

Building Chinese Brand Parts System to Consolidate the Foundation of Automotive Powerhouses

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Abstract: The automobile parts industry is the foundation of automotive powerhouses and is the main driving force promoting the development of the automobile industry. All automotive powerhouses have a strong parts industry. Now, China is at a critical stage, as it is growing from a large automobile country to an automotive powerhouse. However, it is difficult for the development of the parts industry to support the development of the automobile industry. Through the analysis of problems in and opportunities for the development of China's parts industry, we suggest building a complete independent parts system by strengthening the industrial base, expanding the scale of independent support, and encouraging leading companies to consolidate the development foundation and support the development of automotive powerhouses.

Keywords: automotive powerhouses; component system; independent; suggestion

1 An autonomous and controllable parts support system is the foundation of an automotive powerhouse

Automobile parts are the main components of vehicles, and their technological advancement is the key to promoting the upgrading of vehicles. They are also the most important component of the automotive industry chain. The value of the automobile parts industry exceeds 50% in the global automotive industry value chain [1]. A comprehensive parts support system and strong supporting ability are the bases for maintaining the healthy and sustainable development of the auto industry, and a core element of becoming an automotive powerhouse.

1.1 Automotive powerhouses all have powerful automobile parts industries

The USA, Germany, and Japan have become automotive powerhouses not only because of their reliance on world-class vehicle manufacturers, but also because of their reliance on a

strong support system for automobile parts. The automobile parts industry in the above countries developed simultaneously with the automotive industry, and in some cases, ahead of it. Among the world's top 100 automobile parts manufacturers in 2016, Japan, the USA, and Germany represented 28, 22, and 16 companies, respectively (Fig. 1). There are 22 automobile parts manufacturers around the world with revenues of more than 10 billion USD, among which, 16 companies are from the USA, Japan, and Germany. Relying on the world's leading automobile parts manufacturers, these automotive powerhouses have built their own automobile parts industry systems that are strong and able to support the sustainable development of their automotive industries.

1.2 An autonomous and controllable parts support system allows automobile manufacturers to grow stronger

Although the support systems in the USA, Japan, and Germany are based on different models, these countries have estab-

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lished autonomous and controllable supply systems to support the growth of automobile manufacturers (Fig. 2). For example, the Bosch Group has built systems that have strong integrated supporting capabilities, such as chassis systems, fuel and body systems, automotive multimedia systems, and automotive electronic systems. Particularly, they have dominated, or even monopolized, the sub-markets of fuel injection and body stabilization systems to support the global expansion of corporations, such as the Volkswagen and the BMW groups. Similarly, Denso Corporation (Japan), Aisin Seiki Co., Ltd. (Japan), Delphi Packard Electric Systems Co., Ltd. (USA), and BorgWarner Inc. (USA) have formed strong support systems in the fields of automotive electronics and automatic transmissions to reinforce their competitive positions in the global automotive industry. The powerful automobile parts support systems not only satisfy their

countries' technological needs, but also guarantee their countries positions as automotive powerhouses in terms of costs and national economic policies.

2 Status and existing problems in the development of China's automobile parts industry

2.1 China has had significant achievements in the development of its automobile parts industry

In recent years, China's automobile parts industry has seen rapid development. Its market scale has continued to expand and its support system has gradually improved. The industrial chain has improved further with breakthroughs in key technologies. These developments have established a strong supporting role for China's automobile industry to become a pillar industry for national economic development.

2.1.1 Steady growth in market scale

In 2016, China's automobile parts industry still displayed a rapid growth trend. Based on a 2016 survey of 12 757 automobile parts companies above a designated size, the cumulative total operating income for the year was around 3.7 trillion CNY, an increase of 14.23% over 2016. The total profit was 285.8 billion CNY, with a growth rate of 17.12% (Table 1) [2]. Driven by the steady growth of the auto industry, the overall development of the automobile parts market appears to be good, and rapidly developing. From 2001 to 2016, the compound sales growth rate of the automobile parts industry was 25.1%, which was higher than that of the auto industry sales revenue (17.9%) over the same period [2].

