

# Is artificial intelligence changing our future of work? Perceptions of affected workers

## Citation for published version (APA):

Fleck, L., Graus, E., & Klinger, M. (2022). *Is artificial intelligence changing our future of work? Perceptions of affected workers*. ROA. ROA External Reports No. ai:conomics policybrief December 2022

## Document status and date:

Published: 07/12/2022

## Document Version:

Publisher's PDF, also known as Version of record

## Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

## General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

[www.umlib.nl/taverne-license](http://www.umlib.nl/taverne-license)

## Take down policy

If you believe that this document breaches copyright please contact us at:

[repository@maastrichtuniversity.nl](mailto:repository@maastrichtuniversity.nl)

providing details and we will investigate your claim.

December 2022

# ai:conomics policybrief

## Is *artificial intelligence* changing our future of work? Perceptions of affected workers

Fleck, L., Graus, E., Klinger, M.

### Key messages

- This policy brief provides insights about how workers (in-)directly affected by AI implementation experience a change in their work and work environment.
- For this purpose, we conducted 25 in-depth interviews with workers from two multinational private-sector companies that implemented AI.
- Findings suggest that, although several workers were aware of threats such as technological replacement and highlighted human's superiority in certain tasks, most workers acknowledged the added value of AI.
- Furthermore, most workers experienced increased productivity, while some also feared higher workloads as a consequence.
- Nevertheless, no substantial changes in tasks, skill demands, well-being or satisfaction were found as a response to AI implementation.
- Interestingly, perceptions of future employment security depended on the implementation context: interviewees from one company were mostly aware of potential displacement effects, while in the other the AI was perceived as a complementing tool.
- While this brief allows for nuanced insights on individuals' perceptions, more qualitative firm-specific research is necessary to fully comprehend how different implementation contexts of AI can affect various types of workers.

### 1. Introduction

Artificial Intelligence (AI) is yet nowhere near retrieving “artificial general intelligence”: the ability to undertake a wide variety of cognitive tasks that humans can (Acemoglu & Restrepo, 2020; Malone, Rus & Laubacher, 2020). Nevertheless, different fields of AI, such as machine learning, robotics, computer vision, and natural language processing, are already succeeding in performing complex problem-solving tasks as humans would normally do; voice assistants, image recognition, and algorithmic hiring<sup>1</sup> are just a few examples. Although the effects of AI implementation on labour yet remains unclear<sup>2</sup>, it is essential to understand how workers perceive its impact on their work and related outcomes.

Based on qualitative research, this policy brief provides firm-specific insights about whether and how workers (in-)directly affected by AI implementation experience a change in their work and work environment. We interviewed 25 workers at two multinational private-sector companies that have recently implemented new AI applications. The semi-structured interviews took place in 2018-2019 and 2021. To detect patterns in workers' perceptions, we analysed respective interview transcripts using the quali-

<sup>1</sup> For more information about how AI is used in hiring processes, please see the [second ai:conomics policy brief](#).

<sup>2</sup> To read up on the current scope of the effect of AI on work and workers, please see the [first ai:conomics policy brief](#).

tative coding software ATLAS.ti. Note that apart from the distinct organisational characteristics framing the AI implementation, also the interview guidelines for both companies differed slightly. This variation in qualitative data collection limits the possibility for comparison or generalisation, while allowing for more nuanced insights on individuals' perceptions.

## 2. AI use-cases, organisational setting, and role characterisation

The first company ("Company A"), a manufacturer of electronic components, implemented an intelligent image-recognition technology used for quality control in their production process. The AI is added onto a rule-based, automated optical inspection software and is aimed at strengthening quality assurance. Furthermore, the intelligent technology offers a second instance of decision-making, supporting the operators in assessing the quality of products on the line.

