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Operation of Chinese Enterprises Using Smart Manufacturing: Basis for Strategic Plan

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Abstract. Focusing on Chinese companies, this study examined their operations in smart manufacturing and provided key information for strategic planning. Investigating the position of Chinese companies in the smart manufacturing market through an online and offline questionnaire survey, the study found that companies became increasingly competitive. The adoption of smart manufacturing technologies had a profound impact on companies' market positions, driving them to better adapt to market demands. The study looked at the impact of smart manufacturing on productivity. By adopting technologies such as automation, big data analytics, and real-time monitoring, Chinese companies optimized their production processes, improved productivity, and reduced production costs. The findings suggested that smart manufacturing played a key role in stimulating innovation. By introducing advanced technologies and digital solutions, companies not only improved their products and services but also accelerated the introduction of new products. The study examined the Chinese government's policies and support measures for smart manufacturing. Government support was identified as one of the key factors driving firms' adoption of smart manufacturing, covering a wide range of aspects such as financial incentives, industry standards, and technology development. In terms of sustainable development, the adoption of smart manufacturing positively impacted resource efficiency, waste reduction, and environmental impact. Chinese companies sought to achieve economic growth while focusing on sustainability and environmental protection. Taken together, this study provided a comprehensive summary covering key areas such as market position, competitive environment, productivity, innovation, government policies and support, and sustainability of Chinese companies in smart manufacturing. This provided foundational information for companies to develop relevant strategic plans.

After the research period, the conclusion about the operational strategic planning of Chinese enterprises utilizing smart manufacturing from 2024 to 2033 is drawn: Chinese smart manufacturing enterprises should strengthen competitiveness, improve productivity, innovate continuously, make full use of government policy

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support, and achieve sustainable development during the period of 2024-2033 in order to cope with the changing market environment and challenges and achieve long-term stable growth.

Keywords: Chinese Companies, Smart Manufacturing, Operations, Strategic Planning, Market, Competition

1. Introduction

Chinese enterprises have experienced rapid growth in recent decades, establishing a significant global presence across various sectors, including state-owned, private, and foreign-owned businesses. The manufacturing sector, particularly in automobiles, electronics, textiles, and steel, has been pivotal to China's global influence. Innovations, driven by government initiatives, have boosted R&D investments and technological breakthroughs, aiding Chinese enterprises in expanding internationally through mergers, acquisitions, and participation in global value chains.

However, environmental challenges loom large, prompting the government to introduce policies encouraging eco-friendly practices. Despite their global prominence, Chinese enterprises grapple with hurdles such as technological innovation, brand development, and market expansion. Looking ahead, continued investments are anticipated to enhance competitiveness and sustainability.

In the first half of 2023, Chinese industrial enterprises confronted significant challenges, including the global economic slowdown, escalating trade tensions, and domestic structural adjustments. State-controlled enterprises experienced a substantial year-on-year decline in profits, attributed to factors like high base comparisons, global economic pressures, and challenges in traditional industries. Joint-stock enterprises, with a more market-oriented focus, showed a smaller profit decline, while foreign and private enterprises faced challenges from global trade uncertainty, market competition, and rising costs.

The ongoing transformation and upgrading of Chinese enterprises are driven by market demand, technological advancements, resource allocation efficiency, competitive pressures, and changes in policies and regulations. These factors necessitate continuous adaptation to ensure sustained development.

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In the current landscape, the transformation of Chinese enterprises is characterized by the adoption of intelligent manufacturing. This involves the integration of information technology, automation, and advanced data analysis to achieve intelligence, digitalization, and automation in production processes. As a major global manufacturing player, China is compelled to accelerate intelligent manufacturing for industrial upgrading.

Opportunities in smart manufacturing include enhancing efficiency and quality through automation, enabling customized production to meet individual consumer needs, and fostering innovation. However, challenges persist, requiring enterprises to formulate effective strategies. Collaboration among government, enterprises, universities, and stakeholders is deemed crucial to drive the development and application of smart manufacturing technologies and foster innovation within the manufacturing industry.

2. Methodology

A descriptive-quantitative research design was ideal for the study titled "OPERATION OF CHINESE ENTERPRISES USING SMART MANUFACTURING: BASIS FOR STRATEGIC PLAN." The research was based on detailed data collection, gathering a wide range of information, including purchase history, online activities, social media participation, and more. Data sources encompassed multiple channels, such as corporate internal databases, online shopping platforms, and social media. Data were analysed with SPSS 20.0.

2.1. Sampling Procedure

Upon the validation of the questionnaire, a self-constructed survey questionnaire prepared by the researcher of the study was distributed to qualified respondents. Subsequently, with permission, the researcher explained the study's intent to the respective respondents and collected data by means of a survey questionnaire comprising various questions.

Furthermore, the instrument distributed was retrieved within a day, and the gathered information was kept private and confidential. The collected data were reviewed and tallied, and thereafter, they were prepared for presentation, analysis, and interpretation.

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2.2. Respondents

Qingdao, Shenzhen, and Fuzhou were chosen as the locations for studying the OPERATION OF CHINESE ENTERPRISES USING SMART MANUFACTURING: BASIS FOR STRATEGIC PLAN for the following reasons:

These three cities were located in different geographic locations in China, in the Northeast (Qingdao), the South (Shenzhen), and the Southeast (Fuzhou), representing the economic, cultural, and industrial characteristics of different regions in China. This diversity contributed to a more comprehensive understanding of the geographic variability of upgrading and transformation of Chinese enterprises. Qingdao, Shenzhen, and Fuzhou represented cities at different stages of economic development in China. As a pioneer city of reform and opening up, Shenzhen had a highly developed economy; Fuzhou was an emerging innovative city;

Qingdao had a traditional manufacturing base. Therefore, these cities provided research opportunities for companies at different stages of development.

