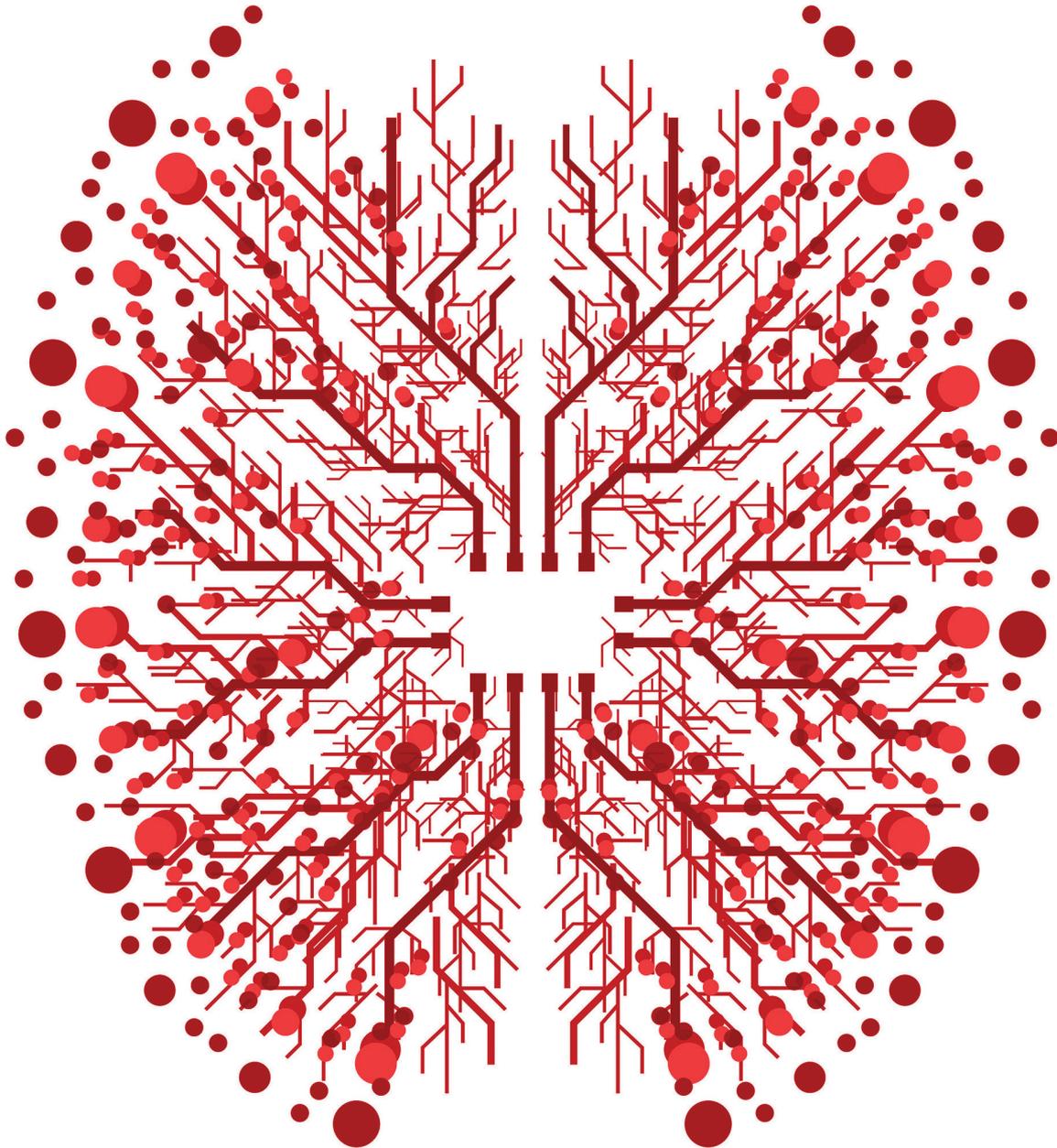


THINKTANK



THE ARTIFICIAL INTELLIGENCE QUOTIENT

The potential of artificial intelligence in the public sector
in Central-Eastern Europe

REVISION III

THE ARTIFICIAL INTELLIGENCE QUOTIENT**The potential of artificial intelligence in the public sector in Central-Eastern Europe**

Revision III

Edition I, Warsaw, May 2020

Published by

THINKTANK

Ośrodek dialogu i analiz THINKTANK

Address: Business Link PGE Narodowy,

Al. Ks. J. Poniatowskiego 1, 03-901 Warsaw

www.think-tank.pl

Authors**Editor:** ZBIGNIEW GAJEWSKI**Text:** LEONARDO CALINI (Microsoft Legal Consultant),

ZBIGNIEW GAJEWSKI, KATARZYNA MŁYNEK, PhD, ANNA STRUZIŁ, PhD

Graphic design: DOROTA JEŃDRKIEWICZ**Report partner**

Microsoft Poland

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**INTRODUCTION**

The potential of artificial intelligence is growing every day. Increasingly powerful computers and cloud computing economics presently enable unprecedented exploration of digital data. At the beginning of this decade, world of technology has at its disposal 25 times more data than at the beginning of the previous one. This, combined with the acceleration in the development of neural networks that has been going on for about 10 years, is conducive to further applications of artificial intelligence. Today, the public sector is also starting to use it. Mostly for image and speech recognition and translation algorithms or, more broadly, algorithms that detect pattern in huge amounts of digital data. In this, the 3rd edition of the "Artificial Intelligence Quotient" report, we present some interesting implementations of artificial intelligence in public sector companies and institutions in Central and Eastern Europe.

This does not mean that AI already has a simple and obvious way forward. Many citizens, politicians and experts continue to raise concerns that numerous jobs may disappear over the next few years, as humans will be replaced by algorithms and robots; that smart AI-based devices will reduce the need to interact with other people; that AI will contribute to the deepening of already significant social inequalities; that it will help to spread false information; and that it will even free itself from human control and threaten humanity.

In this report, we are trying to show what steps companies, states and international organisations are taking to avoid all these threats, so that the artificial intelligence we are dealing with is safe and trustworthy. These efforts are supported by large AI development companies and numerous civil society organisations. All major players around the world have approved of the need to develop ethical principles and legal standards for artificial intelligence.

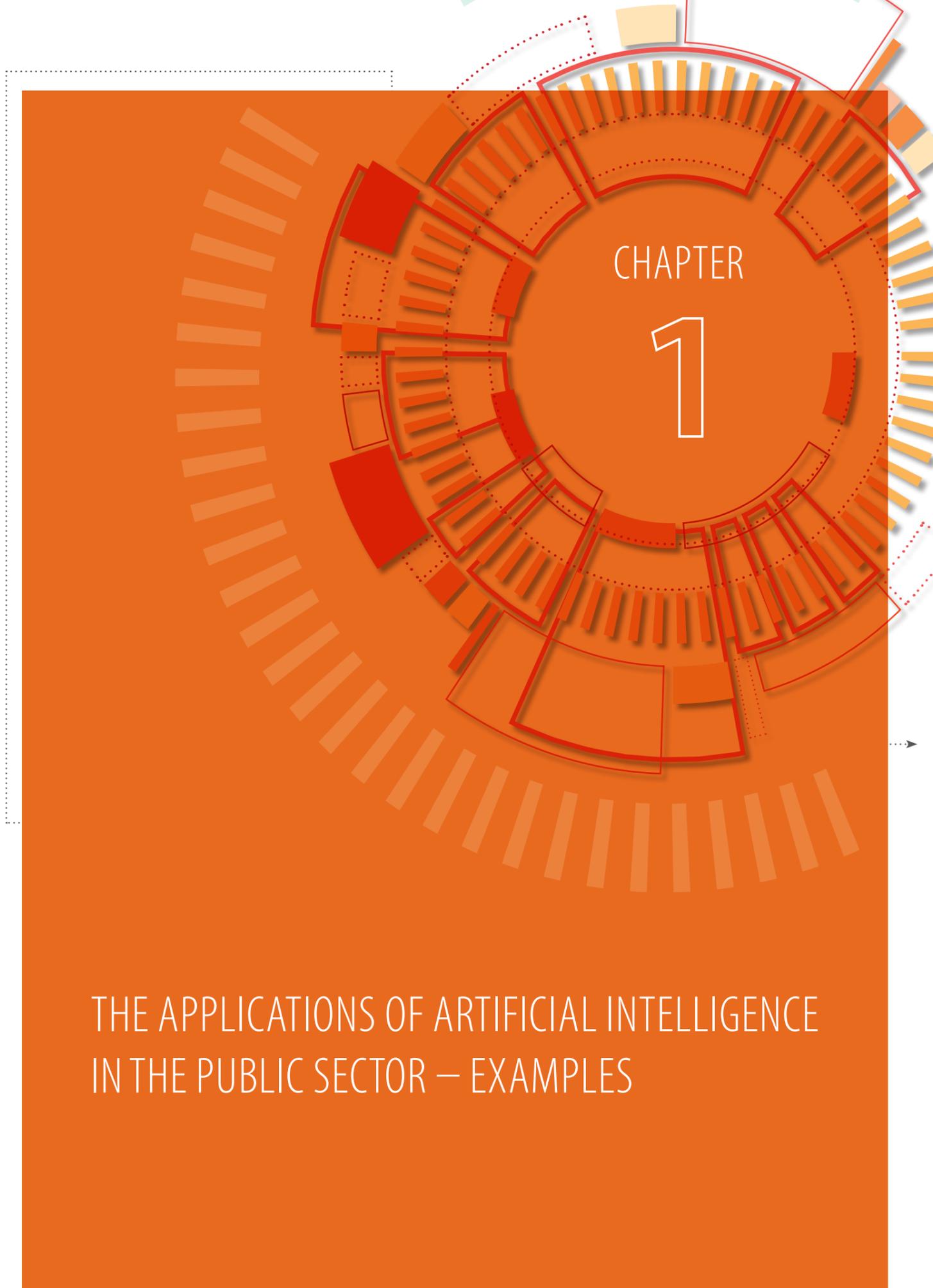
The European Union is the world leader in these efforts. That is why the report devotes a lot of space to a discussion of EU activities in this area. We also analyse the broader context in which the digital revolution is taking place in Europe, the strategies of the Member States and the European Union institutions in this field, the debate about the ethical dimensions and ways of regulating AI and its impact on labour markets. We present good examples of initiatives and cooperation between states and research centres to strengthen the European AI potential.

In our opinion, these actions will bolster trust in artificial intelligence, at least in Europe. Involving AI in the fight against the coronavirus pandemic may also help. Although AI applications do not independently combat the disease or replace experts and scientists, they have become an important tool to support these efforts. AI helps to diagnose infected persons and identify carriers, analyses the need for medical equipment, facilitates the management of hospitals and other medical resources, and very significantly supports the development of a vaccine. And all of these tasks are performed much faster than a human would.

We hope that the report we present to you will also contribute to strengthening the positive vision of artificial intelligence.

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THE APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN THE PUBLIC SECTOR – EXAMPLES

EARLY DETECTION OF LUNG CANCER LATVIA

Over the next couple of years, the analysis of genes and large health data sets will completely change medicine. In Latvia, a project is underway to develop a new method of early diagnosis and treatment of lung cancer based on the analysis of large data sets. And artificial intelligence is helping.

In September 2017, the University of Latvia (UL) in Riga and Microsoft (MIC) established a joint Innovation Centre (LUMIC). Its main goal is to create an ecosystem conducive to cooperation between IT professionals, public sector, government, scientists, students, entrepreneurs, and Microsoft experts, and to promote the development of innovative research and technological solutions. Since then, the Centre has undertaken interdisciplinary IT projects with an emphasis on cloud technologies, the Internet of Things and artificial intelligence, as well as education and support for young professionals.

The inauguration of LUMIC was attended by an impressive list of senior Latvian officials, including Prime Minister Māris Kučinskis, President Raimonds Vējonis and Environment Minister Kaspars Gerhards.

LUMIC is implementing several programmes: support for start-ups, development of new digital skills in the Latvian society, development of innovative applications and solutions, and a programme for the development of the ecosystem of digital transformation. The Centre has also partnered with the Irish venture capital fund Blue Dome Capital Limited to attract investments to support the best-performing IT companies and stimulate new ones.

"LUMIC is a good example of how to integrate innovations co-created by business, the public sector and various social institutions," says Anke den Ouden, Microsoft's Vice President for Eastern Europe.

One of the first LUMIC projects is to "Create a data lake for early lung cancer detection." The goal is to develop the necessary IT support infrastructure for integration and analysis of genotypes and other health information. A lot of medical data has already been collected in the Latvian health care ecosystem, structured and unstructured, but the ability to process it by humans is limited. Meanwhile, there is great potential for supporting effective prevention and personalised treatment of a wide range of chronic diseases such as cancer.

Therefore, the University of Latvia and Microsoft experts have designed an IT data platform specifically designed for the analysis of genetic and other medical information (called a data lake), which would enable more efficient decision-making and create a scalable and cost-effective healthcare system.

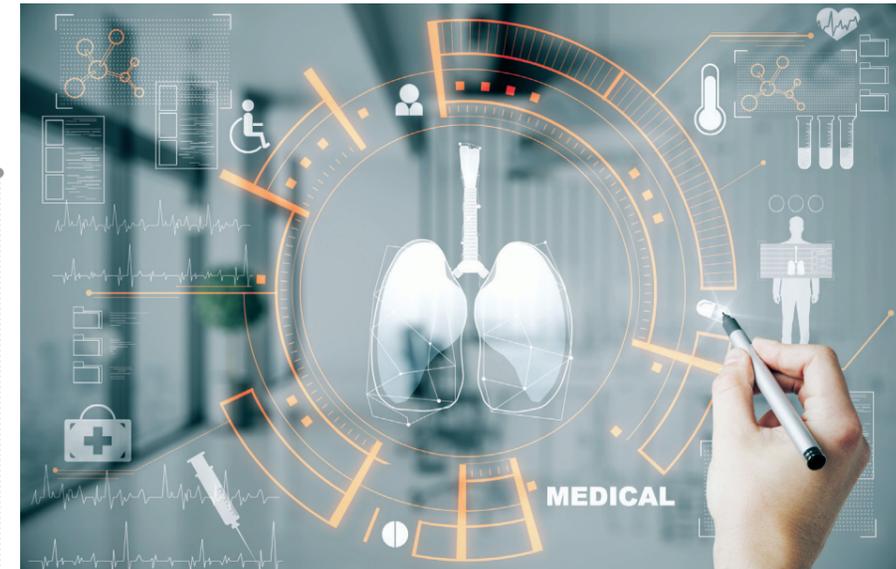
The platform collects data from public registers, hospitals, directly from patients, as well as retrieves them anonymously from com-

puterised diagnostic equipment. It then enables its exploration, processing and anonymisation, multidimensional analysis and finally making them available for research and preventive medicine. All these functions would be impossible without access to Microsoft's cloud services and the artificial intelligence used by Microsoft Azure Cognitive Services.

The architecture used provides researchers with a single interface to a common database. Its structured genome sequencing results, as well as other tests and patient descriptive data, can be reused in many projects and analysed from different perspectives, thus generating a higher return on initial investment.

National health care platform

First of all, the platform was used to develop new methods of risk assessment, diagnosis, forecasting and effectiveness of lung cancer treatment. It will ultimately serve health policy planners and medical authorities to develop data-based strategies to treat and prevent many other diseases. It generally optimises the quality of medical and socio-economic decisions, thus contributing to a more efficient healthcare system.



Currently, the Latvian health care system collects various types of medical data. Not all are available in digital form. Therefore, work is being done on their digitisation and then interconnection within the national platform. This integration will make possible a completely different approach to health care in the future than today. There will be much more prevention, specialised health care programmes targeted at specific age or professional groups or local communities and individualised therapies. The data platform will serve as a basis for continued creation of new knowledge and solutions in both medicine and IT.

