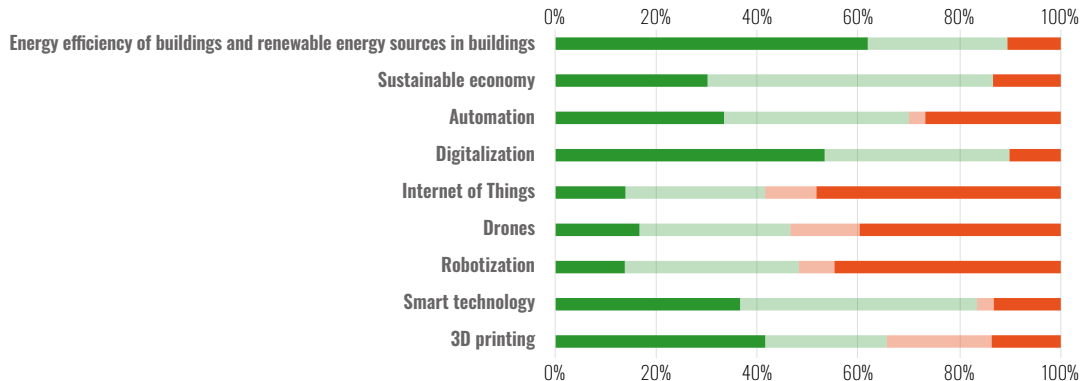
Surveys conducted at secondary schools and construction faculties revealed that the construction faculties, as well as some secondary schools, have prior experience in integrating skills, knowledge, and competencies pertinent to the evolving construction industry.

Our analysis assessed the preparedness of vocational education for present developments and determined the extent to which the current formal education system covers emerging trends and requirements in the construction industry. We also evaluated whether high schools and universities are equipped to handle the current and future challenges associated with climate change, the fourth industrial revolution, digitalization, and automation in response to the anticipated rapid transformations in the construction industry.

Professional expertise and skills

in the energy and construction industry school departments

Presented in percentage



Yes



Partially



Not yet, but we are planning to change the study program



Not yet, nor do we plan to change the study program

The construction sector is **changing...**

Robotization
and industrialization

Virtual reality

3D
printing of buildings

Digitalization
in the construction sector

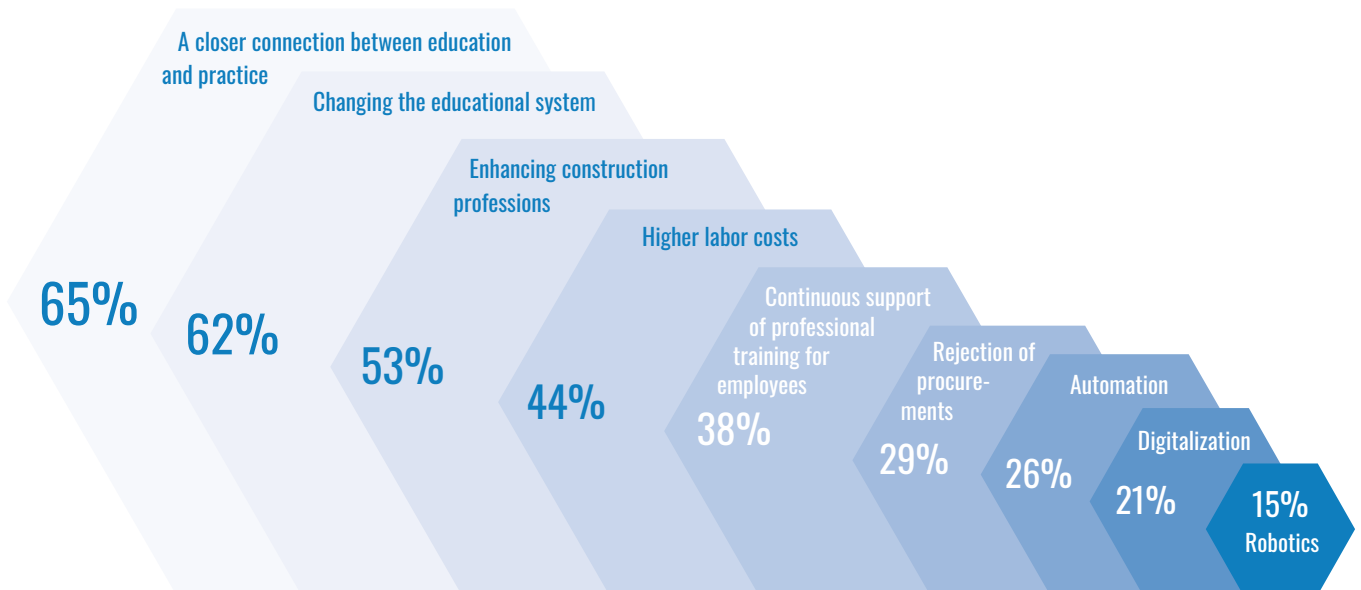


Expected trends in construction companies

The results point to a change in the educational system, whether in form of cooperation of companies with schools, innovation of the educational system or making the construction profession more attractive.

