MINISTRY OF INDUSTRY AND TRADE
OF THE CZECH REPUBLIC

Czech Republic
The Country For The Future

National Artificial Intelligence Strategy of the Czech Republic

Acknowledgement

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VISION – Czech Republic, the country of robots

The Czech Republic is a country of ingenious people. It is these people that we must build our future prosperity on. The Government has committed itself to becoming one of Europe's innovative leaders and a country of the technological future within twelve years. The National AI Strategy you are holding in your hands is one of the important steps towards this objective. Artificial intelligence, which includes smart programs and various machines from robots in factories, through algorithms in banks, to self-driving cars in the streets, is the future. And the Czech Republic wants to play an important role in it.

We have all the requisites to do so – extraordinary scientists and developers, we are a technology-oriented country and we meet the most stringent economic criteria. We have decided to set out on an ambitious path, which requires both the State and businesses to engage investment, resources, data, and, above all, cooperation to retrain staff to develop standards and international partnerships. The very word robot was coined by the Czech writer Karel Čapek in 1920. Already then, it meant more than mere mechanical machines – an entirely new form of technology and society. In 21st century, software robots have a significant role. Already those robots are giving rise to issues of safety, ethical values and risks of abuse. Successful resolution of those issues is our national priority.

Safe and responsible AI

ČThe Czech Republic has great potential to contribute to the prosperity and competitiveness of the EU as a whole. Our best traditions are in industry, defence and security. We are the sixth safest country in the world, and our companies and developers have also succeeded in the area of protection from cyber attacks. We are a safe cyber port in the heart of Europe. Therefore, our ambition is to become the centre of collaboration of the best scientists and developers in these areas and to join the European efforts in the development of artificial intelligence, with man in its centre. We want AI to be not only credible, but above all safe and responsible.

We are going to ensure the safety of driverless cars, robots and autonomous weapons, simply wherever man and intelligent machine meet. We are going to build on our past achievements in mobility and transport, military and security research as well as our historical experience. We are going to focus on protecting every person and consumer, their rights and privacy, especially the weakest ones. We are going to prevent discrimination, manipulation and misuse of AI, we are going to set the rules for decision-making of algorithms about people in everyday life. We want artificial intelligence to serve all the people of Europe.

Model country for Europe

However, by combining our industrial traditions, research facilities and entrepreneurial skills, we can achieve much more. In 2020 – 100 years since the word Robot was first used – we want to build AI research centres of European importance, and we want to be the model country for the whole of Europe in automation before the Czech Republic's presidency of the EU Council in 2022. Our future economic performance will depend on the focus on final manufacturing, technological solutions and services, which are essential for value added and profits. Digital transformation of the economy through artificial intelligence is a huge opportunity for us, and we especially need to support small and medium-sized businesses, start-ups and domestic brands. We want to be a country where new European champions, the new Baťas, emerge and which is appealing to foreign investors not for the low prices, but because of cutting-edge research, skilled workforce and friendly and predictable legislation.

This is the best time for us to make bold changes – we are among the most stable economies, our businesses achieve unprecedented results, and our scientists are gaining increasing respect in the world. While everyone is afraid of robots and labour market turmoil today, we are going to embrace them. We will help all employees and self-employed persons with retraining and acquiring new skills. We will ensure that no one is left behind, everyone is given the chance to succeed and that everyone has a share in the benefits of the breakthrough technology.

We have the highest ambitions and we are fully committed to fulfilling them. We gave the world the word robot and we have nothing to worry about at the time of robots. We have hard work ahead of us, but I am convinced that together we are going to get our country back to where it once belonged.

Ing. Andrej Babiš
Prime Minister of the Czech Republic

Introduction – How to read this strategy

The Czech Republic and the European Union are fully aware of the fundamental importance of artificial intelligence (AI) and its use for the future development and competitiveness of national, European and global economies and societies. The National Artificial Intelligence Strategy of the Czech Republic (hereinafter the "National AI Strategy", "Strategy" or "NAIS") is therefore primarily aimed at building on the activities and strategic documents of the EU and achieving the full potential of digital transformation. To do so, it sets out a framework of priority objectives and tools to support AI development in the academic, public and private sectors, mutual cooperation and international engagement, which the Czech Republic has committed itself to in the Declaration of Cooperation on Artificial Intelligence signed on 10th April 2018. The National AI Strategy follows up on and meets the objectives of the Government Innovation Strategy 2019–2030 and is linked to the Digital Czech Republic programme. It was inspired by similar foreign strategic documents concerning the AI and support for the digitization of the industry and services.

The strategy was prepared in close cooperation with the Ministry of Industry and Trade, as the main coordinator, with public, private and research institutions, the general public and with the involvement of social partners. Deputy Prime Minister and the Minister of Industry and Trade is directly responsible for its implementation and will coordinate it through the newly established AI Committee (a subcommittee under the Committee for the Digital Economy and Society strategy), which primarily includes responsible ministries and whose operational management will be continuously ensured by the Executive Committee. The specific procedural tools and tasks for implementing the overall strategy coordination are summarized in the introduction to the strategy, under the heading "tools and tasks".

NAIS is based on the assumption that current trends in artificial intelligence, automation, robotics, and the related fields such as electromobility, data economy or 5G networks, are crucial for the further development of industry, services and the economy as a whole. The main horizontal objectives of the Strategy are therefore to use these state-of-the-art technologies to help the Czech Republic to become an innovative economy and to support domestic companies and brands and further economic growth. Strengthen the safety and security of the population, increase their comfort in everyday life and ensure fast, efficient and helpful communication with the State. The overall objective is to make the Czech Republic again one of the world's most advanced countries.

The Strategy is vertically divided into seven chapters, according to the priority areas of development of artificial intelligence and their impacts. Each of them contains a summary of the current situation, based primarily on the Research Report on the AI Potential in the Czech Republic and the mapping performed by the AI Platform of the Confederation of Industry. These result in specific objectives in the short, medium and long term and tools to achieve them. The objectives are timed mainly in relation to the EU financial framework, they will be linked to the Implementation Plans of the Digital Economy and Society strategy and formulated as specific measures that can be implemented within a given time frame. The tools are cross-sectional for each chapter and do not have an implementation date. Each chapter lists not only the responsible State administration body as the coordinator, but also the co-coordinator usually co-operating with it, and other entities whose work it will coordinate for the given priority area. The objectives and tools will be reviewed after each time period. The objectives and tools contained in this Strategy do not interfere with or replace the applicable sectoral strategies of the respective coordinators, so this Strategy does not interfere with the division of coordination responsibilities among the different ministries in the sense of the Competencies Act. On the contrary, the purpose is to connect the responsible coordinators and co-coordinators for effective cooperation in achieving the objectives and effective overall coordination of this Strategy.

The key to fulfil the National AI Strategy is primarily to support the concentration of excellent R&D in AI, in particular by supporting the creation of the European Centre of Excellence, Test Centre and Digital Innovation Hubs. The Strategy will also be fulfilled by deepening cooperation with global AI centres, but also by maintaining top research and experts in the Czech Republic and, conversely, by simplifying and attracting conditions for the arrival of top foreign talent. (**Chapter 1**). It is therefore essential to ensure funding for research, the development of start-ups, the entire AI ecosystem, the transfer of know-how and the availability of resources for innovation of SMEs (**Chapter 2**). The driving force behind digital and AI transformation is the economy and it is therefore necessary to create conditions for its development. The State can contribute to this mainly by making available data, completing digital infrastructure, supporting the transformation of enterprises and introducing modern public administration services (**Chapter 3**).

Education, training and retraining, both technical and humanitarian, will play a crucial role, targeting the skills needed in the next decade (**Chapter 4**). The training of human capital will be key to the effects of AI and automation on the labour market and employment, but especially the social system will also have to respond quickly and flexibly (**Chapter 5**). A significant role in development will also be played by clear legislation, ensuring the protection of fundamental rights and security as well as legal certainty for investors (**Chapter 6**). An irreplaceable role in the use of global trends is played by the international cooperation and involvement of the Czech Republic, especially at EU level (**Chapter *7***).

In the above-mentioned areas and in order to promote economic growth and competitiveness, public authorities need to become actively involved. Above all, however, they will need to do this in close cooperation with the private sector, which is without prejudice to other activities in this area, which we welcome. It is the cooperation of all the entities involved that is crucial for the real fulfilment of the National AI Strategy and successful handling of fundamental changes for the Czech economy and society.

doc. Ing. Karel Havlíček, Ph.D., MBA
Deputy Prime Minister and Minister of Industry and Trade

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- The National AI Strategy (NAIS) is part of the implementation of the Innovation Strategy of the Czech Republic 2019–2030 (The Country for the Future) and its main objective to make the Czech Republic an innovation leader.
- At EU level, the main objective is to engage in increasing Europe's global competitiveness through the use of AI. The strategy is therefore directly linked to the initiatives of the European Commission (EC), especially the Coordinated Plan for Artificial Intelligence, and the division into seven vertical chapters corresponds directly to the areas the Coordinated Plan has defined.
- Among cross-cutting objectives is to use the opportunity in the development of AI, good starting conditions of the Czech Republic and cooperation with the private sector and to build the **Czech Republic as a model European country for AI**, thanks to:

1. The concentration of excellent research on **developing responsible and trusted AI**
   - the focus of the Czech AI research and development is on disciplines closely related to human-machine interaction (image recognition, language processing, AI clarity, security, defence, robotics, transport, etc.) in international cooperation within and outside the EU;
   - it develops AI in key areas of security and defence, mobility, manufacturing and services based on the European direction of human-centred artificial intelligence and AI ethical standards;
   - it is the foundation for building a comprehensive ecosystem of the European Centre of Excellence, Test Centre and DIH, which will help Europe-wide competitiveness;
2. Promoting digital transformation, especially for **SMEs** and the development of **start-ups**
   - it builds on the industrial and entrepreneurial tradition of the Czech Republic and high technological intelligence of the population;
   - the basis is technology and innovation transfer from research and development to SMEs, financing high-tech innovations and developing new brands and businesses with pan-European and global reach;
   - therefore, it is essential to support start-ups and spin-offs based on breakthrough disruptive innovations;
3. Ensuring equal opportunities and benefits brought about by **economic development for the entire society**
   - starting conditions given by economic growth and low unemployment, an opportunity to increase added value and wages through the development of an innovation-based economy;
   - the emphasis on broad retraining and increasing the level of skills of workers in fields with the highest potential for automation, in close collaboration between the public and private sectors;
   - the creation of an administrative and legislative framework for AI that avoids any form of discrimination or disadvantage, with a strong emphasis on rights and privacy;

- The Deputy Prime Minister for the Economy and the Minister of Industry and Trade, who chairs the AI Committee.
- Each chapter contains the following key measures:

1. Promotion and concentration of science, research and development

- organization of one of the networks of European Centres of Excellence based in Prague and involvement in others;
- building a system of centres of excellence, test centres and DIH for the transfer of know-how into practice;

- supporting the development and acquisition of top talent in the Czech Republic and abroad, from the EU and third countries;

2. Financing research and development, investment support and the development of the AI ecosystem in the Czech Republic

- expanding financial support for top academic and enterprise AI research;
- building digital innovation hubs (IHAI, mobility, ESA), supporting start-ups and attracting smart investments;
- introducing tools to promote investment in innovative projects and automation, especially in relation to SMEs;

3. AI in industry, services and public administration

- creating conditions for the development of AI, in particular access to and use of data and infrastructure;
- simplifying the recruitment and retention of excellent workers from EU Member States and third countries;
- introducing AI applications in public administration (e.g. health or transport);

4. Human capital and the education system together with lifelong learning

- development of lifelong learning and re-skilling, especially in professions endangered by automation;
- transformation of the education system with regard to future labour market requirements;
- the emergence of new university and doctoral degree programmes focusing on AI;

5. Measures to address the impacts of the AI on the labour market and the social system

- promoting self-employment and starting a small business, adjusting flexible forms of work;
- continuous assessment of impacts and preparation of the social system and measures for changes in the labour market;
- supporting disadvantaged groups and regions most at risk due to automation;

6. Legal and societal aspects of AI, ethical rules, consumer protection and security issues

- setting up an expert platform and forum for the ongoing review of legal and ethical AI rules;
- removing barriers and introducing appropriate new AI development institutes (e.g. data trusts);
- revision of AI legislation with an emphasis on preventing discrimination, protecting rights and privacy;

7. International cooperation

- active involvement of the Czech Republic in international innovation initiatives, development of new technologies and AI;
- the use of existing and new regional, EU and international cooperation platforms;
- inclusion of AI in the programme and preparation of the Czech Presidency of the EU Council in the second half of 2022;

Main coordinating role: Ministry of Industry and Trade

Tools and tasks:

- Establishment of the AI Committee as a subcommittee of the Steering Committee of the Digital Czech Republic strategy, chaired by the Deputy Minister of Industry and Trade for Digitization and Innovation and members of the coordinators and co-coordinators of the individual chapters of the Strategy.
- The cooperating entities mentioned in each chapter collaborate with the coordinators and fulfil the objectives of the strategy according to their respective responsibilities resulting from Act No. 2/1969 Coll. on the establishment of ministries and other central bodies of the state administration of the Czech Republic must not be violated.
- Appointment of the representative for European AI Centres at the Ministry of Industry and Trade, who is directly responsible to the Deputy Minister of Digitization and Innovation, and performs the executive coordination of the objectives of the Strategy in building a European Centre of Excellence in AI and the European Test Centre, both nationally and internationally, especially in the EU.
- Convening stakeholder working groups to coordinate individual chapters to meet their objectives and keeping the AI Committee updated on their functioning.
- Once a year, a report on the fulfilment of the National AI Strategy objectives is submitted to the Steering Committee of the Digital Czech Republic strategy and the Government of the Czech Republic with a proposal to revise objectives and instruments after the end of the short period in 2021.
- Cooperation with private and non-State actors institutionalized in the form of memoranda.