Better chances for patients

"Finding an effective and convenient method for early diagnosis of lung cancer increases the chances for patients," says Signe Bāliņa, professor at the Faculty of Business, Management and Economics of the University of Latvia. She and her colleagues, including cardiologist Andrei Eagle, professor at the Department of Internal Medicine at the Faculty of Medicine of the UL, along with partners from

the pharmaceutical company Roche, experts from Microsoft and BGI, a gene research company, are working on the use of the genome and large data sets in medicine and health care.

"Over the next decade, artificial intelligence will help us analyse genes and large data sets. This will completely change medicine, facilitating the transition from a universal approach to highly personalised treatment, by choosing the most effective drugs and treatments. We, in Latvia, want to follow this trend," says S. Bāliņa. *"The essence of artificial intelligence is to do what a single person cannot do alone. When doctors tell IT specialists about their problems, common new ideas for solving them appear. This is how the future of medicine and new opportunities for humanity are created."*

The new platform will ultimately serve health policy planners and medical authorities to develop data-based strategies to treat and prevent many other diseases. It generally optimises the quality of medical and socio-economic decisions, thus contributing to a more efficient healthcare system.

RURAL INVESTMENT FINANCING AGENCY ROMANIA

The Agency distributes EU subsidies to 100,000 Romanian farmers and agricultural enterprises. Internal forecasting meant to facilitate the payments is an important process in managing them. Until now, this required cumbersome traditional handling by the agency staff. The situation changed completely when AFIR started using Microsoft Azure-powered artificial intelligence.

The Agency for Rural Investment Financing (AFIR), based in Bucharest, is the main governmental entity supporting Romanian farmers and agricultural industry companies. It distributes an average of €2 billion of EU funding to rural development projects each year. Among Romanian institutions, AFIR has the highest absorption rate of EU funds.

AFIR has a complex structure consisting of 13 specialised departments at the central level, 8 regional centres and 41 district offices.

No more paperwork

The process of managing the agency's tasks requires accuracy and transparency, and many documents in constant circulation. The employees involved were overwhelmed by their tasks, there were delays and mistakes. The situation changed completely when AFIR reached for the help of artificial intelligence powered by Microsoft Azure.

How did this happen? AFIR launched a tender to computerise its processes. Among the bidders was Genisoft, a local partner of Microsoft. Genisoft is based in Timișoara and provides IT consulting, software development, training, and auditing. In the ten-

der, Genisoft proposed a completely new payment forecast mechanism. It was to be based on a combination of Microsoft Azure SQL Data Warehouse and Azure Machine Learning, Azure SQL, and Microsoft Power BI. AFIR decided to choose this solution.

Cheaper and more accurately

The IT team, with the help of an external partner, devoted months to transforming the current state into a process that is completely paperless and on-line. Previously, it took the agency's team ten days to prepare a report with forecasts of expenses and financial needs. Now it's done in just ten minutes, with much greater accuracy.

"The use of the AI-based payment forecasting mechanism offers us many improvements, especially in terms of its accuracy. In the past, when doing this manually, there was a large number of errors that could affect the accuracy of the report. AI-based forecasting eliminates these hazards," affirms Daniel Ifrim, IT Director at AFIR. *"The accuracy of forecasting expenses and financial needs has increased to 80% and this applies to all our 25,000 projects. We have thus achieved high efficiency in managing grant funding".*

Leaders in Europe

Piles of documentation, urgent deadlines and a sense of responsibility overwhelmed the AFIR staff. They agreed that the paper workflow was "far from being optimised." Both the organisation and they needed a change. It was also expected by beneficiaries of EU aid. By entering the digital transition, the organisation hoped to improve the accuracy of its expenditure and funding forecasts. Employees hoped to automate the cumbersome manual work process and get rid of paper, and thus to have better control over their tasks. And the agency 100 thousand clients were waiting for their timely payments. These expectations were met by the transformation. It both helped the users and increased the operational efficiency of the agency.

That's why its Director General, Adrian Ionut Chesnoiu, says that this is only the beginning of AFIR's digital journey.

"Using artificial intelligence solutions provided by Microsoft, in 2017 we managed to bring AFIR from 24th to 3rd place in Europe. I am now convinced that by developing together with Microsoft, we will be able to achieve the best results in the financial years 2021-2027," he promises.

MINISTRY OF JUSTICE CROATIA

In the Republic of Croatia, the Ministry is responsible, among others, for organising the work of prosecutors' offices and courts. They produce a huge number of documents, including textual reports of hearings and interviews. They must be extremely accurate, so handling this process is very time consuming. It has been significantly shortened by using AI-based solutions to precisely convert audio documents into editable text.

The ministry itself has already used a "speech to text" application before, which has proved to be useful for meetings or briefings in conference rooms equipped with appropriate recording equipment. Therefore, the officials responsible for organising the work of the ministry started to look for similar solutions for local courts and prosecutors' offices. Their implementation was predicated on the precision and full reliability of the conversion to text of trial or hearing.

Joint implementation

Such a solution was proposed to the ministry by the Croatian company Newton Technology Adria together with Co-Sell, a local partner of Microsoft. The former has been developing applications for converting speech in Central European languages into written text for many years. In addition, the Microsoft Sales team proposed using EU funds to finance this project.

As a result, a Speech to Text (STT) solution dedicated to the Croatian Ministry of Justice was created. It consists of 800 specialised dictation devices equipped with special software. Some of them are used in

the national prosecutor's office and in district and regional prosecutor's offices, with some in use in local common, economic and administrative courts.

The software is a customised Newton Dictate application. It is supported by the Microsoft Azure artificial intelligence platform. The self-learning neural network increases the number of recognisable words and has a constantly updated and rich dictionary of legal terms. The recorded voice, before being converted into text, goes to Microsoft Azure, where it is analysed for accuracy and sent back for saving with an imperceptible delay.

Cheaper and faster

The project involved the supply and installation of equipment, as well as user training. Earlier, changes had to be made to the Civil Procedure Act so that digital voice transcriptions could be considered as official documents of evidential or archival value.

"The implementation has brought significant time savings and accelerated the work of our judiciary," Dražen Bošnjaković, Minister of Justice of Croatia, told Poslovni dnevnik (<http://www.poslovni.hr/>).

Thus, citizens with cases in the justice system have also benefited.

The Newton Dictate system gives users the ability to dictate to many applications, such as Microsoft Word, email and even a web browser. It makes their work much easier. In addition, they can add new words to the application, customize it to their own pronunciation and create templates for voice commands.

More convenient work

Direct beneficiaries of the implementation include court officials and prosecutors trained in the use of specialised dictation devices. They agree that the new solutions have been followed by a significant acceleration of procedures in judicial authorities and prosecution offices.

In accordance with the requirements of Croatian law, judges and prosecutors must initial the texts created in this system, such as the minutes of hearings or records of court hearings. However, this is not difficult for them, as the transcription accuracy reaches 98%.

MEDICAL UNIVERSITY HOSPITAL IN PRAGUE CZECH REPUBLIC

The Prague facility is a complex organisational system, in which 7 thousand employees have to work efficiently and effectively based on the flow of huge amounts of information. That's why the management has decided on a digital transition. Its first step was to move to Microsoft 365 Enterprise services in the cloud. After arranging the data, artificial intelligence was used to analyse them and support the process of hospital management and medical diagnostics.

The hospital has a rich history, as it was founded in 1790. Today it is one of the largest and most important scientific institutes in the field of therapeutic and diagnostic methods in the Czech Republic. It is constantly testing and introducing innovative diagnostic and therapeutic procedures which have gained international recognition. It consists of 44 clinics, institutes and wards, where patients from all over the country are admitted.

For all these reasons, the hospital has a huge base of medical care and diagnostic data.

Step one: data in the cloud

The facility is therefore a complex organisational system. Therefore, in 2018, its management decided on a full digital transition and provided all employees with the ability to use Microsoft 365 Enterprise services in the cloud, from storing medical data, through sharing notes to remote working.

"We want to be a hospital for the 21st century; one that provides patients with the highest level of health care. It also means the effective use of information technologies," explains director of the hospital, Dana Jurásková.

This step has increased management flexibility, while reducing fixed costs and improving productivity. The employees ap-

preciated that despite initial concerns, the whole process of transition to the cloud did not require them to acquire expert IT skills. The improved efficiency of various procedures was also felt by patients.

With the cloud, hospital employees have gained access to a unified communication platform, which allows for teamwork use of common inboxes, storage, notebooks, reports and online discussion forums. This solution is scalable and accessible from any location and from any device 24 hours a day, 365 days a year.

Step two: artificial intelligence

Moving to the cloud and sorting out numerous databases has enabled another technological innovation: using artificial intelligence to analyse huge data sets and support both hospital management and medical diagnosis.

Microsoft Azure's machine learning platform, including the Cortana Intelligence Suite, helped to improve the efficiency of hospital management. The Azure platform has powerful tools to analyse data and identify the patterns the users are looking for, making it possible to obtain knowledge that has not been available before, for example

identifying anomalies that you would not be able to see at the same time.

The hospital is now striving to achieve significant improvements in diagnostics thanks to the AI. The clinicians from the Prague facility, together with Microsoft, are running a project to help them better analyse the radiological images of patients with prostate cancer. For this purpose, the Microsoft ProjectInnerEye tool is used, which, using the latest machine learning technology, performs automatic, quantitative analysis of three-dimensional radiological images.

A qualified oncologist needs between 30 minutes and four hours, depending on the type of cancer, for a traditional radiological evaluation. ProjectInnerEye performs this analysis in a few minutes. It is ultimately approved by a doctor, but the whole process takes much less time than before.

Better logistics, lower costs

The benefits of migrating services to the cloud go beyond mere time savings. Electronic documentation and cloud-based data storage allows monitoring the development of a patient's health, changes in test results and making decisions critical situations more flexible.



Microsoft Azure's machine learning platform, including the Cortana Intelligence Suite, helped to improve the efficiency of hospital management. The Azure platform has powerful tools to analyse data and identify the patterns the users are looking for, making it possible to obtain knowledge that has not been available before.



"Today, we can no longer imagine keeping our patients' records only in paper form," explains prof. Vladimír Tesař, head of the Nephrology Clinic of the 1st Medical Faculty of Charles University. "The mere fact that a doctor from anywhere in the world can access electronic documents and patients' results without having to contact their colleagues from other departments is a huge simplification of our work."

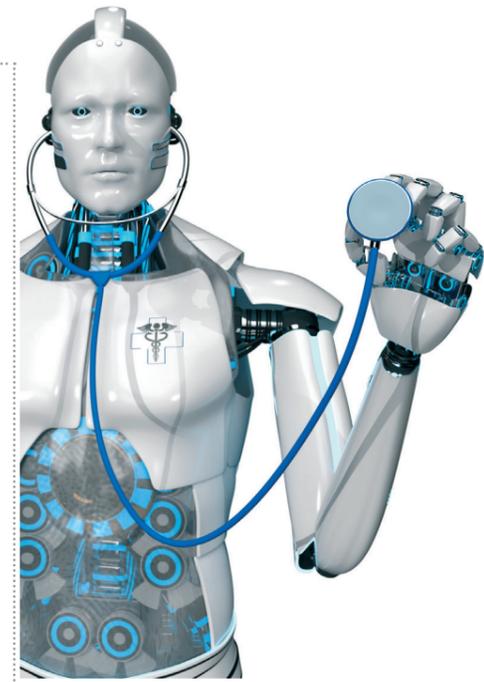
An especially important benefit of this transformation is also an increase in the level of security of data, especially sensitive ones, such as medical records and notes, and the new system's compliance with the strict data protection rules of the GDPR.

The hospital better analyses its entire logistics, its costs, the circulation of medical products and medicines. It can evaluate suppliers or compare the length of hospital stays depending on the diagnosis made and the level of serious complications after various operations.

The transition to the cloud has also increased the precision and speed of X-ray imaging, CT scans, MRI and ultrasound.

The benefits of switching to the cloud and introducing AI at the hospital were also felt by doctors and other staff. This has led to significant progress in the analysis and evaluation of patient records. For example, doctors can now easily find out what medications their patients are already taking to avoid unwanted interactions between the drugs they are recommending during their examination.

"As a regular user, I mainly appreciate the ability to store all files on an online server. This way, I don't have to be afraid of losing data from the computer's hard drive," says Hana Špačková, a leading radiology assistant who works at the hospital's Radiodiagnostic Clinic of the 1st Medical Faculty of Charles University. "I also like the ease of accessing my files via my smartphone or tablet or from any computer connected to the Internet."



NATIONAL AUDIOVISUAL ARCHIVE HUNGARY

The archive collects and describes Hungary's rich press and audiovisual collections. Their identification is a very burdensome process. The artificial intelligence embedded in Azure Cognitive Services has proved to be the only technological tool that helps precisely classify millions of objects documenting more than 140 years of recent national history.

Since 2006, the National Audiovisual Archive (NAA) digitally records and catalogues television and radio programmes produced in Hungary. At the same time, it is involved in the archiving of more than 140 years of the work of Hungarian news agencies, public radio and television. It has a statutory obligation to make its collections available for research and educational purposes.

The NAA library has collected 20 million press materials printed since 1881 and 350 thousand audiovisual files, including 16 mm and 35 mm films, as well as video tapes.

Recently, NAA has launched the "NAA social platform" service, which allows users to create their own collections by downloading and sharing non-copyrighted audiovisual material. NAA provides secure, long-term and free storage of the collection, and with the consent of the copyright holder, the available material can be reused and shared on other social networking platforms.

Helpful technology

Adequate protection of resources of such value for citizens and researchers creates numerous problems. In 2006, the management of the archive established a technol-

ogy research team to automate and digitise the collections. Since then, 10 percent of news items and 30 percent of images have been digitised and described. This is what the 100-person archive crew managed to do.

"Our goal was the full digitisation of 2.5 million objects per year, but since we started, despite the great effort of our employees, we have only managed to achieve 40 percent of this goal. That is why we needed the best technological support for our people we could find," explains Lipót Répászky, the general director of NAA.

People needed a technology that would speed up the very arduous work. The biggest challenge was to precisely identify historical events, specific people, objects and places. Without this, the archives are worthless.

After extensive market penetration, artificial intelligence was used.

"Microsoft Azure Cognitive Services proved to be the only solution under consideration that met our needs in terms of scale, ability to integrate with any other software and user-friendliness, most of them not being IT specialists," describes L. Répászky.

5 times faster

Artificial Intelligence in Microsoft Azure Cognitive Services has been "fed" with the previously digitised collections and then integrated into the analysis of the remaining materials. It is accurate enough to recognise 90 percent of the information that the archive requires.

While the 100-person team learned to identify well-known and commonly recognisable people and places from different historical periods quite quickly, it was more burdensome for objects that were related to people and situations that were less known. This required confronting the knowledge of many people, checking in many sources and running several controls.

"This tool precisely classifies the millions of objects that make up the bank of historical collective memory of our country. And what used to take a human 10 minutes, now takes no more than 2," revels L. Répászky.

Now the work progresses much faster and the results are more reliable. Archiving the collections at the NAA is no longer a frustrating activity for the people employed there.

REGINA MARIA CLINICS ROMANIA

Regina Maria, already a leader in medical services in the Romanian market, wanted to improve customer service and increase internal efficiency. This has been achieved through the digital transformation and applications using artificial intelligence.

Regina Maria Clinics is a leading Romanian provider of private medical services. It employs 5.5 thousand people, has 64 facilities of their own, including three accredited international hospitals, and cooperates with an extensive partner network of almost 300 other institutions. It is constantly developing its medical infrastructure, staff expertise and communication with 200 thousand patients who have fully mobile access to their own accounts, including medical records from the past 10 years, medical consultations and online bookings.

In turn, HR specialists from companies that have purchased online medical services for their employees are provided by Regina Maria Clinics with fully digital access to occupational health records. Managing the flow of information in such a complex and multi-element set has become an increasingly complex challenge.

"Although we were the most digital medical company in Romania," says Georgiana Andrei, the company's Commercial Director, "we wanted to expand our digital capabilities and use the latest technologies to make life easier for patients and to grow our business. The key challenge was also to collect all patients' medical and personal data so that they could get help anywhere in the country."

