ARTIFICIAL INTELLIGENCE (AI)

ITS POTENTIAL AND THE LASTING TRANSFORMATION OF THE GERMAN ECONOMY

A Study by eco – Association of the Internet Industry and Arthur D. Little

MANAGEMENT SUMMARY

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eco
ASSOCIATION OF THE INTERNET INDUSTRY

The complete study can be ordered at go.eco.de/ai-study-2019. As a member of eco, you can find it free-of-charge in the members+ area.

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Foreword

Oliver Süme, Chair of the Board – Board Member for Policy, Law & Regulations, eco – Association of the Internet Industry.

Dear Readers,

I am proud to be able to present to you the results of months of interdisciplinary research and factual analysis with this study on the topic of "Artificial Intelligence (AI) – Its Potential and the Lasting Transformation of the German Economy." As the Association of the Internet Industry, we are convinced that the Internet of the future will be decisively shaped by AI technologies and applications. We believe that AI represents the next step in the evolution of the Internet.

But AI will not only shape and change the Internet industry; it will also influence the entire German economy.

In cooperation with our member company Arthur D. Little, and supported by the Vodafone Institute for Society and Communication, we have succeeded in developing a contribution to the current discussions about the "game changer" that is AI.

Which sectors of the economy in Germany benefit from the use of AI and how? What do these individual leaps forward in innovation mean for companies, for each of the respective sectors, and ultimately for the German economy as a whole?

The fact that the answers to these questions are so clear has surprised us – and we would like to think that such clarity will contribute to a more confident public and political discussion about the use of AI in the future. I hope that this will motivate those user companies who are still diffident about using AI technologies.

One thing is clear after reading these findings:

Germany as a business location can no longer afford to drag its feet in the use of AI in the respective business processes.

To stay competitive internationally, both the Internet and user industries must now move forward with openness and the readiness to experiment with and implement AI in our key economic sectors. This is the only way we will be able to profit from this use of technology as quickly as possible and generate new business models on the basis of our experience.

What the study also shows is that AI will not replace people, either in the short or long term, but will instead support them in their tasks. Therefore, AI is a tool we need to learn to use.

But AI also needs a home. It is therefore equally as important for us as representatives and part of the Internet industry that we maintain an innovative digital ecosystem for AI in Germany. Such an ecosystem is characterized above all by the fact that it provides a smart mix of digital infrastructure offerings, depending on the industry and application scenarios. As well as traditional data center operators, all types of cloud infrastructure providers are included in this ecosystem – with the possibility that edge or fog computing will also be integrated into this mix.

The full potential of all of this can only be exploited once we have established a nationwide fiber optic network in Germany and thus also established the basis for the use of 5G in all regions of Germany.

I am convinced that we still have the chance to make Germany and Europe an important AI location. To this end, all actors – companies, politics, research, and society – must work closely together to tackle the challenges of the digital transformation of Germany as a business location and meet the new technological opportunities with greater courage and optimism.

It will be worth it. This is what this study makes very clear.

I hope you find reading it informative and inspiring!

Leading-Edge Innovation for Germany

Rafael Laguna de la Vera, Founding Director of the German Federal Agency for Leading-Edge Innovations SprinD, Co-Founder and CEO of Open-Xchange AG

"How can you tell artificial intelligence (AI) and machine learning (ML) apart? If it's written in Python, then it's probably ML. If it's written in PowerPoint, it's probably AI."

Mat Velosso, Technical Consultant to the CEO at Microsoft

Hardly any other topic is currently more hyped than AI. And even if some things may seem exaggerated, it is easy to see how this technology and methodology will transform practically all areas of life and markets. Reason enough, then, to go deeper, to understand what is coming and how to deal with it. This trend is reinforced by the general digitalization of all sectors of the economy, with AI being an important sub-topic here. When you look at the big picture, the view becomes clearer:

Microcomputers, the Internet, and smartphones are the outstanding leaps in innovation of the last 50 years. They have changed the world as much as the great innovations did at the end of the 19th century. The most important of those earlier innovations was the car, which still provides us here in Germany with 20 percent of our economic output and 50 percent of our exports. This era is drawing to a close, but the new innovations are not coming from here. So it's high time to position ourselves. What could the European approach look like? Aren't we already way too late and streets behind Silicon Valley and China?

A suggestion

With the Internet, a new, prospering growth industry has emerged, also in Germany and Europe. More than 1,100 international member companies in the eco Association are the best proof of this, even if the centers of digitalization are more likely to be located outside of Europe rather than here. The Internet was and is so successful because it is based on three essential principles: It is open, federated, and permissionless.

- Open protocols and implementations – under open and free licenses – enabled a global collaboration model for software development, operations, and connections, and kept prices low.
- Federated systems created a robust network in which anyone could participate at any time.
- This in turn meant that there was no platform to control everything, no entrance fees, no gatekeeper. The Internet is permissionless; the door is open to everyone.

A prosperous ecosystem developed in which everyone could participate, and spread rapidly. New industries were created and new technological leaps such as the smartphone were actually made feasible. At least in the beginning. In the meantime, a few closed, centralistic platforms have emerged on the Internet; monopolies that are actually the antithesis of the original success.

This is the opportunity for Germany, Europe, and all those who want to participate. The next wave of digitalization, driven in particular by progress in ML and AI, but also by very "banal" things like trustworthy cloud services, should return to the successful principles of the Internet. We should work together again in an open, federated, and permissionless manner. For a long time, this has worked very well in science and research, as well as in the open source software industry, and will dramatically accelerate progress in the development and networking of AI-based systems. In this way we contribute to the preservation of the ethical and humanistic foundations of our society, including our democratic, market-based social system.

This study by eco and Arthur D. Little helps us to recognize the enormous changes that commerce, automotive and mechanical engineering, metal and electrical industries, utilities, manufacturing, and telecommunications are facing – and thus that we all face. Work together. Open your systems, share (the anonymized) data and algorithms. Together we are faster and stronger!

From Using to Shaping

Inger Paus, Managing Director, Vodafone Institute

The Germans are already ahead when it comes to the consumption of artificial intelligence (AI). Be it shopping on the Internet, listening to music via streaming apps, or using card services. But only rarely do these applications come from Europe or Germany.

As far as the design and implementation of AI is concerned, there is still potential for improvement in Germany – to phrase it tentatively. Although many institutions in Germany conduct intensive basic research, it is not uncommon for many talented young people to move abroad, drawn not just by more attractive working conditions, but also by the availability of more capital.

A further obstacle for the German AI market is the lack of acceptance of future-oriented technologies in general. Only 48 percent of Germans are positive about digitalization, as the study "The Tech Divide" by the Vodafone Institute showed in 2018. In comparison: In both India and China, the figure is over 80 percent. And 58 percent of Germans even go as far as assuming that people will be controlled by algorithms in the future.

This attitude can also be found in politics and business. For example, public investment in AI is comparatively modest. A large part of the national economy does not regard AI to be relevant in their own companies.

And yet, it should be in our deepest interest to highlight the economic potential of AI. The aim of this study is to put this into figures that can be easily understood.

AI's expected exponential growth in revenue is a reminder that investments in digital infrastructure should be pushed ahead rapidly. High-performance networks – such as those Vodafone already provides and is expanding – are an important prerequisite for this. Last but not least, the study shows that investments should be of the utmost interest to the telecommunications industry, as here, too, great revenue potential can be expected from AI.

But aside from all the figures, it also becomes clear that AI has the greatest chance of success if it supports or expands human work – and not if it tries to replace it. I am deeply convinced that a coexistence of economic success, technical progress, and social responsibility is also possible in the field of AI.

I wish you a thought-provoking read.

Executive Summary

Lars Riegel, Principal, Arthur D. Little

For the purposes of this study, we have examined the potential of artificial intelligence (AI) for the German economy in 2025. A comprehensive analysis of more than 150 use cases across all relevant industries and all corporate functions shows: If the potential of AI is used comprehensively by companies, a total potential of approximately 488 billion Euros will be created for the German economy in 2025. This would correspond to a 13 percent increase in GDP compared to 2019. Of this amount, approximately 330 billion Euros would be accounted for by cost-saving potential, and approximately 150 billion Euros by revenue potential.