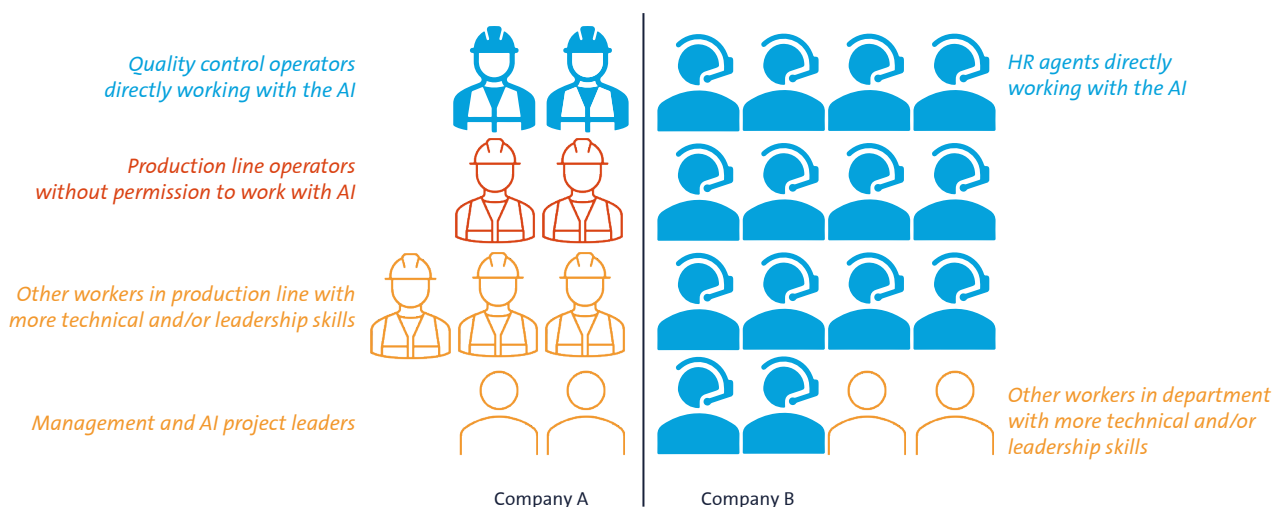
We conducted a total of nine interviews at Company A, among them, two quality control operators, three production line operators (one with additional technical know-how), a production line leader, a shift leader and two project leaders who are involved in the management of the company's AI-project. Not all these workers directly interact with the AI at their workplace, as we also aim to examine effects on workers in adjacent jobs. The interviewees in Company A work in a highly digitalised production environment, leading

them to sometimes answer our questions regarding innovative, not necessarily intelligent, technologies. In case the workers do relate to the AI specifically, it is mentioned explicitly throughout this brief.

The second company ("Company B") is a service provider that implemented a conversational AI with an intelligent search engine and chatbot function. The software provides answers to queries related to human resources (HR). The user-friendly self-service tool is not only supporting operational HR employees (hereafter referred to as "HR agents") during their tasks in phone and e-mail service, but also enables employees from other functions within Company B (hereafter referred to as "customers") to search for answers themselves before contacting the HR department. Ultimately, the AI is aimed at reducing the number of queries and therefore, decreasing the agents' work pressure and freeing up time to work on other tasks.

We conducted 16 interviews at Company B, out of which 14 had the same job: the HR agents who primarily answered HR-related queries via phone or e-mail. To our understanding, their areas of expertise could vary, so that some of them were responsible for talking to only active employees, and others also consulted applicants or retired employees. All HR agents were directly interacting with the AI. The remaining two interviewees were also familiar with the operations within the HR service centre, though having supervisor-related roles including content responsibility.

**Figure 1.** Overview of interviewees in Company A & B



In both use cases, interestingly, the AI is implemented in tasks that in principle may be considered routine, with an occasional transition to a non-routine cognitive component under specific circumstances. For instance, in Company A, checking product images for production mistakes is a repeated task that follows standard procedures and defined rules. When operators detect a novel mistake however, they need to check products from multiple angles and more carefully, implying that they are transitioning into a rather non-routine cognitive task in that moment. In Company B, explaining standardised procedures to customers on the phone or via e-mail follows protocol and can be interpreted as a routine task. However, once special cases that go beyond standardisation occur, solutions must be tailored to the specifics of a customer's problem, also forcing agents to break their routine approach and explore alternative ways.