Digital transformation to the rescue

The Regina Maria network invited local partners of Microsoft – Asseco and Linksoft, who developed a joint implementation of Microsoft Dynamics 365 technology using artificial intelligence for sales and Microsoft Teams to improve internal communication.

Then it was time for the next key technology at Regina Maria. This is the new chatbot Ana, built by local chatbot specialists from Druid.

"We have implemented a new, powerful virtual assistant for managers in Microsoft Teams," describes Georgiana Andrei. "Ana connects to five different internal systems, extracts open tasks for managers and tells them what is in progress or needs approval. We can also ask Ana for details of each task. Ana saves our entire management team about eight hours a day at all levels. Now they can focus on other tasks."

More accurate base, faster registration

New technologies help sales, administrative and clinical staff, as well as patients.

"Dynamics 365 helps to standardise hundreds of individual business processes in sales, marketing and customer cooperation. It has improved feedback management and overall patient service. Our customer database is now 20 percent more

accurate, and complaints are resolved 50 percent faster," explains Cosmin Panaete, Business Processes Director.

Regina Maria also uses Microsoft Teams to improve collaboration between wards and communication between medical teams.

"Not only do we increase the overall pace of contact between us and respond faster to customer feedback, but we also improve the efficiency of our management and resolution of complex medical cases," adds C. Panaete.

The implementation of new technologies using artificial intelligence has improved cooperation and information exchange between doctors, departments and medical teams. It also allowed for more efficient feedback to the patients. This is appreciated by managers at all levels, as they have access to the same information through group chats, online meetings, telephone calls and online conferences.

The waiting time of employees for the decisions of their bosses, who by nature are still busy and therefore previously were difficult to access, has decreased. Now all tasks are performed faster and smoother, teamwork is easier and more productive, and the patient registration process takes 20% less time.

LOTOS GROUP
POLAND

LOTOS Group is of strategic importance for national and European security in the energy sector. All key business processes in the company have long been controlled by high-end IT and OT systems. Cloud solutions supported by artificial intelligence (AI) have now been harnessed to make oil processing more profitable.

LOTOS is a Polish capital group of strategic importance for national and European security in the energy sector. The company produces natural gas and crude oil in Poland, Norway and Lithuania. LOTOS has a network of over 500 petrol stations and supplies nearly 1/3 of the Polish market. It is also the second railway carrier in the country and a leading manufacturer of road asphalt, engine oils and lubricants.

Gdańsk is home to one of the most advanced European refineries, where the raw material is processed mainly into high quality fuels. In this activity, as well as in all other business processes, the company uses advanced IT solutions. The now fashionable terms Industry 4.0 and the Industrial Internet of Things have been already a daily life at LOTOS for more than ten years.

The Competence Centre

In late 2018, LOTOS Group signed a cooperation agreement with Microsoft to prepare the next stages of the company's digital transformation. To this end, a Competence Centre of Artificial Intelligence, Digital Innovation and Advanced Data Analysis has been planned.

"By concluding an agreement with Microsoft, we wanted to implement cloud-based analysis of large data sets that we collect in the company. We have also been and are open to other areas of digitisation, such as robotisation, deeper automation and autonomy, integration of in-

frastructure and data in production management," explains Jarosław Kawula, Vice-President of the Board of LOTOS Group S.A.

From the very beginning, Lotos and Microsoft managers engaged employees of the company for the whole process of designing and for the implementation of mutually agreed innovation. As many as 38 people responded to the announcement. Finally, 12 people were selected, representing the entire cross-section of LOTOS Group's operations and a view of the company's business from very different perspectives.

"Cloud computing brings new cybersecurity challenges. Early involvement of both the IT department and security specialists allow to develop architectural standards consistent with the guidelines of the regulators," explains Tomasz Bystrykowski, Office Director of the Security Operation Center at LOTOS Group.

Knowledge and savings

The Competence Centre has established its first objective with the management of the company: to increase the profitability of oil processing in Gdansk refinery. It constantly processes many types of raw material. The first stage of processing each of them is atmospheric distillation. The result is petrol, kerosene and diesel oil, with the process being set to maximise one of these products, depending on the needs of the refinery. This is controlled by autopilots, which continuously and very dynamically optimise a

very large number of different parameters. The Centre's team decided that it is worth trying to improve their effectiveness by using AI.

"First of all, the team and I created models that reproduced the chemical operation of the processing plant. They promised that the Microsoft Azure platform, which uses artificial intelligence and cloud computing, could improve oil processing efficiency by 1-2 percent. At first glance, this is not much, but on the scale of the whole concern, it would be a significant economic benefit," describes Rafał Rumian, Digital Architect, responsible at Microsoft for cooperation with LOTOS.

The new model started to work in parallel with the autopilot. After the first months it turned out to be more effective. Now the company is analysing how and when to apply this solution on a wider scale. However, thanks to this, LOTOS has taken the first step in the process of digital transformation. It decided to make business use of AI and will take further steps in this direction sooner rather than later.

"Thanks to the establishment of the Competence Centre, we have a real chance to generate significant financial savings, mainly through the use of personnel and tool resources already available in the organisation. The employees dedicated to this pilot programme have gained new competences and first experiences, which will enable us to use the potential of AI to optimise production processes relatively quickly and on a full scale," concludes President Jarosław Kawula.



ARTIFICIAL INTELLIGENCE AND SOCIO-ECONOMIC AND ETHICAL CHALLENGES



1. STATE STRATEGIES FOR AI

The development and use of artificial intelligence are no longer the responsibility of large technology corporations, but also of the public sector in its broadest sense: governments, administrative services and local authorities. Increasingly, together, they are convincing citizens that, while threats should not be underestimated, the AI-based revolution will bring new development opportunities for humanity.

The most recent opportunity to prove this thesis was the coronavirus pandemic. In many countries, governments, in cooperation with businesses, have sought the help of artificial intelligence (AI) in analysing data on the extent of the threat and predicting its development. For example, the UK health service, together with Amazon, Microsoft and Palantir and the London-based Faculty AI company, has developed a tool to map active respirators, occupied and vacant beds in hospitals, the number and geography of infected workers and the length of stay of coronavirus patients in emergency wards.

All the world's leading economies, including the United States, China, France, Japan, the United Kingdom, Canada, Finland, South Korea, Israel and the United Arab Emirates, already have long-term strategies for developing artificial intelligence. In December 2019, at the Kuala Lumpur Summit of Islamic states, their leaders announced the development of new technologies, including artificial intelligence, independent from the West. The EU institutions are working intensively in this area: the Parliament and European Commission.

The Polish government is also working on a document setting out the framework for the policy of developing artificial intelligence. Its first working project has been prepared by an inter-ministerial team of the Ministry of Digital Affairs and the Ministry of Entrepreneurship and Technology. It was subject to preliminary consultation with various circles in the second half of last year. Work is currently underway on the next version of the AI development policy in Poland, which is to take into account the opinions of stakeholders.

The other Visegrad Group countries also declare their intention to use AI to modernise their economies and the public sector, as they see it as an opportunity to accelerate their advancement towards the European and world leaders. The V4 Group even adopted in April 2018 a common position on AI development, but the way to make this ambition a reality is to work together across the whole European Union. More detailed plans of the EU and the Visegrad Group countries will be presented later in the report. Almost every government declaration on AI development announces support for implementation in the public sector, especially in administration, education and health care. This is to be accompanied by systemic regulatory changes and a growing willingness to share public data with the private sector.

For the time being, however, there is a lot of wishful thinking in these formalised government documents on AI development, as well as in more general declarations of a political nature. Ambitious plans are often followed by rather symbolic financial inputs, so it is not easy to assess real mobilisation in individual countries.

An interesting attempt in this regard was made by Oxford Insights and the International Development Research Centre (IDRC), which developed the "Government Artificial Intelligence Readiness. Index" for 2019¹. It assesses 194 countries and regions of the world in terms of their preparation for the use of artificial intelligence in public service delivery. The overall score is made up of 11 indicators grouped into four areas: governance, infrastructure and data, qualifications and education, government and public services. Singapore came first, followed by the United Kingdom, Germany, the United States, Finland, Sweden, Canada, France, Denmark and Japan. China's 20th place on this list is surprising, but as the authors emphasise, this is rather the result of lack of data. Poland is number 27. In our region, Estonia is ranked highest (23rd place), followed by the Czech Republic (32), Latvia (33), Lithuania (37), Slovakia (45), and Hungary (48). As can be expected, the top positions of the ranking are dominated by countries with strong economies, good governance and innovative private sectors. However, this dependence is not automatic, as exemplified by the 6th position of small Finland. >>>



The Carnegie Endowment for International Peace, in a report published in September 2019, estimates that the governments of all countries in the world invested USD 152 billion in artificial intelligence development by the end of 2019.

1.1. Artificial intelligence in politics

The use of AI for political purposes was first highlighted in the US presidential elections in 2012. At that time, Barack Obama's staff used AI to identify the needs and affiliations of voters on the internet and, according to experts, this helped him in his re-election. Four years later, AI was even more widely used for profiling communication with voter by Donald Trump's campaign staff².

The most interesting trend is the introduction of AI to the shaping of public policies and decision-making that serve citizens. In New Zealand in 2018 a peculiar politician called Sam emerged³. At www.politiciansam.nz he says about himself that he is "the first virtual politician in the world who wants to close the gap between what voters want and what politicians promise and actually achieve." The Sam chatbot declares to participate in the parliamentary elections later this year (2020) and, to this end, learns to make decisions based on both facts and the opinions of the voters he encourages to talk to him.

In the city of Tama in Japan, a virtual entity created with the participation of an AI called Michihito Matsuda participated in the 2018 mayoral election and took third place. The organiser of his campaign argued that AI will be a better mayor than a human, because it is not susceptible to corruption and does not make human mistakes.

The 2018 presidential elections in Russia also saw an AI-powered candidate called Alicia who campaigned under the slogan: "The president who knows you best" and won several thousand votes.

Today, these examples should be treated as first attempts, more spectacular than those with real social benefits. But in the near future, the involvement of AI in politics may be an adequate response to the need for decisions of vital importance to citizens' lives to be taken objectively, with full knowledge and different points of view, without discrimination against anyone and in the interest of sustainable development. Artificial intelligence is expected to support societies on this path. It is all the more important to develop ethical principles for the use of AI in politics, as the risk of manipulation and abuse is particularly high in this area.

We also have a Polish example of positive use of AI in political forecasts. Developed by Antoni Sobkowicz and Marek Kozłowski from the Linguistic Engineering Laboratory of the Information Processing Centre – State Research Institute in Warsaw, the model based on machine learning methods proved to be better at predicting the results of the parliamentary elections in Poland in October 2019 than classical polls. The model analysed only the activity of Internet users.

In the near future, the involvement of AI in politics may be an adequate response to the need for decisions of vital importance to citizens' lives to be taken objectively, with full knowledge and different points of view, without discrimination against anyone and in the interest of sustainable development.

¹ <https://www.oxfordinsights.com/ai-readiness2019>

² <https://www.trtworld.com/opinion/can-artificial-intelligence-change-the-future-of-politics-28156>

³ <http://www.politiciansam.nz>

1.2. Controversy over biometrics

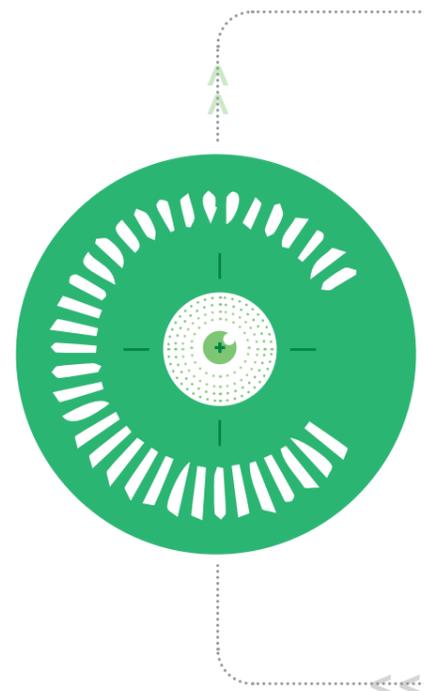
There is increasing pressure in the public sector almost worldwide to use biometric technologies such as iris and fingerprint scanning, face and voice recognition to verify the identity of welfare beneficiaries. This is supported by development aid organisations, private companies and the World Bank. Their experts believe that this is the only way to eliminate the abuses that are quite common in aid systems.

The provision of biometric data is already necessary to receive aid in South Africa, Mexico, Botswana, Gabon, Kenya, Namibia, Pakistan, Paraguay and Peru, among others. The largest biometric database in the world, Aadhaar, was created by India. 98 percent of the country's 1.25 billion inhabitants have already been registered. However, also in these countries, there is a growing concern that biometric data can easily be linked to other systems, not necessarily related to social assistance, such as police or marketing databases.

Resistance is increasing in richer countries on this issue. In July 2019, a parliamentary committee in the UK Parliament called for a moratorium on face recognition by intelligent surveillance systems. In the USA, more and more cities, like San Francisco, Somerville and Oakland, prohibit street surveillance. Bernie Sanders, who is seeking the appointment of Democrats as a candidate for U.S. President in 2020, called for a total ban on the use of the face recognition system by the police. In August last year, Hong Kong residents protesting against changes in the law restricting their freedom destroyed one of the intelligent street lamps that recognize faces.

A separate case in this field is China, which is constantly developing its Social Credit System. It uses biometric data to track all social behaviour of its citizens and then reward or punish them in order to create a "harmonious socialist society". Until now, it was a pilot programme, but since this year it has been extended to all Chinese citizens⁴. It was used, among others, to monitor the isolation of citizens during the coronavirus epidemic.

China is also the largest promoter and exporter of AI-based citizen surveillance technologies. The Carnegie Endowment for International Peace published a report⁵ in September 2019, in which it writes that more and more countries are implementing advanced AI-based surveillance tools to monitor, track and investigate their societies. According to the authors of the report, Chinese technologies are already present in 63 countries and their purchase is often supported by favourable loans granted by PRC government. The exporters of such solutions also include companies from the US (delivered to 32 countries), Japan (to 14), as well as France, Germany and Israel.



Not all purchased technologies are used to control societies. In many countries they have other or parallel tasks, such as searching for missing persons, monitoring traffic congestion or supervising smart energy metering systems.

The same report estimates that by the end of 2019, the governments of all countries in the world invested USD 152 billion in AI development.

At the end of 2019, the Comparitech consulting firm analysed 50 different countries to see what kind of biometric data is collected, used and stored in them⁶. According to this ranking, the citizens of China, Malaysia, Pakistan and the US have the least privacy, with Taiwan, the Philippines, India and Indonesia in fifth place with the same number of points. Biometric data are best protected in Ireland, Portugal, Cyprus, the United Kingdom, Romania and Switzerland.>>>

1.3. Debate on AI regulation

There is a lively discussion around the world about the need to regulate AI. Apart from the admiration for the opportunities created by artificial intelligence today and in the future, there are still strong social concerns about the dangers that may arise from its development. Generally speaking, decision-makers are already aware that the law in this case must, on the one hand, protect people and social life, but should also

not hamper progress in research and applications of new technology. This awareness and the multi-threaded and dynamic development of AI have resulted in very few specific provisions so far. Even in countries that are leaders in AI development and applications, the regulatory process is generally at the guidelines stage. The European Union is most advanced in this work, as will be discussed later in the report.

The World Economic Forum has recently announced its intention to develop recommendations on how to regulate AI⁷ on a global scale, which is very much needed, since without the international community agreeing on common basic standards in this area it will not be possible to address the risks effectively. The WEF is also working on a handbook for public sector policy and procurement officials to help them make better decisions on purchasing AI solutions.