Of greatest significance: (1) We expect cost savings and revenue potential for all industries. (2) We see that AI will affect every function in companies. The biggest impacts are expected to be in the Retail & Consumer Goods and in the Energy, Environment & Chemicals sectors, each with a forecast of just under 100 billion Euros. The greatest potential, at just over 50 percent of the forecast economic impact, lies in supporting manufacturing with AI.

Technologically and economically, there are no obstacles to using AI immediately in companies. Once the relevant data is available, machine learning and deep neural networks can already be used to apply AI applications to support employees and processes in processing image and language information and logical reasoning. By 2025, more than 70 percent of the applications will be used to support humans. AI will not replace employees, but strengthen value creation and competitiveness side-by-side with employees.

Massive investments are being made in AI in the USA and China. The Chinese AI-SaaS company SenseTime alone has a valuation of seven billion Euros and is a leading competence center with excellent prospects for the future. In Germany, we are a long way from this – but we see successful AI companies in attractive niches in the German core industries such as the automotive industry and mechanical engineering. We are optimistic that, in proximity to these sectors, internationally leading German companies will emerge in the medium term.

The most important use cases of AI are:

In Manufacturing:
approx. 11 % higher productivity
- Predictive maintenance
- Automation of quality control
- Optimization of the manufacturing network

In Logistics:
approx. 14 % higher productivity
- Automation of inventory management
- Autonomous warehouse

In Retail:
approx. 23 % higher effectiveness
- Support of sales staff through digital assistants
- Real-time market analysis
- Support for presentation and sales processes

In Marketing:
approx. 15 % higher productivity
- Automation of market analysis
- Knowledge management
- Recommendations for action

Companies in Germany are therefore urged – regardless of size, industry, and competitive position – to start implementing and using AI in their business environment as soon as possible. Companies can orient themselves around four strategic options:

1. AI in Sight: carrying out first pilot projects, developing competencies, and tracking the technology
2. AI Strengthened: strengthening a company's own value creation through process support and automation
3. AI Transformed: enriching and transforming products, services, and value creation with AI
4. AI Player: creating new business models through AI or by marketing the company's own AI solutions

6. The Regulation of AI

The field of AI has changed significantly in recent years and has developed rapidly. The result is a growing focus on the possibility of an increased use of such systems and technologies, the handling of AI, and the impact of AI on the state, society, and the economy. Associated with this focus are questions about the political, legal, and societal regulatory framework for AI.

An aim of the present study is to illustrate how governments and intergovernmental organizations approach the issue of AI. The strategies formulated by the respective governments or organizations serve as the baseline information in this respect. Currently, around 25 countries worldwide have developed strategies for dealing with AI or have published comparable papers. Selected documents and strategies are used to investigate the extent to which the relevant actors are active in four fields of action: Data policy, technology regulation, research funding, as well as application development & application areas.

In the field of **data policy**, we investigate the extent to which the actors want to make existing data usable for use in the area of AI. This also includes the balance between the personal right to privacy and the use of data.

The field of **technology regulation** deals with the question of the extent to which the documents of the actors allow conclusions to be drawn about the general handling of AI and whether they aim for a more restrictive or market-driven handling of AI.

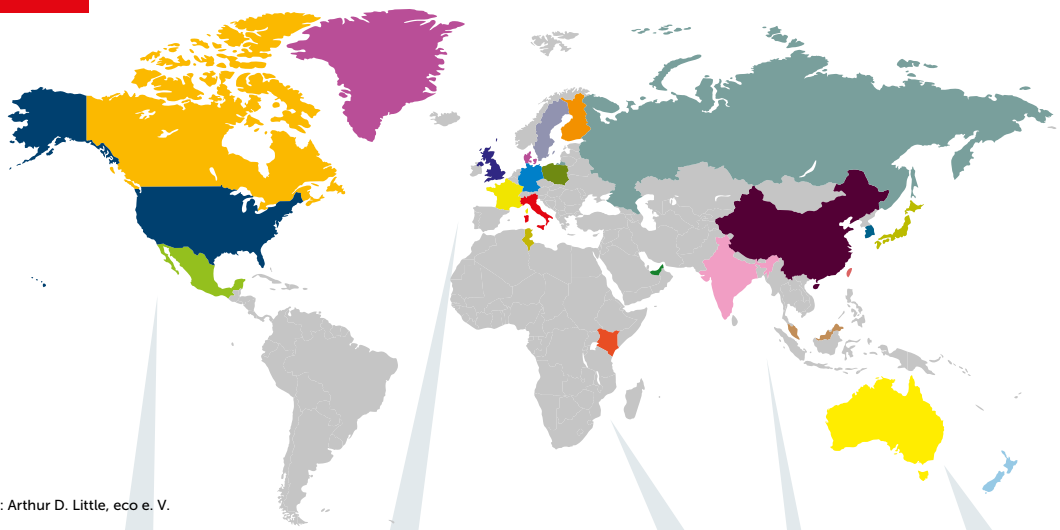
The investigation of the field of **research funding** is intended to explain the extent to which the actors themselves are investing in the development of the fundamentals and application areas of AI and where they are setting research policy priorities for AI.

The examination of the field of **application development & application areas** is intended to determine in more detail in which areas the actors are promoting the design of AI and how they might be dealing with it in regulatory terms.

The baseline information for this investigation includes the AI strategies of the European Union, Germany, and France. Our fundamental findings are compiled and classified on the basis of the four fields of action described above.

In order to better place the observations made here in a global context, reference is also made to the AI strategy of the People's Republic of China. For further reference, corresponding documents from the USA – which has not yet published a coherent AI strategy – have been included in our research.

FIG. 24 **Globally agreed strategies for artificial intelligence**



Source: Arthur D. Little, eco e. V.

North America

- Canada, 2017
- USA
  no coherent national AI strategy adopted to date

South and Central America

- Mexico, 2018

Europe

- Denmark, 2018
- Germany, 2018
- Finland, 2017
- France, 2018
- Italy, 2018
- Sweden, 2018
- Great Britain, 2018
- Russia, 2018
- Poland, 2018
  no final strategy adopted to date

Africa

- Kenia, 2018
- Tunisia, 2018

Asia

- China, 2017
- India, 2018
- Japan, 2017
- Singapore, 2017
- South Korea, 2017
- Taiwan, 2018
- U.A.E., 2017
- Malaysia, 2017

Australia/NZ

- Australia, 2018
- New Zealand, 2018
  no final strategy adopted to date

Alliances/Cooperations and international institutions

- EU, 2018
- G7, 2019
- G20, 2019
- Nordic-Baltic Region, 2018
- OECD, 2019

6.1 The European Union

The European Union (EU) is a unique intergovernmental organization with its own resources (the Commission) and the European Council, which represents the governments of the individual EU Member States. Accordingly, it cannot define its own uniform "European AI strategy" as is done in nation states by the respective governments. Rather, the papers currently published reflect the views of the respective European institutions on the subject. The proposals and recommendations are accordingly evaluated in this context. They are less concrete and provide a more abstract framework within which Member States' national AI strategies should ideally fit. In this sense, the EU does not present a coherent AI strategy, but implements various interrelated policies that constitute a European approach to dealing with AI. For our study, the Commission's communication on "Artificial Intelligence for Europe" (COM (2018) 237) and the "Coordinated Plan on Artificial Intelligence" (COM (2018) 795) were taken as the main resources. The Staff Working Document on liability for emerging digital technologies (SWD (2018) 137) was also used.

Data policy

The EU documents regard the General Data Protection Regulation (GDPR) as the basis for the regulation of AI and the related data policy and accordingly consider that the provisions of the GDPR should apply to these technologies. The right to information granted to citizens by the GDPR are considered to be central. Furthermore, the hope is expressed that the ePrivacy Regulation (ePR) will establish additional regulation in the area of privacy.

The Cybersecurity Act passed at the beginning of 2019 is intended to promote the security of AI systems. In the context of the EU Charter of Fundamental Rights, which explicitly mentions privacy as a protected good, it is also highlighted that the EU would like to continue to deal in detail with the explainability and transparency of AI. The High Level Expert Group on Artificial Intelligence (AI-HLEG) is to develop ethical guidelines that will be used as recommendations for further regulation.