The AI Committee consists of:

- Deputy Prime Minister for Economy and Minister of Industry and Trade of the Czech Republic (chairs the Committee)
- Deputy Minister of Industry and Trade for Digitization and Innovation
- Deputy Chairman of the Council for Research, Development, and Innovation
- State Secretary for European Affairs
- CEO of CzechInvest
- CEO of CMZRB
- Deputy Minister of Education, Youth and Sports
- Deputy Minister of Labour and Social Affairs
- Deputy Minister of Transport
- Deputy Minister of Health
- Deputy Minister of Foreign Affairs
- Deputy Minister of Defence
- Deputy Minister of the Interior
- Chairman of the Academy of Sciences of the Czech Republic

- Director of the Institute of State and Law of the Academy of Sciences of the Czech Republic
- a representative of higher education institutions
- Vice President of the Confederation of Industry of the Czech Republic, chairing the AI Platform
- Chairman of the Czech-Moravian Confederation of Trade Unions
- Chairman of the Technological Agency of the Czech Republic
- Representative for European AI Centres

(The Statute and Rules of Procedure of the AI Committee may further modify the composition, including the specific setting of cooperation with the entities concerned on specific topics within the National AI Strategy)

The executive committee of the AI Committee includes the following persons as needed:

- Deputy Prime Minister for Economy and Minister of Industry and Trade
- Deputy Minister of Industry and Trade for Digitization and Innovation
- State Secretary for European Affairs
- Representative for European AI Centres

The National AI Strategy builds and follows up on existing key strategies at both European and national levels.

1. European Union

At European level, the basic documents are "Artificial Intelligence for Europe" and the Coordinated Plan on Artificial Intelligence (hereinafter the "Coordinated Plan") issued by the European Commission in December 2018. This Coordinated Plan sets out the European Union's strategic objectives and priorities for artificial intelligence. It is a European umbrella strategy for AI, which was developed in cooperation with Member States, and calls on Member States to implement the Coordinated Plan at national level. For this reason, the strategy builds on the structure of the Coordinated Plan, while at the same time modifying the objectives and headings (six areas in total plus international coordination, see below) so that the Czech Republic can take advantage of the financial and administrative support that the EU will provide to the Member States under the tools available by Digital Europe and Horizon Europe in the upcoming programming period 2021–2027.

Member States are to submit national AI Strategies by mid-2019 at the latest (i.e. by the end of June 2019), including the setting of investment measures and implementation plans. At the same time, the Council of the European Union endorsed the Coordinated Plan by its conclusions of 11 February 2019, thus formally endorsing the European approach to addressing and coordinating artificial intelligence. The Strategy therefore implements this European approach.

2. Digital Czech Republic

At national level, the Strategy complements and builds on, in particular, two major government strategies for digitization and innovation. The Strategy is linked to Digital Economy and Society (hereinafter the "DES"), which is a strategy forming one of the three pillars of the government's programme Digital Czech Republic. In its sub-objectives, the DES clearly sets out specific tasks and areas for the elaboration of implementation plans in the field of artificial intelligence. These sub-objectives are in particular: 1.6 "Active involvement of the Czech Republic in the EU Initiative on Artificial Intelligence", 2.1 "Support for the Development of Artificial Intelligence", 6.4 "Ensuring a Consistent Approach and Implementation of Legislation" and 8.3 "Two-way link of programmes and coordination of the strategy Digital Economy and Society and initiatives based on the pillar Czech Republic in digital Europe".

3. Innovation Strategy of the Czech Republic

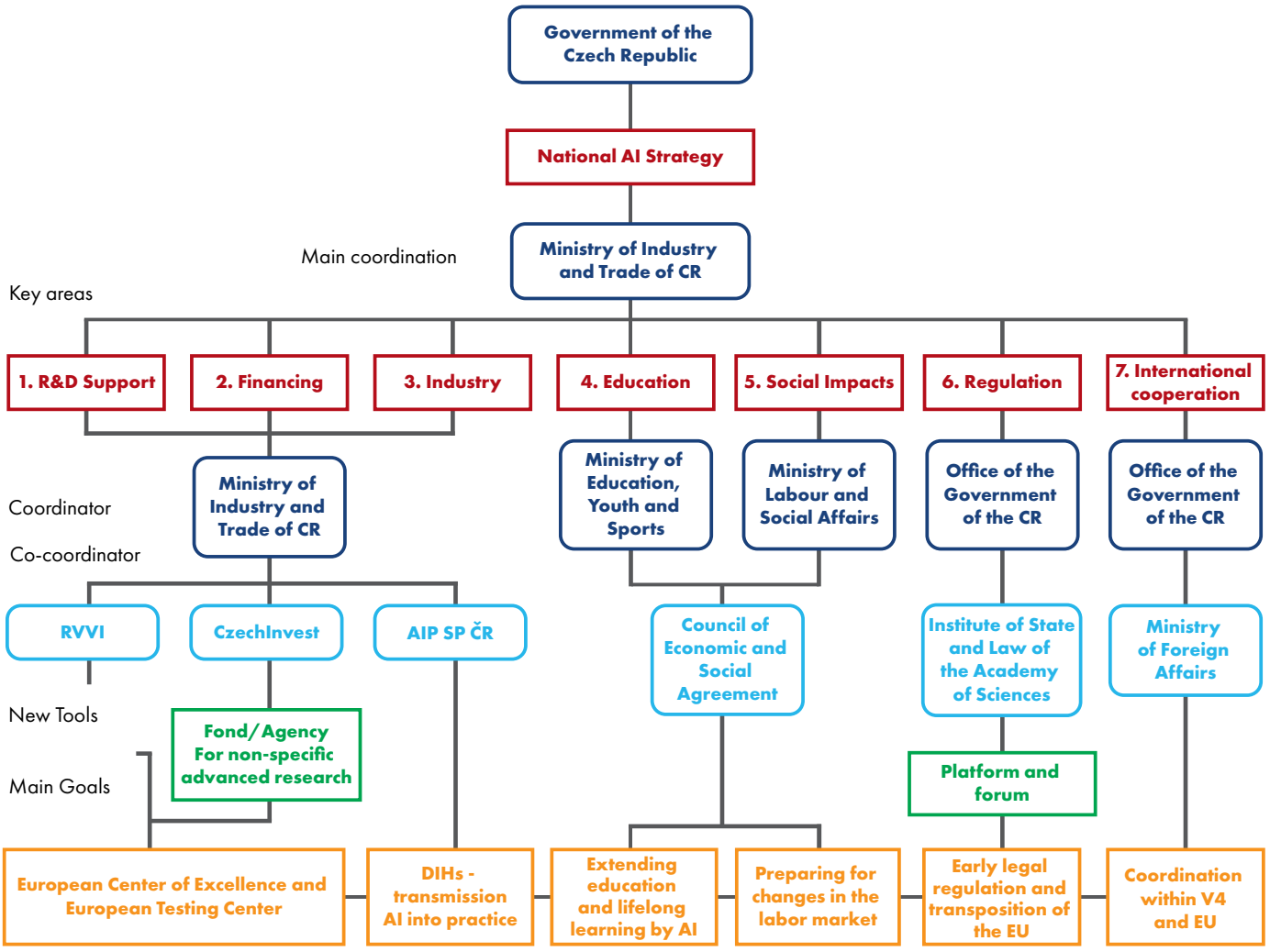
In addition, the Strategy follows up on and supports the Innovation Strategy of the Czech Republic 2019–2030, especially its part Digital State, production and services, where one of the main tools is the Coordinated Plan and the National AI Strategy.

At the same time, the strategy is based on the study "Research of the potential for the Development of Artificial Intelligence in the Czech Republic" (hereinafter the "AI Analysis"), which is the model for this Strategy and which the government acknowledged and at the same time imposed on the Ministry of Industry and Trade the development of a National Artificial Intelligence Strategy of the Czech Republic.

At the same time, the strategy will be taken into account in all other sectoral government documents that address strategic solutions and practices in the digital economy and are linked to artificial intelligence. This applies mainly to the National RIS3 Strategy.

- Communication from the Commission "A Digital Single Market Strategy for Europe", 6 May 2015 COM(2015) 0192
- Communication from the European Commission "Artificial Intelligence for Europe", 25 April 2018, COM(2018) 237
- Coordinated Plan on Artificial Intelligence, 7 December 2018, COM(2018) 795 final, Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions
- Council conclusions on the coordinated plan on artificial intelligence, doc. 6177/19, of 18 February 2019
- Digital Czech Republic, Government Resolution of 3 October 2018, No 629
- Innovation Strategy of the Czech Republic 2019–2030, Government Resolution of 4 February 2019, No 104
- Action Plan for Society 4.0, Government Resolution No 684 of 25 September 2017
- National Space Plan 2014-2019, Government Resolution of 27 October 2014 No 872
- Vision of Autonomous Mobility Development, Government Resolution No 720 of 11 October 2017
- Strategic Framework Czech Republic 2030, Government Resolution No 368 of 19 April 2017
- Development Strategy for Capital Market in the Czech Republic 2019–2023, Government Resolution No 156 of 4 March 2019
- National Research and Innovation Strategy for Smart Specialization of the Czech Republic 2014–2020–2018 Update (National RIS3 Strategy), Government Resolution No 24
- Research on the potential of the development of artificial intelligence in the Czech Republic, acknowledged by the Government on 28 February 2019, which ordered the Ministry of Industry and Trade to draw up the National Strategy on Artificial Intelligence by 30 April 2019, Government Resolution No 82 of 28 January 2019

The diagram below broadly outlines key areas, and their main coordinators responsible for achieving the objectives through key tools.



1.1 Responsibility

Coordinator: Ministry of Industry and Trade
Co-coordinator: Council for Research, Development, and Innovation

1.2 Baseline:

In the field of artificial intelligence, the Czech Republic has a comparative advantage in excellent research and development, both in primary and applied research. There are thousands of researchers in AI and closely related fields. Czech universities also produce more than a hundred experts in the AI area annually, which is more than some of the world's renowned AI centres. In order to realize this potential, it is not only necessary to further develop scientific and research capacity in academia and business and to strengthen cooperation with the private sector, but also to concentrate it significantly. The key factor is attracting top talent and transferring results into practice, enabling substantial support for non-specific advanced research and innovation. The key is to build a European Centre of Excellence in AI research, the European Test Centre and Digital Innovation Hubs, which are one of the priorities of the National AI Strategy.

1.3.1. Short-term objectives (until 2021):

- Establishment of a European Centre of Excellence in AI based on a consortium of academic research institutes based in Prague under direct coordination of the Ministry of Industry and Trade and in collaboration with other V4 national research centres and partners and the Central European region.
- Establishment of a European testing facility for advanced industrial production or advanced transport systems.
- Fully functioning Digital Innovation Hubs (DIH) as a significant part of the knowledge transfer ecosystem. At least one should be focused on security and resilience, especially in synergy areas (Mobility Innovation Hub) or initiatives similar to CLC East within EIT Urban Mobility.
- Involvement in European networks of excellence organized by, for example, CLAIRE and ELLIS, or targeting specific areas such as META-NET and LT Innovate, and promoting cooperation with selected non-EU countries (Israel, USA, South Korea).
- Expansion of the Prague-based European Satellite Navigation Agency GSA to the "EU Space Program Agency".
- Two pilot complex projects facilitating the transfer of academic know-how.
- Programmes for two-way transfer of knowledge and experience between research and private sector with the aim to create and implement revolutionary, disruptive innovations in Czech companies, e.g. using TACR and GACR funds.
- Promotion and assistance in the use of existing projects of economic migration for researchers and experts (Fast Track and Welcome Package projects, long-term residence permits for scientific research, and granting permanent residence in the interest of the Czech Republic).
- Within the upcoming government programmes (a key and highly qualified employee), allow for accelerated and simplified acquisition of residence and work permits for experts, researchers, and their family members.
- Make the Czech Republic more attractive as a country for the further stay and activities of researchers and, after completing their scientific research, allow them to stay in the Czech Republic for up to 9 months in order to find a job, pursue further research or start a business.

- Creating a centre for humanities and social science research on the impacts of the AI on the economy, society and the legal system belonging to the European Centre of Excellence and in international cooperation (EU and V4).
- Involvement of public administration and municipalities in the support of AI activities.

1.3.2. Medium-term objectives (until 2027):

- Full integration and cooperation of the European Centre of Excellence with partner research centres.
- Implement economic migration programmes aimed at facilitating the arrival of highly qualified employees in the Czech Republic, make them more attractive and adapt them to practical needs.
- Programme of promotion of the Czech Republic abroad for research experts, their active search and offering employment opportunities in the Czech Republic and promotion of joint research opportunities in strategic areas.
- Creation of a fully functional ecosystem around the European Centre of Excellence and the European Testing Centre for the transfer of research into practice and support for the creation of Czech start-ups.
- Five projects for the transfer of academic know-how, at least three full Czech value chains.
- Establishment of a European Centre for Business Development and Technology Transfer in the Czech Republic, taking into account the existing structures of this type.
- Completing the network of fully functional DIHs and their full interconnection, including European Centres.
- Deeper engagement in research networks of excellence organized by, for example, CLAIRE, ELLIS, META-NET or LT Innovate, involvement in the strategic teams in these networks and integration across disciplines.
- Creating an application development support system for industry needs, especially with regard to synergies and outputs from the public, private or PPP sectors (e.g. support for new cloud services and API economy).
- Expansion of the IT4Innovations High Performance Computing Centre (HPC) and related study programs and collaboration with DIH, inter alia, to link it to available cloud platforms or similar services.
- Make medical data available for research purposes on the basis of the relevant strategy in accordance with the requirements for personal data protection.
- Creation of a dedicated research centre focusing on the use of AI in space research, either within the European Centre of Excellence or at one of the technical universities.
- Increase many times publishing activity increase in top journals (100 percent).

1.3.3. Long-term objectives (until 2035):

- Integrated system of the European Centre of Excellence, the European Testing Centre and DIH with links to other Centres and DIHs in V4, Central Europe and the whole EU.
- A fully functional integrated system of transfer of academic know-how integrated within the EU.
- The Czech Republic as an attractive country for excellent scientists and researchers in AI from around the world.
- Substantial increase in publishing activity in top journals (300 percent).

