THESIS

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2023

Hungarian University of Agriculture and Life Sciences

Gödöllő Campus

BA in Business Administration and Management

Analyzing competitiveness and competitive environment of BYD Company Limited

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2023

Abstract

As the world pays increasing attention to environmental protection and sustainable development, the new energy vehicle industry is gradually emerging. China's BYD Company occupies a significant market share in this field and has attracted much attention. However, as competition intensifies, BYD must conduct an in-depth analysis of its competitiveness and competitive environment to formulate effective strategies. The purpose of this study is to analyse the competitiveness of BYD's new energy vehicles and assess the competitive environment it faces. Specifically, the research questions of this dissertation include: How competitive is BYD in the new energy vehicle market? What are the key factors in the competitive environment facing BYD? To answer the above questions, this study employed a variety of methods. First, Porter's five forces model was used to evaluate BYD's competitiveness in the new energy vehicle market, including the bargaining power of buyers and suppliers, the threat of potential competitors, the existence of substitutes, and competition among existing competitors. degree. Secondly, the PEST model is used to study the competitive environment faced by BYD Company from external factors such as politics, economy, society, and technology. In addition, the SWOT model was also used to deeply explore BYD's strengths, weaknesses, opportunities, and threats in the competitive environment. The research conclusion shows that BYD has established irreplaceable competitiveness with its complete industrial chain, advanced new energy vehicle manufacturing and battery manufacturing technology. However, facing a competitive environment in which domestic and foreign car-making companies are increasing and national subsidy policies are gradually weakening, the company needs to continue to launch diversified products and services based on consumer needs.

Keywords: New energy vehicles, BYD, competitiveness, competitive environment.

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1. Introduction

Energy conservation and environmental protection are the two major development issues facing countries around the world today, which are related to the survival and development of human beings. For more than a century, the development of fuel vehicles has brought convenience to human life, but also increased environmental pollution. The increasing consumption of gasoline vehicles has also increased the pressure of global oil consumption. New energy vehicles, no longer dependent on oil for power, have gradually developed to assume the role of a vehicle for sustained economic growth and technological progress in manufacturing. To improve the living environment, conserve resources, and drive the sustainable development of the manufacturing industry, more and more countries are vigorously promoting new energy vehicles, and the world's major leading automobile manufacturers are also participating and competing in the new energy vehicle industry track. Along with more and more countries and regions have clearly introduced a timetable for banning the sale of fuel vehicles (Tsai, Chang & Hsieh, 2023). For example, the Norwegian government wants all new passenger vehicles, light commercial vehicles and city buses sold after 2025 to be banned from using conventional fuels to achieve zero vehicle emissions. Other European countries that have pledged to stop selling or registering new internal combustion engine passenger vehicles within the next 10 years include Denmark, Iceland, Ireland, Slovenia, and Sweden (Wappelhorst & Cui, 2020).

The current new energy vehicle market industry is growing rapidly under the stimulation of government policies to encourage the development of new energy vehicles such as tax breaks, free parking, and purchase subsidies, as well as technological advances by auto manufacturers. According to the International Energy Agency (2022), global new energy vehicle sales are about 16.5 million units by the end of 2021, three times the figure at the end of 2018, with electric vehicle (BEV) sales accounting for nearly 70% of the total. It is predicted that the global new energy vehicle market is expected to reach 120 million units in sales by 2030, accounting for 30% of total vehicle sales.

Founded in 1995, BYD Auto Company Limited started from manufacturing and selling fuel vehicles, relying on its strong IT R&D and production strength, and integrating

its advantageous resources with automobile manufacturing, gradually developed into an enterprise with many core technologies of new energy vehicle manufacturing and vehicle styling design, R&D, manufacturing, and sales. After 27 years of rapid development, BYD has developed into a leading brand in China's new energy vehicle industry, with not only the technical development and experimental capability of vehicle products, but also a supply chain system that has developed into an enterprise with obvious advantages (Qudrat-Ullah, 2022). Although the company is at the forefront of the market, there are still shortcomings in the company's sales and marketing strategies that need continuous improvement and unstable factors that affect the achievement of sales targets, and these factors may limit BYD's new energy vehicle company to compete in the global industry.

Against above background, this thesis focuses on BYD Company Limited, a market share leader in the global new energy vehicle industry. **The research purpose** is to analyse the company's competitiveness and competitive environment. Using a combination of SWOT analysis, Porter's Five Forces model and PEST analysis, the thesis addresses two main **research questions**: what is the competitiveness of BYD in the development of the new energy vehicle industry? What is the competitive environment that the BYD faces?

The research on this topic has **theoretical significance**. Automobile consumption plays an important role in the national economic income and social development of each country. The development of new energy vehicles will have an effective control on the reduction of oil energy consumption and, at the same time, can play a key role in improving the environment. The analysis of BYD Co., Ltd.'s competitiveness and its competitive environment can help contribute to the construction of a theoretical system of competitive strategy for the new energy vehicle industry.