In addition to data protection, European stakeholders also want to develop a policy on data. The primary focus is on publicly accessible data. As a cornerstone for a European data policy, the revision of the PSI Directive is cited: this was completed in June 2019 and concerns the publication of a large part of geo-information data and other data generated by the EU. Interfaces (APIs) based on the "European Interoperability Framework" are also to be made available. The EU would also like to develop guidance and information on how to provide and share data for AI systems for businesses and set up a support center to advise public and private bodies. In the area of data policy, less emphasis is placed on regulation and further restrictions, as very strict rules already apply in the European context with the GDPR and the forthcoming ePVO.

Technology regulation

In addition to the aforementioned ethical guidelines for AI – the development of which were entrusted to the AI-HLEG expert group set up for this purpose, and which are now available – and the EU Charter of Fundamental Rights, the European institutions are also endeavoring to shape the legal framework for AI. The traceability and transparency of AI are cited as decisive factors for this. However, there is no further definition of how exactly this transparency is to be achieved. The AI-HLEG is making further concrete statements in this area. However, these should not initially be seen as an official regulatory approach by the European Commission, the Council, or Parliament. Liability rules for modern technologies, including AI, are also under discussion. The Staff Working Document on this topic (SWD (2018) 137) points out a possible revision of the European Product Liability Directive, the adaptation of which is already being discussed with reference to the Internet of Things.

Another aspect to which the EU would like to devote more attention is the set of socio-economic challenges posed by AI. However, a direct, imminent regulatory approach cannot be discerned in this area. The Commission is focusing on qualifications in handling AI and on the training of AI specialists. This is to take place within the framework of the "New Skills Agenda" for Europe, which canonicalizes and records qualification elements. In addition, possible labor market-relevant effects are to be quantified and evaluated by means of technology assessment.

Research funding

For the EU, research funding is a central element with which Europe would like to set its own course in the field of AI. The European Framework Program for Research and Development, "Horizon 2020," will provide 500 million Euros annually for research into AI. In addition, public-private partnerships (PPPs) within the framework of the program are to interlink the research and implementation of AI technologies and applications. This project is also expected to have a leverage effect, with a cumulative annual research volume of 20 billion Euros by the end of 2020, with support from all Member States. In 2020, the European Investment Fund (EIF), together with the funds from Horizon 2020, is to provide around 100 million Euros for research purposes. Research centers for AI will also be established throughout Europe. The focus of these activities is to support basic research and industrial research. The European Innovation Council is to be involved in this work, as is the European Research Council. In addition, centers of excellence are to promote research.

Application development & application areas

When developing applications in the field of AI, European players place a special focus on small and medium-sized enterprises (SMEs). To this end, the 400 hubs that already exist throughout Europe for the development of AI technology applications are to be expanded and upgraded. In addition, an "AI on Demand" concept is to be launched, which will provide assistance specifically for SMEs in the use of AI. Furthermore, the European players see the possibility of offering test fields and experimental spaces for AI products. The focus is on the health sector, the transport and logistics sector, infrastructure inspection and maintenance, agriculture, and the food industry, as well as on agile development and manufacturing. Private investments are to be promoted with the help of venture capital and other instruments and measures that have not yet been specified in more detail. In addition, the Coordinated Plan on Artificial Intelligence identifies optimization potential in the area of the Single Market and cites this as a key challenge.

FIG. 25 **Well-intertwined – the German & the European AI Strategies**

Source: Arthur D. Little, eco e. V.

6.2 The Federal Republic of Germany

In November 2018, the German federal government adopted an "Artificial Intelligence Strategy." Germany has thus preempted the European Coordinated Plan on Artificial Intelligence, which encourages the development of national AI strategies in the Member States. This national AI strategy summarizes the key activities of the German federal government in the field of AI and places them under a common umbrella. Further developments in Germany arise from parliamentary activities. A study commission is currently working on recommendations for action for AI.

Data policy

In considering the area of data policy from both a regulatory perspective and within the framework of the national AI strategy, reference is made to the GDPR, which can be used as a standardized fundament throughout Europe. In addition, there is a national data protection law in Germany. It should be borne in mind here that the German Data Protection Act contains more concrete requirements, for example in the areas of scoring and lending, than the GDPR. In addition, the German federal government has identified challenges in the application of AI in the field of predictive policing and social media forensics. Here it remains to be seen which activities are developed and to what extent they meet the self-imposed requirements of civil rights and the rule of law.

In addition to regulating data protection, the German federal government would like to improve access to data in particular and thus promote the development of AI. To this end, the German federal government would like to make existing databases accessible and usable, and expand infrastructure for real-time data transmission. The national AI strategy is led by a curated data and computing infrastructure. The German federal government would also like to revise the e-Government Act and restructure it with a view to expanding open data. In addition, the International Data Spaces initiative is referenced as a possible starting point for providing and sharing data.

Technology regulation

In the field of technology regulation, an ethical, human-centered approach is placed in the foreground as a guiding principle for AI. A reference to the debate on the ethical use of AI at European level takes account of the cross-border use of digital technologies. Primarily, the strategy creates the impression that no new cross-sectional regulation of AI is being sought. Rather, the existing regulatory framework is seen to provide a stable basis for the regulation of AI. New laws on a larger scale are therefore not expected for the time being. The restrained regulatory approach of the German federal government is backed up by the plan to create a standardization framework for AI in cooperation with the German Institute for Standardization (DIN).

However, the German government sees a greater need for regulation with regard to the transparency and traceability of AI. The establishment or expansion of public or private bodies is intended to create a control mechanism which can oblige the operators of AI systems to disclose their services and products. These measures are designed in particular to prevent people from being discriminated against through AI. A "Digital Bill of Rights" is also to be developed in line with the legal requirements and ethical guidelines of AI HLEG. This is to deal in particular with the aspects and impact of AI related to the field of work and employment. The strategy emphasizes that a societal and dialogue-oriented approach should be followed. Accordingly, reference is made to legislation already adapted to the German Works Constitution Act (BetrVG) on the inclusion of works councils when using AI in companies.

The strategy also notes that there are already numerous sector-specific regulatory approaches and much preparatory work being done in this area. The human-centered approach is to be tested and monitored with "observatories." In addition, a FinTech Council is advising the German Federal Ministry of Finance on possible regulatory approaches for AI in the financial sector. The Competition Law 4.0 Commission, whose task is to formulate proposals for European competition law, is also expected to deal with issues relating to the use of AI and its impact on competition, and submitted proposals to this end in September 2019.

In the area of employee qualification, the strategy still sees potential for development and cites the Digital Pact for Schools and the German Qualification Opportunities Act, which are intended to create the basis for this.

In addition to the close connection to European regulation, it also states that Germany is striving for close coordination with France in the field of AI. In October 2019, the French and German governments signed an agreement setting out key aspects of a joint approach and common goals in dealing with AI.

Research funding

The AI strategy of the German federal government regards research on AI as constituting a central cornerstone for policy-making. A declared goal of the German federal government is to research and develop AI systems in Germany. The research focus here is on the Internet of Things and Industry 4.0. Not only flagship projects are to be funded. Instead, the path of research funding is to follow a federal approach involving several decentralized competence centers. Nevertheless, a certain amount of pooling of resources is planned – above all through the German Research Center for Artificial Intelligence (DFKI), whose structure is to be further developed as a public-private partnership and promoted by a national research consortium. Young scientists are also to be supported. The institutional framework for AI research is to be strengthened through innovation clusters and the German Federal Agency for Leading-Edge Innovations.

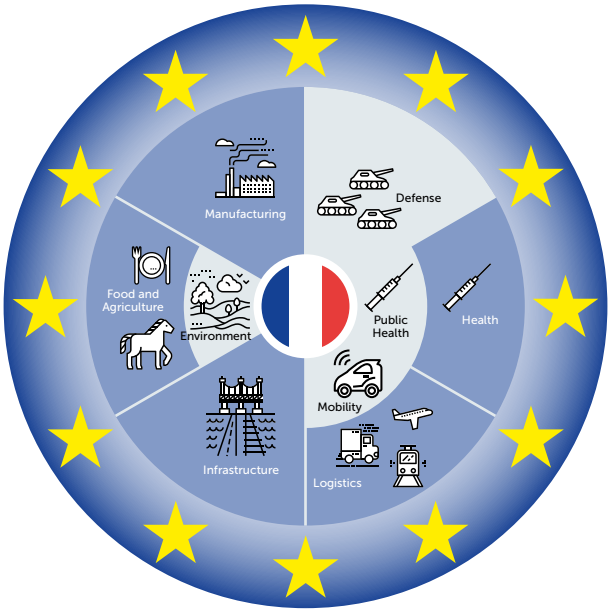
According to the strategy, research will be carried out in particular in the areas of pattern and speech recognition, machine learning, neural networks, and expert systems. But it is also intended that the transparency of AI continue to be tracked. In order to also do justice in the field of research to the human-centered approach anchored in the strategy, research into consumer-centered AI will be included in the equation. So-called legal tech is mentioned as a design field, while privacy management systems in the field of data protection are also alluded to.

