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# Automation, Rise of the Digital Economy and Implications for China's Labour Market

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In October 2020, the Fifth Plenum of the 19th Communist Party Congress discussed China's 14th Five-Year Plan at a time the COVID-19 pandemic is still impacting workplaces in China and overseas. In the 13th Five-Year Plan released in 2015, the Chinese government set a policy target (anticipatory) of creating 50 million **new employment opportunities** between 2016 and 2020. The policy target has been well achieved as over 60 million new employment opportunities have been generated between 2016 and 2020.<sup>1</sup> The plan has listed a host of active labour policies including implementing labour training programmes, promoting employment for university graduates and migrant workers, as well as supporting public employment services.

For the next five years, **automation** is likely to exert a negative impact on the labour market and policy responses are necessary to mitigate the aftermath. While the total number of employees working in legal entities in the secondary and tertiary industries had increased from 356 million in 2013 to 383 million in 2018, those in manufacturing had declined by over 20 million in the same period; the difference was offset by an increase of more than 47 million new jobs in the service sector.<sup>2</sup>

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<sup>1</sup> [http://www.mohrss.gov.cn/SYrlzyhshbzb/dongtaixinwen/buneiyaowen/202010/t20201029\\_393544.html](http://www.mohrss.gov.cn/SYrlzyhshbzb/dongtaixinwen/buneiyaowen/202010/t20201029_393544.html), accessed 1 November 2020.

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Automation, or the process by which work performed by humans is replaced by machines, is entering a new era of digitalisation based on the accelerated growth of digital data, or machine-readable data.<sup>3</sup> Workplace automation in manufacturing as well as service industries now involves the application of software and hardware via network connections that enable automated workflows.<sup>4</sup> **Data** constitutes a non-rivalrous economic resource for production that can be used by many firms or government agencies without limiting others in the use of the same resource (OECD 2015).<sup>5</sup> The International Data Corporation has forecast a huge jump in data usage from 16.1 zettabytes of data generated in 2016 to more than 59 zettabytes (ZB) of data used in 2020.<sup>6</sup>

The recent technological changes in artificial intelligence (AI), the 5G mobile network and cloud computing are all driven by digital data. With the digitalisation of the economy, the degree of automation could be significantly accelerated. This is on top of the fact that first, numerically controlled machine tools have been widely applied in industry and **industrial robots** quickly introduced in economic activities. Local wireless digital communications are expected to expand dramatically with 5G technology, clocking download speeds that far exceed the previous 1.0 gigabits per second achieved.<sup>7</sup> Thus, with the support of 5G networks robots will be able to communicate wirelessly and at a much quicker rate and in more flexible ways than before, creating conditions for a smooth transition to the stage of Industry 4.0.<sup>8</sup>

Second, many tasks can be carried out with software and data facilities in the “cloud”. A **cloud service** is a data centre that rents out its services for storage, computing, or other applications. Many of these services could be AI-related such as natural language processing, voice recognition, facial recognition, knowledge graph, intelligent recommendations and so on. Foxconn Industrial Internet cloud platform (Fii Cloud), for example, provides AI-based services to support “lights-off” factories that are run entirely by robots.<sup>9</sup>

Empirical evidence suggests that automation will be widely applied in China. In 2018, the installations of industrial robots in China reached over 154,000, or **36% of the world total**. This is followed by Japan, which accounts for 13% of the world total.<sup>10</sup> After the outbreak of COVID-19, the number of installed industrial robots has surged. Shipments of industrial robots

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<sup>2</sup> [http://www.gov.cn/xinwen/2014-12/16/content\\_2791953.htm](http://www.gov.cn/xinwen/2014-12/16/content_2791953.htm) and [http://www.gov.cn/xinwen/2019-11/20/content\\_5453896.htm](http://www.gov.cn/xinwen/2019-11/20/content_5453896.htm), accessed 31 October 2020.

<sup>3</sup> [https://unctad.org/system/files/official-document/der2019\\_en.pdf](https://unctad.org/system/files/official-document/der2019_en.pdf), accessed 14 October 2020.

<sup>4</sup> <https://www.computerisation.co.uk/can-workplace-automation-change-business/>, accessed 29 October 2020.

<sup>5</sup> <https://www.oecd.org/sti/data-driven-innovation-9789264229358-en.htm>, accessed 14 October 2020.

