

Artificial Intelligence - Measuring Potential Impacts on the Labour Market. The case of Germany.

Topic:

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AI-based systems use techniques such as machine learning and deep learning to automate complex tasks such as pattern recognition, language processing, trend analysis, and decision-making with the help of large amounts of data. Prerequisites for development and application are high computing power, availability of large amounts of data, and new algorithms. A wide application across all economic sectors and private areas is expected. In particular, the spread of chatbot applications have reached already a large number of users.

The current research on this aspect is divers and yet contradictory. The OECD (2023) expects that AI significantly expands the range of tasks that can be automated beyond routine, non-cognitive tasks and impacts nearly all sectors and occupations. According to IMF (2024), 60% of jobs will change due to AI. 50% could benefit from it, the rest would be automated away. Others, like IWK (2026) argue that particularly white-collar professions are strongly affected by AI. And that there will be no impact on overall employment. At the same time, PWC (2026) found out that globally, most companies (56%) see no advantage in AI. 12% have so far successfully reduced costs and increased sales. A genuine business case is still rare. CEOs expect AI to lead to a decline in employee numbers, particularly in junior positions.

Therefore, there is still a high level of uncertainty regarding the future impact on the labor market. Does AI replace or complement human labor? And what does it mean in an economy as Germany which is phasing a significant decline in population in the upcoming years?

We have approached this question by applying a macro-econometric input-output-model for Germany in combination with scenario analysis. We compare two scenarios in which one baseline scenario extrapolates known and observable developments. The other scenario (AI-scenario) assumes a ramp-up in AI development and AI application. The input-output approach allows for the targeted placement of a set of AI-related assumptions generated from industry-specific observations.

The set of AI assumptions cover the whole AI-value chain of an AI-ramp-up: (i) investment in AI computer centers including operational costs, (ii) upfront investments of industries in order to use AI technologies including qualification of employees (iii) increasing material efficiency (iv) import price effects (v) new business models (vi) overall productivity gains. The assumptions are industry-based and differentiate between different levels and speeds at which industries may adapt AI-technologies and AI-applications.

Under the given premises, AI can achieve significantly higher value creation in the medium and long term with almost the same amount of labor as in the reference scenario, which is the result of the productivity increase. If the general population benefits from the higher added value, consumption opportunities increase. However, if the use of low-emission technologies does not increase beyond what is currently foreseeable, emissions will also rise. Although in total the labour market effects are small. There are substantial shifts between economic sectors, skill levels, and occupations to be expected. This structural change is increasing over time when AI technology is getting more and more integrated and widely used throughout the economy.