Chapter 99 Chinese SMEs in Industry 4.0: Analysis and Future Trends

Hu Shi

Universiti Sains Malaysia, Malaysia

Qaisar Iqbal

b https://orcid.org/0000-0002-6619-7243 Universiti Sains Malaysia, Malaysia

ABSTRACT

Small and medium enterprises (SMEs) play a vital role in the economic development of the People's Republic of China. SMEs contribute to the total of 60% gross domestic product (GDP) and 80% employment. Chinese SMEs contribute to the more than 50% of the country tax. In 2015, China released the Made-in-China 2025 plan to response to the German Industry 4.0, which focuses on knowledge-, innovation-, and quality-intensive manufacturing for cutting-edge technology, new materials, key parts of major products. The chapter aims to explore the challenges and opportunities faced by SMEs in China in the context of Industry 4.0 and Made-in-China 2025. This chapter has used SWOT analysis to explore the challenges and opportunities of Chinese SMEs. Presently, SMEs are facing limited credit facilities, low innovative human capital, sustainable performance as a challenge, and ineffective performance appraisal. This chapter has presented as internationalization, coastal outsourcing, rising middle-class (high consumption), 'one belt, one road' opportunities for SMEs in Industry 4.0 context.

INTRODUCTION

China is regarded as the largest emerging economy in the world with the largest population. China is a leader in world manufacturing areas and the products cover from high-tech goods to daily consumer goods. In 2013 German as a world advanced industrialized nation prompted the initiation and concept of 'Industry 4.0', which means the new industrial revolution. In 2015, China released 'Made-in-China 2025' plan to respond to German Industry 4.0', which focuses on the knowledge, innovation, and quality of intensive manufacturing for cutting-edge technology, new materials, key parts of major products (Li,

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2018; Iqbal & Nawaz, 2019). Industry 4.0 refers to the fourth industrial revolution in the world and puts forward the conception of cyber-physical systems (CPS) with the integration of automation, data exchange, 3D printing and cloud computing advanced technologies (Iqbal, Yang, Nawaz & Iqbal, 2019). 'Industry 4.0' is the integration of physical basic systems and software systems (Kosacka-olejnik & Pitakaso, 2019). One of the similarities for German Industry 4.0 and Made-in-China 2025 is the automation acceleration and collaborative industrial robots. Another point is the time of the goal achievement for Industry 4.0 and Made-in-China 2025 set a similar time duration between ten years to fifteen years. Manufacturing digitalization, CPS, artificial intelligence and big data will be the future trend and 'Made-in-China' will transform to 'Design-in-China'.

The concentration of this chapter is the opportunities and challenges faced by Chinese SMEs in the trend of Industry 4.0 and Made-in-China 2025. This chapter is organized as follows. The first section is the introduction and Made-in-China 2025. Moreover, the next section follows the current situation of Chinese SMEs and government policies. Then the opportunities and challenges of Chinese SMEs are discussed in detail. SWOT analysis is summarized at the end of the chapter. The last section is the conclusion, which focuses on the trend of Chinese SMEs.

THE DEFINITION OF SMEs IN CHINA

SME is a crucial part of the Chinese economy. SMEs comprise 99.81% of total firms in China. The definition of SME varies with the category of the industry in China. SME is defined based on the number of employees, total assets, and total annual revenue of an enterprise. The SME Promotion Law of China (2003) has provided guidelines to define Small and medium-sized enterprises (SMEs) by replacing the old criteria of 1998 and the supplementary criteria of 1992.

Size category	Industries	Employment-based	Total assets	Business revenue
Small	Industry	<300	<¥ 40 million	<¥ 30 million
	Construction	< 600	<¥40 million	<¥ 30 million
	Hotel & Restaurant	<400		<¥ 30 million
Medium	Industry	300-2000	¥ 40 million-400 million	¥ 30 million-300 million
	Construction	600-3000	¥ 40 million-400 million	¥ 30 million-300 million
	Hotel & Restaurant	400-800		¥ 30 million-150 million

Table 1. Definitions	of SMEs in China
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Regarding the above criterions, Small enterprises must fulfill at least one criterion. In the case of Medium enterprises, the firm must meet all three conditions. An industrial SME in China may have up to 2,000 employees where a small enterprise has less than 300 and medium-sized business have a number of employees in between 301 and 2,000.

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