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# Research on the Standardization of China's Intelligent Automobile Industry Development from the Perspective of Marxism

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## Abstract

**Smart cars represent the future development trend of automobiles. The intelligent upgrading and development of automobiles will reshape the competition pattern of the automobile industry. China automobile industry's intelligent upgrading and development still faces many problems and challenges. In this article, through systematic data collection and arrangement, the current situation and development trend of standard organizations in automobile standardization are sorted out; this article also analyzes the current situation and existing problems of automobile standardization in china and combines the basic principles of Marxism, in-depth analysis of the basis and environment of the intelligent upgrading and development of China automobile industry. The article finally draws the following conclusions: To promote the intelligent upgrading of China automobile industry,papershould encourage the intelligentization of automobile products and automobile manufacturing and accelerate the transformation of automobile industry models and the construction of automobile industry infrastructure. Strengthening strategic planning, improving relevant regulations and policies, improving operating standards and evaluation systems, strengthening information security, and establishing innovation alliances are good areas for improvement.**

## Keywords

**Marxist Philosophy; Chinese Automobile Standardization; Intelligent Automobile Industry.**

## 1. Introduction

2022 is regarded as the first year of the smart automobile industry, and the wave of intelligence has begun to sweep the global automobile industry. The automobile industry is an essential pillar of China national economy. The intelligent upgrading and development of the automobile industry will help better meet the needs of people's lives and travel, promote significant changes in the automobile and even the manufacturing industry model, and accelerate the development of China economy and society by leaps and bounds. Developing. With the development and application of many emerging technologies such as mobile communication, artificial intelligence, the Internet of Things, and big data, the intelligent upgrading and development of the automobile industry will usher in a significant strategic opportunity.

The thought of Marx and Engels has significant historical value. The Marxist theory founded in the mid-19th century is a substantial change in human history, and it is the most dazzling star of theoretical wisdom that has appeared in the sky of thought. But the doctrines that constitute the basic principles of Marxism in the study of Marx and Engels have historical value and

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current value. The current value of Marxist thought is not the value of quotations, nor is it the search for excerpts from chapters, nor is it elaborating on words or taking a seat. A moral point of view does not serve as a starting point for thought. The current value of Marxist thought is the value as a standpoint, viewpoint, and method for observing and solving contemporary problems. The current issue of the basic tenets of Marxism is the most discussed. The essence of this question is whether the basic principles of Marxism will be outdated or not. Times will change, leading to new features and new problems. This is not the reason why the principles of Marxism are obsolete, but the practical basis for Marxism to keep pace with the times. As long as Marxism can continue to provide scientific fundamental theories and methods for observing and solving new problems, it will not be outdated. The invincible strength of Marxism lies not in the fact that it contains ready-made answers to all questions but in the fundamental theories and methods it provides for finding solutions.

## 2. A review of Related Research

Connected Autonomous Vehicle (CAV) (also known as a self-driving car, driverless car, intelligent networked car) refers to the realization of vehicle and X (people, vehicles, roads, clouds, etc.) by carrying sensors and controllers and other devices. etc.) intelligent information exchange and sharing, capable of perceiving and evaluating the complex external environment, and a new generation of vehicles with partially or fully autonomous driving functions. In recent years, there has been abundant research literature on the intellectual development of the automotive industry, covering prospects, road and test environments, relevant laws and regulations, implementation paths, and countermeasures. In terms of prospect and trend research, researcher believes that intellectual development leads the significant changes in the automotive industry[1];The smart cars represent the future development trend of automotive technology; The researcher believes that smart cars must start with assisted driving and gradually go through Partially autonomous driving, conditional autonomous driving, advanced autonomous driving, and fully autonomous driving. In terms of road and test environment research, researcher believes that China intelligent transportation construction should learn from the "Google + Ann Arbor" model in the United States[2]; based on specific foreign test sites such as test sites, a proposal for the construction of an intelligent vehicle test site with the vehicle test environment, test scenarios and network security as the core is put forward.

## 3. Opportunities and Challenges for Intelligent Development of the Automotive Industry

With the acceleration of the intellectual development of the automobile industry, the classification of intelligent vehicles has also emerged. The international representative is the classification standard proposed by the American Society of Automotive Engineers (SAE) and the American Highway Safety Administration (NHTSA)[3].