THE MOST FREQUENTLY DISCUSSED AI-RELATED REGULATORY PROBLEMS

- Definition of the subject area, unification of terminology, definition issues, material and personal scope.
- The extent of liability for damage caused by products using AI, e.g. autonomous cars.
- Copyright issues, protection of algorithm authors and the problem of authorship of artificial intelligence products.
- Protection of personal data, rules for their collection, processing and exchange in the context of "feeding" the algorithms used by AI.
- Resolution of disputes between humans and AI creation, such as the responsibility for a contract concluded by a chatbot with the client.
- Communication between objects operating in the internet of things.
- Responsibility for so-called discriminatory algorithms.
- Keeping the law up to date with the dynamics of technological change and the growing range of AI applications.

Source: own work



In the last few years there have been many reports of errors that have been discovered in the algorithms used to help select the desired set of features from a large dataset. Very often the results discriminated against a certain social group, which was attributed to allegedly innate AI defects. As it turned out, the most common cause of the detected errors was algorithmic bias.



One of the key topics related to AI development is the issue of quality and ownership of large databases on which algorithms "learn" intelligent decision-making. In the last few years there have been many reports of errors that have been discovered in the algorithms used to help select the desired set of features from a large dataset. Very often the results discriminated against a certain social group, which was attributed to allegedly innate AI defects. In late 2019, the Department of Financial Services of New York initiated a legal procedure against one of the fin-tech companies when it turned out that their credit cards provided higher credit limits to men than to women. The same was true in many cases of algorithms supporting the recruitment process.

As it turned out, the most common cause of the detected errors was algorithmic bias, which caused one arbitrary group of users to be privileged

over others. However, it was not the algorithms that proved guilty, but the discriminating mechanisms "sewn" into man-made databases, including public ones. Thus, they must first be eliminated from there before they are made available to algorithms with implemented machine learning mechanisms.

Another key legal issue is to determine the authorship of products created by AI-powered software. Currently, the traditional approach is dominant in this matter, indicating as their authors the creators of the algorithms that have resulted in such works. However, there is no shortage of different interpretations. In early January 2020, a court in the Chinese city of Shenzhen decided that an article written by Dreamwriter AI Writing Robot, an application by the Chinese company Tencent, is original due to its articulation and expression and should therefore be considered a copyrighted work⁸.

⁵ <https://carnegieendowment.org/2019/09/17/global-expansion-of-ai-surveillance-pub-79847>

⁶ <https://www.comparitech.com/blog/vpn-privacy/biometric-data-study/>

⁷ <https://www.weforum.org/projects/unlocking-public-sector-artificial-intelligence>

⁸ <https://www.technollama.co.uk/chinese-court-rules-that-ai-article-has-copyright>

2. ARTIFICIAL INTELLIGENCE AND THE LABOUR MARKET

Between 2000-15, 6 million jobs were already lost in the EU countries due to automation and the development of new technologies⁹. In the CEE region, these changes have not been so visible so far, as it has been catching up with the old EU countries. Now that the countries in this area aspire to be leaders in new technologies, they will be subject to the same transformations as the whole developed world and face the same problems as in the West – an ageing population and a lack of hands to work. The answer to these problems can be artificial intelligence and automation.

Economy 4.0 is a great opportunity for the CEE region. It is based on innovation, so it not only stimulates economic growth but also generates new jobs and professions. According to a McKinsey report, the economic benefits of digitisation in Central and Eastern European countries could be enormous: up to €200 billion of additional GDP by 2025. Such economic growth would lead to a significant increase in the region's global competitiveness and prosperity for 100 million people. Even though the digital transition is a great opportunity, it also brings potential risks and many challenges mainly related to the labour market¹⁰.

2.1. Concerns about the impact of AI – labour market erosion and crisis

Due to the development of artificial intelligence and robotisation, many professions will disappear over the next few years and people will be replaced by algorithms and robots – expert opinions and analyses all over the world are quite unanimous on this issue. Robots and algorithms are more efficient, more precise, they are supposed to



make no mistakes, not to get tired and work non-stop. They are not affected by labour laws and, at least for the time being, taxes. As a result, they will perform their tasks faster, better and cheaper than people, while generating lower costs. Automation may soon take jobs away from one in five, and in highly developed countries even one in three employees¹¹. The first ones to become automated will be cumbersome manual jobs, which may give rise to fears that the people performing them now, with lower levels of digital literacy, will become permanently unemployed.

If the automation and uptake of artificial intelligence in subsequent sectors of the economy is prioritised in the richest countries, the income inequalities already existing in the world will increase. The rich will get even richer, and poorer countries will run out of funds to support the growing number of unemployed. Differences in living standards and the resulting social problems, both between countries and citizens, will also widen.

The world is aware of all these threats, but the real response is too slow. If no international solutions are found to mitigate the social and economic consequences of the rapid development of AI, in particular legislative and educational ones, preventing digital exclusion, according to the most pessimistic scenarios, this may be the second cause of a serious crisis in our civilization, in addition to climate change. Many experts believe that new AI technologies in the labour market should be taxed. The funds thus obtained would have to be channelled towards retraining the workers and, in the more distant future, when robots free most people from the need to work, towards providing them with a guaranteed income¹².

2.2. Hopes for positive impact of AI – new professions and opportunities for the excluded

Another growing group of experts believe that artificial intelligence will not push people out of the labour market. On the contrary, they forecast that more jobs will be created and that there will be more new occupations than the old, disappearing ones. Numerous reports (World Economic Forum, McKinsey, Gartner) indicate that for every hundred jobs that will be displaced by new technologies, nearly 140 new jobs will be created. The reduced jobs will quickly be replaced by new professions that we cannot even imagine today. Researchers of labour market trends indicate that thanks to the development of AI, not only occupations from the STEM category (science, technology, engineering and mathematics), but also those that can be performed remotely will gain popularity in the near future. The number of digital nomads is increasing year by year – because that's what the new freelancers are called. There are also new platforms connecting them with employers. According to McKinsey's estimates, by 2025, such

Artificial intelligence can be a great opportunity for all other social groups who have to work from home, such as parents and carers of children and people with disabilities. The chances of the latter will be compensated for by intelligent solutions, such as gloves that translate sign language into speech.

platforms are to be used around the world by approx. 540 million people. The dynamic development of the phenomenon of remote working during the coronavirus epidemic seems to confirm this prognosis and maybe even expand it.

Artificial intelligence can be a great opportunity for all other social groups who have to work from home, such as parents and carers of children and people with disabilities, and are prevented from entering the traditional labour market due to mobility restrictions. The chances of the latter will be compensated for by intelligent solutions, such as gloves that translate sign language into speech. The Institute of Innovative Economy shows that in Poland only 28% of disabled people are professionally active. Thanks to new technologies, the employment rate of this group may significantly increase. >>>

2.3. Demand for new employee skills

Many areas that we do not intuitively associate with technological development will generate demand for high-class specialists. One group who doesn't have to worry about their jobs are ethicists, who will have to equip AI-based solutions with "artificial conscience", or algorithms that will serve as a basis for making decisions in crisis situations.

Artificial intelligence trainers will also be in demand to control and develop the ability of machines, for example chatbots, to inter-

act with humans. The creation of such new professions is a huge opportunity facing the entire labour market.

However, it is largely up to the employees themselves to be the beneficiaries or victims of change. Professionally active people already have to prepare themselves for it, taking care of developing their competences in new technologies. New motivations and ways of adult education will be needed. The rather lightly treated postulate of lifelong learning will become a paradigm. The overwhelming majority of workers will have to adapt throughout their lives to changes in the labour market, especially to work with new technologies, and permanent employment in one place is rather to be forgotten.

According to the European Commission, already as much as 90% of jobs require at least basic IT knowledge¹³, and with the development of technology, the range of skills required in this area will continue to grow. However, it is worth extending not only the knowledge of new technologies, but also investing in the development of soft competences such as creativity, emotional intelligence, ability to work in a group or the ability to actively learn and share knowledge. They are particularly important because, according to the report "Future of Skills. Employment in 2030"¹⁴, four main skill categories – interpersonal, social, systemic and cognitive – will count in the future.



2.4. AI assistance in personnel recruitment

Technology is increasingly affecting the relationship between employees and employers. Thanks to AI-based solutions, it is already easier for employers to find employees with exactly the competences they are currently looking for. Almost half of the HR departments in the world already use various forms of AI. For example, many companies use advanced algorithms that scan social networking sites in search of the best candidates for work. They may collect information from outside the candidate's CV, assessing, among other things, the candidate's personality, risk-taking and the extent to which he or she shares the company's values¹⁵.

Although more than 60% of companies in Poland still manage their HR processes using Excel files¹⁶, there are also more and more facilities for AI-based employers. One of them is the Antal Robot Employment Agency, from which you can borrow a virtual recruiter. It is much faster and more efficient in searching for employees than a human being.

AI also helps job seekers. The popular portal pracuj.pl allows them to search for a job using the Messenger platform, and a specially constructed chatbot Radzimił not only provides advice, but also learns the user's preferences and suggests interesting offers. Popular classifieds services will soon not only seek designers, programmers or supervisors of robots, but also the robots

themselves. The first specialist employment agency (Weegree) to supply robots to companies has already been established in Opole. Nowadays, these are mostly specialised industrial robots. There are also more and more technologically advanced and friendly humanoids on offer, which can work at reception desks or information booths, act as company interpreters, personal assistants for the visually impaired, aerobics instructors or... bartenders. Robots provided by Weegree are already working at Santander Bank, Institute of Physiology and Pathology of Hearing and PGNiG¹⁷. >>>

2.5. Cobotisation is an opportunity

The 21st century will be the century of artificial intelligence and progressive robotisation. This will change the way we work, but also the role of new technologies in our lives. According to various forecasts, over the next 20-30 years algorithms and intelligent machines will replace more than half of the employees. They will help us with the work that we usually don't do with enthusiasm and for which it is becoming increasingly difficult to find willing employees – unambitious, tedious or dangerous.

However, the belief that robots will initially only replace low-skilled workers in factories and warehouses is not entirely true. Smart vending machines are already increasingly commonplace in reception areas and shops, replacing telephone consultants or drivers. In Tokyo, a fleet of autonomous taxis created by Toyota in cooperation with

⁹ <https://www2.deloitte.com/pl/pl/pages/zarzadzania-procesami-i-strategiczne/articles/EconomicStatement/trendy-europejskiego-rynku-pracy-mlodych.html>

¹⁰ <https://www.mckinsey.com/featured-insights/europe/central-and-eastern-europe-needs-a-new-engine-for-growth>

¹¹ <https://www.controlengineering.pl/sztuczna-inteligencja-zmieni-rynek-pracy/>

¹² https://nauka.uj.edu.pl/aktualnosci/-/journal_content/56_INSTANCE_Sz8leL0jYQen/74541952/142877520

¹³ <https://www.gov.pl/web/cyfrizacja/bez-paniki-raport-ke-w-sprawie-wplywu-sztucznej-inteligencji-na-gospodarke-i-rynek-pracy>

¹⁴ <https://futureskills.pearson.com/research/assets/pdfs/technical-report.pdf>

¹⁵ <https://business.linkedin.com/talent-solutions/blog/future-of-recruiting/2018/9-ways-ai-will-reshape-recruiting-and-how-you-can-prepare>

¹⁶ <https://www.magazynrekruter.pl/wp-content/uploads/2017/10/Rekruter-Wrzesien%CC%81-2.pdf>

¹⁷ <https://wyborcza.pl/7,155068,24516063,roboty-humanoidalne-z-agencji-pracy.html>

Uber will take to the streets this year. Soon, autonomous trucks controlled remotely from the office by the operator will appear on the roads. Sweden is already testing such vehicles, manufactured by Swedish company Einride¹⁸.

Artificial intelligence will also increasingly enter into typically "human" professions, such as police officers, teachers, doctors, judges. The police in Dubai¹⁹ and China²⁰ already employ humanoid robots for patrolling the streets. These countries declare that they can replace up to 30% of all officers in the coming years. Increasingly, doctors are also supported by AI. Specialised algorithms already diagnose certain conditions better than experts, and soon extremely precise robots will be able to carry out complex surgeries without the direct involvement of humans, but only under their supervision. Robots are being introduced in child and elderly care faster than before. At Umberto I hospital in Syracuse, Italy the robot NAO is doing great as an entertainer on the paediatric ward and a nurse's assistant providing drugs to patients.

Artificial Intelligence is unlikely to replace judges entirely, but it is already used in the judiciary. In the US, a special algorithm is used for assessing the probability of recidivism and estimating the length of the sentence, and in Estonia, it decides lower-ranking cases, although of course, the sentence can be appealed to a human court²¹. We will write more about this solution later in the report. Although it seemed unbelievable only a few years ago, robots are even

entering places of worship to replace the clergy. In the Kodaiji temple in Kyoto, Japan, the android Kannon Mindar built to resemble the Buddhist goddess of grace Gyanyin will pass on the Buddha's teachings to the faithful there²².

However, the rapid development of technology does not always go hand in hand with its social acceptance. Even if artificial intelligence is already doing better with important tasks, many people are distrustful of it. Negative customer reactions are the biggest obstacle for the widespread and bold introduction of AI in all areas of life. What is the benefit of saving on employees if the company loses customers? Some of them prefer to talk to a human being rather than a bot, prefer to entrust their health to another human being rather than to a robot, and will probably find it difficult to comply with the verdict given by a virtual judge. Therefore, the most serious trend on the labour market, at least in our cultural circle, is, and will remain for a long time to come, cobotisation, i.e. the broadly understood cooperation between people and robots. Using the strengths of employees, both people and artificial intelligence, is not only socially approved, but can also significantly increase the efficiency of any complex work. This idea is at the heart of the industrial revolution 4.0. Artificial intelligence should work with and for humans, not instead of humans. AI will not replace real people, but it can change their lives and create new value on the labour market – the seeds of an entirely new economy and a new world.

>>>



3. ETHICAL DILEMMAS IN AI DEVELOPMENT

The questions that appear in the discussion about current and future applications of artificial intelligence increasingly resemble ethical dilemmas, which until recently were the domain of only theoretical considerations. In view of the extremely dynamic development of AI, its researchers and creators already need to provide answers and decide how devices and applications should behave in non-obvious situations. In addition, they are under increasing social pressure to make the AI ethical and safe for people.

Let's take a look at the most popular, classic ethical dilemma known as the trolley problem. The basic version of this dilemma is as follows:

One of the train cars is rushing uncontrollably along the tracks. On its way, there are five people tied to the tracks and unable to move. You can save them by moving the switch and directing the train to another track. However, there is a man on the other track, also tied up and immobile.

WHAT CAN YOU DO?

In the second version of this dilemma, you are on a bridge over the tracks with another random person. To save the five immobilised people, you have to push the stranger who is standing next to you off the bridge. The oncoming train will kill that person, but that's the only way to save five others.

What should you do to behave ethically? What to do: let the individual die to save the group? Although in both situations the effect of the action is the same – we save

1
Do nothing.
Five people will die.

2
Change the track.
One person dies.

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five people – different actions are taken to get there: moving the switch or pushing a man off the bridge. In such a thought experiment, most of the people surveyed – regardless of gender, origin or education – decide to use the switch in the first case, while in the latter case are not ready to sacrifice the life of a stranger from the bridge.

Why these discrepancies, when in both situations we have the same dilemma – the sacrifice of the individual for the common good. It turns out that throwing someone off a bridge is morally unacceptable, while simply moving the lever... this is how our moral intuitions work.

Ethics does not fare any better with such dilemmas and adopts different solutions depending on the way we understand morality. Absolutistic concepts do not allow for the sacrifice of one person to save others, and utilitarian concepts agree with such a solution because they consider it morally acceptable to sacrifice one person to save five. They accept the principle that the goal sanctifies the means. >>>

3.1. Today's ethical challenges

These problems today are not just theoretical considerations. A critical point might have come when an autonomous car killed a woman during a test. How should such a vehicle behave when it encounters an obstacle in its path and

has to choose between a car with a driver and a small child or a car with two elderly people? Will automotive companies employ ethicists to resolve these dilemmas, and if so, what criteria and values will they invoke when establishing the rules? Social utility, amount of taxes paid, skin colour? Who will be responsible for an accident of such a car? The manufacturer? The car owner? These are the doubts that have to be faced nowadays, and there will only be more of them.