1.4 Tools:

- Involvement in the EU initiative to build European Centres of Excellence, Test Centres and DIH.
- Close links and collaboration between national, V4, regional and EU research institutes, sharing knowledge and finding synergies with European Centres of Excellence and Testing Centres.
- Revision of legal, administrative and other conditions to support the fastest and easiest acquisition of residence and work permits for scientific and researchers in strategic areas for the development of the Czech economy, with an emphasis on AI. Support for the identification of critical mass of excellent researchers, teachers and technical professionals.
- Essential simplification of administration for admission of foreigners – researchers and students from abroad (visa duty, enrolment in studies, administration of doctoral studies, issues of taxes and insurance), revision of the Act on the Residence of Foreigners.
- Financial and non-financial support for attracting and retaining researchers in the Czech Republic, supporting their careers in research organizations, attracting new talents from abroad.
- Financial and non-financial support for systematic building of a comprehensive system of transfer of academic know-how, including incubators and start-ups, involving joint laboratories with domestic and global companies.
- A programme to facilitate collaboration between SMEs and start-ups, and scientific research centres.
- Development of the IT4Innovations national supercomputing centre and its interconnection at national, regional and EU level with other scientific research centres and HPC centres.
- Support for the acquisition of European grants, in particular from the European Research Council (ERC).
- Searching and accessing data sources, collaborating with the public and private sectors to access data for training AI systems. Facilitating access for researchers to training data.
- Supporting the use of AI for space activities, especially collaboration with ESA.
- Design and facilitation of accreditation for new doctoral programs and related specialized positions in universities, support for online studies and interactive learning in English.
- Regular consultation of experts, State sector, academics and business, and collaboration between technical, social sciences, humanities, public, private and non-governmental sectors.
- Incorporating support tools into the RIS3 Strategy.
- Implementation Plan No 1 of the Digital Czech Republic – Digital Economy and Society.

1.5. Cooperating entities

- CzechInvest;
- Technological Agency of the Czech Republic;
- Grant Agency of the Czech Republic;
- Ministry of Education, Youth, and Sports;
- Ministry of Transport;
- Academy of Sciences of the Czech Republic;
- AI Platform of the Confederation of Industry;

(other entities as decided by the chief coordinator or the AI Committee)

2.1 Responsibility

Coordinator: Ministry of Industry and Trade
Co-coordinator: CzechInvest

2.2 Baseline:

Setting up favourable conditions for investment and cooperation with foreign entities for the development of an AI ecosystem, together with the support of science, research and development, is a key part of utilizing the potential of artificial intelligence in the Czech Republic. Excellent research in academia and business requires financial and non-financial support and coordination at the highest level to maximize efficiency. Today, even in the fast-paced and popular AI market, start-ups can face challenges in getting the right funding allowing them to expand globally. Small and medium-sized enterprises whose their development and shift to high-value production will underpin future prosperity, employment and economic growth, will face increasing funding and investment demands with the progress of automation. A strong capital market then promotes economic development through efficient capital allocation, which can also be used to create jobs with higher added value and lower risk due to automation, building digital infrastructure and financing breakthrough innovations in AI.

2.3.1. Short-term objectives (until 2021):

- Mapping and utilizing current AI support tools, infrastructure and platforms.
- Preparation and implementation of calls involving specific support for AI within TA CR and GA CR, including, for example, research into the impact of AI development on cyber security and the security of technologies using AI.
- Creation of a tool to support innovative and research projects in AI managed directly by the Ministry of Industry and Trade, which will enable, among other things, joint projects of companies and academic institutions.
- Incorporating the funding and support for R&D and innovation in AI into the RIS3 Strategy.
- Strengthening institutional financing of research institutions within the 17+ Methodology.
- Creation of the Innovative Hub of Artificial Intelligence (IHAI) of CzechInvest.
- Deepening the involvement in the European Institute of Innovation and Technology (EIT).
- Financing of the Czech Republic's participation in elective ESA programmes dealing with AI development.
- Establishment of start-up support programmes focusing on AI application in the public sector, in the area of public services and in areas of national interest and specialization in the Czech Republic.
- Create special grant programs for the purpose of obtaining and supporting postgraduate students and researchers in their studies and subsequent work in the Czech Republic.
- Creating a map of AI start-ups and, in collaboration with Czech DIHs, connecting the start-ups with investors, system integrators, consulting companies, and support providers.
- Announcement of calls and tenders focused on the development of AI, especially of multidisciplinary teams, even outside R&D support.
- Introducing tools to promote investment in innovative projects and automation, especially in relation to SMEs.
- Creation of market-based financial instruments of the CMZRB to improve access to financing for AI businesses

and projects, especially in the private sector, including through innovative financial instruments.

- Review and new legislative and system settings for the operation of investors (especially angels and other risk investors) as well as for AI start-ups, analysis of tools facilitating their business.
- Elaboration of an analysis of possibilities and forms of implementation of non-specific support of advanced research projects.
- Implementation of programmes allowing joint grant projects of companies and universities in AI.

2.3.2. Medium-term objectives (until 2027):

- Attracting major risk investments targeting the AI area and linking these investments with academic practice and AI centres.
- A demonstrable increase in investment in artificial intelligence and related sectors.
- Attracting foreign technologically advanced projects to support the development of the AI ecosystem.
- Creation of at least two more extensive long-term programmes enabling AI support, one of which can be directed to support cooperation and excellent research within TACR and GACR.
- Implementation of the results of the analysis of introducing tools for non-specific support of advanced research projects.
- Establishment of a fund to finance academic institutions' incubators in the pre-seed phase.
- Needs analysis and possible establishment of a fund, or other tools to support the automation and acceleration of AI solutions in industry and services, especially in SMEs.
- Strengthening the financing of institutions and programme frameworks dealing with AI research with an emphasis on internationalization.
- Changing the conditions of the EU programming period with an emphasis on the development of AI in the Czech Republic, V4 and the region.

2.3.3. Long-term objectives (until 2035):

- Establishment of new, economically important Czech companies in AI, operating on international markets, especially in connection with the European Centre of Excellence and the European Testing Centre.
- Support for AI start-ups for application of research results and outputs, especially in the context of the European Centre of Excellence and the European Test Centre.
- Building stable research centres based on projects financed by TACR and GACR.

2.4 Tools:

- Financing the preparation of the European Centre of Excellence through the Digital Czech Republic programme, resources of the City of Prague, involved entities and other non-State private partners.
- Effective use of existing and future EU support tools, e.g. in the MFF 2021–2027, incl. Digital Europe, Horizon Europe, Connecting Europe Facility, Creative Europe, etc. More use and involvement in EU initiatives such as the European Institute of Innovation and Technology (EIT).
- An expert group composed of representatives of the academic, private and public sectors to develop concrete measures for implementing AI support and investment objectives, defining grants and specific programmes and investment programs for SMEs and researchers in AI.
- Targeted grant programmes focused on long-term specific financing of AI, within GA CR, TA CR and other

providers. At the same time, the analysis and implementation of missing tools to support non-specific research.

- Coordination of all tools to support innovation and competitiveness for the use of funds from available programmes and within the EU, including the negotiation of the next programming period.
- Continuously evaluating the effectiveness of support programmes based on AI mapping and its development in the Czech Republic.
- Designing and creating special grant programs for the purpose of obtaining and supporting AI postgraduate students and researchers in their studies and subsequent work in the Czech Republic.
- Clarification of financial support and tools for the implementation of AI projects.
- Supporting investments in automation and deployment of AI, especially in small and medium-sized enterprises, especially corporate finance and investment sources, including EU sources and financial markets (especially the capital market, including venture capital and alternative and new forms of financing).
- Support for the development and modernization of financial instruments and other financial services tools that can support highly innovative services and business models.
- Promotion of investments in cultural and creative industries and other sectors that generate high added value, as well as jobs at low risk due to automation.
- Promoting the Czech AI environment in the Czech Republic and abroad.
- Connecting domestic and foreign entities to implement joint AI projects.
- Creation of suitable conditions for start-ups and spin-offs in AI area, their financing with venture capital and support for their further development.
- Encouraging incubation and gaining experience abroad, linking research, AI business and start-up scenes and support of all stages of the establishment and development of start-ups.
- Special programme for start-up support programmes focusing on AI application in the public sector, in the area of public services and in areas of national interest and specialization in the Czech Republic.
- Technological missions to AI excellent countries to establish, consolidate and develop both domestic and international AI collaboration, initiate joint AI projects, and invest in further development.
- Assistance to new AI investment projects to attract technologically advanced investment projects from abroad to support the development of the local AI ecosystem.
- Joint-venture projects of domestic and foreign entities.
- Creating support for AI technologies with public support providers.
- Creating a systematic concept of financial support that can be used by municipalities and regions to support and retain researchers and similar experts in regions.
- Inclusion of AI-focused non-profit organizations in the field of strategic development of the Czech Republic into programmes for the support of non-governmental non-profit organizations from national sources.
- Fulfilment of the government's Capital Market Development Strategy in the Czech Republic 2019–2023.
- Implementation Plan No 7 of the Digital Czech Republic – Digital Economy and Society.

2.5. Cooperating entities:

- Českomoravská záruční a rozvojová banka;
- Technological Agency of the Czech Republic;
- Grant Agency of the Czech Republic;
- Ministry of Finance;
- Ministry of Transport;
- Czech National Bank;
- AI Platform of the Confederation of Industry;

(other entities as decided by the chief coordinator or the AI Committee)

3.1 Responsibility

Coordinator: Ministry of Industry and Trade
Co-coordinator: AI Platform of the Confederation of Industry of the Czech Republic

3.2 Baseline:

The Czech Republic is one of the most industrialized countries with almost 40% share of value added in the economy. Of this, more than a fifth of the production goes to the automotive sector. As a result, the advent of AI, automation and massive robotics can become a source of uncertainty for businesses, their business models and the economy. The companies will have to undergo internal transformation of their structure, organization of production and use of employees, as well as partners and customer-supply chains. In the event of a global race for technological dominance, Europe and the Czech Republic, coupled with the German industrial cluster, risk losing up to half the added value, especially in the automotive industry. But the digital and AI transformation of the economy will even more affect the service sector. The Czech Republic's industrial, economic and technological position will therefore be crucial for the future growth of the economy and living standards in the coming ground-breaking period. At the same time, artificial intelligence can be a key engine that will enable us to move up the value chain and encourage the emergence of strong new national champions as well as the successful development of existing businesses. AI can also be the engine of its own disruptive innovations, which can significantly strengthen the Czech economy. Furthermore, the aim is to market our own disruptive advantages before competition. Therefore, it is essential to use and transfer the knowledge from cutting-edge research into business practice, support automation in companies, especially small and medium-sized enterprises, and closely related issues of qualified and retrained workforce. The main objective is to increase not only the competitiveness of the Czech Republic, but the whole region and Europe, and attention should also be paid to the development of such AI solutions that have high application potential through the use of knowledge from other vertical sectors (e.g. automotive, mobility, aviation). In this respect, State intervention is justifiable and desirable, especially in terms of creating business conditions and building the necessary infrastructure and getting the maximum part of the value chain in parts with high added value. The basic prerequisite is to make available a sufficient data base while preserving the privacy and other rights of stakeholders to build a data-based economy.

3.3.1. Short-term objectives (until 2021):

- Accelerating adoption of existing disruptive technologies and engaging AI tools in the corporate environment, with a particular focus on supporting small and medium-sized enterprises, especially those with high synergy effects.
- Creating a continually updated map of all players in AI industry and services.
- Analysis of the position of the Czech Republic in the field of technological development of artificial intelligence and its applications in the business sector, including the network industries of transport, telecommunications and energy.
- Promotion and assistance in the use of existing projects of economic migration (Fast Track and Welcome Package projects), and using the option to grant permanent residence in the interest of the Czech Republic.
- Within the upcoming government programmes (a key and highly qualified employee), allow for accelerated and simplified acquisition of residence and work permits for experts, highly skilled workers and their family members.

- In justified cases (e.g. health care or transport), elaborate strategies and conditions for the use of data for research purposes respecting the requirements for the protection of personal data and propose appropriate measures according to the ministerial focus.
- Propose parameters, conditions and system for collecting and maintaining defined quality data for possible use in AI systems.
- Involvement in global activities focusing on testing and evaluation of data quality and validation and performance of AI applications for use e.g. in healthcare. Preparation of a strategy of implementing AI applications in healthcare in line with approaches in countries with similar health levels, especially in Europe.
- Test the first prototypes on real data and apply them in new areas and evaluate them in practice.
- Creating programmes for accelerating digital transformation and AI innovation, especially in priority sectors and building on the real needs of corporate and cooperating academia.
- Simplifying the conditions for investment and entrepreneurship in the AI area, including receiving investment from third countries, setting up start-ups and third country SMEs.
- Setting the conditions for more efficient use of EU investment programmes for AI companies.
- Elaboration of AI pilot projects in public administration and health care.
- Developing a binding public administration data availability plan for AI use, including data standards.

3.3.2. Medium-term objectives (until 2027):

- Launch programmes supporting the return of Czechs working abroad, with the aim of increasing the number of skilled workers in the AI area.
- Continuously implement economic migration programmes aimed at facilitating the arrival of highly qualified employees in the Czech Republic, make them more attractive and adapt them to practical needs.
- Promote the Czech Republic abroad as an attractive place for highly qualified workers.
- Analyse and implement the necessary changes to the tax system on a continuous basis, taking into account technological progress and, above all, automation.
- Implement ground-breaking AI projects in public administration to simplify life for citizens and businesses and streamline activities and increase the added value of public administration.
- Creating specialized workplaces for evaluating AI applications, e.g. for healthcare, including their involvement in international networks.
- Implement a programme for collecting and protecting high-quality healthcare data for their possible use in AI systems according to the proposed conditions.
- Implement programmes to support automation and use of AI in the business sector, closely linked to excellent research, education reform and social system adjustments.

3.3.3. Long-term objectives (until 2035):

- Use the potential of AI to shift the Czech economy in global value chains towards higher added value, productivity and prosperity of businesses and household wealth.
- Change the Czech economy to a digital economy based on state-of-the-art domestic research and development and high-value-added production that realizes economic growth using AI technology.

- Substantially increase the Czech Republic's global position in terms of competitiveness, technological and industrial competences in all relevant areas and in close cooperation between entrepreneurs and public administration.