<sup>6</sup> <https://www.idc.com/getdoc.jsp?containerId=prUS46286020> and <https://www.import.io/wp-content/uploads/2017/04/Seagate-WP-DataAge2025-March-2017.pdf>, accessed 4 November 2020.

<sup>7</sup> <https://www.verizon.com/about/our-company/5g/5g-speed-how-fast-is-5g>, accessed 10 October 2020.

<sup>8</sup> <https://www.epicor.com/en/resource-center/articles/what-is-industry-4-0/>, accessed 14 October 2020.

<sup>9</sup> <https://www.tencent.com/en-us/articles/2201083.html>, accessed 12 October 2020.

<sup>10</sup> <https://asiatimes.com/2020/08/us-china-both-lag-badly-in-industrial-robot-race/>, accessed 14 October 2020.

to larger enterprises from January to August 2020 registered 14% growth in 2020 compared to the same period in 2019.<sup>11</sup>

China has also initiated several **policy initiatives** in recent years to **support automation in industries**, such as promoting the provision of cloud-based services for the manufacturing sector. In 2017, the ministry of information technology released a three-year action plan (2017-2019) for cloud computing. The action plan encouraged collaboration between major industrial firms and firms providing cloud computing services to build up cloud platforms for industries such as steelmaking, automobile and light industries, among others.<sup>12</sup> In Zhejiang province, cloud services have supported SMEs in their production, marketing and other economic activities.<sup>13</sup> By the end of 2019, more than 377,000 firms out of around 1.5 million enterprises in Zhejiang province had subscribed to cloud services.<sup>14</sup> In Hangzhou, the capital city of Zhejiang, over 94% of above-scale industrial firms have subscribed to cloud services.<sup>15</sup>

Chinese initiatives to support automation are, however, likely to be constrained by the **US-China technology conflict**. One significant factor is US export restrictions on China's access to advanced semiconductor chips, which are essential for automation.<sup>16</sup> So far, Chinese manufacturers have yet to catch up with foreign producers of advanced AI chips and the supply from leading firms such as Taiwan Semiconductor Manufacturing Company may also be restricted due to US policies.<sup>17</sup> This is an area the Chinese leadership will concentrate its resources on to avoid dependence on US suppliers.

Industrial internet links machines and devices in the manufacturing process and provides automated services for prediction and maintenance. As part of the digital economy, **industrial internet** is gaining importance in China, with the total value-added of industrial internet services hitting RMB2.1 trillion in 2019 (2.2% of gross domestic product or GDP), up from RMB1.4 trillion in 2018 (or 1.5% of GDP).<sup>18</sup> Haier's (海尔) COSMOPlat has become a global leading industrial internet platform. Up to May 2020, COSMOPlat served 43,000 companies with 330 million end-users.<sup>19</sup> COSMOPlat has collected massive user data through the "mass customisation" model (大规模定制), thereby attracting service providers such as designers as well as equipment and logistics providers.<sup>20</sup>

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<sup>11</sup> [http://www.stats.gov.cn/tjsj/zxfb/202009/t20200915\\_1789519.html](http://www.stats.gov.cn/tjsj/zxfb/202009/t20200915_1789519.html), accessed 12 October 2020.

<sup>12</sup> [http://epaper.cena.com.cn/content/1/2017-04/14/03/2017041403\\_pdf.pdf](http://epaper.cena.com.cn/content/1/2017-04/14/03/2017041403_pdf.pdf), accessed 12 October 2020.

<sup>13</sup> <http://www.chinado.cn/?p=8873>, accessed 12 October 2020.

<sup>14</sup> [https://m.gmw.cn/toutiao/2020-04/26/content\\_1301182644.htm](https://m.gmw.cn/toutiao/2020-04/26/content_1301182644.htm), accessed 12 October 2020. The number of legal entities in Zhejiang by the end of 2018 was about 1.54 million, see [https://zjnews.zjol.com.cn/zjnews/zjxw/202001/t20200123\\_11606148.shtml](https://zjnews.zjol.com.cn/zjnews/zjxw/202001/t20200123_11606148.shtml), accessed 5 November 2020.

<sup>15</sup> [http://jxt.zj.gov.cn/art/2020/6/1/art\\_1657979\\_44422991.html](http://jxt.zj.gov.cn/art/2020/6/1/art_1657979_44422991.html), accessed 5 November 2020.

