TITLE:
Translation of the text “Eckpunkte der Bundesregierung
für eine Strategie Künstliche Intelligenz – Stand 18. Juli 2018”
with commentary

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Translation of the text “Eckpunkte der Bundesregierung
für eine Strategie Künstliche Intelligenz – Stand 18. Juli 2018”
with commentary
by Jan-Philip van Acken

Based on the original German text: [1]

Translated by Jan-Philip van Acken.
Translator commentary marked with square brackets [for example -Ed.],
difficult or unclear translations retain the original German phrases in brackets ("in Klammern") and are underlined.
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KEY POINTS OF THE FEDERAL GOVERNMENT FOR A STRATEGY ARTIFICIAL INTELLIGENCE

Version: July 18th 2018 [Translation version: January 24th 2019]

The Federal Government will develop a Strategy Artificial Intelligence (AI) ("Strategie Künstliche Intelligenz") before the end of November and present these to the public at the "Digital-Gipfel 2018" [Or: digital summit. -Ed.] in Nuremberg. The present key issues are based upon the recommendations of the "Fachforum Autonome Systeme der Hightech-Strategie" on March 20th, 2017 and on the experts hearing invited by the chancellor on May 29th, 2018 as well as groundwork done by the federal ministries.

> [The Digital-Gipfel was advertised as central platform for the collaboration of politics, business, science and society when shaping the digital transition ("Digitaler Wandel") and hosted 10 thematic platforms and associated focus groups. These 10 platforms were named as follows:
>
> 1. Digitale Netze und Mobilität / Digital networks and mobility
> 2. Innovative Digitalisierung der Wirtschaft / Innovative digitisation of the economy
> 3. Industrie 4.0 / Industrie [sic] 4.0
> 4. Lernende Systeme / Learning Systems – the Platform for Artificial Intelligence
> 5. Digitale Arbeitswelt / Digital world of work
> 6. Digitale Verwaltung und öffentliche IT / Digital administration and public-sector IT
> 7. Digitalisierung in Bildung und Wissenschaft / Digitalization in education and science
> 8. Kultur und Medien / Culture and media
> 9. Sicherheit, Schutz und Vertrauen für Gesellschaft und Wirtschaft / Security, protection and trust for society and business
> 10. Verbraucherpolitik in der digitalen Welt / Consumer protection policy in the digital world
>
> Numbering as well as English names taken from the Digital-Gipfel website, see: [2]
>
> If unavailable, a snapshot has been recorded by the Internet Archive Wayback Machine over at https://web.archive.org on January 15th, 2019. -Ed.]

The Federal Government will conduct additional expert hearings -about, e.g. special use cases, the regulatory framework, as well as social issues— to develop the Strategy. There will be consultation processes with associations, organizations and institutions working nation-wide, too. The key issues serve as groundwork for the developmental process of the Strategy, and do provide guidance for goals and fields-of-action of the Strategy, as well as the actions that the departments will have to immediately initiate prior to the passing of the Strategy in cabinet.

1. Goals

a. The Federal Government is committed to bring research and development as well as applications (“Anwendungen”) of AI in Germany and Europe to world-leading levels and keep that position. Germany is to become the world leading location for AI, especially through means of a thorough and quick transfer of research results into applications, alongside the modernization of administration. (“Verwaltung”). “Artificial Intelligence (AI) made in Germany” is to become a world-renown seal of quality.

b. The Federal Government believes itself to be obligated to push forward a usage of AI that is responsible and for the common good; in collaboration with science, economy, the state, and the civil society. Based on European values like the sanctity of human dignity, respecting privacy and the principle of equality we want to uncover/lift up the potentials of the new technology. (“…die Potentiale der neuen Technologie heben.”)

c. We want to find a European answer to data-based business models and new ways for data-based value added products, that are in-line with our economic-, value- and social-structure.