3.4 Tools:

- Creating specialized AI ecosystems linking research centres to the business community, which will support AI deployment by sector and industry, primarily through dedicated support activities, technical talent training, research, teaching and application area collaboration.
- Continuous collection of AI application data to provide an adequate data base for independent and comprehensive analysis of the needs, strengths and weaknesses of AI deployment across sectors of the economy.
- To conduct a dialogue on possible new AI applications in public administration with private sector and their development and deployment, e.g. in the form of hackathons.
- Provision of digital infrastructure and necessary processes for efficient provision of open data (government cloud, data platform, etc.) in accordance with the objectives of the Digital Czech Republic programme. In order to aggregate data in one place, store the data in a unified form, and above all ensure access to it by the private sector, including in the case of municipalities, their service organizations and subcontractors.
- Supporting the building of complete value chains in the Czech Republic so that the Czech Republic can maximize its potential, especially in terms of supporting the inflow, stay and use of investments in the Czech Republic in the area of AI.
- Support programs for the promotion and acceleration of digital transformation, innovation and enterprise automation based on the real needs of target organizations, especially SMEs.
- Developing tax policy to promote a steady growth of the digital economy while ensuring sustainable government revenue, both in terms of taxation of labour and capital.
- Making available and sharing of public sector data, in particular search for appropriate data for open sharing, their maintenance and updating.
- Targeted educational and awareness-raising campaign for companies on the possibilities and benefits of AI and digitization.
- Support for cross-sectoral and cross-disciplinary collaboration and training of AI systems on shared data to develop new types of automation and economic activities, in collaboration between businesses and academia.
- Developing competition policies to ensure a balanced competitive environment, even in an environment of AI transformation, enabling smaller start-ups as well as larger established companies to develop.
- Promoting the coherence of AI activities with other important areas of digitization such as cyber security or HPC and data analytics.
- Promoting the use of high-performance computing by both the private and public sectors in various sectors of the economy and society.
- The Digital Innovation Hub (DIH) network in the Czech Republic facilitating the development of automation and AI in companies and the transfer of research into practice, especially from the European Centres of Excellence.
- Promoting high value added production and services, by integrating modern know-how, innovation, cultural and creative industries, domestic brands building, by other intellectual property tools and exports.
- Use of AI as part of providing health services, administration of medicinal products and medical devices and in reimbursement processes, reporting of interventions, predictions of cost development and other data processing, especially within the fulfilment of the National eHealth Strategy of the Czech Republic 2016–2020.

- Promoting the success of Czech companies in the AI area with the aim of increasing the prestige of the domestic ecosystem.
- The introduction of AI in public administration to simplify the lives of citizens and businesses and make it more effective, in particular by increasing productivity, improving services, collection of taxes, and fraud detection, with the maximum use of, inter alia, open source technologies, if their nature so allows, while preserving the protection of intellectual property rights and the conditions for investment and cooperation with private entities.
- Implementation Plan No 2 of the Digital Czech Republic – Digital Economy and Society.

3.5. Cooperating entities:

- Ministry of the Interior;
- Ministry of Labour and Social Affairs;
- Ministry of Health;
- Ministry of Transport;
- Ministry of Agriculture;
- Ministry of Culture;
- Ministry of Regional Development;
- The Czech Chamber of Commerce
- The Confederation of Commerce and Tourism of the CR;
- Technological Agency of the Czech Republic;

(other entities as decided by the chief coordinator or the AI Committee)

4.1 Responsibility

Coordinator: Ministry of Education, Youth and Sports
Co-coordinator: Council of Economic and Social Agreement

4.2 Baseline:

Education plays a crucial role in the transformation of the economy and society brought about by artificial intelligence. In order to minimize the potential negative impacts and, on the other hand, to fully exploit the opportunities offered, it will be necessary not only to adapt the whole education system, but also to focus on lifelong learning and retraining directly with employers for the development of human capital. According to the Research Report of AI Potential in the Czech Republic, a part of mainly routine skills will be substitutable with technologies, affecting 1.3 million Czech employees within 5 years, 2.2 million Czech employees within 15 years and almost 3.4 million Czech employees within 30 years. It is therefore essential to focus on skills development that will not be replaced by automation and, on the contrary, develop unique skills that can be used in high value-added positions. At the same time, complex skills, multidisciplinarity and IT thinking are becoming more important. Due to the dynamics of changes, the education system must also be flexible enough to focus on developing the knowledge and skills that can be used on the future rather than the current labour market. At present it shows only insufficient fulfilment of the conditions for the inclusion of digital technologies in education and the overall development of this area in educational processes. Pupils do not achieve the expected results in the field of IT thinking, most teachers perceive the use of information technology as a supplement to classical teaching, not as a fundamental factor in its transformation. Mathematical literacy is then very often negatively related to the subject's low popularity with pupils. Thus, the whole Czech education system faces a very important and challenging task, and for its successful fulfilment it is necessary to allocate sufficient resources and give it the highest priority. Close cooperation between the public and private sectors, especially educational institutions, employers and non-governmental organizations, as well as international cooperation and the adoption of good practice examples, are essential. New strategic documents for education in the post-2020 period offer an opportunity for its transformation.

4.3.1. Short-term objectives (until 2021):

- Developing methodological support for school principals, teachers and faculties educating teachers for proposed changes in the curriculum.
- Financial support and accreditation of a new PhD programme for AI in English at national level.
- Financial support and accreditation of PhD programme for study of social, economic, security and legal impacts of AI.
- Conducting experimental verification of the development of digital competencies, and IT thinking of children and pupils.
- Extending the offer of further professional education and retraining.
- Opening of new master's and doctoral study programmes and fields in AI.
- Enabling independent implementation of doctoral degree programmes in the field of artificial intelligence to non-university research institutions.
- Prepare financial support instruments for the opening of new master's and doctoral degree programmes in AI or the extension of the existing programmes to include AI.
- Recommend universities to use AI for university management.

- Awareness raising, promotion and information support in the area of further education, preparation for changes in the labour market.

4.3.2. Medium-term objectives (until 2027):

- The start of the transformation of education according to the prepared proposal and the Education Policy Strategy after 2020.
- Initiation of teaching under the revised Framework Educational Programmes.
- Updating the Framework Educational Programmes and introducing appropriate elements for teaching AI-oriented IT skills at all primary and secondary schools.
- Incorporating the development of digital competences and IT thinking of children and pupils into teacher training.
- The introduction of AI teaching at (mainly technical) universities, including bachelor programmes focused on AI.
- Implementation of pilot projects for the management of higher education institutions and teaching methods at all levels of education using the principles of management of complex systems using AI.
- The first graduates of an AI doctoral programme in English.
- The first graduates of a doctoral programme for the study of social impacts of AI.
- Creating positions for the study of AI impacts at faculties of social sciences and humanities.
- Designing and implementing programmes to extend or change the qualifications of existing IT professionals within lifelong learning programmes implemented by higher education institutions.
- Performing a transformation of lifelong learning and re-skilling to increase the skills associated with automation and the onset of disruptive technologies, especially for vulnerable professions.
- Introduction of educational programmes at secondary schools and universities focused on specialized creative fields with high added value in relation to private sector demand.
- Financially support the expansion of AI teaching at universities and in study programmes not primarily focusing on AI, including the opening of new AI bachelor programmes.
- Financially support pilot projects for the management of higher education institutions and teaching methods at all levels of education using the principles of management of complex systems using AI.

4.3.3. Long-term objectives (until 2035):

- Completing the transformation of education, including fully functional AI teaching in English in most relevant schools and the transformation of content and form of teaching with regard to the ongoing changes in the labour market and society.
- Ensuring a flexible curriculum update system focusing on development of digital competences and IT thinking of children and pupils, including preparing teachers and headmasters for these situations.
- Exploiting the potential of AI at all stages and aspects of education, including fully operational management of universities and teaching methods at all levels of schools, using the principles of management of complex systems using AI.

4.4 Tools:

- Study of the proposal of gradual transformation of education with respect to AI impacts, including quantification of its implementation costs and ensuring sufficient material and technical conditions.
- The transformation of the education system also with regard to the effects of AI in the preparation of a new strategy for education policy and digital education after 2020 and the revision of framework education programmes.
- Continuous evaluation of automation and AI impacts on society, labour market, education and life in the Czech Republic.
- Revision of general education content, which will include (verified) development of digital competences and IT thinking of children and pupils, and opening to new methods and ways of learning.
- Promotion of the development of STEM technical skills, 21st century skills and creative and soft skills with regard to labour market predictions and the creation of high value added jobs.
- Stabilization of the financial and personnel situation of education and further increase of its budget necessary for the implementation of the proposed measures, based on a study of the design of gradual transformation of education in relation to AI impacts.
- Support programme for the implementation of AI in education, including the use of tools for managing the transformation of education based on artificial intelligence.
- Support for doctoral studies in AI, where the amount of scholarship must allow for full-time dedication to science.
- Developing the competences of teachers in working with information, digital technologies and AI with regard to the changing nature of teaching and increasing teachers' prestige.
- Strengthening school equipment for the development of digital literacy, IT thinking and AI teaching in terms of material equipment, infrastructure and software using open source and licencing.
- Support programme for strategic alliances of higher education institutions with top universities and synchronization of their curricula in relation to student and academic worker mobility.
- Financial support for new higher education programmes in AI.
- Utilizing AI tools to improve the quality and efficiency of the learning process itself, especially taking on routine tasks and freeing up the capacity for creative part of teaching.
- Extension of the National Qualifications Framework to new professional qualifications corresponding to the requirements of the future labour market in AI.
- The development of the National Qualifications System as a comprehensive system to increase qualifications, development of new models and individualization in further education and extension of further vocational training and retraining.
- Development and State support for the system of lifelong learning and vocational training, support for in-service training and development of digital skills.
- Educational seminars for experts and the general public, discussions on current AI implementation topics, raising awareness in society about the basic aspects of AI and its impacts.
- Promoting opportunities for in-service training and digital skills development.
- Motivational tools for businesses and individuals to participate in re-skilling programmes.
- Removing administrative and other barriers to the development of further education, creating a transparent

and stable environment and ensuring effective legislation and standardization processes for further education.

- Design and implementation of measures aimed at increasing the openness of educational pathways and ensuring the permeability of initial and further education, including further development of the results recognition system.
- Analysis of possibilities increasing individual demand for further education without distinction of work activity, especially of self-employed persons (e.g. use of time off, vouchers, tax relief).
- Coordination of initial and further education activities so that the two areas form coherent units within the concept of lifelong learning, including inter-ministerial cooperation and cooperation with the private sector.
- Tripartite dialogue on appropriate support for further education.
- Implementation Plan No 3 of the Digital Czech Republic – Digital Economy and Society.

4.5. Cooperating entities:

- Ministry of Industry and Trade;
- Ministry of Labour and Social Affairs;
- National Institute for Education;
- Czech National Coalition for Digital Jobs;
- National Higher Education Accreditation Authority;
- Czech Rectors Conference;
- Higher Education Council;

(other entities as decided by the chief coordinator or the AI Committee)

5.1 Responsibility

Coordinator: Ministry of Labour and Social Affairs
Co-coordinator: Council of Economic and Social Agreement

5.2 Baseline:

The greatest impacts of the AI on the economy are generally expected through automation and replacement of routine and repeatable (even laborious) work by machines. Thus, human capacity should be liberated for more creative, value-added work and, overall, performance, productivity, quality and efficiency should be increased. At the same time, automation is a way to compensate for the lack of labour due to unfavourable demographic developments in developed countries. Therefore, there is likely no risk of a total loss of jobs, because the lost ones should be compensated by the emergence of new jobs. However, it will be necessary to undergo a successful transformation at the level of the whole economy, sectors and individuals, which can impose a considerable burden not only on the educational, but also on the social system and bring about many negative consequences if it is not properly managed. In most cases, retraining of workers for which sufficient support, will be needed to move to the same or better jobs, while the extent and speed of finding a new job is largely individual. Potential threats include deepening the problems in socially excluded regions, temporarily increasing structural and frictional unemployment, or deepening the various forms of inequality and discrimination. The effects of automation are likely to be different for different population groups, with the middle class being among the most affected groups. The impacts can thus be not only purely economic, but also social and political. We are also very likely to see a change in FTEs, the emergence of new forms of work and the expansion of outsourcing, to which we will need to respond flexibly and consider the use of innovative approaches and their practical verification. Given the unpredictability of the changes, it will be crucial to first prepare the appropriate tools that can be used operatively in the event of disruption in the labour market due to AI and automation. these will be based on the measures under the Work 4.0 Action Plan and the fulfilment of the objectives of the Digital Czech Republic strategy.

5.3.1. Short-term objectives (until 2022):

- Continuous mapping of ongoing and expected labour market trends in individual sectors.
- Updating and revising the National Register of Professions reflecting technological development and specification of new competencies in the Central Competence Database.
- Involvement of employer and employee representatives in the process of assessing the impact of technological trends on changes in the structure of professions and their content.
- Analysis of possible compensation of budget and insurance revenue losses by other sources.
- Increasing support for self-employment and starting small enterprises through effective career guidance, coaching, education, targeted grants, soft loans or tax depreciation.
- Preparing an analysis and subsequent proposals to reduce working time at some life stages.
- Preparing the definition of working relationships within online platforms in terms of preventing the spread of precarious work and endangering insurance systems and ensuring its compatibility with labour legislation in the Czech Republic, coverage in terms of taxation and inclusion in social and health insurance systems.
- Preparing a proposal for appropriate legislative support and legal interpretation in the field of flexible forms of work.

- Analysis of positive and negative effects of teleworking, defining occupational safety and health when working from home.
- Proposal for changes in the social and pension system in terms of future demographic development and changes associated with rapid technological changes.
- Proposal of a recommendation for the support of mental and physical health in the context of the character of work.

5.3.2. Medium-term objectives (until 2027):

- Taking into account the new labour market requirements associated with the development of digital technologies in the National Register of Professions and the Central Competence Database.
- Adaptation of benefit systems to support the transition to emerging disciplines and professions.
- Operational deployment of tools and implementation of prepared changes according to current changes in the labour market.

5.3.3. Long-term objectives (until 2035):

- Prepare the society for the changes and impacts of artificial intelligence and automation on the economy and especially the labour market.
- Prevent long-term unemployment and flexibly create new jobs in the labour market for disadvantaged groups through targeted programs and effective measures.
- Minimize the possible negative impacts of economic and labour market transformation and, on the contrary, contribute to the positive use of opportunities to increase productivity and efficiency of work and its evaluation.

5.4 Tools:

- Regular preparation and refinement of sectoral and thematic predictions in order to estimate the possible threats and opportunities for the creation of new jobs.
- A methodological approach to monitoring the impact of technological changes on the labour market.
- Regular preparation and refinement of sectoral and thematic predictions in order to estimate the possible threats and opportunities for the creation of new jobs.
- Creating the conditions for the involvement of employer and employee representatives in the process of assessing the impact of technological trends on changes in the structure of professions and their content.
- Taking into account the new labour market requirements associated with the development of digital technologies in the National Register of Professions and the Central Competence Database.
- Promoting self-employment and starting small enterprises.
- Research and preparation of possible solutions in the area of tax and insurance systems and the conditions under which these systems could cope with reducing the fiscal burden on labour revenues and with increasing the demand for extended job opportunities in public services.
- Definition and regulation of work in the context of shared economy.
- Supporting older and low-skilled people and reducing gender segregation in the labour market.
- Analysis of socio-economic impacts of technological changes.
- Changes in social security and pension systems.