### 3.1. The Intellievelopment Trend of China Automobile Igent Dndustry

Since the invention of the automobile, automobile intelligence has been accompanied by the development of automobiles, from low-level to high-level intelligence. "Made in China 2025" lists smart cars as a critical area of national innovative manufacturing growth, and "Smart Cars Innovation and Development Strategy (Draft for Comment)" clarifies the strategic vision and development goals of smart cars. With the subsequent promulgation and implementation of laws, regulations, policies, and measures for the intellectual development of China automobile industry, relevant enterprises have entered the field one after another. The intellectual development of the automobile industry has shown a positive trend[4]. There is still a gap between the intellectual development of China automobile industry and that of the United

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States, Japan, Germany, and other powerful automobile industry countries, andpapermust speed up the pace to catch up.

### 3.2. Problems and Challenges Faced by the Intelligent Development of China Automobile Industry

The intellectual development of China automobile industry started late. There are many deficiencies in top-level design, critical areas, industry alliances, and cross-border integration of sectors and technologies[5]. First, the top-level design is not yet straightforward. The intelligent development strategy of China automobile industry has not yet been fully formed, making it challenging to integrate resources, focus on the development direction, and still lack an overall plan for the long-term layout. Second, the foundation in critical areas is relatively weak. There are mainly problems such as weak independent innovation ability, lagging development of basic research, core technology, key components, etc., especially the high degree of external dependence on core technology. The third is the lack of industrial cooperation alliances. The development of China auto enterprises lacks cooperation, mainly relying on their efforts to carry out R&D and facility construction, and it is more common to fight alone. Fourth, the cross-border integration of industries and technologies lags. The automobile and Internet industries have not yet deepened the integration and development of intelligence and networking. They have not yet achieved joint growth with intelligent transportation and smart cities. The cross-industry integration innovation system such as automobiles, communications, transportation, and the Internet has not yet been established. Effective cross-industry organization and management Institutions and overall promotion mechanisms have not yet been formed.See Figure 1.

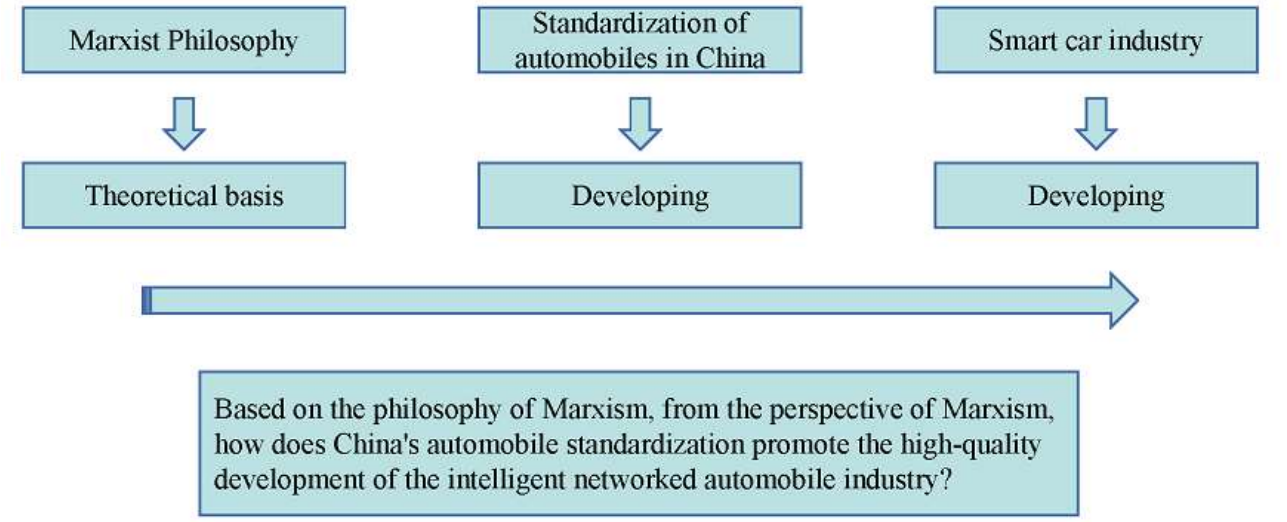


**Figure 1.** Smart car standardization flow chart

The development of intelligent cars in china faces many challenges, mainly reflected in these aspects: First, the policies and regulations are not perfect. Market supervision policies and policies and rules on innovative car safety and traffic accident determination are not yet excellent. Second, there are network security risks. At present, the network security standards of smart cars need to be improved. The network security problems of intelligent car manufacturers may threaten the security of smart cars, and hackers may attack the networked systems or endanger the safety of intelligent vehicles. Third, mixed traffic restricts its development. Mixed driving of intelligent and non-motor vehicles and mixed driving of

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autonomous vehicles and traditional non-autonomous vehicles may seriously limit the introduction and development of intelligent cars, especially LEVEL4 (HA) and LEVEL5 (FA).