These three cities had different major industries, including manufacturing, high-tech industries, marine industries, and cultural industries. Studying these cities helped us understand the application and impact of smart manufacturing in different industries.

The Chinese government's policies and support measures to promote smart manufacturing and enterprise upgrading and transformation usually varied from region to region. Therefore, conducting the study in different cities could provide insights into the implementation of local government policies in this area and their effects. Cultural and social factors: Cultural and social factors in different cities also affected the way and difficulty of enterprise upgrading and transformation. By comparing the cultural characteristics of different cities, the impact of these factors on the research theme could be better understood.

2.2.1 Distribution of Respondents

The researcher employed random sampling, which was a systematic method used to select a subset of individuals or items from a larger population for the purpose of conducting a study or investigation. The fundamental principle underlying random sampling was the impartial and equal opportunity

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for every member of the population to be chosen as part of the sample. This approach ensured that the sample was a fair and unbiased representation of the entire population, a crucial factor for drawing accurate conclusions that could be generalized to the broader group (Crossman, 2018). The respondents also included corporate staff from different companies.

Table 1 *Distribution of the Participants of the Study*

Nature of Participants	Number of Respondents	Percent
Huawei Corporate Staff	22	34.38%
Haier Corporate Staff	21	31.24%
Fuyao Corporate Staff	22	34.38%
Total	**64**	**100%**

3. Results and Discussion

The survey included 64 respondents, with 15.63% aged 18–30, 62.50% aged 31–50, and 21.87% aged 51 and above. This diverse age distribution suggests a potential for varied perspectives on the practical application and impact of technology in the manufacturing industry. Gender-wise, there were 31 male respondents (48.43%) and 33 female respondents (51.56%), highlighting a balanced representation. Among the respondents, 91% were from the Smart Manufacturing sector, indicating a high level of specialization and involvement in the field. Educational backgrounds varied, with 18.75% holding graduate degrees, 59.37% having university degrees, and 21.88% having less than university degrees. The majority, totaling 52, possessed university degrees or higher, suggesting a stronger foundation in deep learning and specialized knowledge. Regarding work experience, 45.10% had over 15 years, 39.22% had 6–15 years, and 7.84% had 1–5 years. Respondents with more years of experience likely possess richer industry knowledge, contributing to a deeper understanding of smart manufacturing in China.

In response to inquiries about the driving forces behind the upgrading and transformation of Chinese enterprises, the majority of respondents

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expressed strong beliefs in several key factors. Notably, 95% acknowledged market demand as a crucial driver, emphasizing the importance of adapting production and operation strategies to meet the flexible demands of smart manufacturing and customer needs. Similarly, 95% considered competition to be a driving factor, emphasizing the need to swiftly adapt to market changes and maintain a competitive edge through technological innovations and efficient production processes. Regarding productivity, 97% of respondents highlighted the role of smart manufacturing in optimizing production, reducing errors, and improving overall efficiency through automation and digitalization. Innovation was recognized by 96% of respondents as a driving force, with its potential to enhance productivity, reduce costs, and drive improvements in various aspects such as product design and supply chain management. Government policies and support were considered influential by 98.75% of respondents, citing fiscal incentives and financial support as encouragements for investing in smart manufacturing technologies. Finally, 97.5% emphasized sustainability as a significant driver, with Chinese enterprises upgrading and transforming to comply with environmental regulations and embrace innovative practices for a more sustainable economy in response to global challenges.

When respondents answered the question describing smart manufacturing in Chinese enterprises, 97.5% of respondents believed that smart manufacturing in Chinese enterprises requires good planning, implementation and evaluation, 95% of respondents believed that smart manufacturing in Chinese enterprises needs to prioritize benefits, 96.25% of respondents believed that Chinese enterprises need to prioritize opportunities for smart manufacturing, and 92.5% of respondents believed that smart manufacturing in Chinese enterprises also needs to consider the Challenges.

4. Conclusions

During the study period, we have come up with the following conclusions regarding the operational strategic planning of Chinese companies utilizing smart manufacturing from 2024 to 2033:

With changes in the global economy and technological advances, smart manufacturing will become a dominant trend in future markets. Chinese companies should continuously adjust their market positioning, actively explore emerging markets, and consolidate their traditional market positions.

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The application of smart manufacturing technologies will intensify market competition. Chinese enterprises need to strengthen technological innovation and brand building, and improve product quality and service levels in order to maintain a competitive edge in the highly competitive market.

Intelligent manufacturing technology will greatly improve production efficiency and flexibility, reduce production costs and improve enterprise profitability. Chinese enterprises should actively adopt advanced automation equipment and smart manufacturing systems to continuously optimize production processes and improve production efficiency.

Technological innovation is the core driving force to promote the development of smart manufacturing. Chinese enterprises should increase R&D investment, strengthen technological innovation and intellectual property protection, and continuously launch competitive new products and solutions.

The government will continue to introduce policy measures to support the development of smart manufacturing, including financial support, tax incentives and technology introduction, etc., to provide enterprises with a favorable policy environment and policy support.

Smart manufacturing technologies will provide important support for Chinese enterprises to realize sustainable development. Enterprises should pay attention to environmental protection and social responsibility, actively promote green manufacturing and circular economy, and realize sustainable development of economy, society and environment.

In summary, Chinese enterprises should strengthen their competitiveness, improve productivity, innovate continuously, make full use of government policy support and achieve sustainable development during the period from 2024 to 2033, in order to cope with the ever-changing market environment and challenges, and to achieve stable growth in the long term.

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