- Creating conditions to increase labour market flexibility.
- Monitoring and evaluating the influence of teleworking on the reconciliation of family and working life.
- Proposal to reduce working time at some life stages.
- Monitoring and evaluating the influence of teleworking on the reconciliation of family and working life.
- Proposal of a recommendation for the support of mental and physical health in the context of the character of work.
- Use of AI in social services, especially to facilitate their users' lives, improve care, or help clients stay in their natural environment for as long as possible.
- Creating the conditions for the involvement of employer and employee representatives in the process of assessing the impact of technological trends on changes in the structure of professions and their content.
- Promoting the development of job opportunities and worker mobility following the impacts of automation and AI.
- Systematic support to labour market adaptation to technological changes, including the support for self-employment and starting small enterprises through effective career guidance, coaching, education, targeted grants, soft loans or tax depreciation.
- Analysis of possible solutions in the area of tax and insurance systems and the conditions under which they could cope with reducing the fiscal burden on labour revenues and with extended job opportunities in public services.
- Definition and regulation in the context of a shared economy and other new economic models.
- Support for job creation by adjusting the possible tax burden on labour.
- Supporting older and low-skilled people and reducing gender segregation in the labour market, including upgrading skills and skills in older age groups, promoting flexible work for women of childbearing age and reducing gender exclusivity of professions and educational disciplines, especially IT and pedagogy.
- Extension of the National Register of Professions to new units of work corresponding to the newly created professions, continuous updating and revision reflecting technological development and competency specifications in the Central Competence Database.
- Use of AI in social services, especially to facilitate their users' lives, improve care, or help clients stay in their natural environment for as long as possible.
- Changes in the social and pension system in terms of future demographic development and changes associated with rapid technological changes towards keeping the employees on the labour market.
- Practical testing of new policies based on foreign good practice and national expert analyses.
- Use of new social models to support the transition of workers to new positions with regard to changes in labour organization and the loss of social security with a tendency towards looser labour relations.
- Fulfilment of the measures under the Work 4.0 Action Plan.
- Implementation Plan No 3 of the Digital Czech Republic – Digital Economy and Society.

5.5. Cooperating entities:

- Labour Office of the Czech Republic;
- Ministry of the Interior;
- Ministry of Education, Youth, and Sports;
- Ministry of Industry and Trade;
- Ministry of Finance;
- AI Platform of the Confederation of Industry;

(other entities as decided by the chief coordinator or the AI Committee)

6.1 Responsibility

Coordinator: Office of the Government of the Czech Republic
Co-coordinator: Institute of State and Law of the Academy of Sciences of the Czech Republic

6.2 Baseline:

In areas affecting global trends, such as artificial intelligence, the development of the Czech legal system largely depends on the activities of transnational and international entities of which the Czech Republic is a member. The most important influence is that of the European Union law, which has set strategic goals in the field of AI, including the creation of Ethical Guidelines for the Development and Use of Artificial Intelligence and the creation of an innovation-friendly legal framework. Other international organizations, notably the OECD, the WTO, the UN and the Council of Europe, also have significant activity in this field. In addition to binding international documents, these organizations also provide regulatory guidance through non-binding model laws and recommendations. Similarly, a number of private sector documents are being produced, especially in the form of self-regulatory codes and other forms of soft-law. In order to develop and fully exploit the potential of the AI in the Czech Republic, it is necessary, first of all, to respond flexibly and continuously to the development of technologies by setting up friendly research and development legislation, as well as emerging economic models, removing obstacles and, conversely, setting legal certainty. All this while maintaining a high level of protection of fundamental and other rights and in line with the European approach of human-centric AI.

6.3.1. Short-term objectives (until 2021):

- Identify specific legislative barriers to research, development and use of AI in each sector.
- Preparation of an analysis of Czech legal regulations and implementation of European principles of liability for damage in relation to AI, especially for the operation of autonomous and collaborative systems and for phases of experimental and live operation with special emphasis on continuously self-learning systems, including possible introduction of compulsory insurance.
- Establishment of an expert platform and forum for continuous monitoring of legal and ethical rules and instruments at national and international level in light of current needs for research, development and use of AI organized in cooperation with the Institute of State and Law of the ASCR.
- A public consultation, including an interactive questionnaire, on the basic legal issues associated with the protection of rights to intellectual property items created by AI and the legal certainty, including Ethical recommendations for the development and utilisation of artificial intelligence.
- Development of an analysis of legislative and technical barriers to accessing data necessary for research and development in AI and horizontal (cross-sectoral) analysis of specific data access legislation. On that basis, an analysis and public consultation of proposals for possible solutions (e.g. the data trust model) in the environment of Czech law, including the legislative proposals for changes and their approval.
- Public consultation on data ownership and disclosure and GDPR application principles, including an analysis of GDPR adaptation law in relation to AI.
- Preparation of a risk analysis of existing personality protection, privacy protection and data protection in relation to AI.
- The facilitation of sharing of personal and other data, which can be utilised for the AI purposes. Public consultation on proposed method, e.g. draft standard form agreements.
- Preparation of analysis for the use of test operation of AI in the Czech law environment, particularly in the form

of regulatory test environment (so called regulatory sandbox). Analysis of the use of the concept of regulatory sandboxes. Identification of sectors suitable for the implementation of AI testing operations, particularly in the light of specific sector regulation.

- Development of certification and standardization in the field of cyber security of AI products, systems and services and prevention of their abuse following the European Cyber Security Act.
- Commence a dialogue between security forces about the possible AI application in the security area.
- Extension of the existing interdepartmental working group of Autonomous Management, which is being led by the Ministry of Transport of the Czech Republic on other legislative issues related to the development and use of autonomous vehicles and other means of transport in the Czech Republic. The conclusions will be presented to the AI Committee, with which it will work closely.
- Creation of model procedures in the creation of DPIA within the impact assessment of selected technologies.
- Installing sound systems in selected courtrooms and recording of court proceedings, incl. testing the transcription of spoken word into a machine form, automatically converting the spoken word into text.

6.3.2. Medium-term objectives (until 2027):

- Implementing AI development and usage tools in accordance with ethical and legal rules (including Ethical Guidelines for Artificial Intelligence Development and Use) and human centric AI.
- Developing industry-specific codes of conduct extending to the European and international levels – a global good practice for AI competitiveness.
- Conducting an analysis and assessment of the risks to the competitiveness of companies resulting from both different strategy papers covering ethical frameworks and constraints on access to data collection and key AI tools as well as legislation in the EU, the US and China.
- Analysis and elimination of legislative barriers and administrative burdens on AI start-ups.
- Taking action in specific areas related to AI development, in particular for efficient and rapid access to and use of data, use of autonomous mobility resources, effective protection of intellectual property and enhanced consumer protection.
- Setting up a legal conduct framework through autonomous systems and for personality and privacy protection when creating so-called digital copies of individuals.
- Creation of a unified system for evaluating the impacts of legal regulations and ethical rules and their adaptation depending on the development of technologies to support basic research, development and use of AI, to support the competitiveness of the Czech Republic and to ensure effective cyber security.
- Establishment of competence centres, certification and evaluation laboratories and centres of excellence for cyber security.
- Creating an interdisciplinary platform to address, in particular, the development and implementation of methods to verify the effects of AI on security and resilience, in particular critical systems, by designing metrics to compare emergency preparedness of public and private entities and developing and implementing standards for AI systems, products and services.
- Introduction of AI elements in the judiciary, such as the sounding of all recording halls, the use of spoken word transcripts in selected agendas, and the involvement of artificial intelligence elements in the justice anonymizer.

6.3.3. Long-term objectives (until 2035):

- A flexible legal system capable of adapting rapidly to changes due to technological developments, including possible adaptations of the legislative process and interpretation of law, including innovation case law and AI with sufficient legal certainty.
- Legislation to develop new business models in the digital economy with regard to AI development.
- Securing standards primarily in the areas of security, personal data protection and the protection of fundamental rights in research, development and use of AI.
- Introduction of AI elements in the judiciary, in particular the use of transcription in machine form in all court cases, deployment of an anonymization tool using artificial intelligence elements, automatic indexing of court decisions allowing easier search among decisions within the CTD project, involvement of artificial intelligence for handling requests of users and citizens.
- Introduction of an analytical statistical system for the processing of data by the justice sector, i.e. in particular the evaluation of data in the field of justice and their use for searching indicators; improving case management.

6.4 Tools:

- Expert Platform and Forum organized in cooperation with the Institute of State and Law of the Academy of Sciences of the Czech Republic (modelled on the "Observatory and Forum" set up by the European Commission) and bringing together representatives of the academia, public service, business and non-governmental organizations with the aim of continuously monitoring legal and ethical rules and instruments at national and international level, as well as emerging needs according to current research, development and use of AI.
- Continuous evaluation of legislative and other legal risks for the competitiveness of the Czech Republic, creation of ethical frameworks and for the national implementation of binding EU regulations and recommendations.
- Supporting the development of AI solutions to ensure the effective functioning of law in the private and public sectors.
- Removing legal barriers to AI development, including public law and, for example, public procurement.
- Developing AI-based systems in the judiciary itself to streamline its functioning while maintaining all safeguards.
- Adopting a clear and timely AI regulation to ensure legal certainty for citizens, entrepreneurs and investors.
- Education and social awareness in the field of AI regulation and ethics, including the promotion of interdisciplinary fields of study.
- Support of certified methodology of implementation and specialized courses, including the proposal of a certified methodology for system audits in co-operation of the public and private sectors.
- Regular updating of the implementation of EU legislation, monitoring of externalities and monitoring of legal certainty in the field of cloud computing, the Internet of Things, data economy and smart economy of industry and services.
- Coordinating and regularly informing all key governmental, academic and business platforms on AI tools discussed in the international institutions and the position of the Czech Republic, especially the exchange of information in expert groups on AI in the UN, OECD and OSCE.
- Fulfilling the strategy Digital Czech Republic – Czech Republic in Digital Europe.
- Implementation Plan No 6 of the Digital Czech Republic – Digital Economy and Society.

6.5. Cooperating entities:

- Ministry of Justice,
- Legislative Council of the Government of the Czech Republic;
- Government office of the Czech Republic;
- Ministry of Industry and Trade;
- Ministry of Transport;
- AI Platform of the Confederation of Industry;
- Economic Committee of the Chamber of Deputies;
- National Cyber and Information Security Office;
- Czech Telecommunications Office;
- Civil Aviation Authority;

(other entities as decided by the chief coordinator or the AI Committee)

7.1 Responsibility

Coordinator: Office of the Government of the Czech Republic
Co-coordinator: Ministry of Foreign Affairs

7.2 Baseline:

Artificial intelligence appears in all current debates at national and international level that are related to the development of the economy and society. AI was one of the most discussed issues in 2018 also in the European Union and the theme resonates in international organizations. Horizontal projects are being developed within the OECD. As with the EU, the OECD is establishing its own AI Policy Observatory on monitoring and collecting relevant policy documents and promoting collaboration between different interest groups. The theme also appears at many AI-focused meetings (The AI Summit, World Summit AI, AI Forum 2018 and others), as well as at major annual conferences (e.g. the World Economic Forum). It can be expected that in the coming years it will play a crucial role in the various activities and programmes of international institutions and in bilateral and multilateral relations between States. It is therefore a great opportunity to become an active and strong player on the international scene with a clear position and clear priorities. The Czech Republic takes over the V4 presidency in July 2019, and AI will be one of the key topics of V4 strategic cooperation.

7.3.1. Short-term objectives (until 2021):

- Identify and exploit the potential of cooperation with selected non-EU States (Israel, USA, South Korea).
- Description of AI priority areas in which the Czech Republic has excellent results or a strong potential for development, and a strategy for communicating these areas towards international partners.
- Preparation of an argument and strategy of communication towards EU partners, especially with the aim to gain support for the creation of the European Centre of Excellence, the European Test Centre and DIH in the Czech Republic (including organising an expert workshop in Brussels).
- Presentation of NAIS and identification of potential / topics for cooperation within the EU, V4 and other international platforms (OECD, relevant international conferences and meetings).
- Organization of a specific conference within the V4 Presidency (2nd half of 2019–1st half of 2020) to exchange experience in AI.
- Promotion of the AI theme to the summit of the V4 Prime Ministers during the Czech Presidency.
- Expert exchange of experience and best practices and presentation of the results of specific projects implemented under the Czech Presidency in V4.
- AI relation to the European Commission's work programme established after the 2019 elections, NAIS revision.
- Negotiating and using the Digital Europe programme, from which it will be possible to draw funds for projects based on modern digital technologies, supporting communication campaigns.
- Inclusion of AI in the Czech Presidency of the EU Council in the 2nd half of 2022.
- Organising a digital EU-wide conference on AI and initiating an EU online platform for sharing good practice under the Czech Presidency of the EU Council.

7.3.2. Medium-term objectives (until 2027):

- One of the priorities of the Czech Presidency of the EU Council will be also to promote the AI in the programme of the Presidency Trio.
- Active participation in the creation of the annual work programmes of the project Digital Europe, taking into account the experiences of national drawdown and the specificities of potential beneficiaries.
- Active support and cooperation with third countries in innovation, new technology development and artificial intelligence (Israel, USA, South Korea).
- Establishing AI as the subject of bilateral and multilateral strategic partnerships, opening and coordinating the promotion of specific topics at working level.
- Promoting international financial programmes to develop AI, support of responsible ministries in their use by potential national beneficiaries.
- Coordination of preparations for negotiations within the OECD, preparation and participation of the Czech Republic in negotiations at all levels based on national expert capacities.

7.3.3. Long-term objectives (until 2035):

- Support and continuity of activities on the 2030 Innovation Strategy, fulfilment of their priorities, including the goals of the Digital Czech Republic, which is its integral part.
- Link to European and international AI initiatives, in particular the Coordinated Plan and its updates.
- Establishing the international image of the Czech Republic as an innovative country with excellent results in AI.