### 3. How did workers perceive changes in their work and work environment?

We examined workers' perceptions related to their interaction with technology, and consequent changes in subjective productivity measures, changes in workload as well as in their tasks and skills. Furthermore, we investigated technology-induced changes in workers' well-being, satisfaction and their perceptions of job security.

#### 3.1 Working with innovative technologies

At Company A, the AI component was running in the background of another, rule-based optical inspection technology which the workers have been accustomed to. Only two interviewees from our sample were directly working together with this software and thus, the AI. Both identified its added value such as trustworthy recommendations, increasing work speed and quality. One of them explicitly acknowledged cost effectiveness as an organisational benefit, while also voicing concerns about anticipated headcount reductions. This interviewee was convinced of the need for humans to make final quality decisions, which may be an indicator of hesitation towards the accuracy of the implemented AI. When asking the other 7 out of 9 interviewees who were not directly affected by the AI (7/9), about their perceptions in regard to working with other innovative technologies such as e.g., robots, the findings are dispersed as well. Some acknowledged technologies' potential to prevent mistakes, increase process speed, and ease

overall work (3/7). However, as one of the workers affected by the AI, some other informants also feared technological replacement (3/7) and one interviewee mentioned a lack of confidence in using the latest technologies due to their complexity (1/7). Another critical voice stated that software generally lacks insights into what exactly some problems entail (1/7), again implying perceived human superiority in decision tasks.

At Company B, the AI was perceived as a supporting tool which some interviewees found helpful (7/16), some under the condition that information still had to be double-checked by a human (2/16), while others denied its helpfulness altogether (2/16). Moreover, five interviewees claimed that the tool had limited knowledge and therefore room for improvement. The fact that the AI was only able to react to queries with generic answers without any customisation (2/16) was emphasised particularly, leading us to interpret that the interviewees still believed that humans were superior in their job, more particularly, their non-routine tasks, due to humans' cognitive flexibility. Overall, the general perception of the AI tool is mixed. A few informants found it neutral (2/16), while more had positive impressions (5/16). Yet others were undecided (4/16), mentioning potential displacement and the importance of continuously valuing human capabilities in their job.

“So, I think ... it's good how [technology is] developing and what you can use ..., but you shouldn't forget your common sense and not always run after [every trend], but first think about whether it's good and whether you're using it properly.”

#### 3.2 Productivity and workload

Although at Company A only two interviewees directly worked with the AI, other workers (7/9) might have also been indirectly affected in terms of their productivity and workload. Some of them explained that they measured their own productivity based upon the status of key performance indicators (KPIs) (3/7), while others presumed that they were productive on a daily basis (2/7). Remarkably, interviewees believed that technology increased their own productivity (3/7), potentially due to an increase in the speed of work (1/7). Apart from one informant denying an effect of technology on productivity (1/7), more interviewees expressed that the initial image-recognition technology eased work (3/7) and secured quality (1/7). Accordingly, one of the quality control operators

stated that the AI made processes faster (1/2), while one of the managers noticed an improvement in the efficiency and quality of products (1/2). None of the interviewees mentioned that the image-recognition technology or its integrated AI affected their productivity or product quality negatively. Contrarily, one interviewee explicitly acknowledged machines' superiority in outcome quality:

"I always say, I think, the quality a human produces is different from what robots produce. ... I do think [technology] can be a relief and computers have more brain [than humans]."

