Study: The changing nature of work in Canada amid recent advances in automation technology

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Businesses adopt technology to improve their productivity, which generally results in workers spending less time performing routine, manual tasks in favour of non-routine, cognitive tasks. Recent and significant advances in artificial intelligence (AI) may have accelerated this trend, which could have negative implications for workers who perform primarily routine, manual tasks. The COVID-19 pandemic could further encourage firms to adopt automation technology as they look to make the production and delivery of goods and services more resilient in the future.

A new Statistics Canada study is the first to track trends in the share of workers employed in four different occupational task groups from 1987 to 2018, with a focus on the degree of routine or non-routine and cognitive or manual tasks required in workers' occupations. This study, conducted in collaboration with the Institute for Research on Public Policy and published in the first issue of the new Statistics Canada publication *Economic and Social Reports*, also examined the detailed job tasks performed by employees from 2011 to 2018—a period of rapid advances in AI and machine learning.

The results reveal a gradual shift from occupations involving routine tasks to those involving non-routine tasks over the past three decades. No sudden shifts were observed over the last decade as the development of AI expanded. This suggests that—at least until 2018—AI has not accelerated the changing nature of work in Canada, which had already been underway for decades. Nonetheless, the cumulative changes over this period are notable.

Specifically, the share of Canadians working in managerial, professional and technical occupations (generally associated with non-routine, cognitive tasks) increased from 23.8% in 1987 to 31.2% in 2018, while the share employed in service occupations (non-routine, manual tasks) increased more moderately (from 19.2% to 21.8%) over the same period. Examples of managerial, professional and technical occupations include dentists and agricultural and fish product inspectors, whereas examples of services occupations include dental assistants and hotel front desk clerks.

The slight increase in the share of employees in service occupations (which are potentially automatable in many cases) was explained in large part by changes in the industrial structure. For example, the aging population increased the demand for health care services. Moreover, the share of workers in service occupations more or less ceased to grow since 2010.

Meanwhile, more routine (and automatable) occupations were on the decline. The share of workers employed in production, craft, repair and operative occupations (routine, manual tasks) dropped from 29.7% in 1987 to 22.2% in 2018, while the share employed in sales, clerical and administrative support occupations (routine, cognitive tasks) also decreased over the period (from 27.3% in 1987 to 24.9% in 2018). Examples of production, craft, repair and operative occupations include mine labourers and mechanical assemblers and inspectors, whereas examples of sales, clerical and administrative support occupations include receptionists and retail salespeople.

More detailed analysis was done on the tasks performed by workers from 2011 to 2018. The findings indicate that job tasks that are complementary to automation, such as non-routine cognitive tasks, were somewhat more important in Canadians' jobs in 2018 than in 2011. For example, the task of analyzing data or information increased in importance by 3.7% among Canadian workers. Similarly, interpersonal tasks such as coaching and developing others, and guiding, directing and motivating others also increased in importance (by 3.6% and 3.5%, respectively). However, there were no large, systematic declines observed in the importance of more routine, manual tasks from 2011 to 2018, as might have been expected given that automation technology may be able to perform these tasks in certain instances.

Note to readers

*The study "The changing nature of work in Canada amid recent advances in automation technology" is based on Labour Force Survey (LFS) occupation data from 1987 to 2018, as well as on job task data from the US Occupational Information Network (O*NET) that were linked to the LFS for 2011 to 2018.*

The research article titled "The changing nature of work in Canada amid recent advances in automation technology," is now available in the January 2021 online issue of *Economic and Social Reports* (36-28-0001).

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