## 4. The Basis and Environment Analysis of the Intelligent Development of China Automobile Industry

In 1990, American strategic management scientist Michael Porter put forward the famous "diamond model" theory in the book "National Competitive Advantage," which consists of four factors (factors of production, demand conditions, related industries, supporting industries, and corporate strategy). structure and competition) and two elements (opportunity and government). This paper uses the "diamond model" to analyze the basis and environment of the intellectual development of China automobile industry.

### 4.1. Factors of Production Analysis

Michael Porter divides the factors of production into primary aspects of production and advanced elements of production. The primary characteristics of production mainly include natural resources, capital resources, and labor factors, and the advanced factors of production mainly include technical personnel, technical resources, and infrastructure. The key lies in advanced production factors to achieve intelligent upgrading and development of the automobile industry. Compared with developed countries, china still has a particular gap.

#### 4.1.1. The Technical Talent Team is Gradually Growing, but There is a Lack of High-level R&D Talents

China's auto industry is mainly concentrated in six areas: the Northeast agglomeration area, the Beijing-Tianjin-Hebei agglomeration area, the Yangtze River Delta agglomeration area, and the central agglomeration area, the western agglomeration area, and Pearl River Delta area. With many universities and research institutes, it has gathered many talents in automotive-related technology research. In developed countries, automobile R&D talents account for more than 30% of the automobile employees, while China only accounts for about 7%. The shortage of R&D talents is severe, and the high-level R&D talents for the intelligent upgrading and development of the automobile industry are even more scarce.See Figure 2.

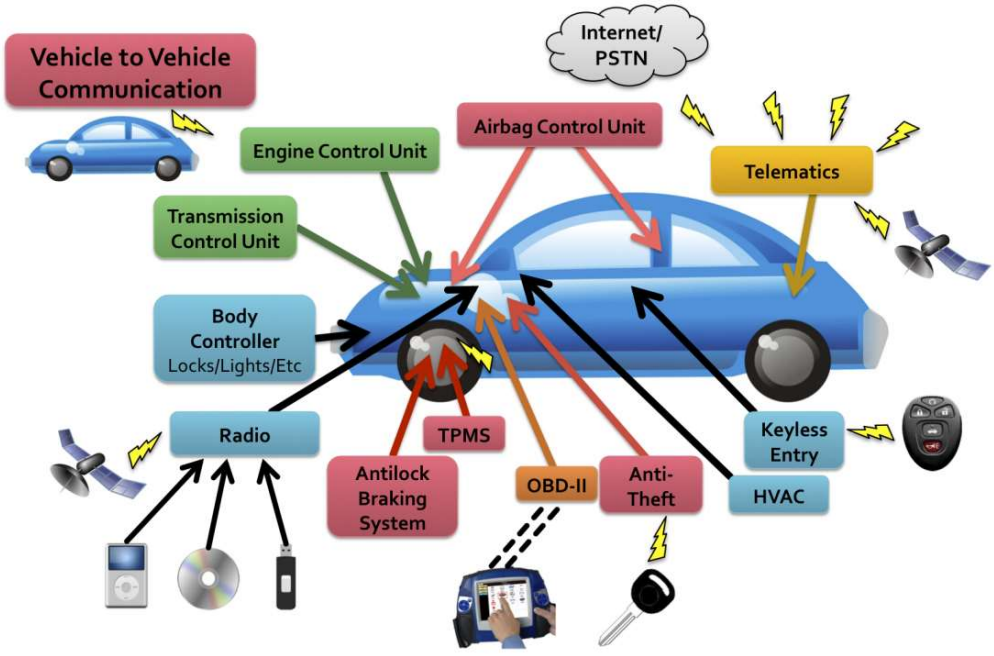


**Figure 2.** Intelligent advanced technology map of automobile industry

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### 4.1.2. Technical Resources Ranked Third but are Still Insufficient

The intelligent functions of smart cars are mainly reflected in the replacement of human eyes, brains, hands, feet, etc. Therefore, environmental perception technology, central decision-making technology, and underlying control technology are the critical technologies of smart cars. Developed countries such as Japan and the United States have more critical technologies for intelligent vehicles. If the essential technologies for the development of intelligent vehicles cannot be obtained, the intellectual development of China's automobile industry will be significantly restricted.

