

# Experimental estimates of AI occupational exposure in Canada

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Recent advances in artificial intelligence (AI)—highlighted by the release of ChatGPT—have fuelled excitement as well as concerns about the role of human workers in the future. While previous waves of technological transformation such as automation mainly affected less educated workers performing routine and manual tasks, a broader segment of the labour force could potentially be affected in an era when highly sophisticated algorithms that can model language and other AI applications increasingly excel at performing non-routine and cognitive tasks typically performed by highly educated workers.

The new Statistics Canada study, "[Experimental Estimates of Potential Artificial Intelligence Occupational Exposure in Canada](#)," published today sheds light on this issue. It provides experimental estimates of potential AI occupational exposure faced by different groups of Canadian workers based on the tasks that they perform. This study uses the method developed by Pizzinelli et al. (2023) (see Note to readers).

The study distinguishes three types of workers: those whose jobs are highly exposed to AI and who might benefit from it because of a high degree of complementarity between their tasks and AI capabilities, those whose jobs are highly exposed to AI and whose tasks might be replaced by AI, and those whose jobs are not highly exposed to AI.

The study found that, in May 2021, 29% of Canadian workers held jobs highly exposed to and highly complementary with AI. Meanwhile, 31% were in high exposure and low complementarity jobs. The remaining 40% were in jobs not highly exposed to AI. The AI occupational exposure distribution was similar in May 2016.

The study also shows that AI might be more likely to transform the jobs of highly educated workers than those of their less educated counterparts. This is contrary to prior waves of technological transformation, which mainly affected less educated workers.

For instance, the study estimates that, in May 2021, 50% of workers with a bachelor's degree or higher held jobs highly exposed to and highly complementary with AI. This is almost four times the rate of 13% observed for workers with a high school diploma or less. Workers with a bachelor's degree or higher (36%) also held proportionately more jobs that were highly exposed to AI and whose tasks might be replaced by AI than workers with a high school diploma or less (25%).

In sum, 86% of highly educated workers held jobs highly exposed to AI in May 2021, compared with 38% of their less educated counterparts.

It is important to note that these experimental estimates of AI occupational exposure are based on a limited number of AI applications and how they might interact with some human abilities. The set of tasks which AI might be able to perform fully unsupervised might grow in the future with technological advancement. As such, the applicability of the index used in this study might decrease over time and therefore the experimental estimates presented in this study should be interpreted with caution.

There are several reasons why employers may not immediately replace humans with AI, even if it is technologically feasible to do so. These reasons include financial, legal and institutional factors. Consequently, relatively higher occupational exposure to AI does not necessarily imply a higher risk of job loss.

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### Note to readers

The study "[Experimental Estimates of Potential Artificial Intelligence Occupational Exposure in Canada](#)" uses the complementarity-adjusted artificial intelligence (AI) occupational exposure (C-AIOE) index developed by Pizzinelli et al. (2023) and applies it to the 2016 and 2021 censuses of population. The C-AIOE index is a variation of the original AIOE index developed by Felten, Raj and Seamans (2021) which measures relative occupational exposure to AI without accounting for potential complementarity of AI. The C-AIOE measures the potential relationship between 52 human abilities and 10 AI applications weighted by the degree of complexity and importance of those skills for a given occupation, as well as the potential complementarity offered by AI in that occupation. An occupation is considered high-exposure if its AIOE index exceeds the median AIOE across all occupations, and low-exposure otherwise. An occupation is considered high complementarity if its complementarity index exceeds the median complementarity across all occupations, and low complementarity otherwise. Occupations were grouped into three broad AI exposure classifications: (1) high exposure and low complementarity, (2) high exposure and high complementarity and (3) low exposure.

The study "[Experimental Estimates of Potential Artificial Intelligence Occupational Exposure in Canada](#)," part of the *Analytical Studies Branch Research Paper Series* ([11F0019M](#)), is now available.

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