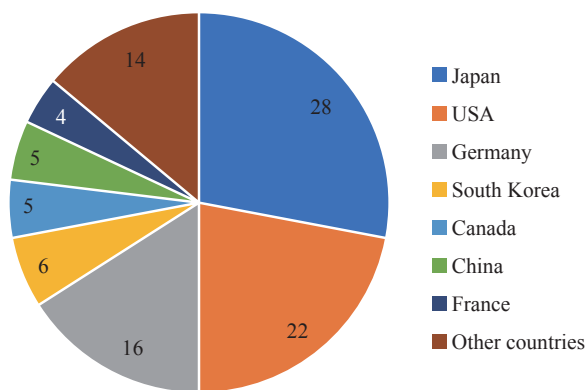


Fig. 1. Ranking of top automobile parts manufacturers in the world. Source: Automotive News, 2017 Global Automobile parts Manufacturer Rankings.

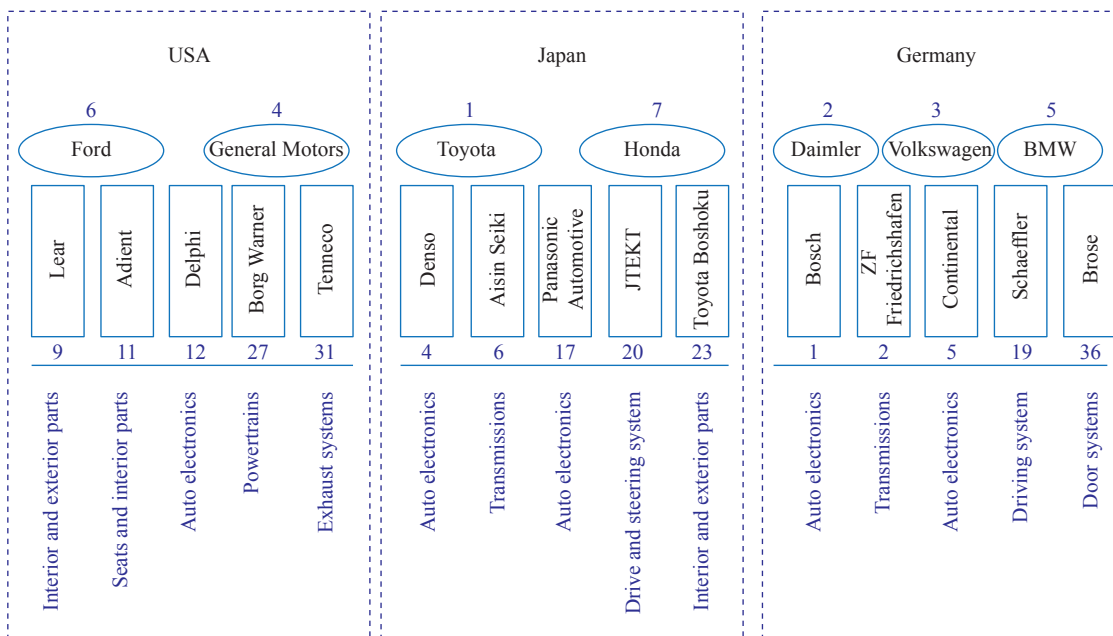


Fig. 2. Major vehicle and automobile parts companies in the USA, Japan, and Germany.

Table 1. Major financial data of companies above the designated size in the automobile parts industry.

Year	Number of companies	Total revenue (CNY billion)	Year-on-year growth (%)	Total profit (CNY billion)	Year-on-year growth (%)
2012	9 341	22 267	11.97	1 524	7.74
2013	10 333	27 097	18.15	1 886	21.6
2014	11 110	29 074	13.06	2 150	16.12
2015	12 090	32 117	8.29	2 465	13.41
2016	12 757	37 203	14.23	2 858	17.12

Source: China Association of Automobile Manufacturers and China Automotive Engineering Research Institute Co., Ltd.