### 4.1.3. Infrastructure Construction is Progressing in an Orderly Manner, but There are Still Gaps

Smart vehicle development infrastructure involves many aspects, focusing on navigation services, proving grounds, and intelligent transportation. China's autonomous Beidou satellite navigation system has gone through three stages of development, from the first generation of Beidou to the third generation of Beidou. China's Beidou satellite navigation system and European Galileo (GALILEO), Russia's GLONASS (GLONASS), and the United States GPS are also known as the world's four major satellite navigation systems. In 2020, the Beidou satellite navigation system can provide high-precision space-time services for the whole country. Compared with the US GPS, the service capabilities of China's Beidou satellite navigation system still need to be further improved.

## 4.2. Analysis of Demand Conditions

Demand conditions provide support for industrial development. Good demand conditions can better promote the large-scale development of the industry and provide the continuous driving force for enterprises to improve products and innovate technologies. Smart cars have broad market prospects in China and even the world. From 2009 to 2018, China's automobile production and sales ranked first for ten consecutive years, accounting for nearly 1/3 of the global automobile market. China has become the largest domestic and foreign auto company. Important automotive market.

## 4.3. Analysis of Related Industries and Supporting Industries

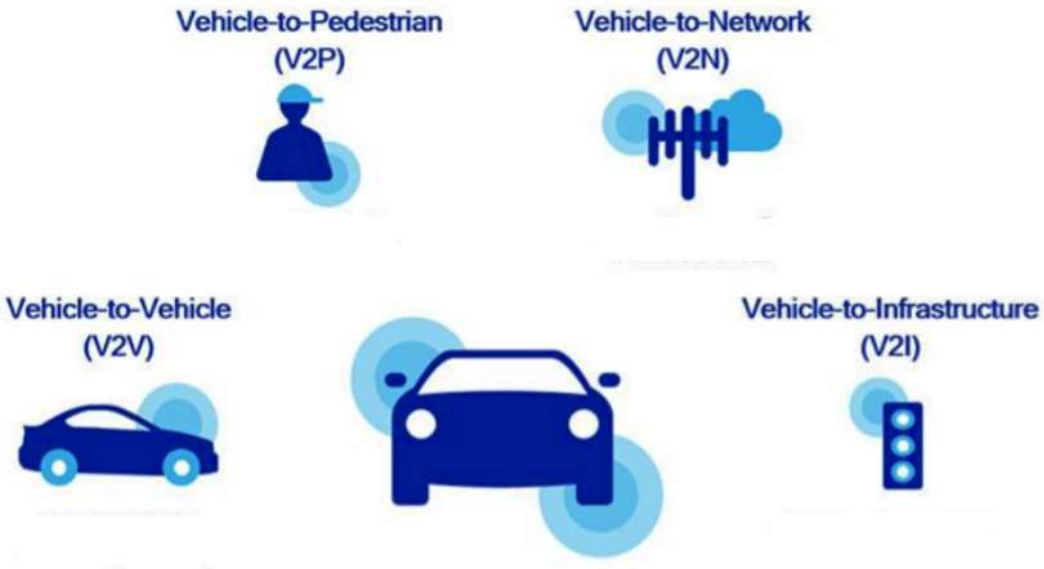


**Figure 3.** Analysis based on automobile standardization from the perspective of Marxism

The industries related to the development of automobile intelligence are vast, mainly covering: wireless communication technology, high-precision map and positioning technology, advanced

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driver assistance technology, information security and privacy protection technology, information fusion technology, intelligent interconnection technology, in-vehicle network technology, human-machine technology Interface technology (HMI), critical technologies of heterogeneous network fusion, critical technologies of transportation big data processing and analysis, critical technologies of transportation cloud computing and cloud storage, etc. These technologies and industries have a good foundation for development in China, but there are still many shortcomings. In addition, due to the inadequate information security and privacy protection technology, the connection of smart cars to the network may bring security risks and face potential network security risks.See Figure 3.

### 4.4. Development Opportunities

The automobile industry is undergoing unprecedented significant changes. Intellectual development is a considerable opportunity recognized by the global industry. The breadth and depth of the development of the automobile industry are unparalleled. The first is the opportunity of the era in which significant changes are planned. The global auto industry is undergoing the fourth revolution centered on intelligent and networked innovation. China's smart car has a bright future. Driven by industrial-technological innovations such as the Internet, big data, cloud computing, and artificial intelligence, the auto industry is ushering in an era of significant changes—the age of smart cars. The second is a historic opportunity for industrial upgrading and development. Driven by factors such as the transformation and upgrading of the traditional automobile industry, good market demand, technological innovation, environmental protection, and energy conservation requirements, the intellectual development of the automobile industry has become the general trend. The auto industry generally believes that 2022 will be the first year of the commercialization of intelligent cars and will show a rapid development trend, which provides a significant historic opportunity for the intellectual development of China's auto industry. The third is the strategic opportunity to surpass developed countries. The smart card market is still in the research and development stage and the introduction stage. The market prospect is conducive to science and technology to promote significant changes in the automotive industry, actively plan and speed up the development of intelligent cars, seize the commanding heights of the automotive industry's intellectual development, and achieve corner overtaking.