7.4 Tools:

- Integrating the AI theme into the V4 priorities and the programme of the Czech Presidency of V4; coordination of V4 positions in AI for EU negotiations (in close cooperation with V4 partners).
- Developing bilateral cooperation and building coalitions of like-minded countries with all the relevant stakeholders in the EU to support AI and build and operate European Centres and DIHs.
- Cooperation in strategic formats such as the Czech-German Strategic Dialogue (Working Group for Research, Development and Innovation), the Czech-French Strategic Partnership (digitization and development of ecosystems for the development of start-ups) and the Slavkov Format (Dual Education and Industry 4.0).
- Active participation in the implementation of the Coordinated Plan for AI and other EU initiatives.
- Active participation in working groups on AI within the EU, OECD, UN and other international organizations.
- Active participation and promotion of Going Digital II; in co-ordination with the specialized ministries, involvement in the strategic discussions in committees, working groups and OECD political plenums will be ensured according to national priorities and needs.
- Continuous communication of AI activities of the Czech Republic at the international level, mainly through digital media and suitable types of events, with an emphasis on presenting key national capacities, outstanding results and achievements of the Czech Republic in this area.
- Fulfilling the strategy Digital Czech Republic – Czech Republic in Digital Europe.

7.5. Cooperating entities:

- Ministry of Industry and Trade;

(other entities as decided by the chief coordinator or the AI Committee)

Academia

Table 1 – Institutions and number of FTEs participating in AI activities

INSTITUTIONS total	FTEs total
CTU	224.9
BUT	71.6
MFF UK	81.3
ITE TUL	7.5
FI MU	50.46
ZCU	62
UPOL AI	16
OSU UVAFM	30
AI@VSE	9.3
VŠB	59.2
1.LF UK	7.75
AS CR	58
TOTAL	**678**

Table 2 – Structure of researchers by workplace

INSTITUTION	Number of R&D workers	of which Ph.D.	of which excellent researchers	FTEs total	number of PhD students involved
CTU	366	156	41	224.9	143
ITE TUL	15	14	3	7.5	8
BUT	104	50	18	71.6	54
UK	118	60.2	16	89.1	51
FI MU	86	67	24	50.46	45
ZCU	80	35	4	62	41
UPOL AI	16	12	7	16	5
OSU UVAFM	33	30	8	30	7
AI@VSE	12	11	6	9.3	10
VŠB	87	40	20	59.2	27
AS CR	97	77	20	58	25
TOTAL	1,014	552	167	678	416

Table 3 – Structure of workplaces by methods, technologies and application sectors

METHODS	ČTU	ITE TUL	BUT	UK	FI MU	ZCU	UPOL AI	AI@ VSE	OSU UVAFM	VŠB TUO	AS CR	TOTAL
Data Science	3.2		1.3	9.4		3	6.5	3.3	11	21.8	12.2	71.7
Machine learning	45.2	1.5	11.1	2.15	5.1	11.2	5	2.2		7.5	17.1	108.05
Distributed autonomous systems	2.8			6.4	0.2	0.2				1.2		10.8
Automatic deduction	9			2.7		0.8	1.5	2	4.7		2	22.7
Planning, scheduling	16.55			2.4	1.8				2.5	9.7		32.95
Speech and natural language processing	4	1.5	8.5	45.5	10.4	15		1.3	0.8			87
Machine perception	12.6		5.8	0.05		2.7						21.15
Autonomous robotics	17.7		6.2	1.1	0.3	0.4				11.5		37.2
Simulations	6.1			9		1.7			3.5	3.3	1	24.6
Computer vision and graphics	13		19.7	2.05	4.5	4			6.5	4.2	18	71.95
Game Theory	4.8											4.8
Formal methods in artificial intelligence			11	4.2	16		3					34.2
TECHNOLOGY AND APPLICATION AREAS												
Augmented and virtual reality	2.4		2.9	2		1				3.4		11.7
Robotisation	9.45		1.1	1.15	0.75	5.3				13.1		30.85
Man-Machine Communication	6.5	4.5	6.9	27.5	7	1.5						53.9
Security and defence	8		10		1.1	0.5		1	1		4.5	26.1
Autonomous transport systems	23.4		2.7	3.55	0.25	1				1.8		32.7
Modern production and distribution systems, incl. Maintenance	9.95		1.3	4.6	0.7					3.1	1	20.65
Power engineering	6.95		1.1			0.5				3.9	1.5	13.95
Smart Products	0		3.7	2.35						1.3		7.35
Gaming and education systems	0		3.1	3.05	0.5	1.8				0.5		8.95
Internet technologies	0		0.9	24.9	1	2		1.3		6.2		36.3
Assistive and Medical Technology	11.4		3.6		9.6	7.1		1.3		5.4	5.5	43.9
Smart cities	4		1.1		0.5	0.5				14.6	2	22.7
Public administration	2.7		0	3.5		0.8		2		5.9	0.2	15.1
Food and agriculture	0		0	2.6		1						3.6

Table 4 – Sources of funding of research teams in AI (CZK thousands)

INSTITUTION	special purpose, Czech	research, European	operational programmes	institutional	industrial	foreign	total
CTU	124,330	37,758	69097	46603	99979	3088	380855
ITE TUL	5100			5200	200	1700	12200
BUT	34614	27521	9223	7753	11996	7,202	98084
UK	51,206	16140	11000	19290	8320		112956
FI MU	16373	2800	1314	13951	766		35204
ZCU	21000	10000	20000	6400	4500		61900
UPOL AI	1,000		1000	17000			19000
OSU UVAFM	9619			28495	570		38684
AI@VSE	897			6103			7000
VŠB	42,663	15824	7715	16308	3476		85986
AS CR	34000	500	3000	51500	5500		94500
TOTAL	340,802	110,543	122,349	218,603	135,307	11,990	946,369

Private sector

In the Czech Republic, according to the expectations of experts, there are hundreds of entities conducting applied research in the field of artificial intelligence. Dozens of private institutions are involved in basic AI research. According to the initial evaluation of the mapping of the corporate AI environment, carried out by the Confederation of Industry of the Czech Republic, analytical conclusions were drawn showing the distribution between individual application methods, sectors and areas. The mapping was done so that the National Strategy could be based on real data and knowledge from practice. Therefore, we collected quantitative data on research, development and production of algorithms and software for AI, but also on the use of AI in the Czech Republic. The mapping will continue and will be evaluated on a regular basis. The numbers were rounded according to rounding rules to make the results as accurate as possible. The members of the Confederation of Industry of the Czech Republic, all other member associations and organizations and the general public were approached for the purpose of mapping – in total thousands of entities were approached, of which 50 companies decided to become involved at this stage.

Table 5 – Application development areas of AI

Application development areas of AI	Total share in %
Information and communication activities	66%
Professional scientific and technical activities	32%
Security and defence	23%
Marketing	30%
Corporate management	17%
Financial and insurance industries	26%
Remote earth survey	9%
Logistics	17%
Manufacturing industry	17%
Business process support	45%
Other	26%

Chart 1 – Application development areas of AI

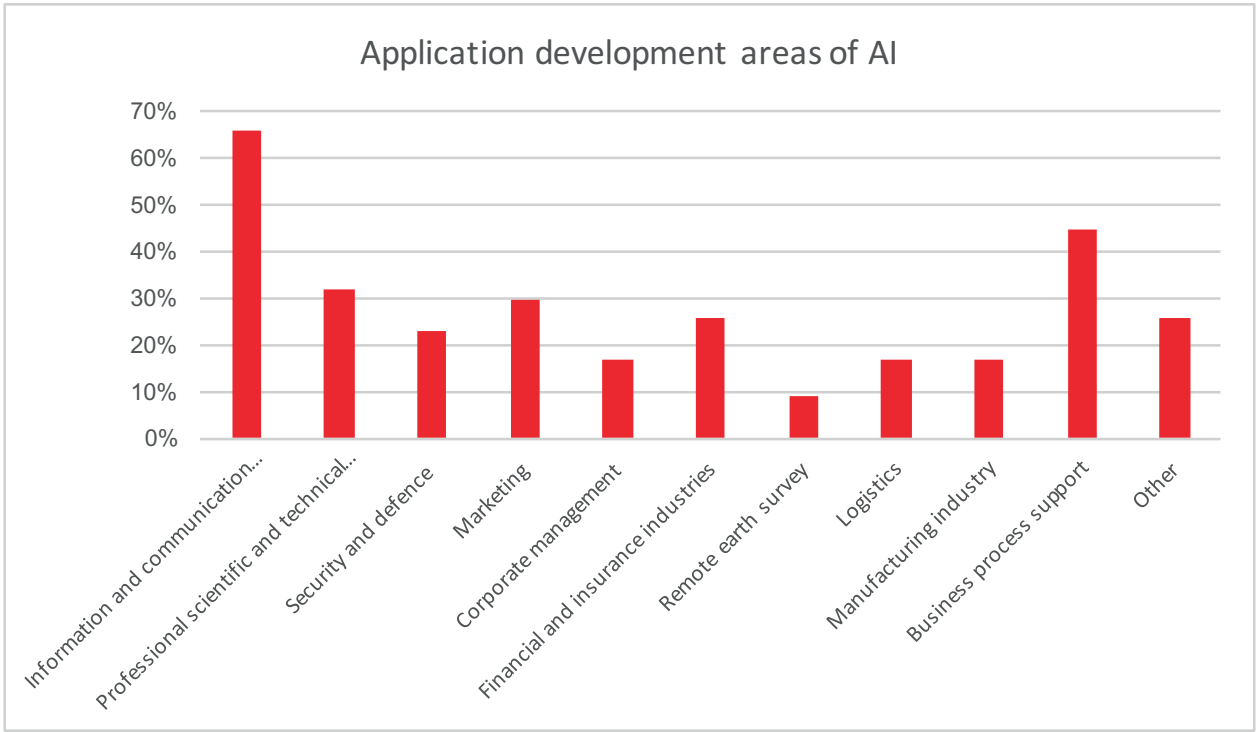


Table 6 – Methods used in AI

Methods used in AI	Total share in %
Data science	57%
Machine learning (incl. deep learning)	79%
Distributed autonomous systems	9%
Automatic deduction	19%
Planning, scheduling	19%
Speech and natural language processing	47%
Machine sensing	21%
Autonomous robotics	11%
Simulation	28%
Computer vision and graphics	49%
Other	9%

Chart 2 – Methods used in AI

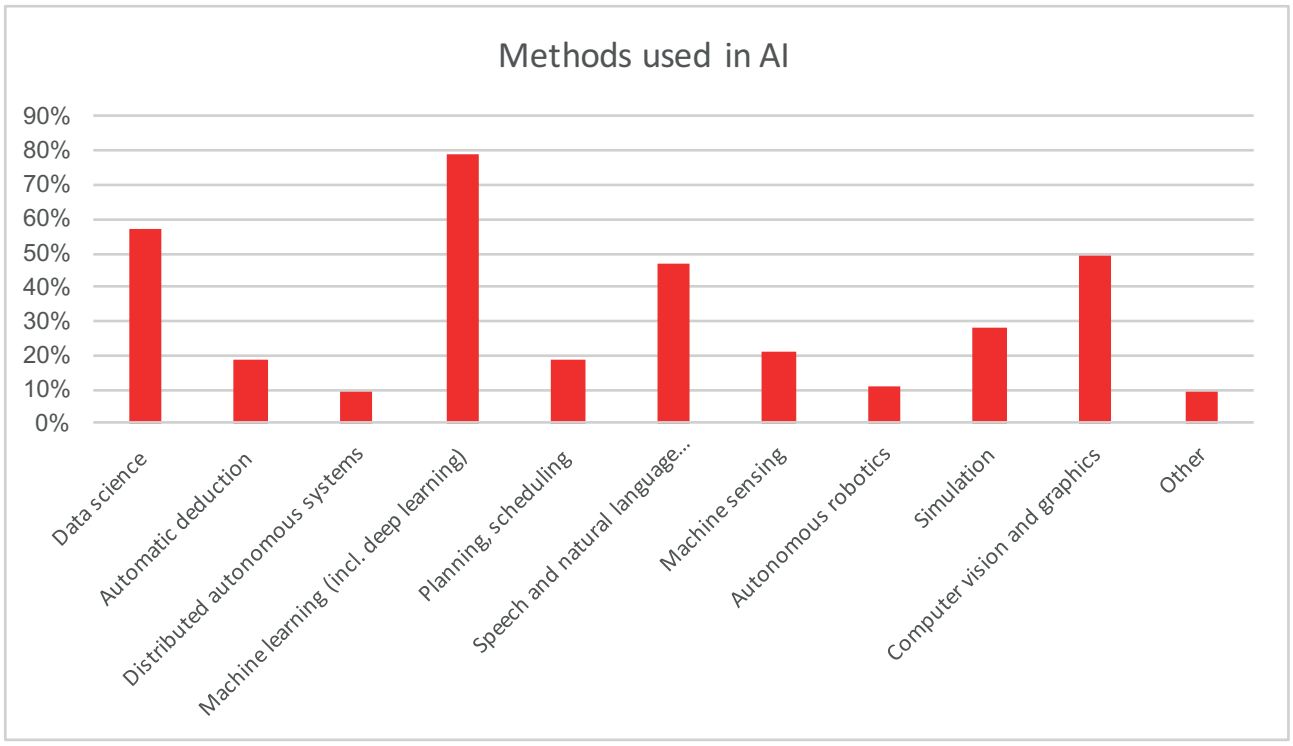


Table 7 – Number of R&D workers in AI

Number of R&D workers in AI (FTEs)	Total share in %
0.1-5	48%
5.1-10	23%
10.1-15	11%
15.1-20	8%
20.1-50	8%
> 50.1	2%

Chart 3 – Number of R&D workers in AI (FTEs)