These trends show the need to improve the image of the entire industry in society and the prestige of construction professions, but also the **need to transform the construction industry into a modern and attractive industry** that offers interesting work and career progression.

Connecting education with practice, changing the educational system with the aim of preparing graduates for market needs work and **increasing the attractiveness of construction professions**, which requires a less expected change in perspective digitalization, automation and robotization.

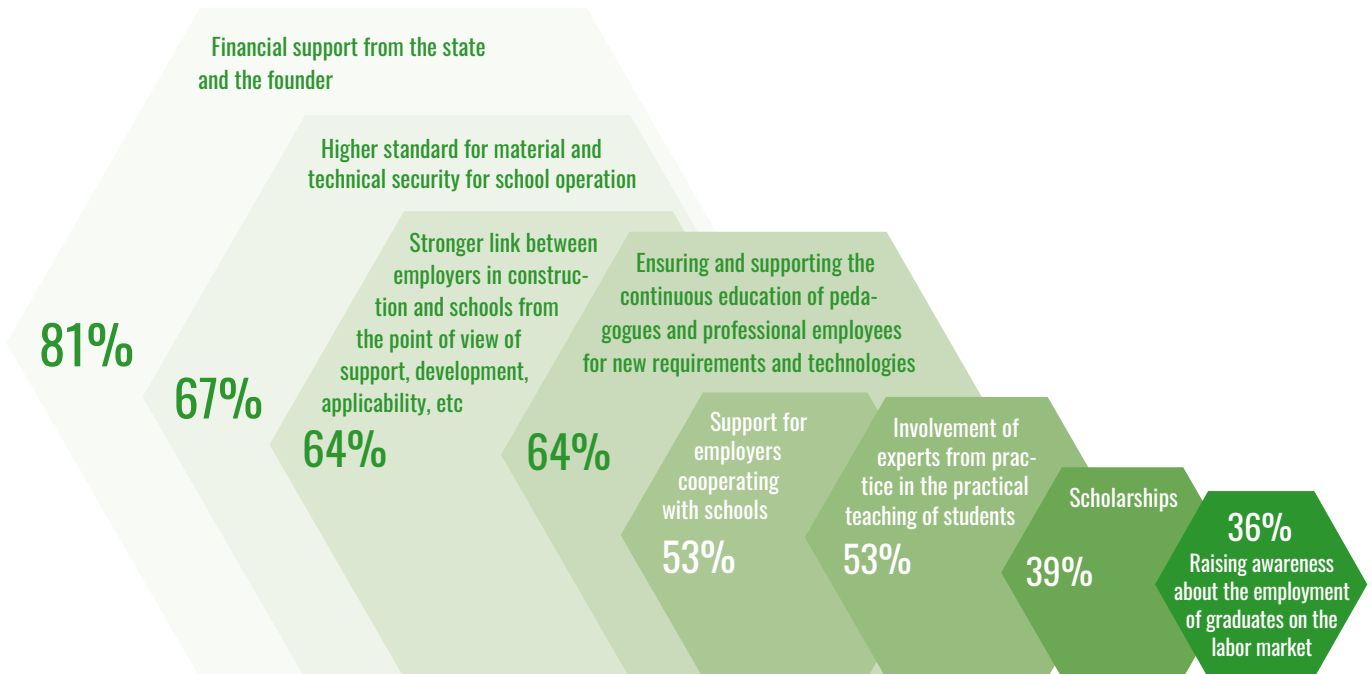


Expected trends in education institutions

The most significant need is a financial support from the state and the founder and material and technical security for school operation.

Additionally, this also concerns the support, development and presentation of the **applicability of education in practice**. Schools could partner with practitioners through selective lectures, teacher training and excursions to ensure that their education aligns with current **labor market requirements**.