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d. We want to broaden the very good scientific base of AI in Germany and link it with promising other technological developments and applications. This is done to tap into new applications in different branches, as well as in the public administration, and in social areas.

e. We want Germany to further develop its very good position in AI research in collaboration with European partners and technology leaders into a top position. We strive to be an attractive research and economics site for domestic and foreign AI experts, that attracts and manages to hold the worlds smartest minds. We furthermore strive to significantly broaden our training capacity when it comes to AI.

f. We want to generate value added product from the usage of AI, want to put the benefit that AI brings to citizens into as vocal point for our efforts –on the personal, the individual level and on the societal level— and above all minimize risks due to changes, make systems traceable/tractable (“überprüfbar”) and prevent undue discrimination.

g. Regarding the use of AI in the workplace we support a human-centric development and usage of AI-applications. We want to ensure that the working population are central to the development of AI-applications: the development of their skills and talents, their autonomy (“Selbstbestimmtheit”), safety (“Sicherheit“) and health.

h. We want to use the potentials of AI to further improve the safety [see above -Ed.], efficiency and sustainability for all citizens in fields of application that are of special relevance (“in Anwendungsfeldern von besonderer Bedeutung”) and simultaneously encourage social participation, freedom of action, and self-determination of all citizens.

i. We want that our specific pools of data (“Datenbestände”) to be made usable for the benefit of society, nature, economy and the state. We furthermore want new AI-based business models to develop in Germany and become new export hits.

j. With the expansion of an infrastructure for real-time data transfer in the gigabit society (“Gigabitgesellschaft”) we create a central cornerstone for AI-applications. Public administration and the federal network infrastructure shall profit from this as well.

k. We want to ensure that IT systems that use and apply AI guarantee a high level of IT security by preventing tempering, abuse and risks to public safety to the greatest possible extent (“bestmöglich”) concerning this sensitive technology.

l. We want to raise awareness in both developers and users of AI-technology about ethical and legal boundaries of AI usage. We want to check if the regulatory framework needs to be refined for a high level of legal certainty (“Rechtssicherheit”).

m. We will take up on the recommendations by the data ethics committee (“Datenethikkommission”) when developing and implementing the Strategy.

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2. The current situation

Artificial Intelligence has reached a new stage of maturity (“Reifephase”) in recent years and is becoming a driving force in digitalization and autonomous systems for all areas of life. The state, society, economy, administration and science are all called upon to face the opportunities and risks of AI. The Federal Government aims to actively co-create the [!] AI in all fields of politics. Current improvements in AI, especially in the field of machine learning, are based on the exponential growth of hardware capability and their usage for editing large pools of data. German research institutes have long ranked among the best centers worldwide and still do. (“zählen schon seit langem …”)

AI, across all fields, finds its way from research more and more towards economic applications. Big digital corporations (“Digitalkonzerne”) invest considerably in the development and use of AI-technologies. They are expecting more efficiency for existing business models or the entry point into new ones. Across the globe public investments are also rising in many countries. AI-technologies increasingly inform (“durchdringen”) business sectors, branches and the everyday life of people. In these cases crucial points for a successful use of AI are: access to data, systemically embedding AI-technologies into complex products, services and business models, and justified trust grounded in 1.) transparent processes/algorithms (“transparente Verfahren”) and 2.) traceability (“Nachvollziehbarkeit”) for the citizens. [Numbers added by me. -Ed.] Regarding the further use of AI in Germany it is also inevitable to develop and expand the digital infrastructure.

Additionally, AI can support finding new insights regarding the origin and spread of diseases, faster detection, and more personalized treatment. Going forward (“perspektivisch”), AI can contribute to further improve our healthcare, to enable new business processes and applications. AI can thus provide impulses to politics regarding economy and employment, going beyond merely providing impulses for health policies. AI-based applications can also support citizens in their investment and consume decisions as well as contribute to climate and environmental protection.

Concerning security (“Sicherheit”) –including statewide security precautions (“Sicherheitsvorsorge”)- the use of AI-based systems is an important part of German sovereignty/statehood (“Souveränität”) and thus a contribution to uphold the security of both the citizens and the business location Germany. For example, using AI to perform a supporting analysis of data relevant to a case can lead to deployment of police forces (“Einsatzkräfte”), optimize evaluation processes, discover unknown patterns in data or lines of actions (“Handlungsstränge”; more commonly used as in ‘plot lines’), [While not explicitly mentioned this most likely includes predictive profiling. -Ed.] and can furthermore support lines of inquiry or detect deliberate misinformation.