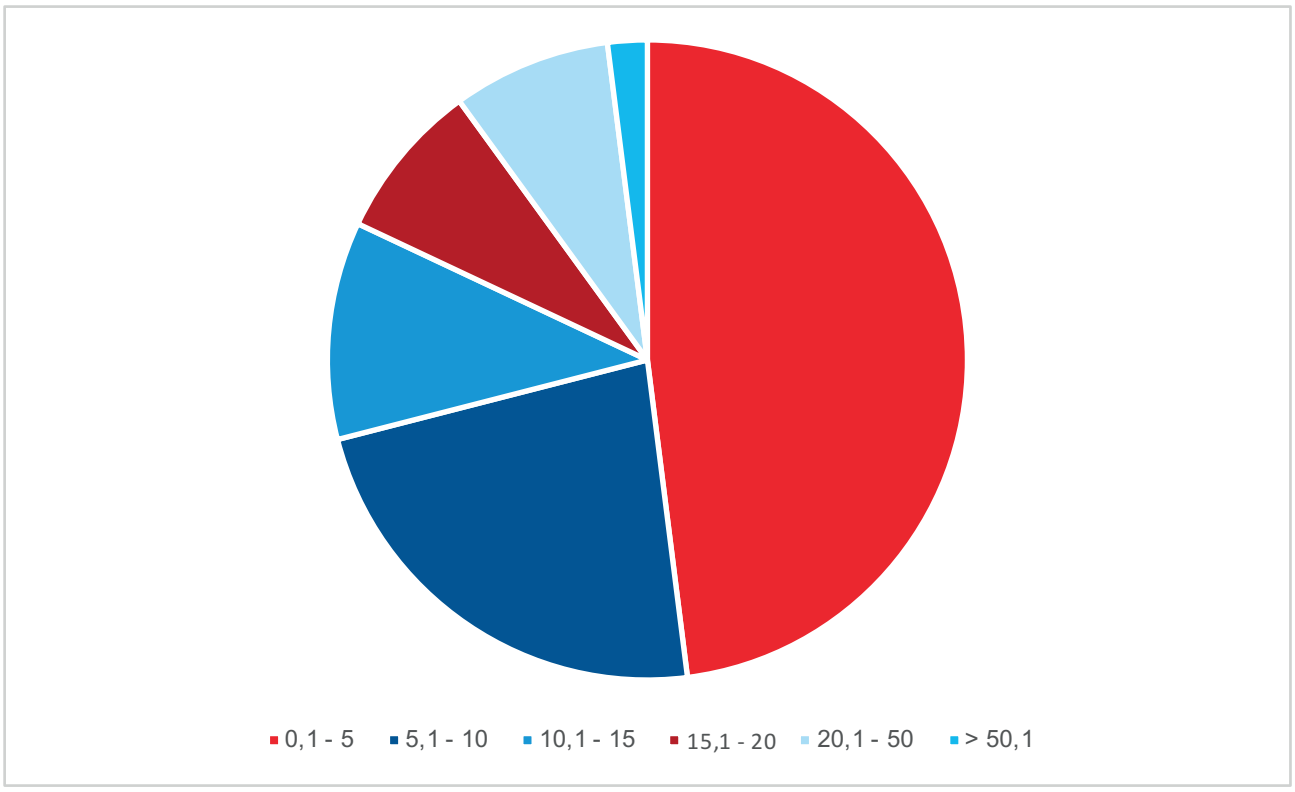


Table 8 – Application sectors

Application sectors of final products	Share
Cybersecurity	23%
Cross-sector applications	13%
Health care	21%
Corporate AI	45%
Robotics	21%
Marketing	30%
Financial and insurance industries	32%
Automotive	26%
Internet of Things	21%
Trading	15%
Regulations and standards	6%
AI hardware	6%
General hardware	4%
Media and news	21%
Education	21%
Earth sensing	9%
Agriculture	6%
Physical security	2%
Humanities	6%
IT and networks	17%
Legal	11%
Travel	2%
SW development	30%
Personal assistants	19%
Sport	2%
E-Sports	2%
Other	21%

Chart 4 – Application sectors of final products

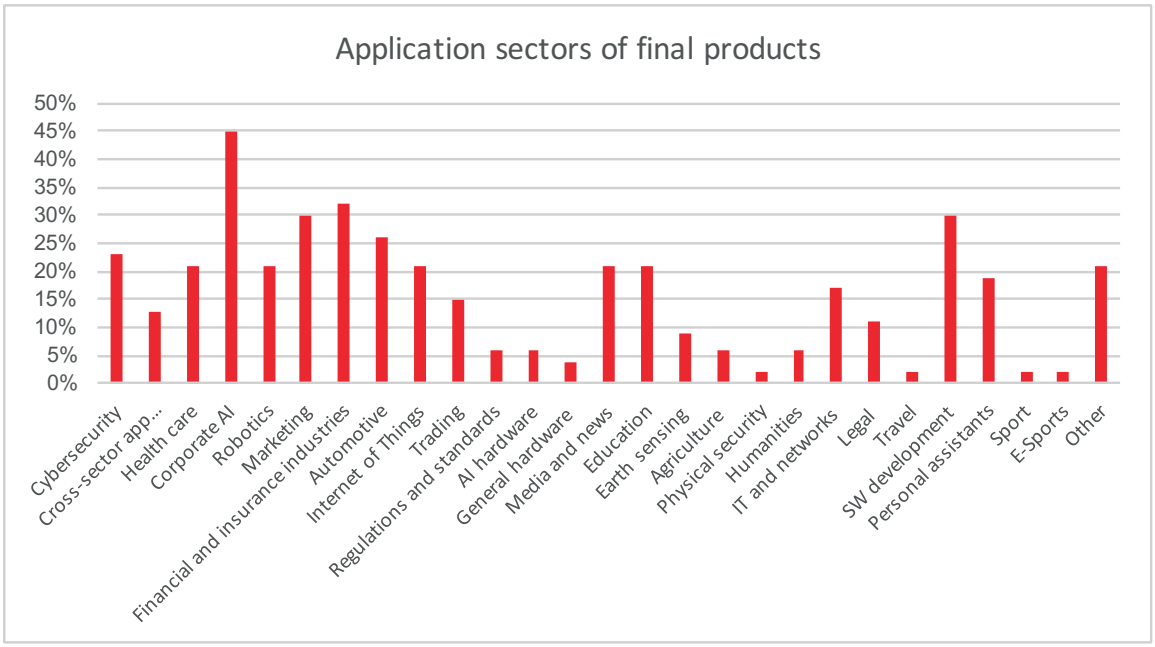


Table 9 – Methods of financing of AI research and development

Methods of financing of AI research and development	Total share in %
Own resources	88%
External sources – private local (e.g. business angel, VC fund, bank loan)	13%
External sources – private foreign (e.g. business angel, VC fund)	8%
External sources – public local (e.g. TA CR, national grants)	30%
External sources – public foreign (e.g. European Union grants)	23%

Chart 5 – Methods of financing of AI research and development

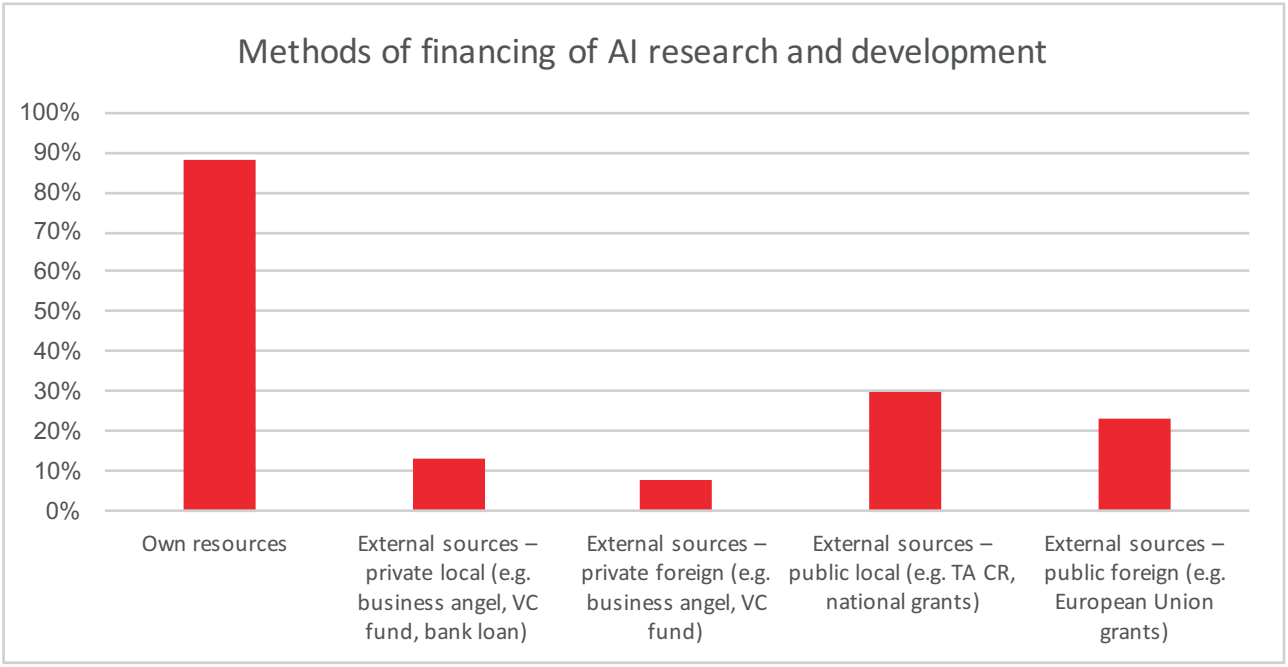


Table 10 – Annual turnover in CZK million in AI activities in the Czech Republic

Annual turnover in million of CZK in AI activities in the Czech Republic	Total share in %
> CZK 1 mill.	19%
CZK 1-5 mill.	13%
CZK 6-10 mill.	15%
CZK 11-15 mill.	4%
CZK 16-50 mill.	4%
> CZK 51 mill.	6%
No answer	40%

* the data in the table are set as an interval to protect company know-how

Chart 6 – Annual turnover in CZK million in AI activities in the Czech Republic

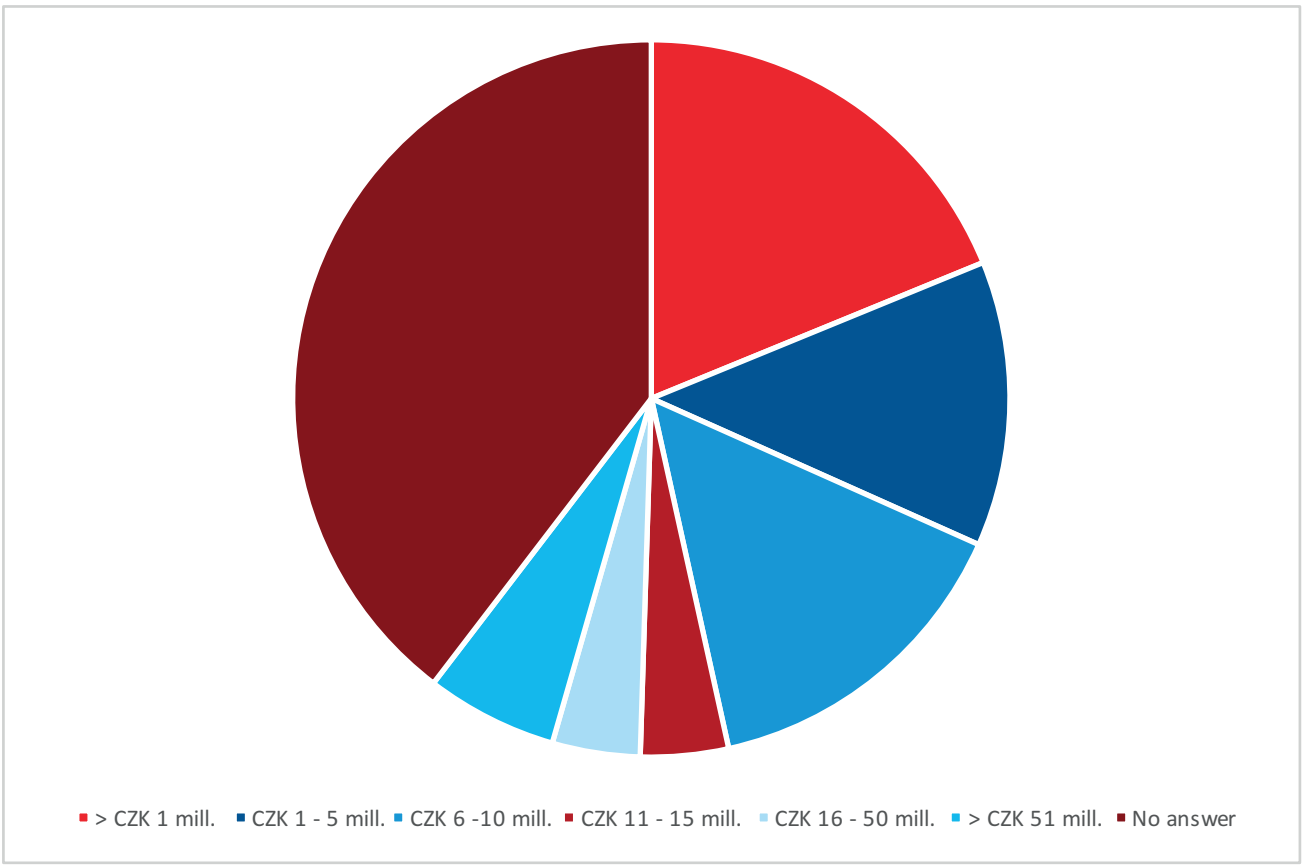


Table 11 – Volume of planned investments for AI in 2019 and 2020

Volume of planned investments in the Czech Republic (in CZK million) in AI for 2019 and 2020	Total share in %
CZK 1-5 million	31%
CZK 6-10 million	8%
CZK 10-50 million	15%
CZK 51 million or more	6%
No answer	40%

* the data in the table are set as an interval to protect company know-how

Chart 7 – Volume of planned investments in the Czech Republic (in CZK million) in AI in 2019 and 2020