Enhanced financial support and higher standards for the technical security for school operation will facilitate project implementation and investment, thereby aiding the realization of new education concepts and increasing education's appeal to young people.

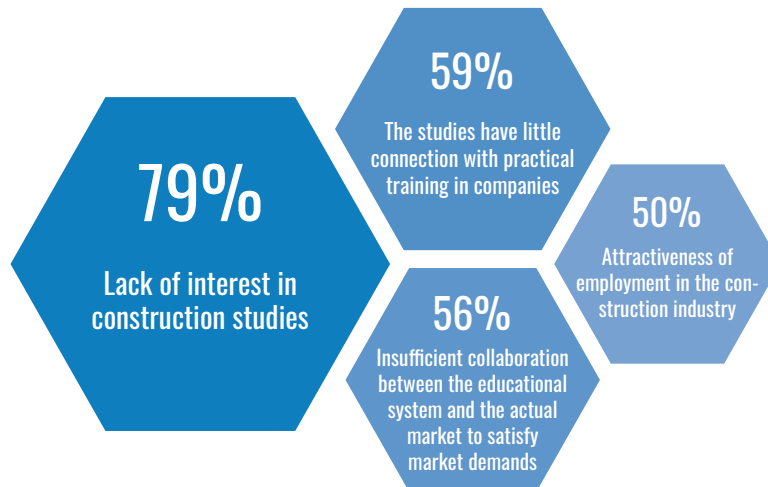


Barriers identify by employers

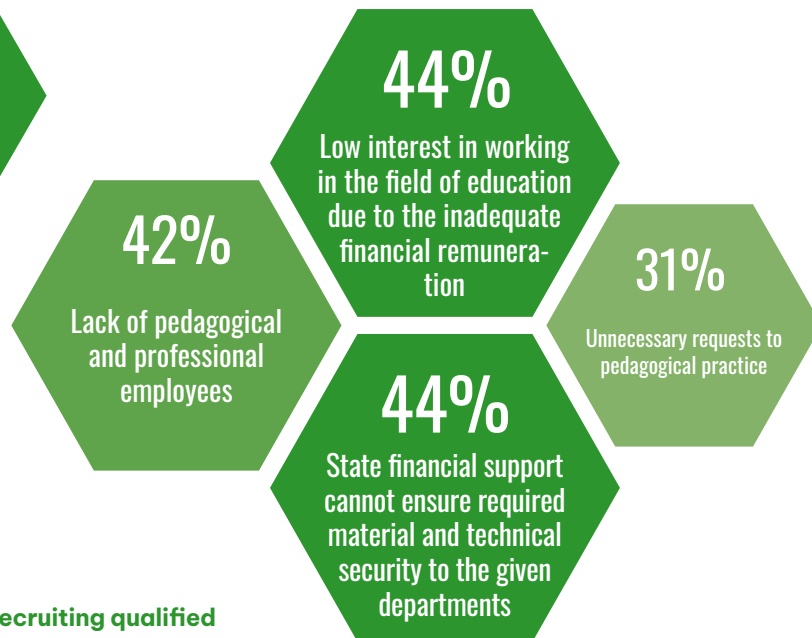
Based on our survey findings, it appears that there is a shortage of skilled labor affecting up to 100% of employers in the industry. It is a combination of many factors that influences the interest in studying construction education leading consequently to the availability of qualified workers in the industry.

Employers have identified **lack of interest in studying construction professions** as a major obstacle. This lack of interest stems from the perception that the construction industry is less prestigious and attractive compared to other fields. Those who are keen on pursuing studies tend to choose other fields or programs that incorporate new digital technologies.

Another challenge is the **inadequate integration of practical training in construction studies** with practice experience in companies. It is crucial to provide access to practical training at construction sites and exposure to real-life scenarios to enhance practical skills and gain essential experience for a successful career in the construction industry. This will also contribute to a better understanding of the practical application of their education, ultimately increasing the industry's appeal to students.



Barriers identify by education institutions



Factors that prevent schools from recruiting qualified teachers, professional masters and school principals.

- Inadequate financial remuneration discourages experienced professionals and they aim to more financially attractive job opportunities.
- This situation subsequently affects the quality of teaching and training, in terms of limited motivation and reduces enthusiasm for working in a setting that lacks adequate financial recognition.
- This results in an unfavorable generational structure of the teaching staff. A related problem is also current requirements for pedagogical practice. The hiring of highly qualified practitioners is hindered due to the failure to meet these requirements.