<sup>16</sup> <https://www.bloomberg.com/news/articles/2020-10-21/the-u-s-china-conflict-over-chips-is-about-to-get-even-uglier>, accessed 5 November 2020.

<sup>17</sup> <https://www.cigionline.org/articles/catching-technology-war-chinas-challenge-artificial-intelligence>, accessed 5 November 2020.

<sup>18</sup> China Academy of Information and Communications Technology, *Industrial Internet Economic Development Report*, 2020.

<sup>19</sup> [https://www.sohu.com/a/399554217\\_260616](https://www.sohu.com/a/399554217_260616), accessed 12 October 2020.

With manufacturing industry employment still constituting 27.5% of China's workforce in 2019, the risk of **job losses due to automation** looms over highly routine tasks in both large and small industrial enterprises, necessitating a shift of workers to the service sector. On the other hand, there will be more informal sector jobs as an estimated 80 over million in the workforce are providing services for the **sharing economy** in China.<sup>21</sup> For example, about 3.99 million workers managed to make a living as Meituan food delivery drivers in 2019, up 23% from that in 2018.<sup>22</sup> About 30% of Meituan food delivery drivers were reportedly former workers in the manufacturing sector.<sup>23</sup>

Studies have confirmed that many workers who performed highly routine tasks in China's manufacturing industry have lost their jobs, while those in the non-routine or middle-level routine activities have been less severely impacted.<sup>24</sup> As automation in industry is still a recent phenomenon, **acceptance of automated manufacturing technology** among government and business is still considerable.<sup>25</sup> The driving forces of automation in Dongguan – a prominent example of the “Workshop of the World” in Guangdong province – relate to the competitive pressure experienced by Chinese enterprises, more for the improvement in productivity and quality levels, and less to government subsidies provided for robots.<sup>26</sup>

The rise of the digital economy can accelerate the process of automation at the risk of substantial job losses, but the transition to a digital economy will also generate new jobs. China has been promoting **digital platforms** that can promote flexible employment and job-sharing. In April 2020, the National Development and Reform Commission and Cyberspace Administration of China jointly released an action plan to promote flexible employment, job-sharing and gig-employment in the digital economy. In a recent report, the number of users and providers in the platform economy reached about 800 million in 2019.<sup>27</sup> Industrial relations and corresponding social insurance enrolment for the flexibly employed are policy issues that are still under discussion.

In the next few years, social protection to accommodate changes in the labour market is an absolute necessity. Currently, informal sector workers or the flexibly employed are insufficiently covered by **social insurance**. Policy changes to provide a more comprehensive coverage of social insurance for informal sector workers are in the pipeline. For example, the April 2020 action plan has singled out new jobs such as freelance designers, ride-hailing drivers, food deliverymen, online match-makers, online fitness coaches, freelance photographers and

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<sup>20</sup> MERICS, *China's Digital Platform Economy: Assessing Developments Towards Industry 4.0*, 2020.

<sup>21</sup> The State Information Centre, *Annual Report of Sharing Economy in China 2020*, 2020.

<sup>22</sup> [https://www.sohu.com/a/396547361\\_100011383](https://www.sohu.com/a/396547361_100011383), accessed 12 October 2020.

<sup>23</sup> <https://news.sina.com.cn/c/2019-04-13/doc-ihvhiqax2411390.shtml>, accessed 12 October 2020.

<sup>24</sup> Dong, Y and Wei, X, Task Content Routinisation, Technological Change and Labour Turnover: Evidence from China, *The Economic and Labour Relations Review*, vol, 31, Issue 3, 2020, pp. 324-346.

<sup>25</sup> Cao, D, Tao, H, Wang, Y, Tarhini, A and Xia, S, Acceptance of Automation Manufacturing Technology in China: An Examination of Perceived Norm and Organizational Efficacy, *Production Planning & Control*, vol. 31, no. 8, 2020, pp. 660-672.

<sup>26</sup> Naubahar Sharif and Yu Huang, Industrial Automation in China's “Workshop of the World”, *The China Journal*, vol. 81, 2019, pp. 1-22.

<sup>27</sup> <https://finance.sina.com.cn/chanjing/2020-08-19/doc-iihvhuipn9408550.shtml>, accessed 5 November 2020.

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so on for coverage by social insurance.<sup>28</sup> While details of this reform have yet to be revealed, labour protection in the era of the digital economy is very likely to be a key initiative in the 14th Five-Year Plan.

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