Originally published July 30th, 2023 in https://www.wzb.eu/en/article/chatgpt-cobots-and-the-like

ChatGPT, cobots and the like

How new automation technologies are transforming the working world

By Alexander Dicks, Martin Ehlert, Insa Grüttgen, Benjamin Schulz, Basha Vicari

Artificial intelligence and automation are currently being debated fiercely. How can these new technologies and applications support people in their work? Will jobs be replaced by AI? Fear of job loss due to digitalization and of loss of autonomy is a widespread concern. The aim of the study presented here is to find out how widespread digital assistance systems are, who uses them and how this affects different groups of employees.

Artificial intelligence and automation have hit the headlines lately – especially since the release of ChatGPT in November 2022. ChatGPT joins a number of new technologies that use sophisticated algorithms and big datasets to automate tasks and activities that could previously only be performed by humans. These new technologies can assist people in their work. For example, by autonomously providing information matching a job task, in generating copy, or by performing manual tasks for them. These technologies are often referred to as artificial intelligence (AI). However, the term is abstract, vague, and does not apply to many applications. Therefore, we rather speak of "digital assistance systems" to highlight the function such systems serve for workers: assisting them, largely automatically, with the tasks they perform in their jobs. Although little is known about their actual diffusion in the working world, public debate is dominated either by doomsday scenarios or by effusive praise for the consequences of these new technologies in the workplace. However, such predictions are usually based on strong assumptions about future developments rather than on reliable data about the use and spread of these technologies.

The aim of our study is to find out how widespread digital assistance systems really are, who uses them, how they continue to be adopted, and how this affects workers. To collect data on their role in the working world for many different activities and areas, we

measure the use of digital assistance systems based on the job tasks workers perform. This means that we do not ask about specific software, applications, or technologies, but rather about the job tasks such systems perform autonomously or the ways in which they assist workers in fulfilling such tasks. Doing so allows us to make long-term use of the questions we developed, because they do not depend on specific titles or even brand names of the technologies we study. In addition, we relate the measurement to the actual job tasks performed, meaning we can measure more precisely the specific aspects of an activity, the job tasks that change.

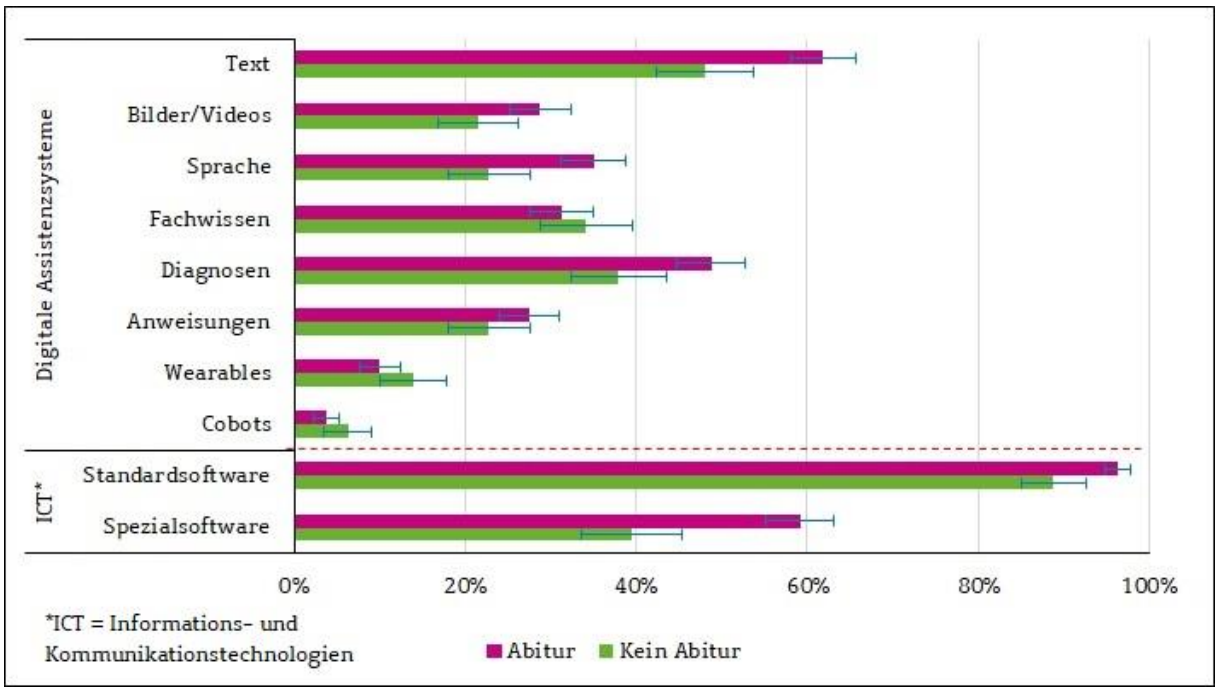
We distinguish between two types of digital assistance systems: those that help workers with cognitive tasks and those that assist them with manual tasks. The first group includes technologies that can recognize or create texts, such as ChatGPT. Automated translation software such as DeepL or specialized chatbots that answer subject-specific questions also fall into this category. Another category includes image-based technologies that create or edit photo-realistic images or videos through text input, such as Midjourney. These, in turn, must be distinguished from systems that process data independently and create diagnoses. The second type – digital assistance systems that assist workers with manual tasks – includes new types of robotic arms that interact dynamically with workers and adapt to their environment, so-called cobots. Wearables, that is, networked devices that are worn on the body and provide information or instructions relevant to performing a task, also belong to this type.