Concerning the linkage of user data [and usage data] American and Asian companies have gained a world-wide dominance and lead over German and European companies, which provides a competitive advantage on the further use of AI-technologies as well. However, competition is just starting on the commercial use of company-, process- and product-data from complex chains of added value (“Wertschöpfungsketten”) and the linkage of these with hybrid services – which is potentially a significantly bigger market. Due to its economic structure with a strong contingent of manufacturing industry, a world-wide top position concerning logistics, as well as excellently trained professionals, Germany does have a starting position. Particularly owned to an advantage in key fields of AI, such as Industry 4.0 and mobility. Germany does stand a good chance here.

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The challenge at this point, for Germany as well as other states, is the accompanying structural change of economy, the job market and the personal living conditions of citizens, coupled with steeply rising international competition for talent, technology, data and investments. At the same time AI requires decisions regarding the sustainability and continuous training of our professionals even now. Furthermore Germany faces the challenge of transferring new AI-technologies into the middle class at large.

The biggest potential for added value for Germany lies in this complex transferal process and data interchange between medium sized enterprises. There is urgent need for action in these areas. This technological development is accompanied by societal changes and the possible necessity of adapting the legal framework for the usage of AI. It is also accompanied [by the possible necessity] to craft a fundamental knowledge base concerning AI, to objectify (“versachlichen”) the public debate. The Strategy of the Federal Government is supposed to contribute to an “AI made Germany”, a particular and specific handling of the technology in the interests and for the benefit of state and society.

Singular states have already recognized the remarkable potential of AI and developed their own strategies (examples include the USA and China). The European Union has recently presented an umbrella strategy (“Dachstrategie”) for the EU and has announced a number of measures to heighten the investments in AI in Europe, to prepare for the socio-economic change through AI, and for the improvement of the legal and ethical framework for further development of AI. The Federal Government explicitly welcomes this strategy by the EU and will campaign for suitable and sustainable features/equipment (“Ausstattung”) of Horizon Europe and Digital Europe, as has been drawn up in the joint agreement during the “Digital Day” in Norway on April 10th 2018, alongside 23 other member states.

The General Data Protection Regulation (GDPR) provides a dependable legal framework for innovative technologies and applications, including the AI domain. It contains directives to protect natural persons during the processing of personal data and concerning the free circulation of such data. The revision of the “E-Privacy”-directive [alternatively spelled ePrivacy -Ed.] is meant to fine tune this protection concept. (“Schutzkonzept abrunden”)

Within Germany essential steps have already been taken: as part of the Federal Government’s High-tech Strategy (“Hightech-Strategie”) the recommendations (“Handlungsempfehlungen”) concerning the application-fields of AI that are of particular relevance for Germany –mobility, health(care), autonomous systems, production and smart home- have been made. The platform Industry 4.0 has successfully improved the interconnection (“Vernetzung”) and collaboration in the area of Industry 4.0 and thereby established standards. This has garnered world-wide attention. In parts of the federal administration (“Bundesverwaltung”) AI is already in use, e.g. the German Patent and Trademark Office. The Federal Government also has been stimulating fundamental and applied research. These measures we will now strategically bundle, expand and amend.

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[Shortly after the original publication of the German original document it has been pointed out that it "*embarrassingly lacks a definition*" [3] of what counts as Artificial Intelligence – and what does not, according to the Federal Government.
In a later document [4], following up on [1], a definition can be found in the preface. It translates to:

A singular, universal definition of AI, or one that is consistently used by all actors, does not exist. The AI Strategy of the Federal Government is based on the following interpretation of AI:

*Abstractly spoken AI researchers belong to one of two fields: the "**weak**" and the "**strong**" AI.*
*The "**strong**" AI postulates that AI systems have the same intellectual capabilities as humans or can even surpass humans.*
*"**Weak**" AI focuses on solving concrete use cases based on methods from mathematics and computer science; the systems developed this way are capable of self-optimization. To do so, either aspects of human intelligence are recreated ("*nachgebildet*") and formally defined, or systems to stimulate and support human thinking are constructed.*

*The Federal Government orients its Strategy towards the usage of AI on solving use-cases and thus towards the positions of "**weak**" AI:*

1. ***Deductive systems, automated theorem proofing:** deduction of formal statements from logical expressions, systems to proof the correctness of hard- and software;*
2. ***Knowledge based systems:** methods to model and query ("Erhebung") knowledge; software to simulate human expert-knowledge and to support experts (formally: expert systems);*
3. ***Pattern analysis and pattern recognition:** inductive analysis methods in general, especially machine learning;*
4. ***Robotics:** autonomous control of robotic systems, thus autonomous systems;*
5. ***Intelligent multi-modal human-machine-interaction:** analysis and "comprehension" of language (connected/combined with linguistics), pictures, gestures and other forms of human interaction.*

Bold text added for emphasis by me. -Ed.]