Artificial intelligence driving a vehicle, managing autonomous weapons or a recruitment program comparing the competences of candidates will propose decisions to us, but it will be us humans who will bear the consequences. What kind of ethics will we instil in it? How can we achieve agreement on the most elementary and fundamental values when, as people, we are so different – we have different world views, different morals, and different religious beliefs also influence our behaviour?

Even today, AI-powered applications make preliminary analyses of creditworthiness and select candidates for work. There are high-profile cases where the algorithm significantly disadvantaged certain social groups, for example, it only chose white men for new jobs, while a banking algorithm assessing the creditworthiness of customers offered loans with unfavourable terms to

Artificial intelligence driving a vehicle, managing autonomous weapons or a recruitment program comparing the competences of candidates will propose decisions to us, but it will be us, humans, who will bear the consequences. What kind of ethics will we instil in it? How can we achieve agreement on the most elementary and fundamental values when, as people, we are so different?

single mothers and black people, as it predicted that they were more at risk of losing their jobs and, as a consequence, having difficulties in paying them off. Certainly, most societies consider such designed applications to be discriminatory and in similar cases expect different decisions from those suggested by the algorithms based on biased statistics.

These fears of losing control over AI development today sparks a widespread demand to prevent the use of solutions that do not allow people to understand the criteria used in them or to reproduce the factors that influenced them. At the same time, many experts retort that we do not necessarily need to understand how this proverbial “black box” works to have a control over it. In their opinion, first of all we need to know how its task has been defined and what the final effect is to be²³.

Soon, if only for reasons of cost optimisation, AI will support decisions in much more complex cases, which may result in an even greater scale of exclusion and discrimination. Such particularly sensitive areas are for example medicine and the judiciary. The use of artificial intelligence in medical diagnostics or for dispute resolution is, thanks to the analysis of huge amounts data, an opportunity to make more accurate diagnoses and more equitable judgments. However, it is understandable that any oversight or misguided hint

will result in consequences for human health and life. It is therefore necessary for AI researchers and developers to be aware of the various risks and to take a responsible approach.

Today, an approach is beginning to dominate public debate around the world that artificial intelligence can provide prosperity and benefit the planet, increase human capabilities, develop their creativity, integrate excluded groups, minimise economic, social, gender and other inequalities. However, AI developers must respect ethical principles, legal regulations, including human rights and democratic values. They must also design systems that enable people to challenge and take control of the decision taken by applications or machines²⁴.

Science fiction films, pop culture, and the media often fuel our thinking about artificial intelligence as a creature that will solve all the world's problems because it will far surpass human mental abilities and ultimately eliminate them – without emotion or malice, as a redundant link. Today, however, there is still no machine/application that understands and recreates human mental abilities, even though it can intelligently solve very complex and specialised problems. Today and in the future, the development of AI is the responsibility of humans and, and so is the need their own safety in this process. >>>

¹⁸ <https://www.sztuczna-inteligencja.org.pl/autonomiczna-ciezarowka-od-pacyfiku-po-atlantyk/>

¹⁹ <https://www.bbc.com/news/technology-40026940>

²⁰ <https://www.globaltimes.cn/content/1160691.shtml>

²¹ <https://www.equivant.com/northpointe-suite/>

²² <https://cyfrowa.rp.pl/technologie/roboty/31997-robot-stal-sie-bostwem-bedzie-nauczal-w-buddyjskiej-swiatyni>

²³ <https://www.gov.uk/government/collections/a-guide-to-using-artificial-intelligence-in-the-public-sector>

²⁴ <https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449>

As part of their Moral Machine project MIT made available an online questionnaire, in which the respondents were to decide how a smart car with broken brakes should proceed and who should die if an accident cannot be avoided. More than 2 million respondents from 200 countries worldwide took part in the experiment. They provided 40 million answers to various event scenarios and laid the foundations for a morality algorithm for the artificial intelligence controlling the car.

3.2. Need for an ethical AI ecosystem

Creating effective codes of ethics for artificial intelligence requires two conditions. First of all, legal regulations of the international community, including the EU, individual countries and internal codes of technology corporations are necessary. Actions to address the potential impact of AI on fundamental rights, in particular as regards privacy, consumer protection and non-discrimination, are key here.

However, no less important is the self-regulation of AI researchers, data scientists, computer scientists and others involved in the emergence of new technologies and the companies, research centres and institutions employing them. Hard regulations may not be enough, and many issues and dilemmas are not yet known at all. All the more reason why legal regulations don't even have a chance to keep up with them. AI developers should therefore consciously cooperate with ethicists, sociologists and other representatives of the world of science who know how to solve moral dilemmas. Together they must anticipate the consequences of the solutions they create. This requires, inter alia, ethical education at every level of science.

Thoughtful regulations, self-regulation of AI researchers and developers, cooperation with experts and scientists, codes of ethics for companies and institutions using artificial intelligence and universal ethical education are the elements of the legal-ethical ecosystem that can ensure humanity's safety when using new technology. >>>

3.3. Ethical regulation attempts so far

The first ethical regulations have already been created around the world to insist on the observance of certain values when planning, developing and using AI systems. One such a document is the "Building Trust in Human Centric Artificial Intelligence"²⁵ prepared by the High-Level Expert Group on Artificial Intelligence (AI HLEG) of the European Commission (8 April 2019).

The aim of the regulation is to safeguard the emerging safe and trustworthy AI in Europe. According to the EC, this is possible by respecting the seven basic principles:

- 1) respecting human agency and oversight
- 2) care for robustness and safety when creating algorithms
- 3) ensuring privacy and data governance
- 4) promoting transparency of AI systems
- 5) taking into account the principles of diversity, non-discrimination and fairness
- 6) strengthening societal and environmental well-being by AI
- 7) accountability for AI.

The guidelines contain detailed methods of assessment and guidance on the practical implementation of each requirement. There is also a pilot programme to which all stakeholders have been invited: companies, public administrations and organisations willing to join the European AI Alliance and the AI Watch.

The EU aims to instil an ethical approach to AI at global level by strengthening cooperation with like-minded partners, including Japan (February 2017, the Ethics Committee of the Japanese Society makes ethical recommendations on ethics with a focus on public engagement), Canada (November 2017, the Government of Canada announces the AI & Society Program to support research on social, economic and philosophical issues) or Singapore (August 2018, the Minister of Communication appoints an Advisory Committee on the ethical aspects of AI and data).

Work on an ethical framework for the AI was also started by the Australian government in 2018. A team consisting of experts, people from the business world, governmental and non-governmental organisations has developed "Australia's Ethics Framework"²⁶ in which it points to eight ethical areas of AI (5 April 2019). These include:

- 1) Human, social and environmental well-being
- 2) Human-centred values
- 3) Fairness
- 4) Privacy and security
- 5) Reliability
- 6) Transparency and clarity
- 7) Competitiveness
- 8) Accountability.

>>>

To a large extent, the ethical demands developed by Australian experts are in line with EC recommendations. This may indicate some kind of consensus on the international scene, at least on the fundamental values that must be respected by an ethical Artificial Intelligence. Among international organisations, the most important achievements in the field of AI ethics were brought by the work of the AIGO Expert Group, which took the form of recommendations to OECD members on the management of AI policies and ethical principles. >>>

3.4. Polish approach to ethical AI

The Polish government announced in 2019 that it would work on a draft policy for the development of artificial intelligence in Poland. Its aim would be to provide Poland with a possibly significant place in the world economy, already shaped by technologies and applications of artificial intelligence. One of the first approaches to such a document drew attention to the issue of human dignity as a superior value. This was a reference to the EU's concept of human-centric approach to ethical artificial intelligence. It emphasised that humanistic values and social principles must be taken into account at all stages of the development of AI systems, from basic concepts, through design, implementation, use and monitoring.

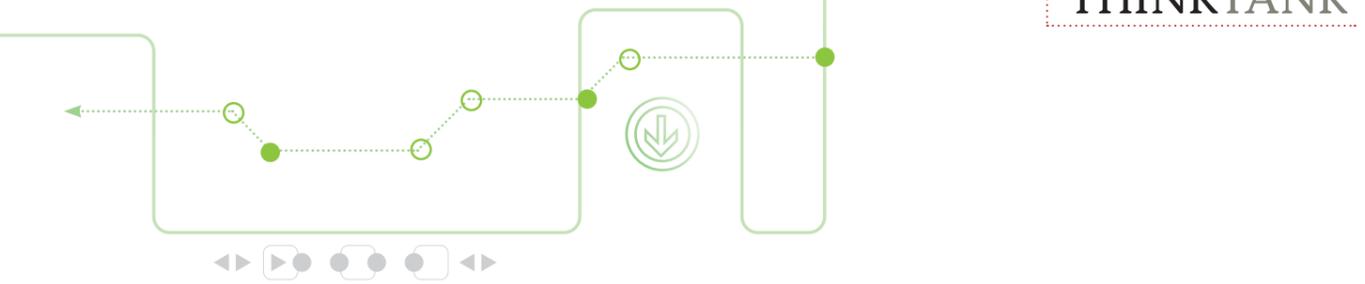
The creators of AI-based solutions must therefore be guided by respect for fundamental rights, including respect

for human dignity, which gives man a unique and inalienable moral status. This also means respecting the principles of environmental protection and other conditions of human life, as well as an absolute requirement for a sustainable approach in the use of natural resources to enable future generations to develop.

On the initiative of Poland, the Visegrad Group countries (V4) in 2018 adopted a common position on artificial intelligence and its potential for development of the EU economy. The document points out that the effects of AI technology development are not only related to industrial development and the emergence of new economic activities, but also have an important legal, social and ethical dimension. Detailed strictly ethical recommendations are not included in the document. >>>

3.5. AI at the service of humans

The implementation of AI ethical recommendations is still at an early stage. However, more and more environments – states, companies and institutions – are aware of the need to take into account moral issues when working on AI. This is due, among other things, to growing social fears that AI may get out of human control and even lead to the extermination of humanity. However, such scenario is being pushed by a small number of AI researchers and developers or lay people who do not understand what artificial intelligence is.



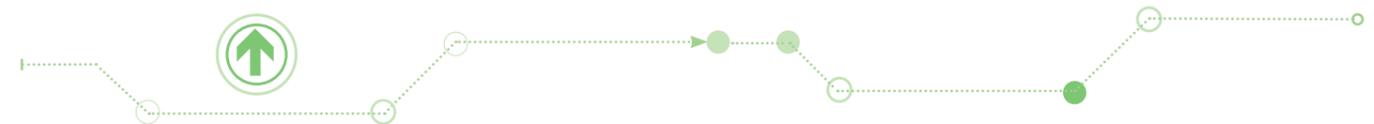
On the other hand, more and more people, even if they do not fully understand the specificity of AI, know that it has a wide range of applications, for example in political campaigns. Societies already know that access to publicly available data, e.g. from Facebook, can influence the course of elections. Therefore, there is a growing awareness of the risks of unauthorised use of personal data. In the EU, this awareness has been influenced, among other things, by the introduction of the General Data Protection Regulation (GDPR). Transparency in data access and processing is one of the key areas for building an ethical AI.

The growing awareness of AI researchers, developers and users makes it more and more common to move away from the technical aspect of AI deliberations and increasingly emphasise the relationship between humans and AI, stressing that it is a technology that serves us and not the other way around. Only such an approach gives a chance that the AI will support us in solving current and future problems of our world, such as those related to the climate crisis, depleting natural resources, demographic challenges or growing economic inequalities.

The positive potential of AI in many fields is manifold, from health care to research. However, it is necessary to ensure that the beneficiaries of AI are not only confined to narrow business groups and richest countries. The age of AI should be able to reduce inequalities, not exacerbate them. This will only be possible if AI developers, the companies using it, the governments and the international community are guided by an agreed ethical framework for AI.

²⁵ <https://ec.europa.eu/digital-single-market/en/news/communication-building-trust-human-centric-artificial-intelligence>

²⁶ https://consult.industry.gov.au/strategic-policy/artificial-intelligence-ethics-framework/supporting_documents/



CHAPTER

3

ARTIFICIAL INTELLIGENCE
— REGULATION AND PRACTICE IN EUROPE1. ARTIFICIAL INTELLIGENCE
POLICY IN THE EUROPEAN UNION

Having analysed the initiatives of the EU institutions, the statements of their leaders and the published documents, it is legitimate to conclude that the topic of AI has an appropriate importance and has become one of several key issues in European politics. For the time being, however, EU declarations do not affect Europe's real position in the „new arms race“.

1.1. Europe's place in the global AI development

The report „Who is Winning the AI Race: China, the EU or the United States?“¹ developed by the Center for Data Innovation, compared the level of development of artificial intelligence of these three key players. It shows that the United States is still the leader, China is ranked second, while the European Union is far behind.

The US dominates in four of the six categories of indicators that the report analyses (quality of specialists, research, development and equipment), while China dominates in two (applications and data). European countries have so far not achieved a dominant position in any of these categories. The advantage of the United States is that it has the highest number of AI start-ups and its ecosystems are strongly supported financially by the private sector. Moreover, both traditional solutions and computer systems powering AI systems are developed there. The quality of education is also at a higher level, as evidenced, among others, by scientific publications in the most renowned journals. And finally, the United States has the largest number of recognised AI experts who constitute the elite of this sector.

Interestingly, the report states that the level of specialists and talent pools of EU countries are at the level of the race leader – the United States. The problem is their use in the

private and public sector. The results of the studies are not later implemented due to poor project funding. For all these reasons, the EU is unable to reap the benefits of artificial intelligence.

The authors of the report predict that the situation in the race is likely to change in the coming years, as China is making faster progress on the AI than its western competitors. This, in their opinion, will cause rapid geopolitical changes. >>>

1.2. Ambitions of the European Commission

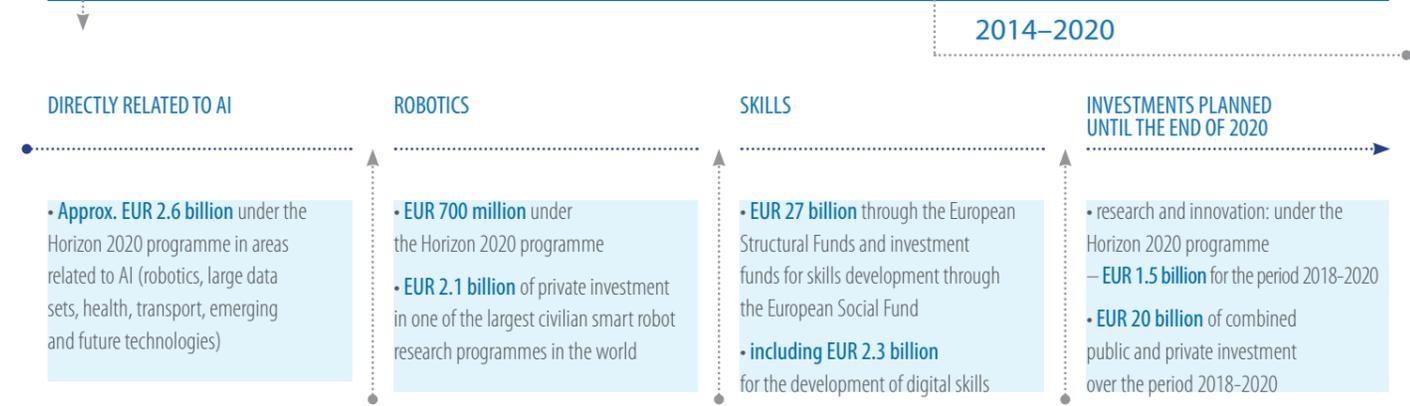
In a speech at the plenary session of the European Parliament, 27 November 2019 Ursula von der Leyen, President of the European Commission, announced that the continuation of the European path in the digital age would become one of several priorities for the Commission she is leading. She also presented 6 specific objectives which she believes will make the EU “a leading power in the digital sector” by 2050:

- 1) mastering and using key technologies: quantum computers, artificial intelligence, blockchain technology and advanced chip technologies
- 2) using our own resources, such as research staff and industrial potential, to compete effectively in these areas on a global scale
- 3) creating forward-looking infrastructure with common standards, including Gigabit Internet networks and secure clouds of current and future generation
- 4) defining secure rules for the processing of data necessary for the development of artificial intelligence, taking into account the protection of the digital identity of EU citizens
- 5) providing a framework for governments and businesses to exchange data and to link and share it securely
- 6) creating rigorous standards and a single European approach to digital security.