To test the reliability of our newly developed questions on digital assistance systems and to obtain an initial assessment of the changes triggered by digital assistance systems in the working world, we conducted a telephone survey among workers in Germany. We asked about different job tasks, about the quality of work, and about the frequency with which respondents use software or devices that autonomously take over tasks in different areas. The fact that the task is performed autonomously by the application in question is a key distinctive feature, because this is where the crucial advancement is happening compared to established software or conventional robotics.

Depending on the job task, we found major differences in the use of the various digital assistance systems. They are most frequently employed for automated word processing and copywriting. Wearables and cobots, by contrast, are still rarely used to assist with manual tasks. They are used more frequently by individuals without a university entrance qualification (Abitur) – unlike nearly all other job tasks, such as image creation, speech recognition, or diagnostics. The figure clearly shows the corresponding differences by education. The prevalence of wearables and cobots was very low in the sample, meaning we can only interpret this result with much caution.

To be able to map the difference between digital assistance systems and conventional software, we also measured the use of standard office software and specialized software such as CAD and contrasted that with the use of digital assistance systems in our analyzes. As expected, standard software and specialized software are more widespread than digital assistance systems, especially among highly educated workers. Moreover, this comparison shows that our approach to measuring the use of digital assistance systems also includes uses of technology that are primarily relevant for workers in lower-skilled jobs. Furthermore, the low correlation between the use of classic information and communication technologies (ICT) and some digital assistance systems indicates that by asking specifically about digital assistance systems, we measure an additional dimension of technology use not covered by the question about standard software. It is only through the separate observation of digital assistance systems that the nuanced picture described above becomes possible. This should also be considered in research on digitalization-driven social inequality in the labor market.

Figure 1:

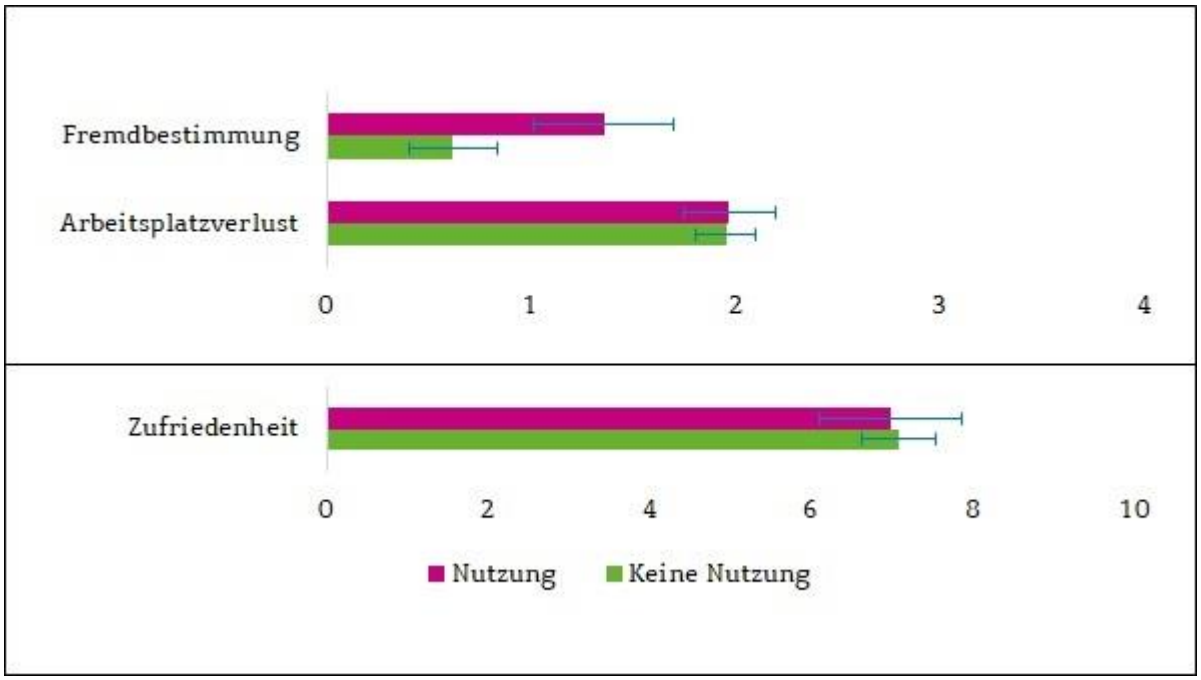


Earlier forms of digitalization in the workplace have already triggered major discussions on their impact on different groups of workers and social divisions in the labor market. For example, fear of job loss as a result of automation is a widespread concern. Public debates have also revolved around the link between digitalization and the quality of work. On the one hand, the spread of digital technologies make physically demanding tasks easier and work in general more flexible. On the other hand, studies showed that digitalization in some occupations and industries leads to higher work intensity, more information to be processed, and less job autonomy, with workers having to complete tasks more quickly and with less freedom to determine their own work routines.

Does the use of digital assistance systems have similar effects? Do workers who use such systems in their jobs differ in terms of their perceived loss of autonomy, their concern about job loss, and their job satisfaction from those who do not? In the case of perceived loss of autonomy, this is the case. Workers who use at least one of the systems at least rarely are far more likely to report this experience than workers who never use even one of the systems. A more detailed analysis shows that this difference is primarily following from the use of technologies for text recognition and copywriting, as well as for digital instruction.

Job loss concerns are reported more frequently than concerns about losing autonomy at work. However, such concerns equally affect users and non-users alike. Likewise, when it comes to job satisfaction, it seems not to matter whether workers use digital assistance systems to complete individual tasks (Figure 2). So, aside from the perceived loss of autonomy, we do not find that new technologies have a particular association with the general working conditions of workers or to widen the so-called "digital divide," that is, the social divide between groups of workers brought on by the spread of digital technologies in the working world.

Figure 2:



For public debates and social science research, it is important to note that digital assistance systems have a quality of their own. Compared to established software and networked digital technologies in the workplace, we see clear differences both in terms of use and in terms of perceived loss of autonomy. We think the second finding is particularly important, as it reflects the key differentiator, that is, the key improvement in current technological advancement and the corresponding new quality of digital assistance systems as compared to traditional software: From the perspective of workers,

digital assistance systems perform their tasks autonomously. The flip side of this autonomy – as our analyzes point out – is workers' perception of losing some of their own autonomy. A good part of the enormous attention these developments are currently receiving is driven by concerns about the effects of precisely this link between digital assistance systems and a loss of autonomy when performing job-related tasks.

The growing loss of autonomy does not seem to translate directly into a perceived loss in the quality of work, at least not up until now. This ambivalence, which already emerged in qualitative studies, should be explored further. In light of these findings, therefore, our general idea of measuring digital assistance systems based on the job tasks someone performs proves promising. It promises to contribute to a more precise and accurate analysis of current trends in training needs as well as in job safety, job quality, and job satisfaction than previous approaches.

Daten:

Data from the WZB development study "Digital Assistance Systems" for the National Educational Panel Study (NEPS). Telephone interviews with 240 respondents conducted from October to December 2022 by the Center for Empirical Social Research (ZeS) at Humboldt Universität zu Berlin. This was a cold-call survey using landline and mobile numbers.

The sample includes individuals aged between 25 and 64 years and working at the time of the survey, including 45% women, 33% with a German university entrance qualification, and 24% working in manufacturing.

References

Friedrich, Teresa S./Laible, Marie-Christine/Pollak, Reinhard/Schongen, Sebastian/Schulz, Benjamin/Vicari, Basha: „Grasping Digitalization in the Working World: An Example from the German National Educational Panel Study". In: Soziale Welt, 2021, Jg. 72, H. 4, S. 415-452. DOI: 10.5771/0038-6073-2021-4-415.

Giering, Oliver/Fedorets, Alexandra/Adriaans, Jule/Kirchner, Stefan: Künstliche Intelligenz in Deutschland: Erwerbstätige wissen oft nicht, dass sie mit KI-basierten Systemen arbeiten. DIW Wochenbericht, 2021, 48. DOI: 10.18723/DIW_WB:2021-48-1.

Krzywdzinski, Martin/Pfeiffer, Sabine/Evers, Maren/Gerber, Christine: Measuring Work and Workers: Wearables and Digital Assistance Systems in Manufacturing and Logistics.

Discussion Paper SP III 2022-301. Berlin: WZB 2022. Online: https://ideas.repec.org//p/zbw/wzbgwp/spiii2022301.html(Stand 14.06.2023).

--

30/06/2023

Alexander Dicks

Martin Ehlert

Insa Grüttgen

Benjamin Schulz

Basha Vicari
