Proceedings of Business and Economic Studies, 2021, Volume 4, Issue 4
http://ojs.bbwpublisher.com/index.php/PBES
ISSN Online: 2209-265X
ISSN Print: 2209-2641

Restructuring of Industrial Talents and Their Characteristics from the Perspective of Intelligent Manufacturing in Dongguan

Juan Zhang*

Guangdong Innovative Technical College, Dongguan 523960, China

***Corresponding author:** Juan Zhang, Sophia.zhang@outlook.com

Abstract: The advancement of intelligent manufacturing in Dongguan puts forward new requirements for industrial talents, and the development of new productivity is bound to force enterprises and employees to make adaptive adjustments. The upgrading of intelligent manufacturing is not only the upgrading of intelligent machines but also the upgrading of the human brain, which includes the reshaping and cultivation of industrial talents. Based on field research, this study analyzes the different characteristics of the traditional and the new intelligent manufacturing model, as well as summarizes the characteristics of industrial talents and the changing trend of talent demand in view of the intelligent manufacturing model in Dongguan.

Keywords: Industry 4.0; Intelligent manufacturing in Dongguan; Reconstruction of industrial talents; Characteristics of industrial talents

Publication date: August 2021; ***Online publication:*** August 30, 2021

1. Introduction

Intelligent manufacturing is able to promote the transformation and upgrading of traditional manufacturing enterprises and bring about technological revolution. It is urgent to re-examine the problems between human capital and industrial development. The new intelligent manufacturing reform of the manufacturing industry in Dongguan puts forward new requirements for industrial talents, in which the characteristics of talents have changed greatly. The new generation of industrial workers who have grown from traditional manufacturing need to keep pace with the transformation and upgrading of the enterprises, as well as to have a deep understanding and keen insight regarding industrial changes. According to Joseph E. Aoun [1], with in-depth application of intelligent machines, internet of things (IoT), 3D printing, and other technologies along with the globalization led by the rise of digital technology, new manufacturing jobs in the future are no longer open to low-skilled workers, but require talents with higher educational level and technical level. Based on a field investigation and observation of the manufacturing industry in Dongguan, the adaptability of industrial talents and the demand for new talents under the two different models, the traditional manufacturing and new intelligent manufacturing, are compared in addition to analyzing and summarizing some trends of industrial talent upgrading.

2. High-skilled talents from labor-intensive to brain-intensive

The two different manufacturing models and their different characteristics determine the similarities and differences among industrial talents. According to a research by Shoufei Su [2], the manufacturing process of the manufacturing plant in the traditional OEM (original equipment manufacturer) model is only able to

complete mechanization and semi-automation operations, while the production line in the workshops still requires a large number of ordinary workers to participate in primary production operations, such as assembly. In this process, the division of labor intensifies the decomposition of the operations of different assembly positions. In order to cooperate with the continuous operations of machines, workers are required to constantly repeat the same, simple operations, pushing their own efficiency to an extreme limit. Workers need to keep up with the speed of the machines and the rhythm of the assembly line, thus becoming slaves to machines. Similarly, Marx [1] have mentioned that workers are becoming mere adjuncts to machines and are required to perform operations that are extremely simple, monotonous, and easily learned. In the era of new industrial competition and labor relations, the labor-heavy and large-scale winning methods of the traditional manufacturing industry are becoming more and more ineffective.

The construction of intelligent manufacturing factories, driven by the concepts of "replacing human with machines" [4] and "Made in China 2025" [5], is quietly underway, in which simple and repetitive jobs have been replaced by robots. Researchers have found that the factory practice of the robotic arm in some smart manufacturing factories has the ability to rotate 360 degrees with high flexibility and accuracy for grasping. Under preset path instructions, programmed by the engineers, these robots can autonomously complete duties that were once used to be performed by humans, such as welding, screwing, and packaging of products. In addition, the accuracy and speed have gradually improved. Even work that required porters to rush back and forth from warehouses to the production lines to transport materials or finished products has been replaced by more intelligent robots. From this observation, the new man-machine collaboration and information interaction model of intelligent manufacturing factories are gradually taking shape, thus determining that the survival rule of the new generation of workers that once relied on labor and simple skills in the past is no longer applicable; instead, they need to turn to high-skill learning and re-education in order to achieve a new breakthrough for survival.