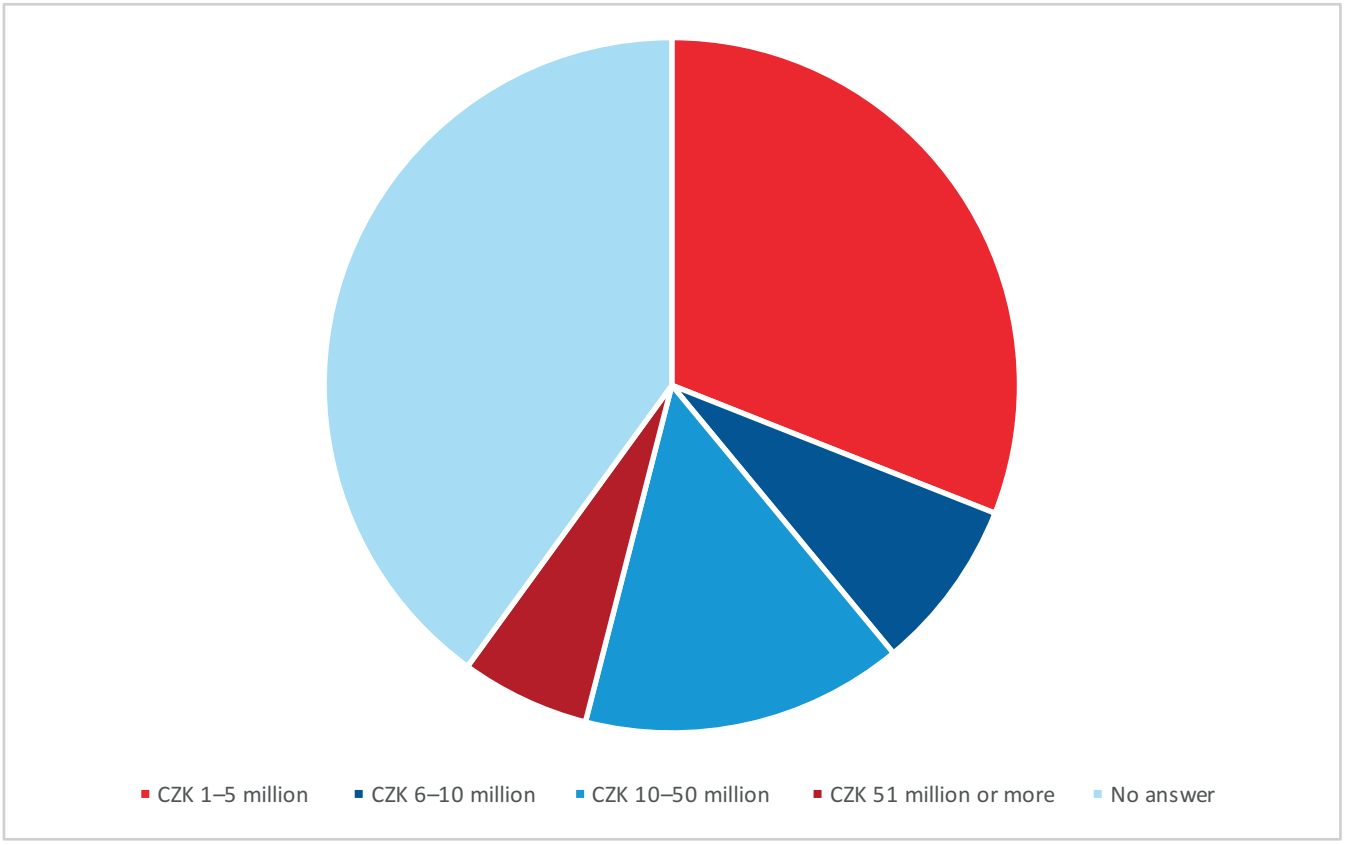
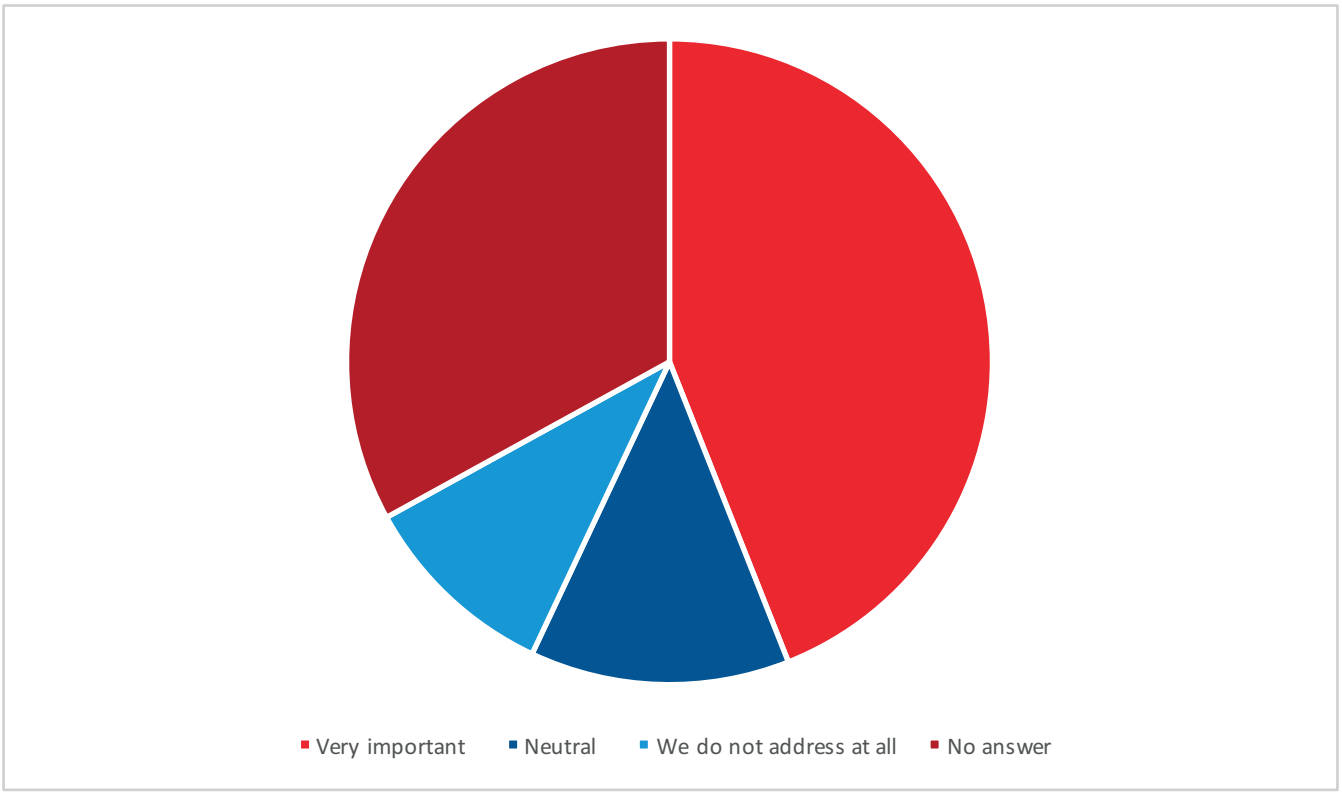


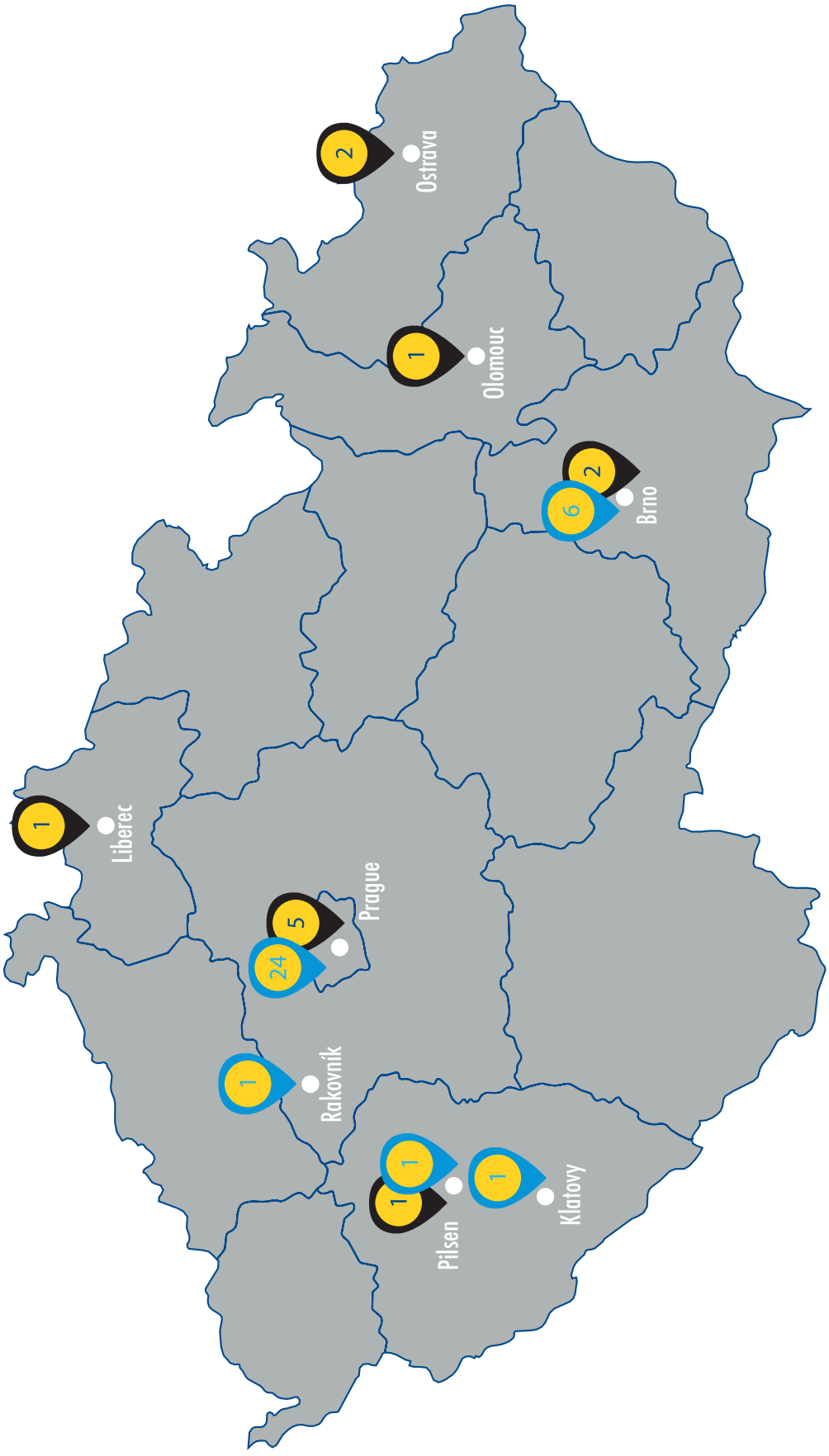
Table 12 – Importance of the issue of education and retraining of workers / employees with increasing labour market transformation

Importance of the issue of education and retraining of workers / employees with increasing labour market transformation (the onset of new technologies, AI, etc.)	Total share in %
Very important	44%
Neutral	13%
We do not address at all	10%
No answer	33%

Chart 8 – Importance of the issue of education and retraining of workers / employees with increasing labour market transformation



Map of private sector entities that conduct applied research in the field of artificial intelligence and academic sector and institutions involved in AI activities.



INSTITUTION	CITY
CTU	Prague
BUT	Brno
MFF	Prague
ITE TUL	Liberec
FI MU	Brno
ZCU	Pilsen
UPOL AI	Olomouc
OSU UVAFM	Ostrava
AI@VSE	Prague
VSB	Ostrava
1. LF UK	Prague
AS CR	Prague

PRIVATE SECTOR	CITY	SCOPE OF OPERATION
SpeechTech, s.r.o.	Pilsen	information and communication activities, security and defence, finance and insurance
TOVEK, spol. s.r.o.	Prague	information and communication activities, security and defence, marketing, corporate management, finance and insurance business process support
Memsource, a.s.	Prague	information and communication activities, corporate management, business process support, translations and localization
ReplayWell, s. r. o	Brno	information and communication activities, education and training
Ximilar, s.r.o.	Brno	business process support, marketing
OptiSolutions, s.r.o.	Prague	information and communication activities, professional scientific and technical activities, corporate management, manufacturing industry, business process support, machine maintenance
Geneea Analytics	Prague	information and communication activities, marketing, finance and insurance, business process support
RaRe Technologies, s.r.o.	Prague	information and communication activities, security and defence, marketing, finance and insurance, business process support Customer support, media & advertising
Machine Learning Prague, s.r.o Machine Learning College	Prague	information and communication activities, professional scientific and technical activities
Retailys.com, s.r.o.		information and communication activities, marketing, logistics, business process support
Phonexia, s.r.o.	Klatovy	information and communication activities, security and defence, finance and insurance, business process support
Seznam.cz	Brno	information and communication activities, marketing, search on Internet, image processing
CertiCon, a.s.	Prague	security and defence, manufacturing industry
Creative Connections, s.r.o.	Prague	information and communication activities, professional scientific and technical activities, creation of medical simulators

Lexical Computing CZ, s.r.o.	Brno	information and communication activities, professional scientific and technical activities
atlantis telecom, s.r.o.	Prague	information and communication activities, business process support
Bender robotics, s.r.o.	Brno	marketing, logistics, business process support
NeuronSW LTD - Czech branch	Prague	logistics, manufacturing industry
Innovative Business, s.r.o.	Prague	business process support
Valeo Autoklimatizace, k.s.	Rakovník	professional scientific and technical activities, security and defence, Automotive - Autonomous driving
Microsoft, a.s.	Prague	information and communication activities, professional scientific and technical activities, security and defence, corporate management, finance and insurance, land survey, logistics, business process support
Eyedea Recognition, s. r. o.	Prague	security and defence, transportation systems
ProTyS, a.s.	Prague 6	industrial automation
GoodAI Research, s.r.o. GoodAI Applied, s.r.o.	Prague	information and communication activities, professional scientific and technical activities, corporate management, finance and insurance, manufacturing industry, business process support
FlowerChecker, s.r.o.		professional scientific and technical activities, aerial land survey
OKsystem, a.s.	Brno	information and communication activities, security and defence, marketing, corporate management, business process support
IBM Česká Republika, spol. s.r.o.	Prague	information and communication activities, professional scientific and technical activities, security and defence, marketing, corporate management, finance and insurance, aerial land survey, logistics, manufacturing industry, business process support
NEWTON Technologies, a.s.	Prague	information and communication activities
VDT Technology, a.s		information and communication activities, corporate management, manufacturing industry, business process support
Blindspot Solutions, s.r.o.	Prague	information and communication activities, marketing, finance and insurance, aerial land survey, logistics, manufacturing industry, business process support
Lundegaard, a.s.	Prague	nformation and communication activities, marketing, finance and insurance
Wunderman	Prague	information and communication activities, marketing, business process support
Amper Meteo, s.r.o.	Prague	professional scientific and technical activities