

Artificial Intelligence and the Future of Work

**A discussion paper of the German Confederation of Trade Unions
concerning the debate on artificial intelligence (AI) in the workplace.
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Artificial intelligence (AI), or more exactly machine learning, undoubtedly has great potential to effect structural change in the areas of the economy, value creation, labour relations and working conditions. Education, from apprenticeships to further training and continuing education, will become increasingly important in this context. This topic has given rise to various different perceptions, hopes and fears, which show above all that the consequences of using AI-based systems depend on far more than technology alone. What matters most is how and for what purpose these systems are used. Therefore, the advantages or possible disadvantages depend in particular on the objectives driving the configuration of the technology.

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Whether and to what extent the technologies are 'intelligent' is of secondary importance here. It is essentially a question of self-optimising systems or 'machine learning', meaning algorithms that, far from just following if-then logic, instead search for patterns in huge data volumes on the basis of neural networks and feedback loops and thus arrive at independent solutions. It is a question of algorithmic decision-making with many possible different variations, some of which are already in use. However, this abstract concept should not distract from the fact that the scope of AI systems is essentially based on the growth of data volumes and data analytics, on computing and storage capacities, algorithms and energy resources, economic interests, policy-making and social values.

After all, the raise of AI systems is backed not only by scientific and altruistic interests, but by economic and political ones. This is demonstrated not only by Google's change of strategy in early 2017 ('AI first'), but also by the investments that are already flowing into or being announced for AI technologies worldwide. It is no wonder, then, that the regions of the world have long since entered into a kind of digital arms race, above all the digital corporations in the USA and China. It is important to consider the technological leap in machine learning as a new economic coordinate. On the one hand, it is a matter of increased efficiency and process optimisation, and on the other, the change in value creation systems is being immensely accelerated – for example through new customer relationships and network effects via platforms or personal language assistants.

As it is an interdisciplinary technology, AI has the potential to become a massive driver of digitalisation. Therefore, it is important to formulate 'digital ethics', as demanded by German Federal President Steinmeier in 2018. However, these should not only cover 'human-centred design', but also social values and participation in the processes of developing, implementing and controlling learning systems. The German Federal Government has formulated such a demand with its 'Eckpunkte für eine Strategie Künstliche Intelligenz' (key points of artificial intelligence strategy). The 'Citizen Score', a social credit programme in China that focuses on the complete digital control and monitoring of the population, is the apparent example for the question of value orientation. A commercial market for individual self-optimisation has however also developed in addition to such government programmes, and it also aims to monitor and evaluate individual actions digitally, raising new questions, particularly at the interface between private and professional life. The issues of transparency and acceptance are of particular importance here.

According to a survey by *Bitkom* (2017), the public opinion in Germany on artificial intelligence is ambiguous. Hopes and worries balance each other out. With regard to the workplace, respondents expect that learning

systems will facilitate day-to-day work, support further training or enable more meaningful activities. Nevertheless, there are concerns about abuses of power and manipulation, culminating in the fear of disenfranchisement. This is also confirmed by *DGB's Index of Good Work* (2016), which states that 45 percent of employees describe feeling at the mercy of technology. While many AI-based services are mostly used unconsciously in private life, the question of acceptance could prove to be the sticking point for the use of AI systems in the workplace.

This also gives rise to legitimate concerns about employment prospects. The advent of AI systems has given fresh impetus to the debate about workplace automation because they are also coming to the fore in skilled occupations such as knowledge work. There are many AI-based applications already on the market that are significantly changing the workplace. The current outlook implies that learning machines will have great automation potential and change job profiles in large numbers. Therefore, the design of the interface between human users and AI is crucial. Learning assistance systems also have a wide range of applications: they range from collaborative robots (CoBots) that can also communicate to systems intended to structure and facilitate work. The focus must be on expanding human capabilities through AI, and not replacing people with machines. Only then acceptance will follow.

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According to the VDI's (*Verein Deutscher Ingenieure*, Association of German Engineers) 'Statusreport Künstliche Intelligenz' (status report on artificial intelligence) of October 2018, the use of AI systems in the German economy is far less advanced than assumed. According to the report, German companies currently use AI methods only to a very limited extent: the highest value overall is in the area of data analysis, with only 33 percent in large companies and just under 20 percent in SMEs; in the area of human-machine interaction the rates are just 6.8 and 4.2 percent, respectively. More than a third of the companies state that they have identified in-house 'resistance' against the use of AI. Nevertheless, many companies see great potential for future AI use. With a view to further development, 86 percent of the respondents are of the opinion that decisions made by AI systems must be logical for users. 89 percent argue that a broad societal debate on the opportunities and risks of AI is necessary. A narrow majority considers the support – and not the replacement – of human work through AI as the objective. However, only 18 percent are experiencing a targeted implementation and active evaluation of AI systems in companies. On the whole, much remains to be done to harness learning machines for positive employment prospects and Decent Work.