3. Fields of action

To reach these goals collaborative action of industry, sciences, politics and the civil society is required. Measure have to be taken both vertically, in single industry branches or the utilities sector, as well as horizontally, in a cross-section across sectors. The Federal Government will go into council with experts in the coming months, regarding the necessary fields of actions. The measures are the responsibility of each relevant department; all (additional) requirements relevant to finances ("finanzwirksamer Bedarf") will be financed or offset within the scope of current budgeting estimates ("Haushalts- und Finanzplanungsansätze"). Based on this, the Federal Government views the following fields of action as priority.

3.1 Strengthen research in Germany and Europe to be the driving force in innovation

We want to notably expand AI-research in Germany. In service to this, additional centers of excellence for machine learning will receive sponsorship ("Förderung"), they will be linked with existing centers and institutions (federal as well as state level) on AI and Big Data as part of the development of a national research consortium. Here the principle holds that diversity in research will result in a future diversity throughout the market.

- Enable attractive and competitive working conditions and salary to trans-regional/nationwide ("überregional") centers of excellence in the AI-area.
- Check existing funding procedures on their usability for research on AI and check to what degree results of AI research are applied. The aim is, among other things, to establish specific offers for the use of AI e.g. within existing promotions of medium sized enterprises.
- Support of an alliance ("Verbindung") between software- and processor-development akin to a systems approach. ("im Sinne eines Systemansatzes")
- Setup of cooperative structures between research and external stakeholders. (coming from the state, civil society, industry, data protection, and information security)
- Support the setup of cooperative structures in the area of AI-research, together with other partners from the European Union. As a first step Germany and France will push forward the development of a Franco-German research- and innovation network, based on existing structures and competences in both countries. At the core of the cooperation is to be fundamental research, the transfer of research results into the industry/economy ("Wirtschaft"), a focus on innovation as well as the advancement of regulatory approaches and ethical standards. [Note that it is not established here why France is specifically highlighted out of all European nations. Neither is it established why this is desired even though a pan-European approach is proclaimed elsewhere in the document. -Ed.]
- Yielding the data-hoards ("heben der Datenschätze") of national and European research institution to generate knowledge by employing AI, while taking into account the interests of the public and of the individual that are worth protecting in the process of setting up the required structures.

- Indexing (“Erschließung”) of data that is generated in the healthcare sector at distributed data-sources during diagnosis and therapy. This indexing is to provide a basis for the deployment of AI in health research, while taking into account the interests of patients –concerning their data- that are worth protecting.
- Responsible usage of the potentials that are present at the connection of AI and key technologies such as bio- and environmental technology.

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- Research and development of AI-based technology as contribution towards civil safety. (“zivile Sicherheit”)
- Stimulation of the development process to both control algorithmic prognosis- en decision systems and make them traceable. (“Nachvollziehbarkeit”)
- Stimulation of technologies that protect privacy and consumer protection technologies to enable a differentiated and self-determined use of personal data.
- Early inclusion of regulatory expertise in research- and development-tasks that –like in healthcare- have to adhere to high regulatory requirements to successfully find their way towards applied usage. (“den Weg in die Anwendung finden”)

3.2 Economy transfer

The know-how present in the German research landscape needs to be turned into value added product in Germany and Europe to a higher degree. Which is why we will focus our activities on the transfer of research results and AI-methods into the economy. We foresee the following opportunities for action:

- Strengthening of transfer activities in the AI area and integration into an overall concept to increase technology transfer, whilst taking into account the transformation of the working environment. This requires an ecosystemic (“ökosystemar”) approach to cover the entire chain of added value.
- Creating transparency across the entire AI-landscape through continual technology-monitoring
- Stimulating the access possibilities of the middle class to AI-technologies, computer capacities and cloud platforms, as well as stimulating the setup of file/information/data exchange (“Datenaustausch”) platforms, e.g. akin to the model of the *mCloud*, [Explained below. -Ed.] including support for small and medium-sized enterprises. To do this the competence centres “Mittelstand 4.0” [roughly translated: small and medium-sized enterprises / SMEs 4.0 -Ed.] that we have built up nationwide in recent years.
    - Reference for mCloud: [Reference added by me. -Ed.] https://www.bmvi.de/EN/Topics/Digital-Matters/mCloud/mcloud.html

- Stimulating the formation of regional clusters, analogous to the clusters of excellence (“Spitzencluster”) and AI ecosystems. Available structures such as the Digital Hub Initiative or the national or bilateral competence centres could be further build upon.
- Initiation of projects that are jointly supported by science and economy, across different areas of application in Germany, where possible together with our European partners.
- Launch (“Auflegung”) of special programs for the fixed-term exchange between science and industry, to improve the connections between innovators and the demand side. (“Bedarfsseite”)
- Setup of real-world laboratories/living labs (“Reallabore”), test beds (“Testfelder”) and the support of simulation tests (“Modellversuche”) for the usage of AI, to enable the field-testing of new technologies and business-models and to identify where the regulatory framework requires amendment.
- Stimulating the cooperation of businesses within competition law and supporting the foundation of consortia that strengthen the competitive position of German and European economy.
- Evaluate if an Important Project of Common European Interest, IPCEI, is possible.

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Individual economic sectors have different starting positions regarding digital transformation, due to customary business models or production processes. The Strategy needs to consider these idiosyncrasies. To do so relevant industry dialogues (“Branchendialoge”) will be held in advance.

3.3 Challenges

To ensure that Europe provides the best prerequisites for seminal innovation both now and in the future, available potentials for leap innovations need to be used more. Regarding an initiative to stimulate leap innovations, AI could potentially be one of the foremost topics. Another instrument to push leap innovations and to acquire talent are Challenges (“Innovationswettbewerbe”). It is thus imperative to check existing Challenges regarding a stronger conceptual orientation towards AI.

3.4 Awaken founding dynamics and carry them through

Access to venture capital is an integral resource for business formation, especially so in the very difficult growth phase. To spark founding dynamics for AI-based business models and products, incentives for investors need to be created and research institutes need to receive targeted funding. To do so the Federal Government foresees the following opportunities for action:

- The scientific competence centers for Big Data and Machine Learning will be allowed to implement their own spin-offs.
- Expansion of holistic consulting and support of start-ups
- Implementing of, e.g., a TechGrowth-fund
- EXIST, the program for scientific entrepreneurs, will be expanded
- As part of the “Digital Hub Initiative” and other programs, the collaboration between entrepreneurs and established businesses, especially small and medium-sized enterprises, will be supported.

3.5 Work environment and the job market: shaping structural change

AI will lead towards a new level of change regarding work, with significant differences from current levels of automation and digitization. With this in mind, present employment-predictions and scenarios will have to be reflected upon. Additionally, strategies to shape and further humanize work (“Humanisierung von Arbeit”) will have to be readjusted. A human-centric approach is essential for the development and positive usage of AI. Within the work environment, the requirements regarding competence, jobs, work organization and work relationship will change notably. It is not sufficient to invest in technology, one will have to invest in the working population and their competences as well. Businesses and employees will have to be able to prepare for the changes and will have to be able to jointly cope with the transformation process. Concerning this we foresee the following opportunities for actions:

- Development of an international and European framework for AI in the workplace, taking into account the ILO [International Labour Organization] and OECD [Organization for Economic Co-operation and Development]

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- Development of AI-observatories on an international and EU level to perform regular, thorough surveys of current developments as well as assessments of possible effects and follow-up developments of AI on employment and the work environment.
- Development of European and national institutions to systematically observe the impacts of new applications on the work environment, concerning employment, design of technology [“Technikgestaltung”, translation unclear. Alternative: design of techniques], human-machine-interfaces, data protection (“Datenschutz”) etc.
- Initiation of a transatlantic as well as European (especially Franco-German) exchange towards human centric design of technology (“Technikgestaltung”)