2.1.2 Key technologies have developed rapidly

The manufacturers of domestic parts have continued to strive to develop key technologies rapidly, and have achieved product batch applications. Weichai Power Co., Ltd. has developed new WP9H/WP10H engines that meet Euro 6 emission requirements, and has reached industry-leading levels in terms of reliability and available operating conditions. The Asia Pacific region has developed intelligent driver functions, such as adaptive cruise control (ACC), automatic emergency braking (AEB), lane departure warning system (LDWS), and forward collision warning system (FCWS). Its Internet of vehicles (IOV) technology has been applied in several models manufactured by the Guangzhou Automobile Group, Jiangling Motors Corporation, and Chery Automobile [2]. In the field of new energy vehicles, significant advances have been made in research on and development of key technologies for new energy vehicles, including power batteries and engines. The technology implemented by Contemporary Amperex Technology Co., Ltd (Ningde, Fujian) and Jing-Jin Electric Technologies (Beijing) Co., Ltd. has reached an internationally advanced level, and their products are exported overseas.

2.1.3 Gradual improvements in industrial chains

There are six major industry clusters: Northeast, Beijing-Tianjin-Hebei, Central, Southwest, Pearl River Delta, and Yangtze River Delta. The output value of the automobile parts industry in the six industrial clusters accounts for around 80% of the entire industry, and industrial chain cooperation and clustering effects have emerged [1].

The industry for new energy vehicles has also gradually improved, forming a new energy vehicle system with a comprehensive structure and autonomous control. Four major power battery industrial clusters have been established, including the Pearl River Delta, Yangtze River Delta, Central Region, and Beijing-Tianjin region clusters, and China has become the world's largest power battery producer [3].

2.2 The development issues in China's automobile parts industry are still in need of attention

Although China's automobile parts industry has achieved remarkable results, there are several problems hindering its development, including the following aspects.

2.2.1 Weak industrial foundations limiting the development of the parts industry

China's foundation in the "four industrial pillars" (basic materials, basic parts, basic processes, and industrial technology foundations) is relatively weak. Regarding core basic parts (components) and key basic materials, China mainly depends on imports. There is low advancement in the application of basic technology, and the industrial technology foundation systems are not comprehensive, resulting in poor product quality and reliability, as well as low competitiveness. This restricts the development of the automobile industry, especially the parts industry.

Currently, there are deep integrations occurring between the automotive industry and other industries, such as electronics, IT, materials, and energy. The parts industry is also welcoming changes and upgrades. The gap in industrial foundations not only affects the current level of development of the parts industry directly, but also increases the difficulty in achieving technological breakthroughs in other emerging fields. China must accelerate the overall standard of the automotive industry and enhance its technological strength to prevent the gap between the parts industry and the automotive powerhouses from increasing [4].

2.2.2 Reliance on foreign core technologies and poor modular supply capability

The scale of China's automobile parts industry continues to expand, but the technical strength of the manufacturers of autonomous domestic parts is far lower than that of foreign-funded enterprises. Moreover, the lack of investment in enterprise innovation has resulted in weak core competitiveness in products and a lack of system and assembly components. At present, China relies on foreign-funded enterprises for the supply of key components, such as powertrains, automatic transmissions, and electronic and electrical systems. In particular, certain critical, high-precision, and high-value-added components, including fuel supply systems, ignition systems, and dedicated energy components, are lacking and have been supplied by foreign companies. The lack of autonomous core components has caused the development of the domestic automotive industry to be controlled by foreign-funded enterprises, rendering it difficult to achieve industrial transformation and upgrading.

Furthermore, due to technological backwardness, most parts

manufacturers are only able to produce basic labor-intensive, low-value-added products. They lack the capability to provide single or multiple completely functional components for automobile manufacturers, and can only maintain a second-tier or third-tier support relationship with automobile manufacturers. It is difficult for them to enter the ranks of a top-tier supplier.

2.2.3 Parts manufacturers are numerous and scattered, and lack competitiveness

According to statistics, there are currently around 100 000 parts manufacturers in China, of which approximately 13 000 are companies with an annual output value of 20 million CNY or more, accounting for less than 15%. In addition, the profitability of autonomous parts manufacturers is generally weak. Autonomous parts manufacturers represent more than 80% of the total number of domestic parts manufacturers, but sales are only 20% of the total. As much as 90% of autonomous products are low-end and concentrated in low-value-added areas. With regard to profitability, as the high value-added key component areas are monopolized by foreign brands, the average profit margin of the domestic parts industry is only 7%, which is lower than joint ventures and foreign-funded enterprises by less than 50% [5].