But the 'opportunities and risks' should not be debated on an abstract level any longer. The aim should be to formulate the requirements for the design of AI for Decent Work and to demonstrate methods for its implementation. After all, machine learning is not just about the automatic loss of jobs, but also offers a wide array of opportunities to organise work more intelligently.

The goal should be to foster AI-based assistance systems in order to improve the quality of work and to create new, high-quality employment opportunities including appropriate education and training.

Designing AI processes for Decent Work

A decisive factor for the effectiveness of AI in the workplace is the transparent, verifiable and controllable design of the man-(learning) machine interface. The design must begin in the conception and development phase of AI systems. A prerequisite for appropriate design is a broad participation process, which should begin with the definition of the objectives for the AI and its application and should include an impact assessment. Employees and their representative bodies must be involved.

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This kind of negotiation process on the objectives and effects of AI systems is an indispensable foundation for a successful company transition process. The issues of impact on employment, qualification and risk analysis, as well as resolving possible conflicts of objectives with regard to data usage and personal rights, require a transparent technology assessment that also allows for interventions by employees and their representatives.

The guiding theme is Decent Work by Design. This means that the employees and their representative bodies are involved in and can co-determine the definition of the objectives of AI systems that influence working conditions and employment prospects as well as further training and continuing education options. The same also applies to development, implementation, operation and evaluation phases where the dynamics of and changes to the learning systems must be taken into account. Machines supporting humans must be the key objective here.

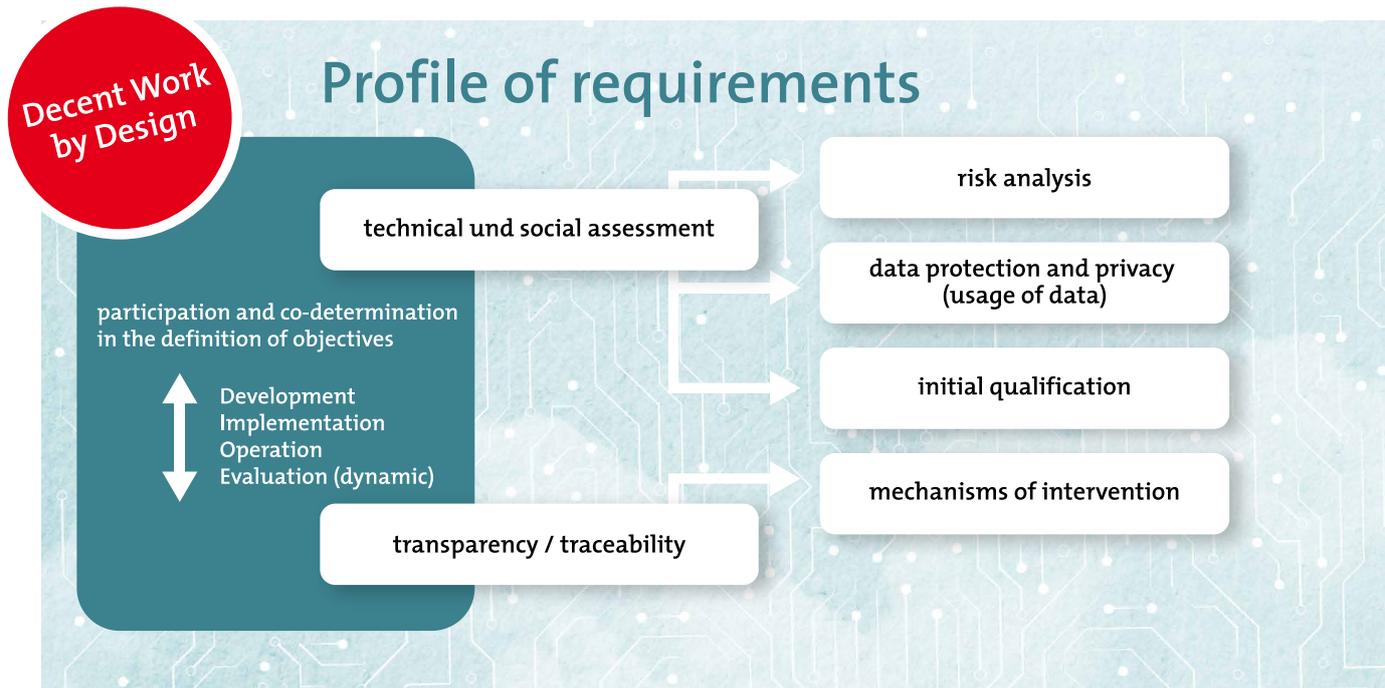
Designing binding processes for the timely involvement of employees and their representative bodies is a crucial factor for the successful use of AI systems in the workplace. As experts on their work, they can contribute their knowledge and experience to the best possible design of the man-machine (or learning system) interface. Thus, the goal is to use human intelligence to deploy artificial intelligence in the working environment for an efficient and productive workplace design that promotes health and learning.