In addition to public research, the German federal government also wants to strengthen private sector research in the field of AI. In addition, corporate research funding for the development of AI systems is being sought. Programs such as the Central Innovation Program for SMEs ("Zentrales Innovationsprogramm Mittelstand" - ZIM), SME 4.0, and the Joint Industrial Research program ("Industrielle Gemeinschaftsforschung" – IGF) are also available to support such research. Here, AI research is built into the existing structures.

Application development & application areas

The AI strategy of the German federal government formulates as an abstract objective a European approach for data-driven business models. The intention is to take a new path, one which is based on high-quality and publicly accessible data. The aim is to achieve technical sovereignty in the field of AI. Mobility, in particular, is cited as an important field of application, with corresponding legislation for the Road Traffic Act already in existence since 2017. The security of IT systems and digital services is also highlighted as an issue. In addition, the need for sustainable development and the achievement of the 17 Sustainable Development Goals of the United Nations is stipulated. Research on and the development of space and geo-information applications is to be stepped up considerably. The health sector is also considered to be of central importance. AI systems are to be used in the treatment of patients to improve care and strengthen prevention. In the field of care, more emphasis is to be placed on robotic applications based on AI. The biotech sector should also benefit from AI technologies. Although applications in the areas of Internet of Things and Industry 4.0 are primarily cited in relation to research, they should also be considered in the area of application development.

FIG. 26 **Well-intertwined II – the French & the European AI Strategies**



Source: Arthur D. Little, eco e. V.

In addition, the extent to which regulation is conducive to the use of AI is to be examined on a sector-specific basis.

A strengthening in the area of venture capital is also foreseen. The German state bank Kreditanstalt für Wiederaufbau (KfW) will make around 200 million Euros available for this purpose in 2020.

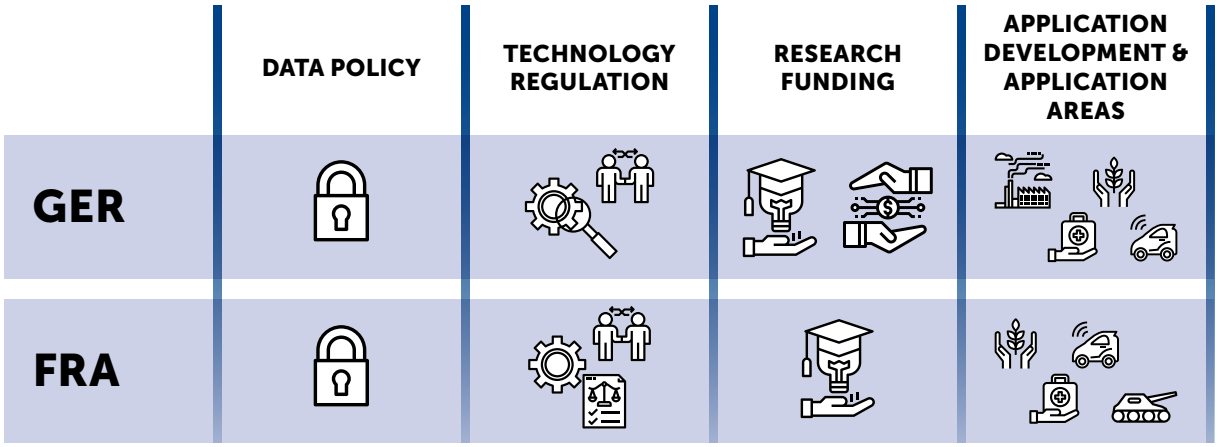
6.3 The French Republic

In spring 2018, French President Emmanuel Macron presented an AI strategy for his term of office. It highlights the importance of AI for French society. The French state sees itself as playing a central role in making AI and its applications a success. The strategy defines the central challenges such as the development of AI ecosystems, the definition of a future-oriented data policy, the implementation of a legal and financial framework conducive to AI, and the answering of ethical questions. In France, an inter-ministerial coordination unit for AI is to be set up in order to enable synergies across society and to benefit from AI development.

Data policy

The French government recognizes that the general regulatory requirements need to be reviewed to enable digital innovation in the future. Numerous projects of the future French data policy, such as the strengthening of open data, are to be regarded in a European context. In order to accelerate the development, implementation, and use of AI-based applications, the government recommends that a European legal framework for the use of data in general and public data in particular be drawn up. The strategy points out that the French administration has a high volume of data. It is therefore necessary to review potential access to publicly collected data at national and EU levels. At the same time, the future policy on data use must strengthen the sovereignty of France and Europe.

FIG. 27 **Key aspects of AI strategies in Germany and France**



Source: Arthur D. Little, eco e. V.

The basic premise should apply that all planned measures should be based on and reflect the high standards of the GDPR.

In order to take advantage of the many possibilities offered by AI, the development of a platform for the exchange of public and private data is envisaged, with the aim of supporting research institutions in particular. Technological development is to be promoted through the harmonized interaction of research and companies interested in cooperation. In this context, reference is also made to the amended PSI Directive.

Technology regulation

In the regulation of technology, the French AI strategy pursues an ethical and human-centered approach. An AI Ethics Commission is to be established to provide expert support for the questions of ethics and AI developments that will arise in the future. The aim of the Commission's work will be to define recommendations, including for a benchmark on ethical issues.

The French government wants to ensure that AI and the underlying algorithms are transparent to the population and are not perceived as a black box that could endanger security. Therefore, the algorithms used in public administration should be underpinned with the highest possible transparency and, if necessary, made publicly available. The setting up of an expert group on AI algorithms is planned. The focus of the expert group's work will be the testing of algorithms and their underlying database. Similar to the impact assessment for the GDPR, the French government plans to carry out impact assessments on the potential for discrimination by AI applications. The results should not only safeguard the country's internal security, but also be used to measure the success of AI developments.

In order for the potential of AI to unfold in the labor market, labor law regulation is to be revised. The quite rigid regulation that has been in place up to now is to be reformed to enable transformation.

Research funding

The French strategy sets out the objective of achieving a visible lead in the development of AI in the coming years in a global comparison. The government therefore plans to invest a total of 1.5 billion Euros in research funding for AI up to 2023. It is intended to expand the establishment and promotion of AI-oriented chairs at French universities and to strengthen these through research projects.

In order for the academic bodies to produce reliable results, the research institutes must be equipped with the necessary IT infrastructure. A task force has recommended the development of a supercomputer that is geared to future AI requirements. The central requirements include storage capacities, computing times, and cloud access options.

It is important for the acceptance and future of France to anchor AI competencies in society as a whole. For this reason, the exchange and teaching of digital skills should be organized in an interdisciplinary manner. In this context, the strategy points to the particular importance of partnerships between research institutes and private partners such as companies. On the basis of the partnerships, AI skills would be imparted to the economy and, in return, previously inaccessible data portfolios would be

developed. It is expected that the use of AI will change the French labor market, and therefore the creation of opportunities to learn digital skills at all stages of life are deemed to be necessary.

Application development & application areas

For the rollout of AI applications, the French government has defined four concrete application areas that will pose major challenges for society as a whole in the coming decades. The central application areas include: Public Health, Environment, Mobility, and Defense.

The use of AI is generally intended to increase sustainability in the above-mentioned areas. In order to precisely define the deployment potential and key challenges of the individual sectors, sector-specific strategies are to be developed. Building on this, the French government is seeking to set up sector-specific platforms. This is intended to pool value-added data from AI applications and to enable new value chains.

The French strategy points out that AI applications can only be developed and used successfully and in a targeted manner if networking between all players in research, education, and industry is strengthened in the future. Only on the basis of good networking can the transfer of knowledge from research results to practical application succeed reliably.