3. Creative talents from traditional manufacturing to intelligent manufacturing

The intelligent manufacturing model and intelligent manufacturing factories should be regarded as a complete system with various manufacturing chains and production links being closely connected. The industrial robot or artificial intelligence (AI) is just a supporting tool for the intelligent manufacturing system or much larger, the era of Industry 4.0. Intelligent manufacturing, if viewed from a more concise perspective, involves constant interaction, feedback, response, and execution of people, machines, and data. Intelligent manufacturing involves the integration and application of various highly interconnected key technologies such as AI, IoT, and the industrial internet. Intelligent manufacturing and traditional manufacturing have brought about subversive technological changes, which are bound to encounter various technical problems. Relying only on conventional manufacturing talents can no longer provide feasible solutions for the new industrial technological revolution. In other words, the intelligent manufacturing model requires more creative talents to provide intellectual contributions rather than simple labor.

Creativity, under the intelligent manufacturing model, is not only reflected in top-level designs of intelligent manufacturing systems or products, but also in the solutions to multiple aspects, such as technical support, continuous optimization of production process, innovation of quality testing methods and their manufacturing process control, consumption response, as well as ideas that are required to break technical bottlenecks. In a study, a researcher [6] suggested that the advantage of new intelligent manufacturing is that it can quickly respond to new consumer demand. The new consumption era reflects the customization and personalization of consumer demand, which have an impact on the traditional manufacturing system. The new consumer demand requires manufacturing processes to be more flexible and quicker to meet the needs in small batches. From this point of view, the new consumer demand would accelerate the iterative upgrading of products, and the product life cycle would become much shorter. The rapid transformation of each generation in regard to the products involves new product design, modeling, application of new materials, as well as re-decomposition and process control of manufacturing processes. Conventional

manufacturing talents have been facing difficulty in coping with these changes, thus creative talents have become a new model of intelligent production to achieve breakthrough changes and sustainable development for effective human capital support.

4. From single-skilled talents to senior compound talents

The difference between traditional manufacturing and new intelligent manufacturing involves complex technological interaction and integration, as well as systemic thinking. The industry requires talents to have more than one specialization and skill. According to observation, in order to maximize the proficiency of operations, traditional manufacturing excessively decomposes and refines all operations, leaving each worker isolated. As a result, workers are only familiar with their operations and master simple operations while lacking recognition and learning opportunities for extended positions in other areas. The work scenario under the intelligent manufacturing model would break the boundaries between posts whereby workers would need to have the ability to rotate in multiple posts. In the assembly line of intelligent manufacturing model, people would only shoulder technical work functions, and the positions are no longer fixed, but more flexible.

From the perspective of industrial chain expansion and the deep participation of intelligent manufacturing in the product life cycle, workers in intelligent manufacturing factories should not only have several cross-technical capabilities, but also the ability of interdisciplinary learning, reengineering, and professional improvement in addition to the ability of interdepartmental communication and collaboration as well as problem-solving. From the perspective of the systematic layout of the intelligent manufacturing model, due to the addition of industrial internet and other technologies, the manufacturing link, consumer end, and the material supply end are in a state of constant networking and timely feedback; that is to say, the production technicians in manufacturing workshops may need to respond and adjust the feedback at both ends, the upstream and downstream, in a timely manner, communicate with PMC (production material control), warehouse, distribution, and product design departments to solve problems encountered in the manufacturing process and all other aspects together.

In addition, influenced by global industrial competitions and new consumer demands, single large quantities of orders would reduce, and would be replaced with small quantities in multiple batches, customized production services, etc. The flexibility of the intelligent manufacturing model is more efficient in coping with these changes. At the same time, when faced with changes in regard to orders and demands, intelligent manufacturing factories would be able to flexibly deploy production technicians or other technical support personnel so that the internal talent teams of enterprises have more flexibility, and these organizations can carry out human resources reconfiguration at any time. The new requirement for talents in view of intelligent manufacturing is no longer one-way, alike the traditional manufacturing model in the past, but requires talents with compound professional quality, comprehensive or even cross professional skills, and the ability to solve problems.