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The relevant actors for these processes – developers as well as employers and employees – should begin to collaborate at the outset of AI system development in order to jointly agree and document the optimisation goals for company application, including workplace design. Possible conflicts of objectives should be explored at this early stage. In this process, usability by the employees should be given priority. In order to make the best possible use of employees' skills and to ensure a high level of transparency from the outset, new approaches such as internal crowd-

sourcing can be adopted. Truly empowering the employees is crucial in order to facilitate creative spaces and avoid additional or high levels of stress. When purchasing external systems, the active cooperation of employees and their representative bodies in formulating the requirements for the AI system should also be ensured.

These processes form the basis for a technical and social impact assessment of learning systems in a company context. This also includes the transparency of traceable and verifiable information as well as determining implementation responsibility and intervention mechanisms. This in turn acts as the foundation for a long-term qualification for the use and handling of learning systems as well as for risk analyses on the effects of stress in changing working environments. In addition, data usage and protection (privacy) are of particular importance in the workplace. Privacy by Design also applies here.



Acceptance of AI as a prerequisite for successful transition

All AI systems, which are based on personal data in a company context, also offer new possibilities for data-driven analysis and the control and monitoring of employees. When using AI, the handling and company usage of employee data must be designed so as to protect the employees' personal rights.

The foundation: Employee data protection

Upon the implementation of AI systems in a company context, the personal rights of the employees (privacy) must be preserved. To this end, the requirements of the European General Data Protection Regulation (GDPR) and the new German Federal Data Protection Act must first of all be observed. With the GDPR, the principle of 'Privacy by Design' (Art. 25) applies, which means that technology design in accordance with personal rights or data protection by design is the order of the day. To date, there is no separate data protection law for employees, but this is recommended by many data protection experts due to the required, detailed density of regulation governing the employment relationship. The Works Constitution Act does not yet provide for a general right of co-determination of employee representative bodies regarding the processing of employee data, but it does allow for co-determination of and participation in the introduction and use of technical equipment suitable for monitoring performance and behaviour. For example, 'the introduction and use of technical devices designed to monitor the behaviour or performance of the employees' is subject to co-determination under the Works Constitution Act. Works councils have a duty to ensure that the rights to privacy and informational self-determination are protected. In this case, even the possibility of surveillance by new technical systems is decisive.

The sticking point: objectives of company data usage

Company data protection and the preservation of employees' personal rights are important values in of themselves which must be safeguarded. This applies to the storage, usage and processing of personal data.

AI systems in a company context affect the far wider issue of data usage. AI systems have the potential to significantly change working conditions and social relations in the workplace. The primary objective should be to use AI for assistance systems in order to reduce workloads and promote better working conditions. Nevertheless, AI applications offer new possibilities for measuring and evaluating employees and workforces – for example through individual profiling or company network analyses ('workplace analytics'). Such a form of employee optimisation can generate additional pressure, create new psychological stress and ultimately trigger new conflicts.

Since the handling of personal data is a sensitive issue for the implementation processes of AI systems, this question must be given special priority when developing objectives. It is in the interest of both sides to resolve such conflicting objectives at an early stage in order to use the potential of data for Decent Work. This point must also be taken into account when planning solutions to be developed externally (Privacy by Design).

Ultimately, the aim is to achieve a good balance between new, data-based business models and the improvement and optimisation of processes on the one hand, and the interests of employees, above all job security and Good Work, on the other.

In terms of acceptance, the opportunities for participation and co-determination regarding the handling of AI systems should be expanded to facilitate data usage initiatives by employee representative bodies. This applies to the entire process of operational implementation.

Pilot and experimental phases to check the interfaces of the AI application with regard to the objectives and to rule out unwanted effects would be one possibility. However, options for intervention and correction with mandatory co-determination rights should also be created in the further process. As acceptance of AI usage is also increased by participation and co-determination processes during implementation and evaluation, co-determination should be institutionalised for the entire process chain. An AI committee appointed by the works council to supplement the existing co-determination structures with intercompany and external (scientific) expertise and accompany the process is a viable possibility.

Given the dynamics of AI applications, 'flexible agreements' to ensure regular adjustments should be considered. To this end, the company actors should receive AI consulting.

Ultimately, the aim is to achieve a good balance between new, data-based business models and the improvement and optimisation of processes on the one hand, and the interests of employees, above all job security and better working conditions in the future, on the other. This requires openness and commitment to the participation, co-determination and negotiation processes described above.

At the same time, ethical limits, social standards and 'fail-safes' should be set: The human user should always have the right of final decision. In addition, labour law consequences for employees which could theoretically result from 'digital management' or surveillance must be strictly excluded. Failing this, acceptance issues could become a serious obstacle to the implementation of AI systems in the workplace even if ergonomics were improved.