6.4 Placing the strategies in the global context

The AI strategies from France, Germany, and Europe were published over the period of one year and in many places show a close relationship to each other, even if this is not always explicitly formulated. This is due to the time sequence of publication. At the same time, commonalities and also differentiations can be identified, which are explained below. There are also other activities in the field of AI. At present, some 25 states and five intergovernmental institutions have published or are about to publish AI strategies or have produced corresponding documents that can be used instead of an AI strategy. In the public debate, the main actors with regard to the regulation and design of AI systems are usually the People's Republic of China and the USA. Their strategies are drawn on in order to place the German, French and European AI strategies in a global context.

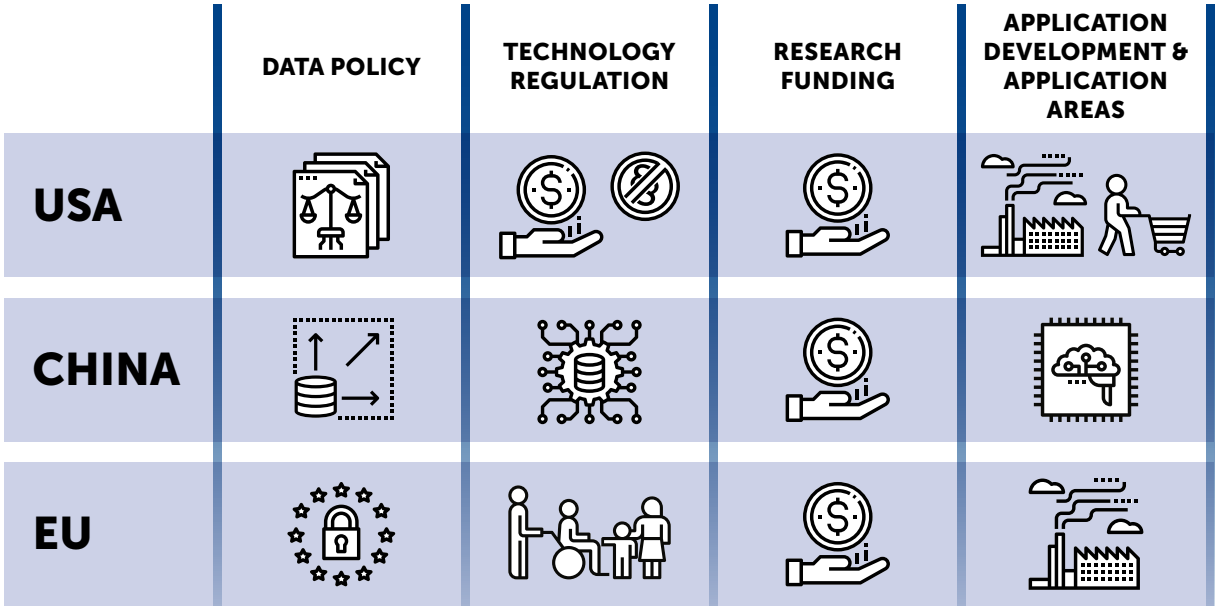
The European approaches to regulating AI should provide a framework for the Member States. The EU wants to promote common goals in Europe through programs and funding. National strategies in Member States such as Germany and France focus on concrete applications and the use of AI in their respective countries. Neither the European nor the German and French AI strategy approaches exhibit any fundamental contradictions or diverging objectives. Rather, they intertwine at many points and complement each other to form a fairly homogeneous European overall picture, albeit one with occasionally different emphases; with the latter being due to the respective regulatory requirements and legal and institutional traditions. It is in this overall context that the further differentiation should be seen.

The strategies from Germany, France, and Europe share approaches either based on the European harmonized legal framework (GDPR, PSI Directive) or built on it, and use this framework as a guideline for their further action. In terms of transparency, Germany, France, and Europe have a fundamental need for cross-sectional regulation of AI.

In this context, the German AI strategy, with its approach for private or public bodies to monitor services and products that work with AI, offers a more concrete concept than that of the European strategy. The French AI strategy holds out the prospect of a publication obligation for algorithms developed by the public sector. In addition, all strategies are characterized by the guiding principle that the need for regulation must primarily be considered on a sector-specific basis. In contrast to the German federal government, the EU is placing greater emphasis on the aspect of liability rules for the use of AI and would like to address this within the framework of an amendment to the European Product Liability Directive.

A similar sector-specific approach to the regulation of AI can be found in the relevant US government documents. However, the USA is primarily relying on deregulation and market-driven approaches to achieve faster dissemination and application of AI. Although China's AI strategy cites industry as the central field of application, it is much more abstract in terms of the application areas. The data protection aspects play a very minor role. Rather, the Chinese strategy explicitly writes about Big Data and the merging of different data. The American documents mention the protection of privacy, but it is not positioned prominently, which may also be due to the legislative powers of the US government in this area. However, in the USA, approaches to protection against discrimination are certainly highlighted and addressed, which, conversely, may be mentioned in Chinese documents as a marginal note, but are not further concretized.

FIG. 28 **Key aspects of AI strategies in the USA, China, and the EU**



Source: Arthur D. Little, eco e. V.

In addition to the legal standards in the area of data protection and access to public data, the strategies of Germany, France, and Europe demand access for AI in the realm of public data. The question of the extent to which this focus could help companies to develop high-quality services that are also based on user data is left open. What is certain is that AI systems based on such data will face regulation in the European legal area. Access to data held by or generated by the public sector is also highlighted in the relevant documents of the People's Republic of China and the USA. The approach taken by the USA is similar to the European and German approach. In contrast, the Chinese approach appears to focus on a large central data infrastructure that is designed as an open source platform for AI. This is intended to provide a basis for various applications and systems that can build on it.

The question of how people will interact with AI in the future, and the extent to which the use of AI can also become relevant to employment – and therefore needs to be regulated – is addressed by the European, German, and French AI strategies. In Germany, the issue is subject to more strict regulation due to the additional inclusion and participation rights of works councils. France is planning to reorganize its labor law under the auspices of AI. The People's Republic of China would like to play a determining role in this area, above all through the qualification and transparency of all those involved. In the US documents, the role of employees and the shaping of the world of work are central aspects.

The European and national AI strategies of Germany and France all focus strongly on AI research and development. The differences in the field of research are mainly due to the fact that the German AI strategy identifies more application areas for research. This can also be observed in the area of application development: Here, the EU is pursuing a rather sectoral and abstract approach, while the AI strategy of the German federal government specifically identifies sectors and application areas that are to be developed. It is particularly noteworthy here that France, contrary to the German and European approach, explicitly states the military development of AI as an objective.

A positive point worth emphasizing is that the German and European AI strategies in particular want to support a more dialogue-oriented approach to standardization and the necessary dialogue with society as a whole. This is important to promote the acceptance of AI in society. The relevant French documents also indicate that the acceptance of AI plays a central role and that open approaches to solutions could be arrived at, for example through a joint platform of industry and science. Only if there is a societal consensus on the use of AI will politics and industry be able to use these technologies in Germany and Europe. The teaching of skills in dealing

with AI, which is also listed in the European strategies, is considered to be a central component for the success of the dialogue with society as a whole.

The opportunities for researching AI technologies are currently favorable. All actors considered here intend to allocate significant budgetary resources to AI research. The research funding projects in the EU, Germany, and the People's Republic of China do not focus exclusively on application-oriented projects – basic research is also to be simultaneously carried out and funded. In Germany and Europe, the focus is on theoretical basic research in particular. In the individual fields of application, this is then further described and, in some cases, restricted on the basis of legal regulation and ethical principles. Chinese basic research, on the other hand, is intended to increasingly work towards the Chinese AI platform, which the State Council has defined as an objective. In its "Summary of the 2018 White House Summit on AI," the USA mentions an explicitly market-driven approach to AI research.

In the area of application development, the Chinese objective seems to be most concretely defined. A clear focus is on industrial and robotic applications based on an open central platform on which the various services can be built. The more market-oriented strategies of the EU as well as Germany, France, and the USA are less precise at this point, although the French government's approach of a common "data platform" for business and science could turn out to be quite concrete. In addition, further approaches can also be found in Germany, France, and the EU, both with regard to the digitalization of administration (e-government) and the support and monitoring of economic developments, for example through the EU's "AI on Demand" platform. The close intertwining of the strategies is also underlined by the German-French AI agreement.