- Development and implementation of a sweeping skilled workers strategy as part of the partnership for professionals [“Partnerschaft für Fachkräfte”. Alternative: partnership for skilled workers], which is supported by a social partnership. (“sozialpartnerschaftlich getragen”)
- Development of a national advanced vocational training strategy, together with social partners, to provide answers to the digital transition of the work environment as a whole and the transition by means of AI-technologies in particular, as well as developing a broad impact instrument to advise the employed and support their competences.
- Setting up a sponsorship scheme for places to experiment with AI-applications in the work environment within companies. (“betriebliche Experimentierräume für KI-Anwendungen in der Arbeitswelt”)
- Examination –and, if necessary, further development- of possibilities for worker participation when introducing AI-applications
- Arranging a thorough knowledge transfer to the heads of human resources (“Personalverantwortliche”), work councillors and the working population, based on the initiative New Quality of Work (“Neue Qualität der Arbeit”); establishing future centres (“Zukunftszentren”) to build competences especially within staff councils and work councils.

3.6 Strengthening schooling and acquiring skilled workers/ experts

Germany needs to become an even more attractive location for world-leading AI scientists and lure talents from around the globe. To do so we foresee the following opportunities for actions:

- Funding of new academic chairs for AI at choice locations in Germany, within the boundaries of the Constitution. (“Grundgesetz”)
- Making work- and payment conditions more attractive for young scientists, both domestic and foreign
- Expanding the offerings for up-and-coming scientists and early promotion of young people’s understanding of AI by providing opportunities to “get it” and participate.
- Stimulating (advanced) training (“Ausbildung, Fortbildung, Weiterbildung”) programs, whilst paying special attention to individual areas such as healthcare or the food supply chain.
- Creation of parameters for AI experts that provide incentives against enticement (brain drain) and allow for the acquisition of international professionals. (brain gain)
- Basic knowledge of AI needs to be embedded as core part of teaching content, not only in computer science, but in other study programs in the natural-, social- and engineering sciences, as well as in (advanced) vocational training if reasonable.

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3.7 Use AI for state purposes and adapt competences on the level of administration

Using AI within public administration (“öffentliche Verwaltung”) allows to deliver information and services in a way that is more targeted, more tailored, and with a lower threshold to citizens and businesses. Regarding state-wide security precautions, the aspects of AI in terms of security policy are relevant as well. For both the state and the administration the requirements, regulatory frameworks, and the possibilities that come through the use of AI do change; this triggers the following call for action:

- Examination of the usage possibilities of AI in public administration.
- Transparency, testability (“Überprüfbarkeit”) of data processing, data protection, protection of fundamental rights, and freedom of discrimination need to be ensured.
- The AI competencies within public administration need to be consequently established and extended. The tractability (“Nachvollziehbarkeit”) of administrative rulings –and thus effective legal protection when deploying AI- need to be ensured for citizens.
- The Federal Government will be in a pioneering role when it comes to the usage of AI and contribute to the improvement of efficiency, quality, and security/safety (“Sicherheit”) of administrative services.
- Security-political aspects and potentials when it comes to AI have to be considered in terms of state wide safety precautions.

3.8 Making data available and usable

When it comes to methods of AI and machine learning the availability and goodness/quality (“Güte”) of data are central prerequisites and determining factors for the quality of results. At the same time the security of a usable data corpus (“die Sicherheit einer nutzbaren Datenbasis”) is essential. The access to data, however, is restricted in many cases – partially due to legal reason, and partially due to the factual data dominion (“Datenherrschaft”) of both governmental and private agencies. The amount of usable high-quality data needs to be raised significantly, without infringement on personal rights, the right to informational self-determination or other fundamental rights. With this premise in mind we envision the following steps:

- Data from both public and scientific sectors will be made more readily accessible (“werden verstärkt geöffnet”) for AI research, to enable their scientific use and use for the greater good, for the purpose of an Open Data strategy.
- Further realization of a European data-sphere (“Datenraum”) to make available data all across Europe more usable, and to facilitate the scaling of data-based services [“Angebote” – more commonly translated as: offers, offerings] within the EU.
- Examine whether or not (and if necessary: how) access to data and the usage of data needs to be re-regulated, especially in case of sector-specific rules. The goal is a clear legal framework. Data access and data usage will be paid special attention to in the upcoming rework of competition law.