There is a serious shortage of international competitiveness among autonomous companies. As the world's largest automobile market, only five parts suppliers entered the world's top 100. Their principal businesses focus on non-core parts, such as wheels and rails, as well as interior and exterior parts (Table 2). The overall strength cannot compete with the standards of international leading parts companies.

3 China's automobile parts industry has tremendous development opportunities

3.1 China emphasizes the importance of developing its parts industry

The Chinese government has continuously introduced policies to support the development of the parts industry, providing guidance as well as essential support and development opportunities for the industry. It is clearly stated in *Made in China 2025* and the *Plan for the Middle-term and Long-term Development of the Automobile Industry* ("the Plan") that it is necessary to focus

on breakthroughs in the key part technologies. The Plan also clarifies the objectives of the parts industry. By 2020, there shall be several automobile parts manufacturers that possess strong international competitiveness in certain key core technology fields. By 2025, it is expected that several parts manufacturers will enter the global top 10 in terms of output scale. The Belt and Road Initiative has created favorable conditions for the overseas structuring and international expansion of parts manufacturers and has accelerated the pace of "going global" for the industry.

3.2 China has ample space for market development

In 2016, China's automobile production and sales showed a relatively rapid growth trend, with 28.119 million and 28.028 million units, respectively. This represented a respective increase of 14.5% and 13.7% over 2015. China has maintained its top rank in the world for eight consecutive years. However, in the same year, the number of vehicles owned per thousand in China was 140 [6] (Fig. 3), which is still far lower than that of the automotive powerhouses—the USA, Japan, and Germany—and the global average. There is still ample room for growth in China's automobile market, providing continuous drive and uplift in the development of the parts industry. Moreover, the development of self-owned brand cars will also drive the development of core part manufacturers. According to a survey by the China Association of Automobile Manufacturers, the share of self-owned brands in China's passenger car market increased from 38% in 2014 to 43% in 2016. The rise of self-owned brands has also provided opportunities for autonomous parts systems to include high-value-added products. The increasing standards of products and technologies of autonomous parts manufacturers have also made it possible for China's automobile parts to participate in international competition. In addition, the localization of joint venture brands and the international procurement of giants have also provided development opportunities for autonomous parts manufacturers [6].

3.3 The smooth development of new energy and intelligent and connected vehicles (ICVs) has created favorable conditions for the development of the parts industry

With continuous breakthroughs in the energy revolution

Table 2. Principal businesses of Chinese corporations in the Global Top 100.

Corporation	2017 Global ranking	Principal business
Yanfeng Automotive Interior Systems Co., Ltd.	14	Interior/exterior parts, seats, electronic systems
Inalfa Roof Systems Co., Ltd. (acquired by BAIC)	66	Seats
CITIC Dicastal Co., Ltd.	71	Aluminum wheels and chassis
Johnson Electric Group	81	Micromotors, integrated motor systems
Minth Group Ltd.	93	Exterior parts

Source: Automotive News, 2017 *Global Automobile parts Manufacturer Rankings*.

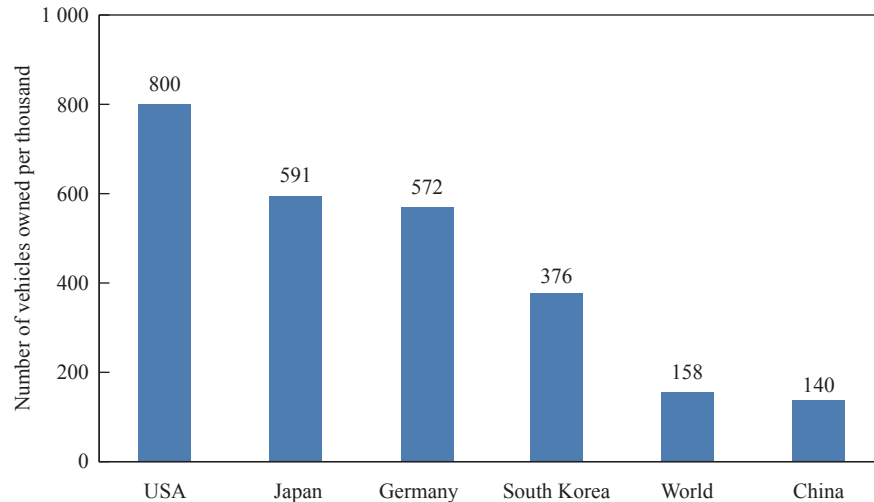


Fig. 3. 2016 major countries and vehicle ownership per thousand.
Source: China Industrial Information Network.