In particular, the handling of data protection could be a key feature of differentiation. Concrete approaches to data protection are currently not found in the Chinese AI strategy. The handling of data will therefore be subject to much fewer restrictions, which could, in particular, facilitate the handling and processing of personal data. Conversely, Germany and Europe, where consumer markets are also paying more attention to the issue, could benefit from data protection rules. Awareness of the importance of avoiding discrimination could be another factor that has a positive impact on AI investment in the European Economic Area. It remains open at this point as to what extent these developments will continue. The "Beijing Principles on AI" were published at the beginning of 2019 in China, which underlines that ethical aspects in the use of AI are also becoming increasingly important there.

6.5 Summary and outlook for AI regulation

In Europe, in the EU Member States, and in international comparison, political actors have recognized the groundbreaking importance of AI for positive societal and economic development. Political considerations and approaches focus on the handling of data, the relationship between people and technology, the responsibility of AI developers and operators, and meaningful promotion and further research into the topic. The strategic importance attached to the AI technology field and the technological competence in this segment is obvious. AI is regarded by all actors as an important economic and location factor.

Europe and the EU Member States are aiming to dissolve the previous bipolarity of an apparent US and Chinese dominance in this field of technology by means of a coordinated European approach and to set their own accents. Europe and the EU Member States have recognized the opportunities and potential of developing algorithms, AI systems, and applications according to high ethical and data protection standards as an original European strategic factor in the international context. However, the strategies apply a lower level of focus on the challenges for existing business models through disruption and AI and the societal dialogue concerning these challenges.

In order to develop the societal and economic potential of AI, a responsible data policy is needed that provides access to a high-quality database and also to public data. The EU, France, and Germany take a rather conservative approach in the economic context and discuss the use of AI against the background of their previous economic and industrial priorities.

Respect for human and civil rights plays a central role, as is usual in liberal democracies. Therefore, transparency, traceability, and trust in a reasonable and appropriate use of AI are of great importance. They are ultimately also decisive for their societal acceptance. This also includes examining and identifying potential effects on the labor market so that unintended impacts can be cushioned at an early stage.

In addition to basic research at universities and research institutions, transfer to industry is also important and must be encouraged. Political actors around the world face the challenge of providing a reliable and appropriate framework for the use of AI. This should be based on innovation-friendly and market-driven regulatory mechanisms and should support and encourage the use and testing of AI in different sectors of the economy.

7. AI in the eco Association: Topic Evaluation and Measures

AI is a key technology for tomorrow's digital markets, and at the same time an important interdisciplinary issue. As the largest association of the Internet industry in Europe, eco aims to promote the acceptance of AI by examining, discussing, and communicating organizational, technical, legal, and ethical issues. In its Guidelines for the Handling of Artificial Intelligence, eco calls for, among other things, AI to become a core competence of German industry.

Under the title Service-Meister, a consortium led by the eco Association is developing a platform that supports service processes with AI. The issue of security must be considered throughout, and there is a great need to use data collectively and establish fair mechanisms for this.

The value creation network around AI-based processes is becoming increasingly extensive and digital infrastructures are an essential part of this consideration. eco pools the competences for this and is a decisive support for industry in the use of digital services with and from the Internet.

7.1 A simple trick is what helps us get started

Harald A. Summa, CEO, eco – Association of the Internet Industry

How important is AI for our economy? A simple question to which there seems to be no easy answer. This may be because, on the one hand, the topic is so complex, so multi-layered, and visionary that not even experts would claim to have understood it. On the other hand, AI is also an issue that easily triggers opinions: Be it the opinion that the problems artificial intelligence is dealing with are only of interest to geeks – or, on the other side, that people will urgently need to search for pursuits that will still be relevant even after the singularity has occurred.

But it may also be quite simply due to the term. "Artificial intelligence": Who can visualize anything in response to this term? And who has the overview and the imagination to envision working in cooperation with artificial intelligence in their own place of work? I suspect that many cannot do this.

What might help us on the way is one simple trick: Let's talk about the objective rather than the tool. Let us simply replace the term "artificial intelligence" with terms with which we are all much more familiar, because they have been drivers of innovation and competition since the beginning of industrialization. Instead of talking about AI, let's talk about improving efficiency, minimizing

down time, and managing supply and value chains more precisely. Let's talk about automation.

So, about exactly those topics that are – thanks to intelligent technical solutions – already on the agenda in every company today, at least those that want to survive in the market tomorrow. How important is AI for the industry? Anyone asking this question must be prepared for many different opinions. But for anyone who asks about the importance for the economy of efficient and smooth operational processes, the unanimous answer will be: "They are indispensable."

Especially given that new data-based business models have been emerging for some time. And in these, the former product – a valve, a measuring device, a car or even the entire factory – is seen as the producer of a new raw material: data. Therein lies yet another new source of money.

Who will run this data-based business in the future? That's not settled yet. There is no guarantee that those who provide the hardware will get their hands on the data. But what is pretty certain is that anyone who does not appreciate the value of this data, or does not know what to do with it, will miss a great opportunity.

And one thing is definitely certain: Anyone who wants to make the most of this opportunity will be unable to avoid the new planning, control, efficiency, process optimization and automation possibilities that run under the term AI. AI is therefore not only already enormously important for our economy today – it's also continuing to get even more important.

7.2 Digital ethics in the AI era

Alexander Rabe, Managing Director, eco – Association of the Internet Industry

Unfortunately, the term "artificial intelligence" is, in public and political discussions, all too often associated with calls for regulations and prohibitions. This may among other things be due to the large number of dystopian science fiction novels and films produced in the last millennium, which certainly were not conducive to a positive connotation of the term. Since then, "THE" artificial intelligence has often been perceived as a danger to humanity and the "singularity" described as a future horror scenario and the next logical evolutionary step. Humanity becomes replaceable – laws are needed to prevent this from happening.

But does this attitude help Europe to position itself in the international competition for the brightest minds in AI development? Does this perspective encourage innovative entrepreneurial spirit for AI start-ups that, as game changers, are turning the international markets upside down? Hardly.

Anyone who wants to try out something new will therefore primarily be drawn to a culture that is more open to this new technology and also promotes it. In the meantime, the USA and China have, in global comparison, positioned themselves at the frontline in terms of AI promotion and are strengthening competition-friendly framework conditions in the field of AI development.

Europe has set out to catch up in the race for the best brains and the most innovative ideas and technologies. Alongside the provision of appropriate funding, in 2018/2019, the EU Member States also had ethical guidelines for dealing with AI formulated by an interdisciplinary committee of experts.

This is a good signal for all those who want to carry out research and found companies in this field in Germany and Europe.

Of course, decisions that can have significant consequences for the community or for individuals must not be left to algorithmic black boxes alone. But where exactly are the limits of such a classification? At what point must laws take effect and penalties be imposed? And at what points do we need other measures instead of rigid guidelines?

When dealing with new AI-based business models and technological approaches, we therefore need – before rigid regulations and laws are enacted – ethical lines of action, responsible users, informed and competent decision-makers in politics and business, and a target scenario for digital transformation.

Digital Germany 2040 and a completed European digital single market are ultimately such target scenarios.

Without these consensus goals, it is all the more difficult to formulate and adhere to ethical guidelines in the field of AI. Due to a lack of basic IT skills in large parts of Europe, however, digital literacy is de facto impossible to achieve. We still have whole cohorts of school and university graduates who complete their training without any basic understanding of IT and go on to become active players in business, science, society, and politics. This is where we have to start in order to enable ethical action in a digitally networked world in times of AI and to keep Germany and Europe competitive as a business location with sustainable digital innovations.

Then AI can also find a home in Germany and Europe.

7.3 AI and cyber security

Prof. Dr. Norbert Pohlmann, Board Member for IT Security, eco – Association of the Internet Industry

In the future, cyber security systems that actively use AI will help to detect significantly better intelligent hackers and their attacks, prevent damage, and minimize risks in the desired digitalization process.

Higher detection rate of attacks

With the help of AI, the detection rate of attacks in the network and in ubiquitous IT end devices (smartphones, laptops, servers, Internet of Things devices, etc.) can be significantly increased. In other words, the detection rates of IT systems that do not use any form of AI cannot be maintained at the same level of security and protection in the long term, when attackers are also using AI methods to attack IT systems.