5. Strong learning ability talents from non-collaborative upgrading to synchronous upgrading

In the era of new intelligent manufacturing, people and enterprises would face global industrial competitions and technological changes. Hence, the upgrading of employees and enterprises should be kept at pace in the same frequency. The reform of intelligent manufacturing requires talents not only with a high education background but also a strong learning ability. The latter represents a continuous dynamic learning ability in terms of life-long educational practices from school to workplace and also the re-education as industries upgrade. Due to the characteristics of intelligent manufacturing, in terms of its technical complexity and rapid product iteration, a high demand for talents is put forward. Therefore, it is mandatory

for the new generation of workers in the industry to be able to learn continuously. The upgrading of individual skills and all-round labor quality should be coordinated with the pace of industrial upgrading. "The capability of Dongguan's industrial workers to keep up with the demand of industrial development has a direct impact on the survival of more than 5 million people, the development of 180,000 industrial enterprises, and the future of a famous manufacturing city," mentioned in a report by Economic Daily [7].

For workers who do not need high learning costs and changes, the age of traditional manufacturing is clearly comfortable and glorious. They can spend their entire careers in factories without learning new knowledge or skills instead of worrying, as they do now, about losing their jobs to machines or their factories running out of orders to fill. In regard to the old manufacturing model, electronics factory workers only need to know how to weld, tighten screws, insert accessories, and carrying out simple product packaging while in shoe factories or clothing factories, the workers would only need to know how to sew and so on in order to survive in these factories. This model of production has been on-going for 20 to 30 years. In the past, when enterprises organized training for improvements or optimizations of technologies, most employees had negative attitudes toward learning. This is because whether they learn or not, they do not have to worry about losing their jobs or finding new ones in a short period of time. The resulting embarrassment is that while some forward-looking companies desire to upgrade themselves, employees resist, thus resulting in poor talent allocation. In the past, many manufacturing enterprises were reluctant to invest their funds and time into training because it was easy for factories to obtain plenty of foreign trade orders, and large factories could invest their redundant funds to smaller factories for production orders in addition to a relatively low cost of hiring workers. The whole manufacturing side of the business was very easy at that time. Until the intensification of global industrial competitions, and technological changes brought by Industry 4.0, superimposed with the uncertainty of the international trade environment and other factors, the comfort zone of enterprises and individuals is shattered, and change becomes imminent. As Taylor Pearson [8] cautioned in his description of the future of work, "It is up to you to fight change or accept it; chances will not last forever."

6. Conclusion

In the era of Industry 4.0, the survival mirror of intelligent manufacturing in Dongguan, such as competitive environment, technological changes, and production model remodeling, reflects the new characteristics and requirements of the industry for talents. Therefore, enterprises and individuals are in urgent need of multidimensional iterative upgrading while individual learning and team learning should be synchronized. In other words, organizations and individuals need to maintain a strong learning ability in order to compensate for the backward technology, concept, and cognition caused by their lack of learning awareness in the past. Cultivating a new generation of workers with strong learning ability does not only provide intellectual support for industrial upgrading but also more possibilities for personal survival and development, career advancement, as well as their integration into the city.

Disclosure statement

The author declares that there is no conflict of interest.

References

[1] Aoun JE, 2017, Robot-Proof: Higher Education In The Age Of Artificial Intelligence, MIT press.

[2] Su S, 2011, How to Solve the Dilemma of the High Turnover Rate of Employees in The Manufacturing Production Line. Economic Vision, (29): 155-6, 158.

[3] Marx, Engels, 1995, Anthology of Marx and Engels: Volume 1, People's Publishing House, Beijing, 279.

[4] Dongguan People's Government Office, 2014, Dongguan City Promotes Enterprise "Machine Substitution" Action Plan (2014-2016). Dongguan Municipal People's Government Bulletin, (8): 32-5.

[5] The State Council, 2015, Made in China 2025. Bulletin of the State Council, (16).

[6] Juan Z, 2020, Research on the Re-Education of the New Generation Migrant Workers in Dongguan under the background of "Intelligent Manufacturing", Guangxi University, Nanning.

[7] Yang Z, 2021, What Kind of Industrial Workers Does "The World's Factory" Match. The Economic Daily, (012).

[8] Pearson T, 2015, The End of Jobs: Money, Meaning and Freedom Without the 9-to-5, Lioncrest Publishing.

[9] Juan Z, 2020, Study on the Dilemma and Countermeasures about Integrating into Cities of New Generation of Migrant Workers. Anhui Agricultural Sciences, 48(06): 230-4.