and innovations in IT, automotive products are accelerating development toward new energy, lightweight, and intelligent connections. Automobile parts companies will have to face the changes from traditional automobiles to new energy vehicles, in terms of the energy, engine, and control systems, as well as the rapid expansion of the sensing, communication, control, and decision-making systems of ICVs. New energy vehicles and ICVs are expected to be the next breakthroughs in seizing opportunities and catching up with development in the world.

China has a first-mover advantage in the development of these vehicles. Currently, under the support of a series of national policies, the technical standards of China's new energy vehicles have increased greatly, and the scale of the industry has expanded rapidly. In 2016, the production and sales volume of new energy vehicles in China exceeded 500000, achieving a year-on-year growth rate of over 50% and ranking first in the world. The development of new energy vehicles has created favorable conditions for the development of power batteries and engines and numerous competitive suppliers of new energy components. Regarding ICVs, as China has strong advantages in Internet-related industries, its capability to support the development of ICVs continues to strengthen, and the automotive industry is expected to achieve breakthroughs.

4 Suggestions for the establishment of an autonomous parts system

Automobile parts are the basis of the development of the automobile industry and are an essential component of the industry. Through the support of national policies, autonomous innovation of businesses, and coordinated cooperation of self-owned brands, it is possible to create a large number of large-scale parts manufacturers that are internationally competitive and support

China in becoming an automotive powerhouse, resulting in a leading automobile parts support system.

4.1 Increase governmental support for the “four industrial pillars” for automobile parts and improve the environment for industrial development

The “four industrial pillars” for automobile parts are intertwined and interdependent. They are highly complex and extremely integrated. Only by improving the overall level of the “four industrial pillars” and effectively integrating them can the entire automobile industry, especially the parts industry, be strengthened [7]. It is necessary to strengthen high-level planning, utilize various resources, and resolve the basic products and technologies that restrict the development of the automotive industry in various phases and channels. It is also essential to speed up “industrial strengthening,” provide guidance to R&D manufacturers of materials and parts and integrate the processes with technological organizations. The government could also collaboratively develop core technologies, promote the engineering and industrialization of scientific and technological innovations, and resolve the development bottleneck of high-end equipment and major engineering projects, while supporting the growth of the parts industry. Furthermore, we suggest that the country's fiscal support policies and major special projects be slanted toward the “four industrial pillars,” creating a favorable environment for their development.

4.2 Focus on innovation and improve the self-supporting capabilities of key parts

4.2.1 Strengthen innovation capacity and achieve breakthroughs in key technologies

Increasing fiscal and taxation support policies actively pro-

motes the autonomous innovation of parts and supports the innovation capabilities of core technologies. The government could consider expanding funding, credit, and insurance financing channels to support projects related to key parts and establish a collaborative innovation platform for production, education, and research. This will improve the mechanisms of innovation, and allow the market to allocate technological resources, resulting in an acceleration of the sharing of R&D resources and research developments. Key technical difficulties should be broken down into layers and the entire industry and industrial chain should collaborate to achieve breakthroughs in core technologies. Emphasis should be placed on the development of “applied technologies” and “platform technologies” for automobile parts, establishing a safe and controllable key parts support system. By developing complete vehicle platforms and modularization, the government could provide financial support to parts manufacturers for system development, system support, and modularization [8].