AI thus has an increasing impact on the cyber security situation, which must be shown by current situation reports.

Support/relief of cyber security experts

A further major challenge for the defenders is the question of which of the very many recognized security-relevant events additionally require human analysts. Not all events can be processed by specialists, because the number of events pushes the processing ability and capacity of human analysts to their limits. Attackers can take advantage of this fact and distract the defenders in a targeted manner in order to penetrate the IT system unnoticed.

AI can help to analyze events in real time and to decide whether human intervention is still necessary. This can also compensate for the lack of cyber security experts. In other application scenarios, where partial autonomy is not technically possible and human involvement is mandatory, the use of AI can significantly support human tasks and activities. This will allow a more targeted use of existing resources and increase the overall level of cyber security. In this context, "situation-specific" means that

classical methods based on signatures are only used in a supporting role and new, behavior-based methods – such as advanced anomaly detection or predictive analysis – are being introduced. The use of AI makes such procedures possible and can bring about significant progress in cyber security.

Improvements to existing cyber security solutions

In addition, identity and access management systems benefit from the automatic evaluation of users' transaction data to ensure that only authorized users are granted access to IT systems and applications. However, the collection, processing, and storage of personal data must be in compliance with the provisions of data protection law (e.g. the General Data Protection Regulation (GDPR)). It should be noted that data protection compliance can represent an asymmetry in attack scenarios between defender and attacker.

Novel passive identification and authentication methods can make a contribution and result in increased resilience and robustness of IT systems. Due to the lack of active user interaction in this form of identification and authentication, for example by evaluating sensor data in smartphones, IT systems can be made more secure very easily. But also in the field of risk-based and adaptive authentication, AI will help to implement appropriate cyber security depending on the situation, thus significantly minimizing the damage. Other approaches in the field of AI and cyber security include the detection of malware, spam, and fake news as well as secure software development, IT forensics, threat intelligence, and many more.

Security and trustworthiness of AI applications

Apart from AI for cyber security, the security and trustworthiness of AI applications play a very important role for future success. Trust is understood as the subjective conviction of the correctness of a statement and of actions. Therefore, an AI system is considered trustworthy by users if it always behaves in the expected way for the intended purpose. This trustworthiness can be established in AI systems if the input data for the AI is of high quality for the specific application and if the IT application and the AI system used have been designed by AI and application experts and have been implemented in a tamper-proof and trustworthy manner. In addition, AI systems must allow results to be tracked and ethical principles to be respected. Trustworthiness will lead to a higher acceptance of AI. Therefore, security and trustworthiness of AI applications are an important area for the future success of AI.

7.4 AI in the new working world

Lucia Falkenberg, Chief People Officer, eco – Association of the Internet Industry

The use of AI in the new world of work is currently causing uncertainty and doubt in many places and raises many questions: Will a machine do my work in the future? Will decisions that are crucial for me, such as those concerning the allocation of work, soon be made by algorithms? And is human work becoming increasingly worthless? As justified as these worries are, fear and ignorance are the worst conceivable advisors, when more than ever the will to create and the striving for continuous development of one's own abilities are in demand.

One thing is certain at present: The world of work will undergo massive changes in the course of digitalization; work will not disappear, but change and lifelong learning will become a basic prerequisite for future professional success. It can be assumed that almost every job will be affected by digitalization and speculation about how many and which jobs will be lost in the future varies.

In fact, the world of work has not only been undergoing change since the Industrial Revolution, but has always been characterized by progress and constant change. Never before, however, has the potential to shape things been as great as in the digital world of work, and rarely before has it been possible – at least in the industrialized nations – to afford to discuss the value of work from an ethical point of view and against the background of economic prosperity. For example, a basic income is currently being considered as a starting point for societal participation, the courage to implement innovative entrepreneurial ideas, and a self-determined life.

Even pessimistic forecasts assume that digitalization will create a large number of new jobs, that completely new job profiles will develop and that digitalization will remain the most important job engine of the German economy. The task now is to create the framework conditions for

as many companies and their employees as possible to benefit from the economic potential of the digital working world and to make use of the existing scope for creativity.

Qualified specialists more important than ever

Digitalization offers great opportunities for a more flexible and efficient working world and will increasingly be able to integrate groups of applicants who previously had poorer conditions on the labor market due to physical limitations, cultural differences, or non-work obligations.

Demographic change alone is already causing a considerable shortage of skilled workers and is fueling the development towards an applicant market in which employers and employees meet at eye level and considerable efforts are made to attract suitable applicants to companies. The use of digital technology and AI is already taken for granted and desired by younger groups of applicants, because it eliminates physically demanding, repetitive, and meaningless activities in favor of creative and communicative tasks.

Thus, the use of AI already enables the analysis of large amounts of data and thus creates the prerequisites for valid decisions based on structured information – but the decision is made by humans.

A good example of this is algorithms that evaluate digital applicant data and ideally provide more unbiased results than the human colleague, unless the person who programmed the algorithm has transferred their own thought patterns. But who ultimately becomes part of the team is not decided by the AI or the increasingly popular recruiting chatbots, but by the future human colleagues.

The fact that this decision-making sovereignty will remain with humankind in the future is – in addition to the demand for maximum transparency – one of the core requirements of a working world determined by ethical standards and a sense of responsibility, in which AI is increasingly becoming the norm.

Efficiency and freedom in the AI-supported working environment

At the same time, digitalization enables people to work independently of time and place, thus creating new scope for a better work-life balance and a life-phase oriented organization of professional development. Algorithms complement and support human work and open up new possibilities for self-determined work, new types of employment models, and diverse career paths. The further development of the corporate culture towards agility, flexibility, and participative models plays a decisive role in this process.

Continuous qualification as a basic requirement

The growing need for new skills such as programming and self-motivated learning ensures that the world of work is becoming more democratic and a new understanding of leadership is being established. Employees and employers jointly accept the challenge of reacting agilely to constantly changing markets. The striving of individuals to develop their own skills throughout life and the necessary continuous training are of immense importance.

Not only companies, but also politics and society are facing major challenges in this area. The requests to political decision-makers to adapt the legal provisions to the conditions of the digital working world, to facilitate the influx of urgently needed skilled workers, and to establish a national further training strategy are finally being heard. Their implementation is still taking too long. Especially the development of digital skills at all levels of the education system is increasingly determining the employability of German employees.

Shared responsibility in the digital working world

The topic of "corporate responsibility" is also becoming increasingly important in this context. In the future, it will encompass much more than the question of the psychological and physical integrity of employees and a cosmetic facet of employer attractiveness. The race for the most talented specialists will be won by those companies that are already looking closely into the question of what strategy and goals the use of AI should serve, what qualification requirements it entails, and how to give their own employees the greatest possible opportunity to participate.

The social partners and especially the trade unions are called upon to take up this challenge together, beyond outdated ideological trench warfare, and together to create the conditions for Germany to sensibly implement opportunities for innovation and to shape the digitalization of the world of work for the benefit of all concerned.

7.5 FAST.FORWARD.FUTURE – designing the Internet of the future with AI

Andreas Weiss, Head of Digital Business Models, eco – Association of the Internet Industry

The field of AI has changed a lot in recent years and has developed rapidly. Dynamic learning systems in particular are currently being used more and more frequently, opening up new areas of application that were previously unknown in this form.

AI-based applications and digital assistants are already part of everyday life for many people and have also found their way into the private sphere. These systems are used in homes, offices, but also in the automotive sector, with the aim of creating smart homes or smart buildings and enabling autonomous driving.

Nearly all future concepts are based on the collection of data and provision of AI functions and services via the Internet. A survey within the eco Association competence areas showed relevant functional areas for the use of AI. The Internet of Things and Industry 4.0 are growing ever closer together thanks to AI-based processes. Retailers, both stationary and online, are also intensively testing the new possibilities, especially with regard to target group-oriented communication. In all areas, risk minimization measures and the issue of security through AI are particularly relevant. In this context, the question also arises of how new value-added processes and business models can be developed with the help of AI.

AI and industry

We are now reaching the phase in which classic business models are being challenged by the digital services available via the Internet. In concrete terms, the eco Association is accompanying this change with the project Service-Meister, which was successful at the AI innovation competition of the German Federal Ministry for Economic Affairs and Energy (BMWi) and is now being implemented from 2020 to 2022 (www.servicemeister.org).