Although technologies seemed to influence the pace of work and the quality of products, its impact on workload remains unclear. While employees in leadership positions voiced that the AI should lead to a reduction of workload among the production line workers (2/4), who themselves hold rather diverged opinions. Some of them expressed to have experienced an increase in workload (2/5), while one claims the opposite (1/5). Another believed that workload decreased, but that production speed as well as the repetition of conducted tasks increased (1/5). Interestingly, most workers believed that their workload in the future will also increase (4/5). Evidently, the actual effect of the AI on the current or future workload of workers remains yet undetermined.

At Company B, the HR agents defined their own productivity in two different ways: the number of completed queries in a day (6/14) and the perceived quality of their calls (3/14). When asked how the AI influenced their efficiency and effectiveness, most of them reported a positive effect (12/14): the AI helped to complete tasks faster (6/14), thus speeding up work processes and saving time (4/14).

"[The] search function is already an aid and lets me find things faster so I can get more done in the day or finish [fifteen minutes] earlier. Some tasks I can do faster."

Results regarding the effect of AI on agents' way of work and workload were, however, less aligned. Although some informants voiced that the AI indeed made work faster and saved time by providing support and additional information (7/14), others believed that the AI did not substantially impact their work (4/14). Since the AI is claimed to simply represent a different approach to achieve the same

result (1/14), one of the supervisors did not necessarily notice workload reduction caused by the AI either (1/2). Hence, although it seems that the AI helped the HR agents in their work by assisting and providing fast information, it remains uncertain to which extent their workload improved. This could stem from the observation that the AI lacked some specialised knowledge which could have inclined customers to continuously consult the agents as well.

### 3.3 Changes in tasks and skill demands

Besides an impact on productivity and workload, AI can also impact employees' tasks and skills (Acemoglu & Restrepo, 2020; Brynjolfsson, Mitchell, & Rock, 2018; Samek, Squicciarini & Cammeraat, 2021). At Company A, some interviewees were working in the same jobs, and therefore, performed the same tasks and utilised similar skills sets. Although none of the interviewees mentioned a significant impact on their tasks, some implied that the nature of their tasks changed because of technological innovations: for instance, one worker expressed that there was more room to structure tasks autonomously and prepare for new orders (1/7). In addition, another interviewee mentioned that they gained additional responsibility since they had to oversee more production lines (1/7). This interviewees' impression that the AI responsibly detected simpler errors in inspected products autonomously, therefore leaving workers to check more complex errors, may allude to a change in complexity within the task of product inspection. Nonetheless according to two informants, no new skills were needed to work with the AI. One interviewee labelled the AI as a "normal computer" running in the background of various processes (1/7). Other workers did not mention a need for reskilling. Management, however, addressed that more specialists may be needed for complex tasks such as programming or optical inspection processes in the future (1/2).

At Company B, HR agents' usual tasks involved reacting to queries by giving information via e-mail and phone. Most of them too voiced that the implementation of the AI did not change their tasks (11/14). Although the nature of the tasks apparently remained the same, one interviewee indicated that it created more room to learn about topics more in-depth (1/14). Furthermore, while most HR agents stated that no new tasks were generated (11/14), one interviewee mentioned the introduction of the AI tool to the customers as a new task (1/14). Some others believed that improving the AI might be a new task for the future (3/14). Both supervisors also indicated



that improving the AI could be a new task for the HR agents (2/2). Nevertheless, neither supervisors (2/2) nor agents (13/14) indicated that new skills are needed to interact with the AI, potentially backed by one claim that the AI acted as a regular search engine (1/14). Although it appears there was no real impact on performed tasks or required skills, some interviewees identified improving and training the AI as a potential future task. This might require some different skills, e.g., technical skills, as well.

### 3.4 Well-being and satisfaction

When asked how interviewees from Company A viewed their well-being, some assessed that the implementation of innovative technologies eased their work (2/9). One other noted no change in well-being, while another said that well-being declined due to the increase in production speed. Strong social contacts were mentioned twice as an important predictor for well-being, one interviewee even stated that if robots were to replace most humans in the production, work would be less enjoyable:

“At some point, [a colleague] is bound to be replaced [by computers/robots]. But I think to myself, you need this social [aspect] in work. And not only in [your] personal life.”