4.2.2 Innovate for the collaboration model between vehicle and parts manufacturers and expand the scale of autonomous support systems

The government could consider picking up the momentum of the leading and driving effects of the vehicle manufacturing industry, innovating for the collaboration relationship between vehicle and parts manufacturers, and maximizing benefits. On the one hand, it could ensure that vehicle manufacturers and parts manufacturers support each other to form a mutually beneficial venture, establishing a cooperation mechanism between the vehicle and parts manufacturers with cost-sharing and benefit-sharing. This also encourages the in-depth cooperation between leading automotive companies and competitive parts manufacturers throughout the product life cycle. For automotive companies that can purchase key and core components produced by autonomous parts manufacturers, the government should offer tax incentives, enhancing the enthusiasm of the automotive industry and increasing the supporting rate for autonomous parts. On the other hand, parts manufacturers should also strengthen their own technological capacity and maintain the advanced and forward-looking nature of technology, in order to achieve new market developments amid technological changes and keep pace with the development of the automotive industry. Consequently, this would create opportunities for deep cooperation with the automotive industry and change the current dependency relationship.

4.3 Create leading corporations and establish a competitive global supply system

4.3.1 Promote mergers and acquisitions and combine resources to develop leading companies

The government should promote mergers and acquisitions,

combine resources to create leading companies and a desirable environment, adhere to market-oriented operations, and focus on the guiding role of a government. By relying on leading enterprises to promote the horizontal and vertical integration of industrial chains, a group of large-scale parts manufacturers with international competitiveness will emerge. The industry access standards should be increased, resolutely eliminating backward companies. This allows resource elements, such as talent, capital, and technology, to concentrate on leading companies, reduces homogenous competition, and increases industrial concentration and resource allocation efficiency.

4.3.2 Encourage overseas mergers and acquisitions, and accelerate internationalization

The government should improve planning guidance and overall coordination, as well as integrate competitive resources. It should also guide businesses to implement global development strategies and step up overseas structuring. Overseas mergers and acquisitions should be performed in a focused and step-by-step manner, optimizing resource allocation globally, and developing and improving global production and service networks. This also enhances internationalized operation capabilities and international competitiveness.

4.3.3 Rely on leading manufacturers to build a global supply system

The government should implement industrial clustering and depend on leading manufacturers to drive the aggregation and extension of the industrial chain. Other possible enhancements include upgrading toward the high end and improving the core competitiveness of the industry. Strengthening leading businesses improves the relationship between vehicle and parts manufacturers and breaks through the traditional dependent nature of automobile parts, and supply and demand models. This eventually divests the dependence relationship between the parts and the automotive industry. The automobile parts industry should develop neutrality, and be market-oriented and independently operated. It should also implement the specialized division of labor and coordinated production, while promoting the optimization and upgrading of industrial structures. Taking advantage of the Belt and Road Initiative and depending on the leading manufacturers, businesses could construct an international operating platform and promote the establishment of a global supply system for parts manufacturers to integrate into global support systems.

References

- [1] China Automotive Engineering Research Institute Co., Ltd. Annual report on auto parts industry in China [M]. Beijing: Social Science Academic Press, 2016. Chinese.
- [2] China Automotive Engineering Research Institute Co., Ltd. Annual

- report on energy-efficient vehicle industry in China [M]. Beijing: Social Science Academic Press, 2016. Chinese.
- [3] China Automotive Technology and Research Center Co., Ltd. Annual report on new energy vehicle industry in China [M]. Beijing: Social Science Academic Press, 2015. Chinese.
- [4] Project Team of Manufacturing Power Strategy. Research on the manufacturing power strategy [M]. Beijing: Publishing House of Electronics Industry, 2015. Chinese.
- [5] Xiong X H. China's parts business revenue 3.5 trillion, the core components are monopolized by foreign investor [N]. China Business, 2016-10-10(C10). Chinese.
- [6] Zhang X H. Study on the development strategy of Chinese auto parts industry [J]. Automobile Parts, 2015 (9): 39-43. Chinese.
- [7] Zhao F Q, Liu Z W, Hao H. et al. A comprehensive evaluation system for automotive industry of different nations [J]. Chinese Journal of Automotive Engineering, 2016, 6(2): 79-86. Chinese.
- [8] Zhao F Q, Liu Z W, Hao H, et al. Analysis of China's strategy for a stronger automotive country and its implementation pathway [J]. Forum on Science and Technology in China, 2016 (8): 45-51. Chinese.