The cross-plant, cross-departmental, and cross-company service platform is tailored specifically to the challenges facing German SMEs. An important sub-goal is to enable less educated professionals to provide complex services with the help of digital guides such as AI-based service bots and smart services. The second sub-goal is a platform for digitalized service knowledge to enable cross-company scalability of services. This should create a service ecosystem that counteracts the shortage of skilled workers in Germany and make German SMEs competitive in the long term.

Specifically, the aim is to digitalize maintenance processes, keep systems available, and market internal service knowledge externally – all this with the use of processes from the AI sector to make innovations easily accessible to SMEs. Service-Meister will create an open AI platform for all maintenance processes. The project relies on tandems of application companies and implementation partners to develop AI functions.

SERVICE MEISTER

The project under the leadership of the eco Association not only provides the industry with a decisive technology component for further digitalization; it also provides answers to the many questions that arise with regard to the opening market for services.

8. Conclusion

The aim of this study was to identify and assess the potential of AI for the German economy up until 2025.

The factual evidence allows just one conclusion to be drawn: AI offers a very high level of potential for the German economy. If AI is used on a nationwide basis, GDP growth of more than 13 percent between 2019 and 2025 is realistic. In addition, it offers the opportunity for established German companies to transfer domain-specific knowledge into the digital world and into AI, because the necessary data is available due to many years of industrial expertise, as well as the wide distribution of German machines, systems, and processes designed here. German companies can package these in AI applications for their own industry, based on their own competencies. This creates a new business model for the digital world.

However, potential is also always associated with risk. If Germany sleeps through the introduction of AI in all areas of the economy, we run the risk of being at a disadvantage compared to international competitors – and this applies not just to the core industries that are internationally important for Germany, such as Mechanical Engineering, Automotive, and Chemicals; but also to industries that affect the everyday life of all German citizens, such as Trade, Energy & Environment, and Transport.

We strongly recommend that companies in Germany act promptly, because the introduction of AI goes far beyond the introduction of a new technology. As our analysis of use cases shows, AI supports people first and foremost, and changes processes and value-added activities in a sustainable way. Strategic change is essential for companies: This ranges from the ten strategic forces of business model, customer interface, management, employees and culture, data and technology to a new system for performance measurement and performance metrics. This change cannot take place within two years in 2025, but requires structural interventions in the cornerstones of companies: People, vision, culture, and processes. This also includes the willingness to use data in a cooperative manner. The more data available, the better and more effective AI procedures will be.

Policy-makers and society are called upon to create suitable framework conditions and prerequisites for the successful introduction of AI. The principles of high level data protection must not be changed. Rather, it requires an active, reflected, and coordinated approach by policymakers to ensure that the AI ecosystem in Germany is specifically promoted and further developed. The state has the opportunity to facilitate academia, innovation, and the taking of entrepreneurial risks in the field of AI.

The aim must be to expand today's ecosystem of academia and large corporations to include innovative start-ups and medium-sized companies and venture capitalists. This is the only way to ensure that innovations are tested and introduced across sectors and that Germany uses the next five years to ensure that in 2025 AI is present in all companies, in all sectors, and in all corporate functions.

About Arthur D. Little

Arthur D. Little has been one of the innovation leaders in strategy consulting since 1886. We are the recognized expert for companies that want to combine strategy, innovation, and transformation in technology-intensive and converging industries.

Arthur D. Little navigates clients through changing markets and ecosystems and helps them to take a leading and formative role in this change.

Our employees have in-depth industry experience and know the trends of tomorrow and their impact on individual industries. Arthur D. Little maintains over 34 offices in the world's major business centers. We are proud to work for many of the Fortune 1,000 companies worldwide, as well as other market leaders and public sector organizations.

About eco

eco shapes the Internet

With more than 1,100 member companies from over 70 countries, eco is the largest association of the Internet industry in Europe. Since 1995, we have played a decisive role in shaping the Internet, fostering new technologies, creating framework conditions and representing the interests of our members in politics and in international bodies.

Together with our members, we are committed to a free, technology-neutral, network-neutral, and high-performance Internet. We thereby want to promote the security and reliability of the Internet as well as build trust in it. Our goal is to shape the digital transformation of society and the economy in the best possible way so that successful economic action can be brought to fruition on the basis of our democratic values. As the voice of the Internet industry, we assume social responsibility for ethically oriented digitalization.

Imprint

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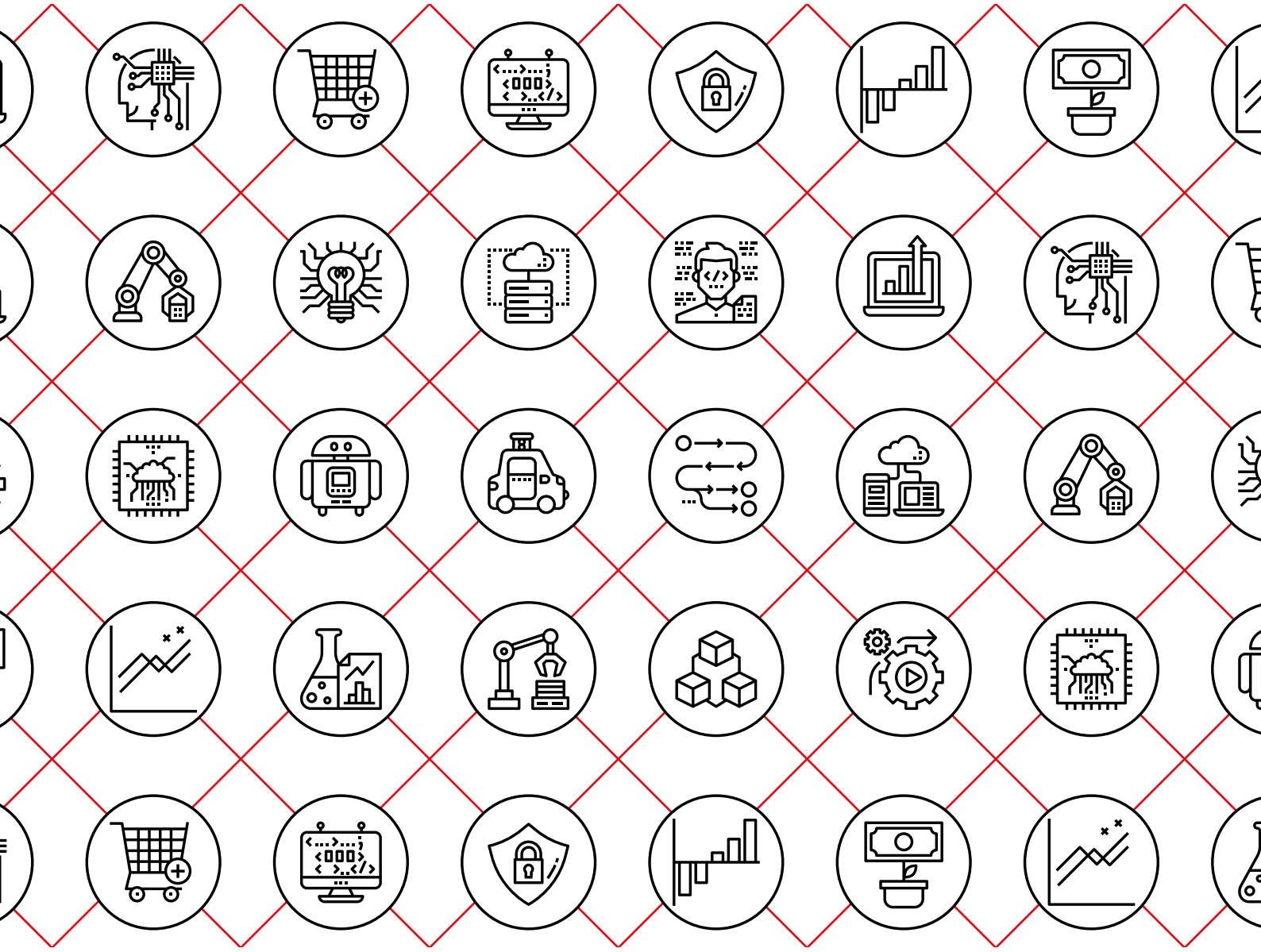

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