Vocational schools also face a challenge in terms of **inadequate funding**. According to the current analysis, the lack of funding presents a significant barrier to the advancement of education, especially concerning the anticipated needs by 2035. This hinders schools from acquiring the necessary resources and equipment and adapting to ongoing developments. Outdated educational facilities lead to students being unprepared for practical application, ultimately decreasing the appeal of pursuing studies or employment.

A photograph of an industrial construction site featuring several large, yellow robotic arms (CNC machines) working on a complex metal structure. The scene is brightly lit, likely from large windows or skylights, creating a high-contrast environment. The robotic arms are positioned at various angles, some reaching towards the center of the frame. The background shows the intricate framework of the building under construction, with various beams and supports visible.

Rise of alternative construction techniques

The construction
sector has turned to
industrial construction

as a solution to the increasing decline in labor productivity compared to other industries and the shortage of skilled craftsmen in various professions and seems to be a solution to these issues. Covid-19 caused a significant acceleration of the industrial construction in the world, changing the industry as a whole.

The delay
in this area will have serious
consequences for Slovakia,
affecting both social stability and
economic growth.

Required new competencies, knowledge and skills





Final Slovak Roadmap

National Qualification
Platform

Status quo analysis

Roadmap



Milestones of the BUS SK Roadmap



1 Roadmap endorsement by stakeholders (2023)

- General strategy (symbiosis of the continuing and formal education)
- Identification of new professions and roles in working teams
- Recommendation for the government and regional governments
- Identification of measures and timetable for their implementation

2 Creating an ecosystem for the adaptation of vocational education (2024–2025)

- Implementation of the recommendations addressed to the Slovak Government and the regional governments
- Equipping vocational schools at secondary level with new technologies
- Preparation of the projects for the elaboration of continuing education programmes

3 Setting up continuing educational systems (2025)

- Symbiosis of continuing education and formal education
- Institutionalism of continuing education

4 First phase of continuing education projects (2026–2028)

- Preparation, testing and validation of model continuing educational programmes for the formation of off-site construction production teams in a dual on- and off-site construction system
- Monitoring of relevant innovations in the construction sector
- Continuing evaluation of achievements

5 Second phase continuing education projects (2028–2030)

- Preparation, testing and validation of model continuing education programmes for integrated industrial construction teams
- Adaptation of vocational education curricula at secondary level

6 Implementation of new vocational training curricula (2029–2031)

- Setting up new vocational education curricula at a secondary level

7 Evaluation and update of the Roadmap (2031)

- Evaluation of the results of the Roadmap
- Update for 2031–2041





State support for the creation of new educational programmes for pupils and adults

Update of existing and creation of new fields of study to adapt the fields to technical progress and the needs of the transformation of the construction sector

Making the teaching profession more attractive and creating the conditions for a significant increase in the interest of young people and professionals in the teaching profession

Support scholarships for pupils in disciplines that are in short supply and needed to cope with the current changes resulting from European and international agreements

State support for companies involved in the educational process

Providing additional training for teachers on the new skills requirements

Creation of national campaigns on the employability of education in the construction sector and systematic promotion of the sector by the state in the media

Ensuring effectively sufficient data collection on the education system needed for its management, including the employability of graduates

Review and increase the financing of schools and material and technical provisioning, to create a network of schools with a smaller number of schools, so that they are provided with the required material and technical provision

State support of continuing education scheme

Recommendations & Measures

1

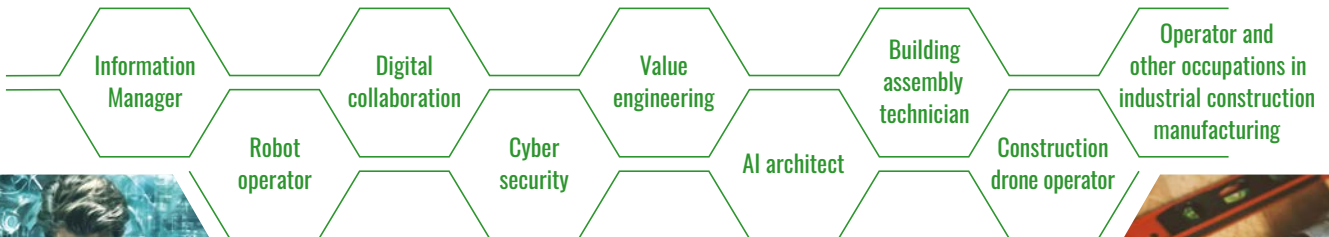
TARGET GROUPS:
operators/technicians EQF 3-5
IMPLEMENTATION: 2024–2026

