Industrial Engineering and Innovation Management (2025)
Clausius Scientific Press, Canada

DOI: 10.23977/ieim.2025.080206
ISSN 2522-6924 Vol. 8 Num. 2

The Formation and Principle of Chinese Manufacturing —Taking Electric Vehicle Enterprises as an Example

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Keywords: Made in China; Electric Vehicle Enterprises; Form; Principle; Manufacturing Industry Development

Abstract: This article focuses on the formation and principle of Chinese manufacturing in electric vehicle enterprises. Under the background of global manufacturing competition and vigorous development of electric vehicle industry, it is of great significance to analyze the unique performance of Chinese manufacturing in this field. Through theoretical analysis, this article studies the role of policy guidance, market demand, technological innovation and other factors in the formation of Chinese-style manufacturing in electric vehicle enterprises, and discusses the principles of cost control, rapid response and coordinated development. It is found that policy support creates a good environment for the development of electric vehicle enterprises, market demand drives enterprise scale expansion and process optimization, and technological innovation helps enterprises accumulate core competitiveness. Chinese-style manufacturing relies on cost control to achieve price advantage, relies on rapid response to meet changing market demand, and promotes overall industrial efficiency through coordinated development. These findings provide a theoretical basis for understanding the development logic of Chinese manufacturing in electric vehicle enterprises, and also provide a reference for the formulation of relevant industrial policies and enterprise development.

1. Introduction

With the increasingly fierce competition in the global manufacturing industry, "Chinese manufacturing" has gradually emerged on the international stage with its unique development path and model [1]. As an emerging force in the manufacturing industry, Chinese-style manufacturing combines the policy environment with China characteristics, huge market demand and accumulated technological innovation capabilities, showing strong development vitality [2]. As a typical representative of Chinese manufacturing, the development process of electric vehicle enterprises profoundly reflects the formation and operation principle of Chinese manufacturing [3].

With the enhancement of environmental awareness and the transformation of energy structure, the electric vehicle industry has ushered in an unprecedented development opportunity [4]. China electric vehicle enterprises not only occupy a dominant position in the domestic market, but also continuously expand their share in the international market [5]. Exploring the formation process and principle of Chinese manufacturing behind it will not only help to deeply understand the development logic of China's manufacturing industry, but also provide reference for other industries

and further promote the transformation and upgrading of China's manufacturing industry.

This article focuses on the specific performance of Chinese-style manufacturing in electric vehicle enterprises, and aims to reveal its driving factors and operating principles through theoretical analysis. In the past research, more emphasis was placed on the development strategy or technological innovation of a single enterprise, and less systematic analysis was made on the formation and principle of Chinese manufacturing in a specific industry from the macro level. This article will fill this research gap and contribute to the theoretical research of Chinese manufacturing. Through in-depth analysis of Chinese-style manufacturing in electric vehicle enterprises, it is expected to provide reference for relevant industrial policy makers, help them formulate more targeted and forward-looking policies, and push Chinese-style manufacturing to a higher level. At the same time, it also provides ideas for electric vehicle enterprises and other manufacturing enterprises to make better use of the advantages of Chinese manufacturing and enhance their international competitiveness.

2. Chinese manufacturing related theory

2.1. Manufacturing development theory

The theory of manufacturing development provides a cornerstone for understanding Chinese manufacturing. The traditional manufacturing development theory emphasizes comparative advantage, and thinks that the country should develop industries with cost advantages according to its own resource endowment [6]. In the early stage of industrialization, China, with its abundant labor resources, vigorously developed labor-intensive manufacturing industry, which is in line with the traditional theory. However, with the development of the times, new theories such as competitive advantage theory have emerged [7]. The theory points out that enterprises can create competitive advantages beyond comparative advantages by innovating and improving production efficiency. In the process of development, China's manufacturing industry has gradually changed from relying on traditional comparative advantages to building competitive advantages.

The theory of industrial upgrading is also an important theory of manufacturing development. It believes that the manufacturing industry will gradually climb along the industrial value chain, from low value-added processing and manufacturing links to high value-added R&D, brand and marketing links [8]. China's manufacturing industry is in this upgrading process, striving to get rid of the low-end positioning of the "world factory" in the past and March into the high-end manufacturing field.

2.2. Connotation of Chinese manufacturing

Chinese manufacturing has a unique connotation. From the perspective of factor combination, it integrates the three forces of government, market and enterprise. By formulating industrial policies, the government guides resources to gather in key industries and key fields, and creates a good policy environment for the development of manufacturing industry. With huge domestic demand and active international trade, the market provides broad sales space for products and forms economies of scale. Enterprises make full use of policies and market opportunities to continuously improve their production and innovation capabilities.