As an inhibitor of employee well-being, workers' perceived stress may also depend on technology use (Salanova, Llorens & Cifre, 2013). Interviewees at Company A had ambiguous perceptions of stress caused by new technologies. While some reported an increase in stress (4/9), others perceived a decline (3/9). Individual statements hinted toward technologies having reduced stress related to the difficulty of the task itself, i.e., tasks becoming easier (1/9). Simultaneously, the implementation of technologies appeared to have increased stress related to the speed in which tasks were performed (2/9) and how often they needed to be carried out (2/9). One informant particularly observed that newly implemented technologies and their implications led to increased stress at first while decreasing stress over time (1/9).

At Company B, most of the interviewees were satisfied with their job (13/16), while a few acknowledged fatigue (2/16) or the desire to change their job (1/16). The AI-tool was not mentioned as a factor affecting job satisfaction, neither positively nor negatively. Factors that have been explicitly identified to negatively affect job satisfaction were unfriendly customers on the phone (3/16), (mental) exhaustion

and/or stress (3/16), constant organisational changes and adapting to them (3/16), as well as the maintenance of work quality (1/16). Positive contributors to job satisfaction on the other hand were social aspects such as closeness to colleagues (6/16) and managers (3/16) as well as interacting and communicating with other people (5/16), especially helping them (4/16).

### 3.5 Job security and future development

As interviews at Company A were conducted with workers in different positions, it may not be surprising that findings on perceived job security are inconclusive. While some did not change their future career plans (2/9), others were proactively taking measures to develop skills that they deemed necessary to keep up with technological change, and thus, remain employable (4/9). The differences in these statements may be correlated with the positions and their respective development prospects, e.g., one operator stated that there are only limited options for future development within production. The same interviewee was uncertain and pessimistic about the future, convinced that there will be no operators in the line anymore in the upcoming 10 years, fully aware that software partially is taking over certain tasks:

“So, the future does not look bright. At some point, there will probably no longer be any operators on the lines, only the line leaders who will take over.”

Most of the production line workers were rather pessimistic about the future (3/4), while threats were perceived less urgent by workers with additional technical or leadership responsibilities (2/3). The employees in upper management positions were fully aware of AI having the potential to replace human labour (2/2) and were striving to build autonomous processes (1/2). In an environment with a relatively high number of temporary contracts and loaned work, high turnover is not unusual (1/9). While apparently there was no formal communication of potentially labour-displacing effects of the implemented AI (1/9), production line workers were mostly well-aware that headcount may be reduced as a consequence (3/4). Especially, certain organisational policies that facilitated voluntary turnover, such as settlement programs and temporary contracts raised assumptions of displacement (1/9).

“So, I think the only thing that distinguishes [humans] from robots or something like that is that [humans]

can show feelings, that's the only thing, and that makes one a bit afraid of being replaced.”

In Company B, job security was evaluated positively by most interviewees (10/16), out of which one mentioned that their perception was only positive under the condition that no tasks would be outsourced. One out of the four informants who were rather uncertain about their job security also referred to previous headcount reductions and the assumption that standardised processes may be outsourced in the future. Accordingly, some interviewees uttered preferences to switch their position, department, or employer in the future (4/16) or develop further skills (2/16). Contrarily, some informants desired to remain in their jobs until retirement (5/16), while others did not have any specific plans for their professional future (3/16).

The overall positive evaluation of job security at Company B implies that the introduced AI had not yet been related to a potential decline of secure employment. This may be associated with age, as the majority of informants who stated to wait for retirement were in their late fifties (4/5), compared to younger to middle-aged interviewees wanting to develop further professionally or not planning for any particular change. Furthermore, this can be related to the fact that the AI was perceived as a tool benefitting work (9/16), rather than reducing customer calls, and was compared to a colleague or friend by some of the interviewees (2/16). Sceptical voices acknowledged that the AI tool may currently be beneficial; however, a certain reasonable balance should be remained:

“[The AI-tool] is a medium which definitely simplifies daily work, but the bottom line is that it should not be developed enough or used to rationalise the displacement of various jobs at some point.”