Update of existing and create of new fields of study to adapt the fields to technical progress and the needs of the transformation of the construction sector

The transformation of the construction sector towards industrial construction production, which will be largely carried out off-site construction, with buildings being assembled on site, places new demands on skills, knowledge and competences. Industrial construction production encompasses five key trends:



For this reason, existing curricula need to be revised and new curricula need to be developed to meet new roles in existing professions and entirely new emerging professions in the construction industry. These professions include, for example:



2
TARGET GROUPS:
operators/technicians EQF 3-5
IMPLEMENTATION: 2024

Support scholarships for pupils in disciplines that are in short supply and needed to cope with the current changes resulting from European and international agreements

To increase the percentage of graduates who remain in the construction sector after the completion of vocational training at secondary level, it is necessary to motivate pupils already during their vocational training in the form of scholarships.

3
TARGET GROUPS:
operators/technicians EQF 3-5
IMPLEMENTATION: 2024–2026

State support for the creation of new educational programmes for pupils and adults

The transformation of the construction sector will require a major change in existing study programmes and the development of new ones. These programmes not only concern pupils in preparation for the profession but also the retraining of adults in continuing education programmes. This scope of work and focus on the latest knowledge in the sector will require experts to work with stakeholders. The state needs to support this work financially and organisationally. It can also make use of EU funds, which are part of the operational programmes.



4

TARGET GROUPS:
SMEs in the construction sector
IMPLEMENTATION: 2024

State support for companies involved in the educational process

The construction sector is characterised by a high proportion of micro, small and medium-sized enterprises, which do not have the opportunity to engage in the training process without financial support from the state. Since their input into education by providing know-how and taking on apprentices for practical training is irreplaceable, it is necessary to facilitate their involvement through cost recovery and possible additional benefits.

5

TARGET GROUPS:
Teaching and professional staff of vocational schools at secondary level
IMPLEMENTATION: 2024

Providing additional training for teachers on the new skills requirements

The adaptation of existing and the creation of new curricula and continuing education programmes must go hand in hand with intensive training of trainers – teachers at secondary vocational schools. This training should be recognised as part of the professional education/professional development of teachers. This will increase the motivation of educators to acquire new skills and knowledge in the field, which are essential for the effective preparation of pupils for careers in the transformed construction sector.



TARGET GROUPS:
Teaching and professional staff of
vocational schools at secondary level
IMPLEMENTATION: 2025

Making the teaching profession more attractive and creating the conditions for a significant increase in the interest of young people and professionals in the teaching profession

Vocational schools at secondary level are struggling with a shortage of teachers and the rising average age of current staff. It is therefore necessary to attract new young teachers into vocational education so that the age structure of the teaching staff is sustainable in terms of the need to continuously respond to new demands of practice.

However, average starting salaries for secondary school teachers lag not only behind all EU Member States but also candidate and associated countries. According to Eurostat, Slovakia ranks second worst with its average starting salaries in secondary schools, just behind Albania. Such starting salaries are un motivating and have stopped the inflow of young teachers into schools.



7

TARGET GROUPS:
VET schools in construction sector
IMPLEMENTATION: 2024–2025

Review and increase the financing of schools and material and technical provisioning, to create a network of schools with a smaller number of schools, which will be supra-regional and specialised in the construction sector, so that they are provided with the required material and technical provision

The status quo analysis has shown that the biggest obstacle to the introduction of innovative educational concepts is the lack of state funding for vocational education schools. It is not sufficient to provide the required modern technical equipment. This lack of funding is an insurmountable obstacle to the development of education in terms of needs in the horizon 2035. It should be recalled that education and training for employment is, among other things, guaranteed by the Constitution of the Slovak Republic and the role of the State in its financing is unmistakable.

The creation of a network of schools with fewer schools that are supra-regional and specialised in the construction sector will help to spend financial resources more efficiently to meet current and future requirements for skills, knowledge, and competences in the construction sector.

8

TARGET GROUPS:
Pupils in secondary vocational schools, employers' needs for graduates by study programmes in secondary vocational schools
IMPLEMENTATION: 2024–2026

Ensuring effectively sufficient data collection on the education system needed for its management, including the employability of graduates

Good quality and reliable data are needed for effective planning and programming of education in the construction sector. It is therefore important to ensure that it is collected, processed, and made available to the public. In view of the Statistics Act, such data collection and processing are the exclusive responsibility of the State.