On the development path, Chinese-style manufacturing presents the characteristics of combining gradual innovation with leap-forward development. Enterprises make gradual improvement on the basis of existing technologies, and gradually improve product performance and production efficiency. In addition, in some emerging technical fields, such as new energy, artificial intelligence, etc., China's manufacturing industry actively deploys, realizes leap-forward development, and

seizes the commanding heights of international competition [9]. This unique connotation makes Chinese manufacturing unique in the global manufacturing industry and lays the foundation for the rise of China's manufacturing industry.

3. The formation of Chinese manufacturing in electric vehicle enterprises

3.1. Policy guidance and support

Policy plays a key role in the development of electric vehicle enterprises in China and the formation of Chinese manufacturing. The state has issued a series of policies to encourage the development of electric vehicle industry, from research and development subsidies to car purchase subsidies, to promote industrial progress in all directions. In order to show the support of policies more clearly, taking 2016-2020 as an example, the related policy subsidies are arranged as shown in Table 1 below. These policies have created a good development environment for electric vehicle enterprises, attracted a lot of resources into the industry, and accelerated the formation of Chinese manufacturing in the field of electric vehicles.

Table 1: Subsidy Situation of Electric Vehicle Industry Policies

Policy Category	Subsidy Content	Subsidy Standard	Coverage Scope
R&D Subsidies	Battery technology R&D	30% subsidy based on R&D investment	Electric vehicle enterprises above designated size
	Motor control technology R&D	Maximum subsidy of 5 million yuan per project	Enterprises focusing on motor control R&D
Vehicle Purchase Subsidies	Subsidy for pure electric vehicle purchase	15,000 yuan subsidy for vehicles with a range of 300 - 400 kilometers; 25,000 yuan subsidy for vehicles with a range over 400 kilometers	Individual consumers
	Subsidy for plug - in hybrid electric vehicle purchase	10,000 yuan subsidy	Individual consumers

3.2. Market demand drive

The huge market demand in China is an important driving force for the formation of Chinese-style manufacturing in electric vehicle enterprises. With the acceleration of urbanization, the improvement of residents' environmental awareness and the increasing demand for convenient travel, the electric vehicle market has experienced explosive growth. From the domestic market, electric vehicles have become the first choice for many consumers because of their flexibility, convenience and environmental protection. At the same time, with the rapid development of take-away, express delivery and other industries, the demand for electric two-wheeled and three-wheeled vehicles continues to rise.

In the international market, the global demand for clean energy vehicles is growing day by day. With the advantage of cost performance, China electric vehicle enterprises have gradually gained a foothold in the international market. Taking the European market as an example, in recent years, the export volume of electric vehicles in China has continued to increase, meeting the demand of European consumers for environmentally friendly travel tools. The growth of market demand urges enterprises to continuously expand production scale, optimize production processes, and promote the continuous improvement of Chinese-style manufacturing in electric vehicle enterprises.

3.3. Technological innovation and accumulation

The technological innovation and accumulation of electric vehicle enterprises have played a core role in promoting the formation of Chinese manufacturing. In the early days, China electric vehicle

enterprises gradually mastered the basic manufacturing technology by introducing, digesting and absorbing foreign advanced technology. With the improvement of the enterprise's own R&D capability, it began to achieve breakthroughs in key technical fields.

In the application of intelligent technology, many enterprises integrate intelligent interconnection technology into electric vehicle products to realize remote monitoring and intelligent navigation of vehicles and enhance the added value of products. The continuous technological innovation and accumulation of enterprises not only enhance their own competitiveness, but also make Chinese-style manufacturing have unique technological advantages in the field of electric vehicles, which promotes the formation and development of Chinese-style manufacturing in electric vehicle enterprises.

4. The principle of Chinese manufacturing in electric vehicle enterprises

4.1. Cost control principle

Cost control is one of the important principles of Chinese manufacturing in electric vehicle enterprises. China electric vehicle enterprises achieve cost control by optimizing supply chain management, mass production and technological innovation. In the aspect of supply chain management, enterprises establish long-term and stable cooperative relations with suppliers, concentrate on purchasing key components, such as batteries and motors, and reduce unit costs through large-scale procurement. Enterprises constantly optimize the production process, improve the level of production automation and reduce labor costs. Taking a well-known electric vehicle enterprise as an example, Table 2 shows its cost reduction through different measures:

Table 2: Cost Control Measures and Effects of an Electric Vehicle Enterprise

Cost Control Measure	Specific Content	Cost Reduction Effect (per Vehicle)
Supply Chain Optimization	Sign long - term cooperation agreements with three major battery suppliers, increasing centralized procurement volume by 50%	15% reduction in battery cost, approximately 800 yuan
Production Process Optimization	Introduce automated assembly production lines, improving production efficiency by 30%	20% reduction in labor cost, approximately 300 yuan
Technological Innovation	Independently develop new lightweight materials for use in frame manufacturing	10% reduction in material cost, approximately 150 yuan

As shown in Table 2, through these measures, enterprises have effectively reduced production costs and improved the price competitiveness of products, which is a typical embodiment of Chinese manufacturing in cost control.

4.2. Fast response principle

Quick response to market changes is another key principle of Chinese manufacturing in electric vehicle enterprises. China electric vehicle enterprises can quickly capture the changes in market demand and quickly adjust product strategies. With the increasing demand of consumers for intelligent and personalized electric vehicles, enterprises have increased their investment in research and development of intelligent control systems and personalized customized services.

Enterprises can achieve rapid response by establishing agile R&D and production systems. In the research and development process, concurrent engineering is adopted, and multiple research and development teams work simultaneously to shorten the product research and development cycle. Flexible production mode is adopted in the production process, which can quickly switch production lines and produce electric vehicles with different models and configurations. When the

market demand for long-life electric vehicles increased, enterprises launched new long-life vehicles in just three months, which met the market demand and showed the advantages of quick response of Chinese manufacturing.

4.3. Synergistic development principle

The principle of coordinated development is embodied in the close cooperation between electric vehicle enterprises and upstream and downstream industries. The upstream raw material suppliers and parts manufacturers, the middle-stream electric vehicle enterprises and the downstream sales and after-sales service providers have formed an ecosystem of coordinated development.

Upstream enterprises provide high-quality and stable supply of raw materials and parts for vehicle manufacturers. For example, battery raw material suppliers continue to develop new materials to improve battery performance and meet the requirements of vehicle companies for battery life and safety. Downstream sales and after-sales service providers timely feed back market information to vehicle manufacturers to help them improve their products. This collaborative development model has improved the efficiency and competitiveness of the whole industry. Taking the battery industry as an example, the key nodes of the coordinated development of electric vehicle enterprises and upstream and downstream are listed in Table 3. This principle of coordinated development is an important guarantee for the efficient operation and sustainable development of Chinese manufacturing in electric vehicle enterprises.

Table 3: Key Nodes for the Collaborative Development of Electric Vehicle Enterprises and the Upstream and Downstream of the Battery Industry

Collaboration Link	Key Node	Collaboration Effect
Upstream Collaboration	Cooperate with lithium mine suppliers to ensure a stable supply of lithium resources	Guarantee a stable supply of battery raw materials and reduce supply risks
Midstream Collaboration	Jointly develop new battery technologies with battery manufacturers	Improve battery performance, such as a 20% increase in energy density
Downstream Collaboration	Dealers provide feedback on battery range issues, and the enterprise improves the battery management system	Increase user satisfaction and reduce the after - sales maintenance rate by 10%

5. Conclusions

In this article, the formation and principle of Chinese manufacturing in electric vehicle enterprises are deeply studied, and the following results are obtained. In terms of formation, policy guidance and support set up a development framework for electric vehicle enterprises. A series of policies, from R&D subsidies to car purchase subsidies, attract resources and promote enterprises to make continuous progress in R&D and marketing of key technologies. The internal and external drive of market demand, whether it is domestic urban commuting and industry demand, or international preference for clean energy vehicles, urges enterprises to expand their scale and optimize production. Technological innovation and accumulation are the core driving forces. Enterprises have made progress in the fields of batteries and intelligence from the introduction of technology to independent breakthroughs, laying the technical foundation for Chinese manufacturing.

On the principle level, the principle of cost control allows enterprises to reduce costs and enhance price competitiveness by means of supply chain optimization, process improvement and technological innovation. The principle of rapid response enables enterprises to quickly capture market changes and launch products that meet the needs in time through agile research and development and flexible production. The principle of coordinated development builds a

coordinated ecology of upstream and downstream industries and enhances the overall efficiency and competitiveness of industries.

To sum up, the development mode of Chinese manufacturing in electric vehicle enterprises is unique and effective. This not only points out the direction for the future development of electric vehicle industry, but also provides valuable reference for the transformation and upgrading of other manufacturing industries, and pushes China's manufacturing industry to a higher level in global competition.

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