## 5. Problems and Challenges Faced by China's Automobile Standardization

Compared with the progress of automobile standardization at home and abroad, it can be found that although the Chinese government and the industry attach great importance to the development of automobile technology and have formed a perfect framework for the overall planning of the standard system, the development and implementation progress of specific standards is relatively slow. Slowly, the status quo of China's automotive standard system cannot meet industrial development needs, such as automotive technology research and development, commercialization, etc. There is a significant gap between the level of automotive standardization in European and American countries. KPMG's Vehicle Readiness Index confirms these gaps over the past three years. From 2019 to 2021, the Autonomous Vehicle Readiness Index (AVRI) report released by KPMG evaluates the development and maturity of a country/region's auto industry from four aspects: policies and regulations, technological innovation, and infrastructure and consumer acceptance. Among them, procedures and regulations mainly focus on the perfection of policies, laws, planning, and standards. From 2018 to 2020, the readiness index of most countries has improved to a certain extent.

In contrast, China's overall readiness index ranked 15th in 2018 and dropped to 20th in 2019 and 2020. China's general readiness index is in the policy. The drop-in regulations and infrastructure has been particularly pronounced.

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To sum up, China's automobile standards face significant challenges in distributing quantity, quality, technology, and other fields. First of all, although China has formulated a relatively complete overall framework of the standard system, the speed of normal development in actual work is far behind the original planning goals. It cannot effectively support the rapid growth of the industry. Second, because automobiles are deeply integrated with cutting-edge information and communication technologies, the attributes of interconnection are undeniable. Seize the advantages of industrial development developed; countries have taken a right to speak of international standards. In this regard, China's overall situation is relatively passive. Third, from the technical field of standards, the distribution of China's automotive standards is still very uneven, especially in terms of verification and confirmation, human factors, security and privacy, and other measures are very lacking.

## 6. Conclusion

Smart car is the future form of automotive products and the commanding heights of automotive technology development. An intelligent car is a mobile interconnected intelligent terminal. Smart car is an integral part of the urban intelligent transportation system-a significant component of value chain reshaping. The development of intelligent cars is an extensive and highly complex system engineering that requires multi-party collaboration across industries and fields. This involves critical technological breakthroughs in various areas such as automobiles, transportation, information, communications, electronics, and urban construction, but also requires rational division of labor, effective interaction, and full cooperation among countries, industries, enterprises, and even society. This paper believes that the government should fully understand and affirm the crucial strategic significance of developing smart cars. The country should list intelligent cars in the same national strategic position as new energy vehicles, do top-level design at the federal level, clarify relevant design elements, formulate a Long-term development strategy, and unswervingly promote the implementation of the system, leading the transformation and upgrading of China's auto industry and even the entire manufacturing industry. The government must take the lead in solving significant problems and put them into action, including the establishment of a unified standard and regulatory system; the cultivation of critical enterprises in the intelligent automobile industry chain; the coordinated guidance of the automobile industry and technology fields; From the perspective of social development needs, plan the intelligent transportation system and intelligent vehicles in a unified manner. Continuous efforts are made to seize strategic opportunities in the development process of smart cars to enable China's auto industry to grow and develop as soon as possible and help the overall transformation and upgrading of China's manufacturing sector.

## References

[1] Wang Xiaoming. Research on the intelligent upgrading and development of China's automobile industry [J], Reform,vol. 12(2019),P.146-154.

[2] Wu Shenghao,Zheng Suli,Yang Luqi. The development trend of foreign autonomous vehicle standardization and its enlightenment in China [J],Standard Science, vol.11(2021),p.16-24.

[3] Gao Jun.Marx and Engels' scientific and technological thought and its current value [D]. Soochow University, 2018.

[4] Song Guanghui. The future development trend of intelligent vehicle technology [J]. Times Auto, vol.21(2020),p.29-30.

[5] Zhao Fuquan, Liu Zongwei. Analysis of the strategic value and advantages and disadvantages of developing smart cars in China [J]. Modern Economic Discussion, vol.04(2016),p.49-53.