>>>

1.3. EU spending to date and budgetary plans for AI development in 2021-27

EU SPENDING ON AI DEVELOPMENT



SAMPLE PROJECTS

AGRICULTURE	DATA AND E-HEALTH	PUBLIC ADMINISTRATION AND SERVICES	TRANSPORT
AI can improve processes and minimise the use of fertilisers, pesticides and irrigation, ensure better food production efficiency and reduce environmental impact	AI can recognise cardiac arrest during emergency calls faster and more often than a medical dispatcher	AI can improve early warning systems to prevent natural disasters or simulate the pace of epidemics to save lives	AI can minimise friction between a train's wheel and the track, while maximising its speed and enabling autonomous movement
Project: Trimbot2020	Project: KConnect	Project: SmokeBot	Project: VI-DAS
The project developed an intelligent gardening robot that can cut hedges, roses and shrubs.	Multilingual text and search services that help people find the most relevant medical information available	Civilian robots to support fire brigades in search and rescue missions, especially in difficult conditions	Automated sensors detect potentially dangerous situations and accidents; the driver is warned, road safety is improved
Input: EUR 5.4 million	Input: EUR 3 million	Input: EUR 3.8 million	Input: EUR 6.2 million

Source: <https://ec.europa.eu/digital-single-market/en/news/factsheet-artificial-intelligence-europe>

Plans beyond 2020

The European Commission recognises that in order to create a solid basis for the development of artificial intelligence in the future after 2020, an increase in investment in AI is needed:

- **EUR 20 billion** per year of total public and private investment
- **EUR 1 billion** per year through Horizon Europe and the Digital Europe programme

Source: <https://ec.europa.eu/digital-single-market/en/news/factsheet-artificial-intelligence-europe>

EC budget proposals for AI in 2012-27

The European Commission proposes to allocate **EUR 9.2 billion** under the „Digital Europe” programme to „the first ever comprehensive programme for the development of digital technologies”, including:

- **EUR 2.7 billion** to finance projects to develop and strengthen supercomputers and data processing in Europe
- **EUR 2.5 billion** to disseminate artificial intelligence across the European economy and society
- **EUR 2 billion** for cyber protection of the digital economy, society and democracy
- **EUR 700 million** for the acquisition of advanced digital skills by current and future employees
- **EUR 1.3 billion** for the digital transformation of public administrations and services of general interest and for access to technology and know-how for businesses, in particular SMEs.

Source: https://ec.europa.eu/commission/presscorner/detail/pl/IP_18_4043

1.4. Policy and investment recommendations for artificial intelligence

On 26 June 2019, the High-Level Expert Group on Artificial Intelligence (AI HLEG) presented „Policy and investment recommendations for trustworthy Artificial Intelligence“²⁸. The Group was established a year earlier by the European Commission to support it in conducting development policies in this area and to prepare draft regulations. It consists of 52 independent experts, representatives of various countries, representatives of the academic community, civil society and business.

Its earlier document, „Ethics Guidelines for Trustworthy AI“²⁹ (April 2019), indicated 7 key requirements that AI systems should meet in order to respect fundamental human values and not cause intentional or unintentional harm. This was an important first step towards a comprehensive European normative framework for AI. It set out basic principles which should ensure that artificial intelligence technologies are human-oriented, trustworthy and compatible with European values. We have presented them in more detail in the earlier part of the report.

In a document of June 2019, experts urge the EU to develop a comprehensive strategy to identify opportunities and challenges for AI in Europe over the next 10 years. Recommendations

on this issue have been developed further in 33 proposals for concrete actions.

The Group emphasises, referring to its previous recommendations of April last year, that while it is very important to develop artificial intelligence based on ethical principles, it is not enough to materialise all the hopes that are associated with the new technology. In their opinion, Europe has a chance to become an AI leader only as a community fully coordinating its efforts. Just as the single market has been an important achievement for Europe in the last few decades, the focus must now be on a single European market for artificial intelligence.

The cornerstone of the EU's future success on the global market must be a wise policy of managing private and public data. The current high standards of privacy and personal data protection must be safeguarded, but at the same time we must have clear rules to make them available to the development needs of artificial intelligence. Legislation needs to be put in place as soon as possible so that companies and research centres interested in AI development can use, process and exchange data. A large European market is a huge asset in this respect.

The document also stresses that the European public sector has an impor-



Experts appreciate that the EU plans to significantly increase investment in artificial intelligence, but much more needs to be done on the public side, and real success can only be achieved with substantial support from the private sector. Another important condition for speeding up AI is to increase digital skills of Europeans and to encourage them in lifelong learning.



tant role in the development of the AI. It should be bolder in ordering innovative AI-based solutions and tools that will optimise public services and set a good example for other sectors.

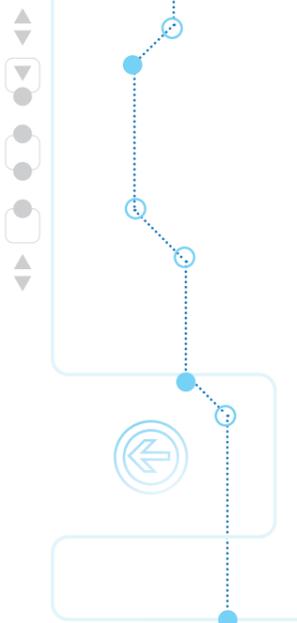
According to the experts, the EU needs to set up a major ambitious programme of European AI research and strive to be a world leader in this field, and the funding for this should be multiplied.

Experts appreciate that the EU plans to increase investment in artificial intelligence in the future budget, but much more needs to be done on the public side, and real success can only be achieved with substantial support from the private sector, they write. Another important condition for speeding up Europe's AI is to increase Europeans' digital skills. Experts point to the urgent need to introduce this subject matter at all levels of education for pupils and students as well as adults.

The document also included a proposal to regulate AI. A comprehensive review of existing EU legislation is needed to assess to what extent it is still appropriate in a world based on artificial intelligence. In general, AI regulations should serve as general guiding principles rather than detailed guidelines. Excessively restrictive regulations can hamper innovation.

„We call on decision-makers to refrain from setting up legal personality for artificial intelligence systems or robots,“ they also write in response to ongoing discussions around the world. They also present their views on another important and topical issue. „Citizens should not be subject to unjustified identification and profiling by biometric methods based on artificial intelligence,“ they add.

This document was the EU's first step towards a comprehensive definition of the conditions under which Europe could gain a competitive advantage over the US and China. >>>



²⁸ <https://ec.europa.eu/digital-single-market/en/news/policy-and-investment-recommendations-trustworthy-artificial-intelligence>

²⁹ <https://ec.europa.eu/futurium/en/ai-alliance-consultation/guidelines#Top>

EUROPEAN AI ALLIANCE

It is the broadest platform for cooperation between all EU actors with an interest in artificial intelligence. In particular, it encourages participation in the European Commission's AI policy-making process³⁰. It is also intended to complement and support the work of the High-Level Expert Group (AI HLEG) in preparing draft guidelines on various aspects of AI. In particular, enterprises, consumer organisations, trade unions, social organisations, scientific institutions were invited to participate in the Alliance.

Discussion of the Alliance and exchange of information takes place on a special online forum. You can present your opinions, ask questions, obtain information about upcoming meetings and events organised or attended by the European Commission, as well as register your own events and publish studies.

In June 2019, 500 members of the AI Alliance also met in a plenary meeting.

CLAIRE

CLAIRE³¹ is another European network of institutions interested in artificial intelligence research and development, which aims to create a pan-European Confederation of Laboratories for Artificial Intelligence Research in Europe. Its initiators have the ambition to create a brand as recognisable as CERN. Currently (January 2020) the network consists of more than 340 research centres from 34 countries with more than 20,000 employees. There were also 3.4 thousand individual declarations of support.

CLAIRE plans to develop trustworthy AI that will increase rather than replace human intelligence and thus benefit all European citizens. The initiators of the network plan to coordinate research on AI in the widest possible range of its applications, including healthcare, manufacturing, transport, research, sustainable agriculture, financial services, public administration and entertainment.

The Network aims to significantly increase AI research funding, cooperate with all key stakeholders and involve citizens, industry and the public sector in its activities.

TIME MACHINE

At the end of last year, the European Commission selected for implementation and funding in the next decade a project of a „large-scale historical simulator”, which would use artificial intelligence to analyse huge amounts of data to reconstruct thousands of years of European history. The author of this original idea called the „Time Vehicle”³² is prof. Frédéric Kaplan from the Swiss Federal Institute of Technology in Lausanne.

The project aims to gather scattered data on the history of Europe – from ancient manuscripts and plans of historical objects to contemporary photos from smartphones and satellites, and then create a consolidated knowledge base on the social, cultural and geographical evolution of Europe, unique in our civilization. This will make it possible, for example, to see what a particular monumental object looked like in different phases of its history.

Already more than 300 organisations from 34 countries participate in the work and their number is constantly growing. These include the national libraries, including the Swiss National Library, state archives, including the State Archive in Krakow, famous museums (including the Louvre), a hundred academic and research institutions, several dozen European com-

panies and government institutions from across the EU.

The „Time Machine” is also a growing network of involved European cities. Venice has been implementing its own similar project since 2012, with plans for Amsterdam, Jerusalem, Paris, Budapest and Nuremberg, among others.

AI4CITIES

Europe's leading climate cities (Copenhagen, Helsinki, Amsterdam, Paris, Tallinn, Stavanger) launched a joint AI4CITIES 3-year project on 1 January 2020. Its aim is to develop breakthrough AI-based solutions to help cities achieve carbon neutrality. This takes place in cooperation with a wider group of partners (e.g. Barcelona, Budapest, Egaleo, Lamia, Istanbul, Milan, Porto, Eurocities network).

The search for solutions for urban transport and urban energy is to be a priority, as these two areas are responsible on average for 24% and 58%, respectively, of greenhouse gas emissions in cities in the EU respectively.

EURAI

The European Association for Artificial Intelligence EurA³³ (formerly ECCAI) is the oldest of the initiatives coordinating cooperation in this field, as it was established as early as July 1982.

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Its aim is to promote research on the development and application of artificial intelligence in Europe. Members are national associations from EU Member States. The Polish representative is the Polish Artificial Intelligence Society (<http://www.pssi.agh.edu.pl>).

The association organises annual conferences and specialised courses of artificial intelligence called Advanced Course on AI (ACAI), awards research grants and rewards important scientific work. It also sponsors master's degrees in AI at nine universities in several European countries.



2. ARTIFICIAL INTELLIGENCE IN EU REGULATIONS

In the European Union, there has been a broad debate on various aspects of AI regulation for several years. The European Commission presented its approach on this issue in February 2020. After the public consultation, concrete legal solutions will be proposed.

2.1. Current state of law in the EU

On 12 February 2019, the European Parliament adopted a resolution on a comprehensive European industrial policy on artificial intelligence and robotics³⁴. It reflects the current approach of EU bodies to regulate various aspects of the development and use of artificial intelligence. The resolution emphasises the need to make up for Europe's lagging behind in AI development in relation to North America and Asia. This requires a coordinated policy at European level. The resolution announces the establishment of an EU-wide coherent legal and ethical framework for the development and use of AI in the near future.

Until separate legislation is developed, the resolution stresses the need to respect existing legislation, which also applies to AI. Above all, it points to the provisions concerning:

- databases which are a condition for the development of AI (Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases³⁵),
- software which is the essence of the AI (Council Directive of 14 May 1991 on the legal protection of computer programs³⁶),

- protection of personal data, which is necessary for the security of citizens (Regulation 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of individuals with regard to the processing of personal data³⁷).

The European Parliament, on the other hand, notes the lack of specific standards on the broader responsibility in artificial intelligence matters. Although civil legislation is currently in force, there is a risk that it will be inadequate and insufficient, given the specific nature of the area.

With regard to autonomous vehicles, the European Parliament notes that some member states have already adopted national legislation on the matter. This may lead to a "patchwork of regulations hindering development in this area" and therefore calls for uniform European rules to avoid "over-regulation in robotics and SI systems".

A whole chapter of the resolution is devoted to the issue of cyber security, an important aspect of artificial intelligence. AI can both support cyberattacks and be a tool to fight them. Parliament recommends that the EU invest in its technological independence and develop its own infrastructure, data centres, cloud systems and other necessary components. The Parliament also stressed in the resolution the important role of so-called "regulatory sandboxes", which, by temporarily exempting them from legal restrictions, enable operators of artificial intelligence to test the safety and effectiveness of their technologies under real conditions.

The main idea of the resolution is that AI must be a "human-centred technology". It must not be used to the detriment of fundamental rights. The European Parliament therefore emphasises the advantage of humans over computer systems and recommends that human responsibility for the technology it has developed be applied as a guiding principle. In this context, the resolution promotes the principle of transparency of algorithmic processes. Every artificial intelligence system must be developed in such a way as to enable human understanding of its actions. >>>

2.2 Future approach of EU bodies to AI regulation

Following this resolution, the European Commission started to work on the implementation of the resulting recommendations. In April 2019, it announced the communication "Building Trust in Human Centric Artificial Intelligence"³⁹. In June 2019, a group of EC-appointed experts (AI HILEG) presented "Policy and investment recommendations for trustworthy Artificial Intelligence." Both documents have been discussed above.

³⁰ <https://ec.europa.eu/digital-single-market/en/european-ai-alliance>

³¹ <https://claire-ai.org/>

³² <https://www.timemachine.eu/>

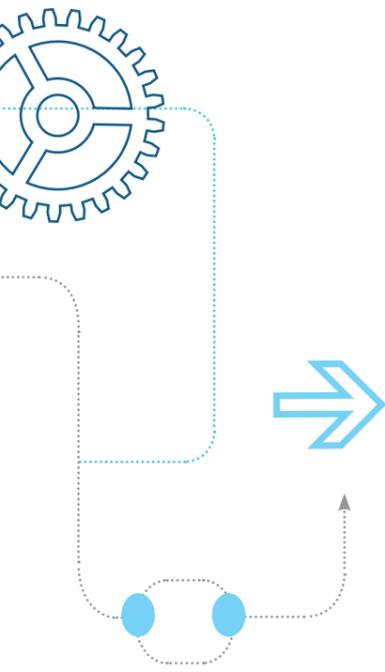
³³ <https://www.eurai.org/organisation/>

³⁴ http://www.europarl.europa.eu/doceo/document/TA-8-2019-0081_PL.html?redirect

³⁵ [http://orka.sejm.gov.pl/Drekywy.nsf/all/31996L0009/\\$File/31996L0009.pdf](http://orka.sejm.gov.pl/Drekywy.nsf/all/31996L0009/$File/31996L0009.pdf)

³⁶ [http://orka.sejm.gov.pl/Drekywy.nsf/all/31991L0250/\\$File/31991L0250.pdf](http://orka.sejm.gov.pl/Drekywy.nsf/all/31991L0250/$File/31991L0250.pdf)

³⁷ <https://www.uodo.gov.pl/pl/131/224>



European leaders realise that AI will soon change the economy, politics and social life on the planet. They therefore seek to create a regulatory framework that would be a barrier to negative scenarios of AI development. The problem is that excessive security may make it difficult for Europe to catch up with its biggest competitors. Hence EU regulatory action will move between the two options.

On 22 January 2020, the European Parliament’s Internal Market Committee adopted a resolution calling on the European Union to accompany the development of artificial intelligence and automated decision-making with strong consumer protection against abuse.