TARGET GROUPS:

Public, primary school pupils and their parents

IMPLEMENTATION: 2024–2028

Creation of national campaigns on the employability of graduates from construction education programmes in the construction sector and systematic promotion of the sector by the state in the media

The transformation of the construction sector, changes in the nature and conditions of work in the construction sector must go hand in hand with the promotion of employment and career opportunities aimed at the public, primary school pupils and their parents. Given the urgency of meeting the Slovak Republic's obligations under EU legislation and other international commitments, it is essential that the State develops and finances nationwide campaigns with this focus.

TARGET GROUPS: Job seekers in the construction sector from regions transforming to clean energy and current employees and craftsmen in the construction sector.

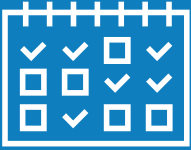
IMPLEMENTATION: from 2025

State support of continuing education scheme

Construction is becoming a sector in which rapid changes in skills, knowledge and competence requirements will take place. For this reason, continuing education will play an important role, unparalleled in the past when the construction sector has resisted change and innovation.

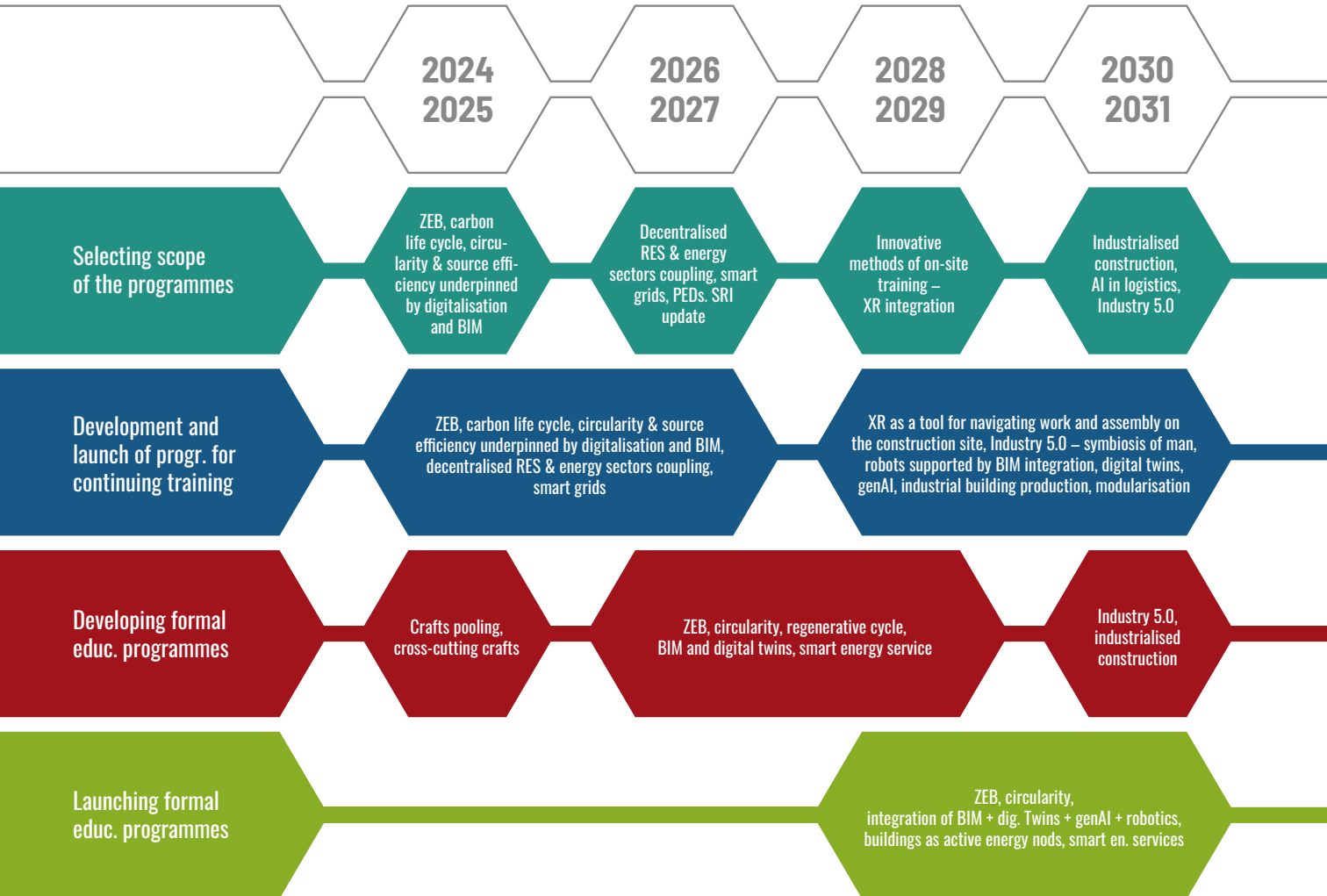
Lifelong learning in the sector must be systematic, and its stability, quality and accessibility must be improved. For this reason, state intervention and financial support for all forms of lifelong learning are essential.