- Connecting –by means of AI- private and public stakeholders (“Akteure”) to strengthen process optimization. Support of data cooperation between the state and the corporate sector, for the purpose of a public-corporate data pool. [“öffentlich-privater Datenpool”, where ‘privat’ is linked to ‘Privatwirtschaft’/corporate sector]
- Survey the possibility to support mutual “data partnerships” [alternatively: data twinning?] between businesses

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- Expansion of current activities to create interoperability between data systems in the health sector.
- Support of the interoperability of data platforms, as exemplified by the “International Data Space (IDS)”
- Expansion of necessary infrastructure concerning hardware/computing capacities, as well as cloud-services, taking into account both energy efficiency and particularly climate protection.

3.9 Adjusting the regularity framework and ensuring legal certainty

The increasing application of AI will possibly require adjustments to the regulatory framework, to provide security of investments as well as legal certainty to providers, and to provide users with a basis for legitimate trust and acceptance. The following needs to be taken into account:

- Examination and, if required, adjustment of the regulatory framework for the use of data and the application of AI-technology, especially clarification of the legal relationship between those involved. We will heed the suggestion of the data ethics committee.
- Ensure transparency, tractability and traceability of AI systems, in a way that enables the protection against bias (“Verzerrung”), discrimination, manipulation and other improper uses, especially concerning use cases involving algorithm-based prognosis- and decision-making systems.
- Support of the development of innovative applications that support the self-determination, social participation and privacy of citizens.
- Strengthening the social partnership during the integration of AI into the workspace.
- Adjustment of the legal framework of copyright law in order to facilitate Text and Data Mining (TDM) as basis for machine learning as well as for non-commercial uses. When doing to the interest of those involved should be brought into a fair balance (“fairer Ausgleich”).

3.10 Setting standards

Whoever sets the standard, governs/determines (“bestimmen”) the market. Shared norms and standards provide for a reduction of technological hindrances, support the liberalization of markets and thus strengthen the competitiveness of the economy. Shared standards are able to provide applications with

a higher degree of usability and enable interoperability. Due to this an adequate “thrust capability” (“Stosskraft”) for Europe when it comes to international standardization processes needs to be ensured. On that issue we will consider the following opportunities for action, together with scientific and economic experts:

- Starting an initiative to more strongly jointly represent European interests in international standardization committees.

- Stronger engagement for the development of open and international standards.

3.11 National and international interconnection

Interdisciplinary/cross-over technologies (“Querschnittstechnologie”) like AI sooner or later touch all areas of economy, administration and the everyday life of citizens. The development is global, which is why politicians (“die Politik”) need to act and think “cross-border”.

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We thusly plan:

- Coordination of measures regarding the AI strategy with other activities of the Federal Government, such as the data ethics committee, the Industry 4.0 platform, the digitization of healthcare, to Mobility 4.0 (“Mobilität 4.0”), the child and youth media protection (“Kinder- und Jugendmedienschutz”), the IT consolidation Bund (“IT-Konsolidierung Bund”), the “central office for information technology in the security sphere” [Zentrale Stelle für Informationstechnik im Sicherheitsbereich] (ZITiS), as well as measures regarding the future of work and the welfare state, or for measures regarding climate protection.

- Stronger cooperation with EU institutions, especially with the European Committee and other member states when it comes to question of frameworks for the use of the shared digital domestic market and further measure of the AI-Strategy. Funding requires an effective system of complementary tuned instruments on national and European scale, taking into account the principle of subsidiarity and considering existing instruments.

- Exchange, and preferably accommodation, concerning joint mission statements (“Leitlinien”) with/regarding internationally leading regions and economic areas. We welcome international cooperation regarding the area of AI and will search for bilateral and multilateral collaboration in the area, e.g. within the G7 or the G20. German consulates (“Auslandsvertretungen”) as well as the German “Wissenschafts- und Innovationshäuser” [literally: science- and innovation houses] can be used for this kind of collaboration. We will take our moral values (“Wertevorstellungen”) as baseline when it comes to the deployment AI-systems and their use.