#### 4. Conclusion

What do our findings reveal about innovative and intelligent technologies' effects on perceptions of work? Remarkably, although quite some interviewed workers were aware of threats such as technological replacement, most informants were still able to acknowledge the added value of technological progress: they mostly perceived the AI as a supporting tool and highlighted human superiority in decision-making as well as flexibility. Furthermore, while most workers noticed an increase in productivity, some of them also feared an increase of their workload based on a

technology-induced increase in work- and production speed. Moreover, we neither found substantial changes in tasks nor current skill demands, potentially resulting from the AI technologies being embedded within familiar tools and work processes in both use-cases. However, the absence of changes in tasks and skills may also only be valid in the short run, as the interviews were conducted shortly after AI adoption. In addition, we did not detect clear patterns of a direct effect on well-being or satisfaction as a result of AI implementation. However, perceptions of future employment security depended on the implementation context: in one company the interviewees were mostly contemplating technological displacement effects more pronouncedly, while the AI was rather perceived as a supporting, complementing tool in the other company. This may partially depend on organisational communication strategies surrounding the AI implementation and its consequences for workers' job security.

Ultimately, while this brief aimed to provide insights on how workers experience AI implementation, additional qualitative firm-specific research is essential to fully comprehend how different implementation contexts of AI can affect various types of workers. Additionally, although we did not find substantial evidence that AI adoption changed workers' tasks, skill demands, well-being or satisfaction in the short run, long term consequences of AI adoption on these- and related outcomes are yet to be understood.

Accordingly, workers' individual experiences highlighted in this brief can serve as a basis for considerations surrounding firm-specific AI implementation. Even though the interviewed workers have not been able to observe substantial changes in tasks, skills, well-being and satisfaction, they can still worry about their workload and employment security in the future. This implies that even though AI may currently not incur drastic changes in jobs yet, affected workers are not limiting their concerns to the short run. Most of them seem to anticipate these changes in the future, showing clearly that workers need to be taken along in the journey of AI implementation. Aside from monitoring AI-induced changes, mitigating any occurring fears and concerns among workers seems increasingly important. For instance, concerns can be addressed by transparently informing workers of potential effects and offering opportunities to proactively shape their professional future.

#### Acknowledgements

We would like to sincerely thank *Marie Fischer* for her outstanding support in the preparation of qualitative interview data.



## References

- Acemoglu, D., and Restrepo, P. (2020). The Wrong Kind of AI? Artificial Intelligence and the Future of Labour Demand. *Cambridge Journal of Regions, Economy and Society*, 13(1), pp. 25-35.
- Brynjolfsson, E., Mitchell, T., and Rock, D. (2018). What Can Machines Learn and What Does It Mean for Occupations and the Economy? *In AEA Papers and Proceedings*, 108, pp. 43-47.
- Malone, T.W., Rus, D., Laubacher, R. (December 2020). Artificial Intelligence and the Future of Work. Research Brief 17, MIT. Retrieved from: <https://workofthefuture.mit.edu/wp-content/uploads/2020/12/2020-Research-Brief-Malone-Rus-Laubacher2.pdf>
- Salanova, M., Llorens, S., & Cifre, E. (2013). The dark side of technologies: Technostress among users of information and communication technologies. *International journal of psychology*, 48(3), 422-436.
- Samek, L., Squicciarini, M., and Cammeraat, E. (2021). The human capital behind AI: Jobs and skills demand from online job postings. *OECD Science, Technology and Industry Policy Papers*, No. 120, OECD Publishing, Paris. Retrieved from: <https://doi.org/10.1787/2e278150-en>