Implementation time frame

for projects developing new study programmes and continuing vocational education and training programmes





**Stakeholders
endorsing
the Roadmap**

Stakeholders endorsing the Roadmap



CZECH REPUBLIC

Organization	Type of stakeholder
Ministry of Industry and Trade	Governmental body
Ministry of the Environment	Governmental body
Ministry of Regional Development	Governmental body
CKLOP – Komora lehkých obvodových plášťů	Professional associations
SIA ČR – Stavitelství, inženýrství architektura	Professional associations
Chance for Buildings	Professional associations
Metrostav a.s.	Construction industry
JRD s.r.o.	Construction industry
Trigema a.s.	Construction industry
GEOSAN GROUP a.s.	Construction industry
SWIETELSKY s.r.o.	Construction industry
Energie – stavební a báňská a.s.	Construction industry
Energie – nemovitostní a.s.	Construction industry
Knauf insulation s.r.o.	Construction industry
Association of Building Entrepreneurs of the Czech Republic (SPS)	Professional associations
Czech society of civil engineers	Professional associations
National Centre for Construction 4.0 (NCS 4.0)	Professional associations
Czech Premanufactured Building Associations (ADMD)	Professional associations
Association of manufacturers of mineral insulation (AVMI)	Professional associations
KORE	Construction industry
University Centre for Energy Efficient Buildings of CTU (UCEEB)	Education, research and academia
EkoWATT s.r.o.	Construction industry
Heimstaden s.r.o.	Construction industry
KKCG Real Estate, a.s.	Investors and developers
Velux s.r.o.	Construction industry
Secondary School of Civil Engineering and Business School, Kadaň	Education, research and academia
Centrum pasivního domu	Professional associations
Pozemní stavitelství Zlín a.s.	Construction industry
Technical University of Ostrava	Education, research and academia
Czech Chamber of Commerce	Professional associations
ReMi Konzult, spol. s r. o.	Construction industry
INOS® Zličín, a.s.	Construction industry
SUBTERRA a.s.	Construction industry
STRABAG a.s.	Construction industry
Syner a.s.	Construction industry
Czech Infrastructure Association (ARI)	Professional associations

SLOVAKIA

Organization	Type of stakeholder
Ministry of Education, Research, Development and Youth of the Slovak Republic	Governmental bodies and regional authorities
Ministry of Transport of the Slovak Republic	Governmental bodies and regional authorities
Ministry of Environment of the Slovak Republic	Governmental bodies and regional authorities
Ministry of Economy of the Slovak Republic	Governmental bodies and regional authorities
Banská Bystrica Self - Governing Region	Governmental bodies and regional authorities
Košice Self - Governing Region	Governmental bodies and regional authorities
Prešov Self - Governing Region	Governmental bodies and regional authorities
Žilina Self - Governing Region	Governmental bodies and regional authorities
Friends of Earth, FotE	Professional associations
Slovak Green Building Council	Professional associations
Association of Towns and Communities of Slovakia	Professional associations
Industrial Unions and Transport Association	Professional associations
Guild of roofer's Slovakia	Professional associations
Energy Cluster	Professional associations
Integrated Trade Union	Professional associations
Chamber of Surveyors and Cartographers	Professional associations
The National Union of Employers	Professional associations
Strabag Pozemné staviteľstvo, s.r.o.	Construction industry
Chemkostav, a.s.	Construction industry
Proma, a.s.	Construction industry
BALA, s.r.o.	Construction industry
HORNEX, a.s.	Construction industry
Koga Bau s.r.o.	Construction industry
STRABAG s.r.o.	Construction industry
Metrostav a.s. - organizačná zložka Bratislava	Construction industry
VÁHOSTAV-SK, a.s.	Construction industry
Secondary Vocational School of Crafts and Services	Education, research and academia
Secondary Vocational School of Technologies and Crafts	Education, research and academia
Secondary Vocational School of Construction Nitra	Education, research and academia
Secondary Vocational School of Construction Žilina	Education, research and academia
Secondary Vocational Technical School Prešov	Education, research and academia
Secondary Vocational School of Construction of Oskar Winkler Lučenec	Education, research and academia
Secondary Technical School of Construction and Geodesy Košice	Education, research and academia
Secondary Technical School of Construction Prešov	Education, research and academia
Secondary Technical School of Construction of Emil Belluš Trenčín	Education, research and academia
Secondary Technical School of Construction Žilina	Education, research and academia
Technical University of Košice	Education, research and academia
Secondary School of Electrical Engineering - Hálova, Bratislava	Education, research and academia
Secondary School of Electrical Engineering - Adlerova, Bratislava	Education, research and academia
Univeristy of Žilina	Education, research and academia