- Building up capacities and knowledge of AI in developing counties in the context of scientific collaboration, to allow for the taking of scientific, societal and social chances. Developing counties and emerging market countries (“Schwellenland”) may not be left behind by technological change.

3.12 Having public dialogues and developing operational frameworks

The development of AI is dynamically advancing, thus forcing a continual feedback loop for the Strategy AI during its implementation, with representatives from science, economy, politics and society, to establish a trust- and innovation-promoting AI culture in Germany. To do so we envision:

- Organizing public dialogues concerning the handling of AI and its specific regulations in different use cases (“Anwendungsfelder”), with the involvement of the civil society. In so doing we will, for example, deliberate social and spatial impacts as well as ethically relevant issues.

- Expansion (“Weiterentwicklung”) of the Learning Systems platform [One of the platforms of the Digital-Gipfel, as mentioned above. -Ed.] into the Artificial Intelligence platform, where the exchange between politicians, science and economy will be conducted on a broad front (“auf breiter Basis”). Dialogue with society will be organized there as well. Within the platform we will develop use case scenarios, that can support resolving technological, ethical and legal issues. They shall also be used to illustrate the benefits of AI, the challenges, as well as ethical and legal boundaries of use, and the scope for design. (“Gestaltungsmöglichkeiten”)

- Expansion of multidisciplinary research into technology assessment (“Technikfolgenabschätzung”) in the area of AI

- **[End of page 11]**

- Organization of an interdisciplinary dialogue of scientist as groundwork for a public dialogue concerning the handling of AI and the specific regulations (of AI) and the user-orientation in different areas of application.

- Accompanying the social-partnership dialogues for a sustainable integration of AI into the workplace.

3.13 Immediate measures of the Federal Government

In the implementation of especially research- and innovation funding, the emphasis will be on the area of AI. Gaining -and holding onto- AI experts in Germany has priority across programs and political parties. (“programm- und politikübergreifend”) The interconnection and expansion competence centers together with France will be implemented immediately. Furthermore the establishment of themed (“thematisch”) competence centers will begin. Also included in the immediate measures is the upgrading of infrastructure. The Federal Government will implement respective measures in terms of these key points within the scope of ongoing programs and the 2018 budgeting.

- **[End of page 12]**

- **[End of document]**

[Note that military use of AI is not mentioned once, as also highlighted by [3]. In the follow up to this key point document, the actual strategy paper [4], the term military (incl. related terms) appears twice. First on p.18:

> *Research into AI application possibilities, especially concerning the defense of the national security and for **military purposes** will be conducted within the context of the relevant departments' areas of responsibility.*

Secondly on p.32f, as part of a segment on "AI usage for active defense ("Gefahrenabwehr") for inner security and national security":

> *In terms of hazard prevention ("Abwehr von Gefahren") AI technologies can support **security personal** (…). Here sufficient control and sufficient transparency are ensured.* [Not clear how or by whom. -Ed.]

> *AI (…) holds chances and risks for stately safety precautions. The Federal Governments aspires to grasp these chances (…) and use them lawfully. (…), the necessity exists to develop means for hazard assessment and appropriate defense mechanism. (…) Even if we are to exclude a specific, technologically feasible application due to political, juridical or ethical reasons, then it is still necessary to consider the possible impact of their usage through third parties (…). The future use of AI-based technology and systems will have repercussions on the **armed forces** and is thus an important topic for the future development of the **Bundeswehr**. The Federal Government will (…) comprehensively weigh the pros and cons.*

> *The Federal Government wants to identify suitable topic areas and facilitate AI in the sense of a development that is agile and practical.*

> *(…) The usage of AI can present a significant efficiency boost when compared with regular evaluation methods, (…). AI serves as instrument to contribute information for decision making, which would be impossible to be gathered in an adequate measure of time without the use of AI. This includes the recognition of people in context of big data analysis, even though the follow-up evaluations in the police-, intelligence service- or **military-sectors** and the decision based on these will remain in the hands of the personnel of the relevant authorities.*

Another critique of the key point paper was the relative silence on the "changes in the world of work" ("Veränderung der Arbeitswelt") [3], which later got an entire sub-chapter (namely 3.5) across several pages in the strategy paper itself. -Ed.]

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