The Council of Europe is also working on a legal framework for AI. This organisation has set up an ad hoc AI Committee to develop regulatory arrangements for the development, design and use of AI, based on Council of Europe’s standards on human rights, democracy and the rule of law.

European leaders realise that artificial intelligence will soon change the economy, politics and social life on the planet. They therefore seek to create a regulatory framework that would be a barrier to negative scenarios of AI development. The problem is that excessive security may make it difficult for Europe to catch up with its biggest competitors. All indications are that EU regulatory action will move between the two options in the coming years. >>>

2.3. European Commission’s White Paper on Artificial Intelligence

After receiving feedback from a number of stakeholders in the public consultation of the above-mentioned documents, the European Commission announced that it would present the future AI regulatory framework in the first 100 days of its mandate. Indeed, a document was published on 19 February 2020. However, despite earlier announcements, the EC has not decided to propose a final normative draft. “White Paper on Artificial Intelligence – a European approach to excellence and trust”² is a collection of ideas and guidelines for future legislative changes, which is aimed at public consultation.

“While AI can help protect citizens’ security and enable them to enjoy their fundamental rights, citizens also worry that AI can have unintended effects or even be used for malicious purposes,” the document states. This is why the European Commission proposes two regulatory levels for artificial intelligence: (1) a mandatory conformity assessment system for „high risk” AI and (2) a voluntary labelling system for all other AI applications.

The Commission considers that stricter requirements should be imposed on AI systems that can have the greatest impact on human health and safety, such as health, energy, public order or transport. Solutions using AI in these areas must be fully transparent, traceable and guarantee human supervision. Supervisory authorities

must be able to test and certify data used by algorithms as it happens with the introduction of cosmetics, cars or toys. For lower-risk applications of artificial intelligence, the Commission envisages a voluntary labelling scheme.

However, some solutions involving AI may be considered as high-risk even when used outside high-risk sectors, such as remote biometric identification or recruitment.

1. the quality and relevance of data used in AI training, including respect for the requirement that they do not lead to unauthorised discriminatory results
2. the accuracy of documentation of data sets and programming techniques used to build, test and validate AI systems
3. transparency, i.e. providing clear information on the possibilities and limitations of an AI system, in particular the purpose for which it is intended, the conditions under which it can function as intended and the level of accuracy expected in achieving a given purpose; moreover, citizens should be clearly informed that they are in contact with an artificial intelligence system and not with humans
4. the robustness and accuracy of the system at all stages of its life cycle, and reproducibility of results and resistance to both overt attacks and more subtle attempts at manipulating data or algorithms
5. human oversight capabilities, including:
 - the approval or rejection of AI recommendations, for example on social welfare benefits
 - overriding AI system’s decisions even in situations where the result of its operation has immediate effect, for example when it automatically grants or rejects credit card applications
 - real-time intervention and deactivation of an AI system when a person finds out that its operation is not safe.

In general, all AI solutions put into operation in the EU would be tested and certified against five criteria:

In the Commission’s view, the above requirements should apply to all economic operators which provide AI-based products or services within the Union, whether or not they are established in the Union.

“Many actors are involved in the lifecycle of an AI system,” says the White Paper. “These include the developer, the deployer (the person who uses an AI-equipped product or service) and potentially others (producer, distributor or importer, service provider, professional or private user).” The EC therefore asks how the duty to prevent risks should be distributed among them. In response, it suggests that “in a future regulatory framework, each obligation should be addressed to the actor(s) who is(are) best placed to address any potential risks.”

Conformity assessment would be part of the permanent market surveillance system, which could include provisions to allow member states’ authorities to monitor compliance and impose ex-post controls. Should an AI system fail to meet the applicable requirements, regulators would have the power to require it to be brought into line with European regulations. For products already subject to EU conformity assessment, such as medical devices, AI systems assessment would be part of this mechanism.

Regardless of the regulation on high-risk AI, the White Paper proposes to introduce a voluntary labelling scheme for all other types of AI. The creators of such systems would be free to decide whether to subject them to European certification. Those who would decide to do so would be awarded a “quality label” confirming that their AI system is trustworthy. Although

such certification would be voluntary, the notified AI system would have to fulfil all the requirements indicated above.

In the earlier stages of the work on future EU AI regulations, the prevailing view was that facial recognition technology should be banned in public places, except for a limited number of reasons, of which the main one is substantial public interest. However, in the White Paper, the Commission invites a broad European debate „on the specific circumstances, if any, which might justify such use.”

At the time of the publication of this report, it was not clear what the final public consultation on the content of the White Paper would be. Discussions on this issue have so far been dominated by the view that it is appropriate to vary the Commission’s approach to regulation according to the risks that AI systems will bring to social and economic life in the EU. Excessive and uniform caution in all potential AI uses would be a barrier to its development in the EU. It is not necessary to certify AI systems used to improve the organisation of storage of goods in warehouses or to improve the spelling in text documents. Moreover, such a restrictive approach would discourage companies from offering AI-based products and services in Europe and would act as a restraint on the process of accelerating the digital transition of the European economy, which is the Commission’s declared objective >>>

“In the earlier stages of the work on future EU AI regulations, the prevailing view was that facial recognition technology should be banned in public places, except for a limited number of reasons, of which the main one is substantial public interest. However, in the White Paper, the Commission invites a broad European debate on this matter.”

³⁸ <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2019:0168:FIN:PL:PDF>

³⁹ https://ec.europa.eu/info/sites/info/files/commission-white-paper-artificial-intelligence-feb2020_pl.pdf

3. ARTIFICIAL INTELLIGENCE IN THE VISEGRAD GROUP

The Visegrad Group countries declare their participation in the race to use artificial intelligence to modernise the economy and public sector. They see the development of AI as their chance to leap up to the economic premier league.

In recent years, Central and Eastern Europe has been trying to make an accelerated transition from a competitive wage economy to knowledge-based growth. This part of Europe is not short of well-educated workers who are familiar with new technologies, and the number of jobs requiring expertise in new technologies is growing here at the fastest pace in Europe. According to calculations made by the Polish Ministry of Digital Affairs, the extensive use of technologies related to artificial intelligence would allow Poland to reach the level of GDP planned for 2035-36 five years earlier. So, the stakes are high.

Today, however, the governments of all countries with developed economies are taking increasingly intensive steps to use AI to accelerate their development. It is difficult to judge for the time being whether the V4 countries have a much better chance in this race. Since in April 2018, they adopted a common position on artificial intelligence, its role and potential for the development of the regional and European economy, no new, concrete initiative has emerged. Rather, the communication itself shows that the V4 Group sees an opportunity to make its ambitions a reality through cooperation across the European Union.

It pointed out the need to create the best possible conditions for the development of AI technologies and enterprises, while taking into account its social, economic and legislative impact. The communication also calls for concrete actions such as the establishment of a European Artificial Intelligence Observatory, the creation of virtual data repositories or the creation of so-called regulatory sandboxes to support R&D in key sectors.

The V4 countries in their position also encouraged the European Commission to allocate more funds from the EU budget for digitisation.

However, the document does not announce any joint ventures within the V4 Group, although such cooperation could increase its chances in the ongoing race. Those who would be in a position to lead the way could create a common policy for digital transition, for example, to allow themselves access to standardised public data sets, invest in cross-border infrastructure projects and advocate at European level so that their interests in the EU are better taken into account.

For the time being, each of the four Visegrad Group countries has its own ambitions and is developing at its own pace the standards and recommendations for domestic institutions to ensure the best possible conditions for the development of new technologies.

3.1. Poland – ambition to play a key role in the global economy due to AI development

There are over a quarter of a million IT specialists in Poland. This means that every fourth coder and admin from Central and Eastern Europe lives in Warsaw, Krakow or Wroclaw (data collected by Stack Overflow). It is a huge capital, all the more so because, according to estimates, the demand for specialists in this area is constantly growing.

In EU reports, Poland is indicated as one of the 3 countries (along with Portugal and France) where the largest number of jobs in the IT sector will be created in the next two years⁴⁰. No wonder that the Polish government sees a huge opportunity in technological development and aspires to enter a relatively narrow group of 20-25 percent of countries that will lead the way in the development and application of artificial intelligence.

Now, governmental planners need to spell out this ambition in the form of a strategy document that will indicate the objectives, tools and means, as well as institutions responsible for developing artificial intelligence. As we have already mentioned, work on it is being carried out and is soon to be completed. Economic and expert circles expect the government's strategy to create real conditions for an ecosystem of cooperation

between the public sector, science and R&D centres and private business, and to coordinate their efforts.

Four areas are considered crucial in discussions on this subject. The first should be a policy of organising and making available large data sets, including public ones, without which the development of AI-based systems cannot be counted on. The second area includes financing and tools to optimise investment expenditure. The third issue is the training of professionals and the strengthening of universal digital education for the whole society. It is about preparing both creative creators and conscious users of new technologies. The fourth area includes regulatory and ethical issues. The proper design of each of these elements of the strategy would make Poland not only a user but also a producer of artificial intelligence solutions in a few years.

Although the government's plans sound ambitious, experts point out that currently Poland is only ranked 25th in the European Innovation Scoreboard and their implementation will not be possible unless the government accelerates the adoption of modern information technologies, including AI, in the areas directly subordinate to it – the power industry, healthcare, administration and treasury companies.

The picture of the Polish AI market is complemented by the Digital Poland Foundation's report „Map of the Polish AI”, prepared at the inspiration of the Ministry of Development. It shows that as many as 2/3 of IT sector companies base their development financing on their own resources, moreover, they face a serious shortage of specialists. And most importantly, most of their products and services are sold abroad, as it is difficult to find buyers for them in Poland.

Both documents therefore show that for Poland to count in the game for the title of AI leader, it must move decisively and as quickly as possible from ambitious plans to their implementation.

3.2. Czech Republic – ambitions, clear strategy and plans to create a superhub for artificial intelligence

The Czech Republic also has a plan to succeed in the most promising future technology – artificial intelligence. The National Strategy for AI was approved by the government in May 2019. Although it is not a legal act, it is integrated with the government's innovation strategy and the „Digital Czech Republic” programme.

The experts believe that the Czech plan is concrete and applicable, setting quantitative objectives for the implementation of AI solutions.

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The strategy is divided into seven chapters and identifies areas where coordinated action for AI development should be taken, such as:

- promotion and financing of R&D activities
- creating public service infrastructures and providing access to data for the development of artificial intelligence
- modernising human capital and the education system to meet AI requirements
- monitoring the impact of AI on labour markets
- improvement of the legislation of the Czech Republic for consumer protection and security of intellectual property
- cybersecurity
- data management
- engaging in international cooperation in the field of artificial intelligence – mainly with the European Union and other regional organisations.

The preparation of the document was preceded by extensive consultations involving representatives of the public, private and academic sectors. The priority themes of the strategy are security and defence, industrial production and human-machine communication.

The importance the Czech government attaches to the development of modern technologies is demonstrated by the fact that the main management role in the area of artificial intelligence is played by the Deputy Prime Minister for Economic Affairs in close cooperation with the Prime Minister. The Czech Republic wants to quickly catch up with such technological giants as the USA or China and become a kind of „superhub for artificial intelligence” on the European map. >>>

3.3. Slovakia – plans to build the country’s economic strength based on artificial intelligence

The document „Digital transition strategy - Slovakia 2030” was published by the Bratislava government in late 2019. It presents plans to transform Slovakia into a country of modern technologies. According to its assumptions, by 2030 Slovakia is to be a country with innovative and green industry, whose economy will be based mainly on knowledge and innovation, including artificial intelligence. Close cooperation between businesses and universities, promoted by the government, is meant to help.

The greatest capital of a country that should be used to achieve these goals is people. Investment in AI and human capital is the way to transform the industrial society into an information society and the most appropriate way to improve citizens’ quality of life.

Also in 2019, the independent Slovak Research Center for Artificial Intelligence (slovak.AI) inaugurated its activities. It is a platform for the exchange of knowledge and experience created by AmCham Slovakia (The American Chamber of Commerce), which brings together students, researchers, entrepreneurs, investors and other people interested in artificial intelligence and the possibilities it promises. The platform invites experts to cooperate and strongly supports the academic community. >>>

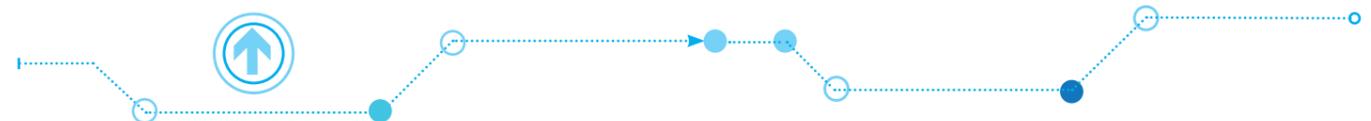
3.4. Hungary – focus on AI education

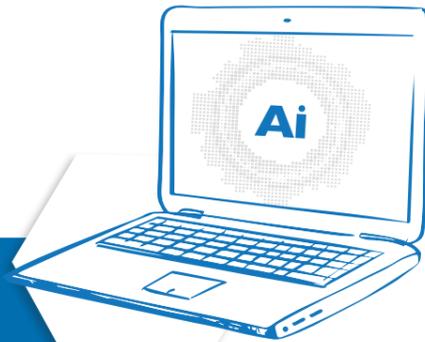
Although Budapest hosted the first European interactive exhibition of AI technology, Hungary is the only country of the Visegrad Group that has not yet presented its governmental strategy in the field of artificial intelligence and digital transformation. At the end of 2019, however, the Coalition for Artificial Intelligence was established, which, with the support of the Ministry of Innovation and Technology, is to develop its foundation. The document will focus on investments in data collection and processing, the use of modern technologies, including artificial intelligence in the economy and support for innovation.

Hungary wants to increase the competitiveness of its AI technologies on the international arena and integrate them into the development of the public sector and the country’s economy. Hungarian experts estimate that in terms of digital infrastructure, the country is one of the best developed in the European Union, but lags behind when it comes to the application of state-of-the-art technologies in everyday business activities.

The government also plans to set up a research centre dedicated to the AI. Kiválósági Központ (AI National Lab) is expected to be operational as early as 2020 and to carry out, among other things, research on the impact of AI on society, which is an original and interesting idea. Another interesting initiative of the Hungarians is the creation of a governmental website that would present successful forms of using artificial intelligence and allow companies to test individual solutions in advance. >>>

“The importance the Czech government attaches to the development of modern technologies is demonstrated by the fact that the main management role in the area of artificial intelligence is played by the Deputy Prime Minister for Economic Affairs in close cooperation with the Prime Minister. The Czech Republic wants to quickly catch up with technological giants and become a kind of „superhub for artificial intelligence” on the European map.





4. ARTIFICIAL INTELLIGENCE IN SELECTED EU MEMBER STATES AND THE UK

4.1. Estonia – innovation in the public sector

Wired magazine called Estonia „the most advanced digital society in the world“. It's not an overrated opinion. The Estonians have even made their experience in digitising public services an export commodity. Many countries copy them and some buy licences for Estonian solutions.

Estonia launched its e-services programme 20 years ago with a coherent concept of what it wants to achieve and how. *“Of course, it becomes more flexible as technology advances, but the key to success is consistency, as well as cooperation between the government and the private sector,”* adds Ott Velsberg, Estonia's 29-year-old Chief Data Inspector⁴¹.

Today 99% of public services have already been made available in a digitised form. You just cannot get married or divorced and register the purchase of property this way. At the end of 2019, there were 23 e-services in the government portfolio, and three quarters of them use artificial intelligence. There's supposed to be 50 this year. The UN has placed Estonia in the elite group of countries with the eGovernment development.

The philosophy of eGovernment is to make life easier for citizens: better quality of service, less bureaucracy and the possibility of direct interaction. Therefore, filing an annual tax return usually takes three to five minutes, setting up a company takes a couple of hours. Now, the government is seeking to ensure that all benefits that the citizens are entitled to by law not need to be applied for. They are to

be paid out or granted automatically: when a child is born, the government will pay the benefit, register on the nursery's waiting list, assign a personal identification number.