Comparative analysis

The project was unique in the way that all activities were **replicated** in **both the Czech Republic and Slovakia**. Regular biweekly online meetings were held throughout the project, along with additional communication and active collaboration between Czech and Slovak partners to monitor work progress in their respective countries and compare it with each other. This maximized the synergies of activities between the two countries.

Although both countries were aiming to the same goal, the Roadmaps' approach differed slightly, reflecting the identified barriers in the Status quo analysis of each country.

Slovak initiatives primarily focused on education in the construction sector. The most significant achievement was the initiation of discussions and improved collaboration among stakeholders with a focus on **developing new educational programs and implementing specific measures in school practices.**

Czech measures addressed a broader range of topics, with a particular emphasis on enhancing capacities across the entire construction sector. The most important aspect was the **established collaboration with the governmental bodies that will play a crucial role in implementing measures.**



Lessons learned and recommendations

Lessons learned

The structural environment and general legislation of both countries lead to similar responses to challenges and face comparable structural issues.

- Both countries share the common challenge of lacking skilled professionals in their construction sectors, with a shortage of workforce overall.
- Both countries have identified significant gaps in education on all levels including primary, vocational and life-long education.

During the project, it became evident that there was considerable interest in the theme. All stakeholders involved demonstrated high commitment to the project's development. Including the state who expressed strong support for continuing work on the measures after the project's conclusion.

The sooner technological progress takes place, the easier it will be transforming the construction industry and bringing in added value by skilled individuals.

Recommendations

Enhancing the educational system is essential, including the preparation of teaching and training staff to meet the modern workplace requirements and to make teaching professions more appealing.

The primary focus should be on **technological advancement and digitalization.**

Finding adequate **strategy and funding** is must.

Making rapid and significant progress is necessary **to attract a talented workforce** to the sector.



Partners of the project

The Czech
Chamber of
Chartered Engineers and
Technicians Active
in Construction

Architecture and
Building Foundation

The Czech Green
Building Council

Slovak innovation
and Energy Agency

ViaEuropa
Competence
Center

Czech
Technical University
in Prague

Institute
of Education
and Services

The Association
of Construction
Entrepreneurs
of Slovakia

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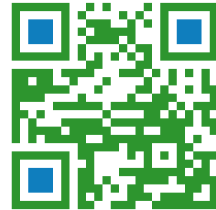
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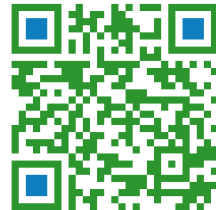
DoubleDecker

The path
to energy savings
and efficiency

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to know more
about
the project?



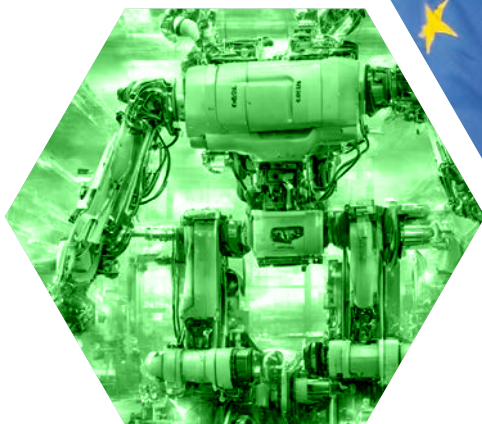
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