The Estonians are boldly implementing e-services in the public sector despite the stumbling blocks that have occurred to them. This was the case in 2014 with the implementation of e-ids and in 2017, when gaps were detected in the e-id system that could easily be exploited by hackers. In addition, when they were liquidated, the system was inaccessible to citizens who wanted to handle their affairs with an e-id. Despite the criticism and doubts that emerged then, the government is implementing further solutions.

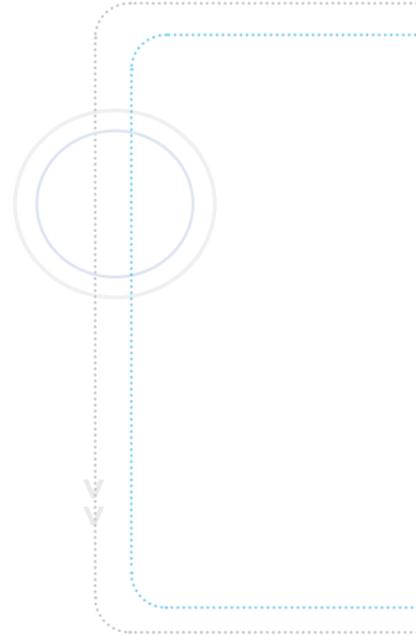
The key to further improvements in eGovernment using AI is to manage public data even better than before.

“We are currently transforming our National Statistical Institute (Statistics Estonia) into the main data management agency,” Ott Velsberg announces⁴². *“It will gather all necessary knowledge and provide support to other ministries and agencies in our country. We more than doubled the amount of data available to the public over the last year.”*

The problem faced by the government in digitising its services is the need to balance the growing demand for easy

access to large databases with respect for citizens' right to privacy. *“We are always trying to do everything possible to make it easier for interested parties to access this data,”* stresses Ott Velsberg.

Estonia is one of the two countries in the world that offer e-residence, a government-affirmed status and identity, providing access to the EU's digital business environment. Barack Obama is one such e-resident, among others.



ESTONIA'S E-ACHIEVEMENTS

- By the end of 2019, more digital signatures were used in Estonia than in the European Union as a whole.
- The integrated Estonian IT system X-Road saves the country over 844 years of traditional work every year.
- 99% of public services are available to citizens as e-services.
- In Estonia you can start a company in just 3 hours.
- Estonia already uses blockchain technology to ensure the security of healthcare data.
- In Estonia, twice as many students study computer science as the average in other OECD countries.
- In the 2019 elections, almost 47% of voters voted online.
- In Estonia, autonomous vehicles can already drive on public roads since 2017.

Source: <https://e-estonia.com/solutions/>

The latest and most ambitious Estonian AI project in the public sector is the „robot-judge“, now under development. More specifically, it is using an AI algorithm to speed up online proceedings for claims below EUR 7,000. The algorithm is supposed to analyse documents, not the statements of the parties. Dissatisfied people can file an appeal against the AI judgment, which will be reviewed by a person. >>>

4.2 France – superpower ambition and real industrial cooperation

After president Emmanuel Macron presented an ambitious plan to turn France into a European centre for the development of artificial intelligence at the Paris Summit in March 2018 „AI for Humanity“, French business has taken more intensive action.

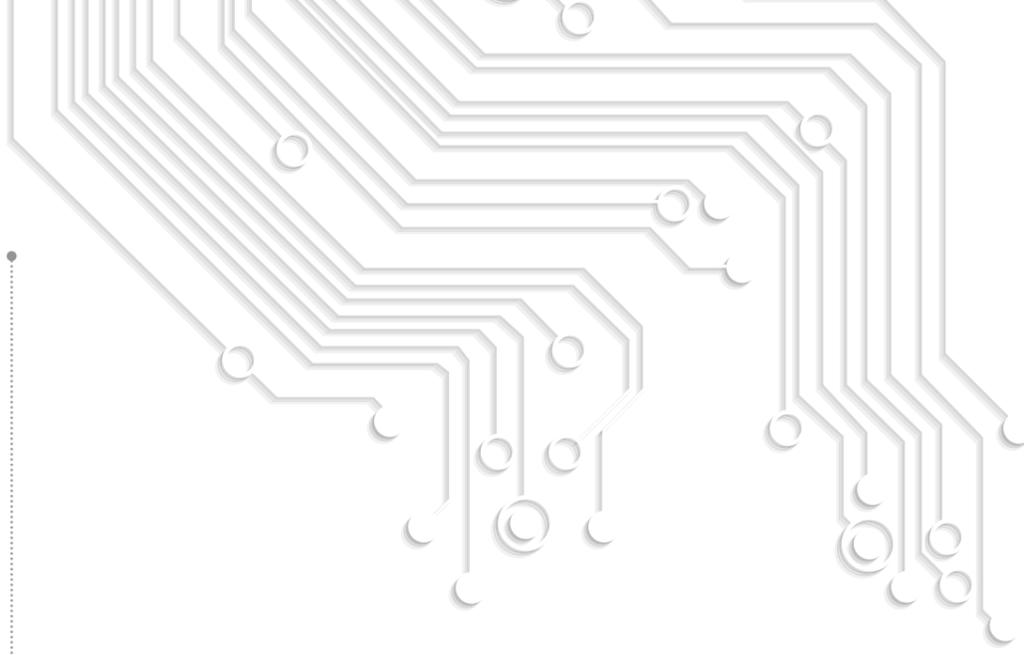
In July 2019, eight large corporations, in agreement with the Ministry of Economy and Finance, called on all French businesses to coordinate their efforts to build a technologically independent national AI capacity. The call was signed by French corporations operating internationally: Air Liquide, Dassault Aviation, EDF, Renault, Safran, Thales, Total and Valeo.

All signatories are in the process of digital transition and are now to help each other to use AI in their industries and international markets. In particular, they consider the use of Big Data crucial to achieve this objective.

The appeal, also addressed to the academic community, pointed out the need to share research and development opportunities and knowledge about AI applications in industry. It also stressed the need to build up a pool of talented staff capable of achieving these goals.

Experts believe that the government's and industry's ambitious plans are yielding first results in France. According to a report⁴³ published on 22nd October 2019 by Roland Berger, a global consultancy firm and France Digitale, an association representing venture capital funds and entrepreneurs, investments in AI start-ups increased significantly in this country last year and they now represent 21% of all start-ups working on the development of artificial intelligence in 2019 in Europe.

The report identified 432 such entities, compared to 312 in 2018 and 180 w 2016 r. Last year, they raised EUR 1.14 billion, while the British had EUR 1.11 billion and the Israeli had EUR 0.81 billion. French entities are primarily active in sectors such as large dataset analysis, retail, healthcare and customer service.



The European ranking of start-ups focused on AI development is headed by the United Kingdom (529 companies and 27% of the total number of European start-ups), followed by France, Germany (182 companies and 9%), then Spain (92 companies and 5%), and the Netherlands with 70 companies and 3% market share.

As can be seen, France and the UK are strong leaders in this ranking. Add to this the high level of French R&D spending (2.9% of GDP) and France is becoming one of the main European AI players, with business there willing to cooperate with the public sector on this issue. >>>

4.3. Germany – AI as a trademark, resistance to progress in industry

The German government adopted the National Artificial Intelligence Strategy on 15th November 2018 and allocated EUR 3 billion to its research and development by 2025. The main goal is to make the German AI a globally recognised brand. Experts consider this plan ambitious, but unrealistic.

The strategy assumes that Germany will become a European and world leader in the use of artificial intelligence technology. Its development is to be carried out in a responsible manner and for the benefit of society, i.e. taking into account ethical, legal and cultural standards.

An important element of the German concept is the R&D cooperation with France, which is to be coordinated by a joint science centre.

The fastest way to implement AI solutions is to employ them in the production of autonomous vehicles. The leading German car manufacturers are among the most advanced in this field in the world. However, outside this sector, companies in Germany seem to have little interest in implementing AI. According to a study by the German Economic Institute in Cologne, only 10 percent of companies in this country use AI, and 70 percent do not plan to adopt it⁴⁴.



The latest and most ambitious Estonian AI project in the public sector is the „robot-judge“, now under development. More specifically, it is using an AI algorithm to speed up online proceedings for claims below EUR 7,000. The algorithm is supposed to analyse documents, not the statements of the parties. Dissatisfied people can file an appeal against the AI judgment, which will be reviewed by a person.



One year after the publication of the strategy, the federal government assessed progress in its implementation. Of the twelve areas identified in the Artificial Intelligence Strategy, the Ministries involved have already initiated around 150 activities, two thirds of which have been launched and the remainder are in the planning phase.

However, many German experts consider the government's actions to date to be inadequate. According to Jan Peters of Darmstadt University of Technology, Germany still has a lot of catching up to do⁴⁵. The expenditure so far has been inefficient. The German Research Centre for Artificial Intelligence has been developing the same themes, such as knowledge-based systems, for 30 years. It would be more appropriate to invest in machine learning, and this area is neglected in the government's strategy paper.

Heiner Pollert, PhD, president of the Patentpool Group and chairman of the German Institute of Inventions, considers the federal government's programme to be ambitious but unrealistic. He calls for the pace of AI development to be accelerated and resources to be regrouped. He compares the measures taken so far to the climate package – „too little, too slowly“. He suggests spending significantly more funds to support AI start-ups, as many of them are fleeing from Germany to other countries, where they have easier and less bureaucratized access to venture capital.

As a reaction to these allegations, in December 2019, German economy minister Peter Altmaier announced in an interview with Tagesspiegel⁴⁶, that Germany would allocate at least EUR 10 billion to support its AI start-ups in the next decade to prevent them from being bought out by US and Israeli companies, as has been the case so far. >>>

4.4. United Kingdom - largest expenditures, penalties for lack of transparency

The British government has been doing much to maintain its top position among the countries leading the race for AI implementation in the economy, public sector and military. At the same time, it seeks to reassure the British people who fear the negative effects of the new technology.

The UK announced its AI development strategy in April 2018, but many of the measures to ensure the country's global leadership in this area have been taken before. The plan assumes that the UK will become the most innovative country in the world, and will achieve this goal, among others, through a significant increase in spending on research and development, widespread development of technical education, improvement of the infrastructure base, cooperation of business with the public sec-

The strategy of the German government assumes that Germany will become a European and world leader in the use of artificial intelligence technology. Its development is to be carried out in a responsible manner and for the benefit of society, i.e. taking into account ethical, legal and cultural standards. An important element of the German concept is the R&D cooperation with France, which is to be coordinated by a joint science centre.



The British government declared that it would spend as much as GBP 630 billion on AI development by 2035. Already now, the level of expenditure for this purpose puts the UK in third place in the world. British society seconds the ambitions of its politicians, but at the same time demands that the government enforce ethical requirements in AI work by public institutions and private business.



tor. It is also envisaged that AI will be involved in public tasks, such as medical diagnosing in hospitals, processing of applications for social assistance or identification of child abuse.

A year earlier, the British government backed its ambitions with a declaration that it would spend as much as GBP 630 billion on AI development by 2035. Already now, the level of expenditure for this purpose puts the UK in third place in the world, after the US and China.

British society seconds the ambitions of its politicians, but at the same time demands that the government enforce ethical requirements in AI work by public institutions and private business.

For this reason, among others, the government has announced that the UK will become the first country where any company using AI to make decisions affecting people's lives must be able to explain the criteria used by the algorithm. The lack of clarity in this case will be punishable by a severe sanction: a financial penalty of 4% of annual turnover.

One of the areas where AI is of concern to the British people is automatic face recognition technology. According to the Ada Lovelace Institute's report⁴⁷ of August 2019, they see its beneficial impact on the level of public safety, but at the same time 60% of respondents fear an increase in public surveillance. Almost 50% of the respondents would like to have the right to give their individual consent to be subject to this technology. Three quarters do not want biometric identification to be used by private companies. The authors of the research report stress that social acceptance of biometrics requires a clear definition of the rules of its use.

As mentioned earlier, in July 2019, a committee of the British Parliament shared most of these concerns and called for a moratorium on face recognition by smart surveillance systems.

THINKTANK, Warszawa, 06.04.2020

⁴⁰ Raport Empirica dla KE, 2018.

⁴¹ <https://sciencemediahub.eu/2019/10/16/a-scientists-opinion-interview-with-ott-velsberg-about-e-governance/>

⁴² <https://fst.net.au/features/interview-ott-velsberg-government-chief-data-officer-government-estonia>

⁴³ https://www.francedigitale.org/wp-content/uploads/2018/10/FranceDigitale_RolandBerger_EUAI.pdf

⁴⁴ <https://www.dw.com/pl/post%C4%99p-z-oporami-tylko-10-procent-firm-w-niemczech-stosuje-sztuczna%C4%85-inteligencj%C4%99/a-51000004>

⁴⁵ https://www.deutschlandfunk.de/kritik-an-strategiepapier-zur-kuenstlichen-intelligenz.676.de.html?dram:article_id=433627

⁴⁶ <https://www.tagesspiegel.de/politik/wirtschaftsministeraltmaier-ueber-tesla-wenn-das-werk-nicht-kommt-waere-es-ein-schaden-fuer-ganz-deutschland/25335790.html>

⁴⁷ https://www.adalovelaceinstitute.org/wp-content/uploads/2019/09/Public-attitudes-to-facial-recognition-technology_v.FINAL_.pdf

SUMMARY

The public sector in its broadest sense: governments, administrative services, local authorities and companies controlled by them are increasingly boldly using artificial intelligence to improve their work, as we have shown in Chapter I of this report. This is a result of both the technological trend and the conscious, long-term AI development strategies adopted by almost all countries of the world. The strongest of them see AI as a great development opportunity and mobilise significant resources for its research and implementation in administration, education and health care. They are also planning systemic changes in legal regulations and create conditions for sharing public data with the private sector.

In general, the potential for using AI in public service is linked to the economic strength of each country, innovation and quality of management in the economy and administration. However, this dependence is not automatic, as exemplified by smaller Finland and Estonia. This shows the way for the Central and Eastern European countries, which also have ambitious plans to use AI to accelerate their advancement to the European top, but so far do not stand out in their implementation.

However, our region has a chance to realise its ambitions through cooperation across the European Union, which has identified the development of artificial intelligence as one of its closest strategic objectives. The current European Commission declares to accelerate investment in AI research and implementation in all possible areas to make up for the gap between Europe and world leaders - the US and China. In the next financial perspective, there will be much more funding for mastering and using key technologies, mobilising researchers, creating forward-looking infrastructures with common standards, defining secure data processing rules necessary for the development of AI, and increasing the digital skills of Europeans.

The EU is also seeking to adopt regulations to ensure that AI development takes place under social control. The lively discussion on this issue over the last few years has led to an agreement that the law must ensure a safe and trustworthy AI, but should not hamper progress in research and applications of new technology. It is in this spirit that the European Commission has already prepared the outline of appropriate legislative solutions.

Today, more and more proponents voice an approach that artificial intelligence can provide prosperity and benefit the planet, increase human capabilities, develop their creativity, integrate excluded groups, minimise economic, social, gender and other inequalities. However, AI developers must respect ethical principles, legal regulations, including human rights and democratic values.

The widespread use of AI to fight coronavirus, including the effective acceleration of drug research and vaccination against COVID-19, may provide an additional argument for public acceptance of the new technology. We also hope that AI will help us to get back to normal more quickly after the pandemic.

THINKTANK

THINKTANK is a Polish analytical centre, established in 2009. It operates as a social enterprise. It runs a club for decision-makers, has its own media and an open network of experts in many fields.

THINKTANK is also a platform for dialogue, exchange of experience, knowledge and good practices for business leaders, politicians, local governments and officials. We analyse and synthetically present trends and recommendations from selected areas of knowledge, gathering them in our Knowledge Base, available for members of THINKTANK Club. These areas are:

- > management
- > leadership
- > impact of new technologies on the economy and the public sphere
- > social communication
- > public policies
- > European Union.

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