Moreover, it also has **practical significance**. The analysis of BYD's competitiveness and its competitive environment from the perspective of a new energy vehicle company can help the company understand its own market environment, grasp the internal and external macro and micro market conditions, and thus identify the potential risks in the market competition. In addition, it also helps the company to choose the applicable competitive strategy according to the actual situation faced by the company, which is beneficial to the long-term development of the new energy vehicle company.

2. Theoretical background and literature review

This section will first briefly describe the concepts related to new energy vehicles, followed by a specific introduction to the theories involved in the competitiveness and competitive environment analyzed in the thesis, to facilitate a more systematic application with the analysis of BYD New Energy Vehicle Company. Finally, a review of the relevant literature is presented.

2.1 Concepts of new energy vehicles

Traditional vehicles use oil or diesel as the power to drive the car. Using the principles of traditional vehicles upgraded in construction, new energy vehicles are vehicles that use new types of energy to replace traditional fuel vehicles. These new energy sources include electricity, hydrogen, solar energy, wind energy, etc. The advantages of new energy vehicles over traditional fuel vehicles include zero emissions, low noise, high efficiency, and energy efficiency, which makes them a promising option for reducing air pollution and greenhouse gas emissions. In addition, with the advancement of clean energy technology, the cost of producing and using new energy vehicles is gradually decreasing, thus they are becoming more and more popular. Depending on the power of the vehicle, the current types of new energy vehicles are mainly hybrid vehicles, fuel cell electric vehicles, pure electric vehicles, and hydrogen engine vehicles (Wang et al., 2022).

Hybrid vehicles are vehicles that are powered by both fuel and electricity. They can recharge the battery by recovering brake energy, generators, etc., while also using the engine to drive the vehicle. Compared to conventional fuel vehicles, hybrid vehicles have higher energy use efficiency, but still have exhaust emission problems (United States Environmental Protection Agency, 2015).

Fuel cell vehicles use hydrogen as a fuel, which reacts with oxygen to produce electricity and produces water vapor as the only waste product. They do not produce any tailpipe pollution and have the advantages of high energy conversion efficiency and fast

refuelling, but the construction of hydrogen refuelling stations is not yet widespread, as the cost of hydrogen production and storage is also higher (SFC Energy, 2022).

Pure electric vehicles are one that relies entirely on batteries to store energy and does not require the use of any traditional fuel. The components of a pure electric vehicle include a generator, a rechargeable battery, etc. The power is provided by the battery, and the generator recovers energy when the vehicle decelerates and brakes. The battery is the technical core of the pure electric vehicle, which mainly applies lithium manganese acid and lithium iron phosphate batteries. They do not produce tailpipe pollution and are currently the most environmentally friendly type of vehicle. However, the range and charging time of pure electric vehicles are one of the main factors limiting their popularity (An et al., 2019). The main production of BYD automobile company analysed is the pure electric vehicles.

Hydrogen engine vehicles are vehicles that use hydrogen as fuel and convert it into electricity. This type of car uses a fuel cell as the power source, which reacts hydrogen with oxygen to produce electricity and produces water vapor as the only waste product. This process is called hydrogen fuel cell power generation. Since their fuel is only hydrogen, their emissions are only water vapor, which makes them a promising option for reducing atmospheric pollution and reducing greenhouse gas emissions. In addition, they have a higher energy conversion efficiency than fuel vehicles, which means less fuel is wasted, thus saving on fuel costs (US Department of Energy, 2016).

2.2 Theoretical background

The competitiveness of a company is both an economic concept and a management term. The academic community has been studying competitiveness for a relatively longtime. In the 1990s, the American scholar Michael Porter introduced the concept of enterprise competitiveness. According to him, enterprise competitiveness refers to the internal supporting ability of an enterprise based on its own competitive advantages and competitive resources to provide consumers with high-quality products and services in the existing market, gain high profits and enhance its own brand image (Porter, 1995).

The formation of enterprise competitiveness does not happen overnight but is gradually accumulated and enhanced. It is an advantageous resource that can bring considerable profit to the enterprise and is often inimitable and difficult to replace. The theoretical basis for the analysis of competitiveness and competitive environment is mainly SWOT analysis, five forces analysis model and PEST analysis tool.

2.2.1 SWOT analysis

SWOT analysis is an acronym for the analysis of four words, S (Strengths), W (Weaknesses), O (Opportunities) and T (Threats).

When using SWOT analysis theory, the focus is on its systematic and structural nature, and secondly, the internal resources and external environment of the company are also considered in the analysis content. SWOT analysis can provide a scientific and comprehensive theoretical basis for the development of business and marketing strategies. Applying to SWOT method, the data should be objective and true, and at the same time, quantitative analysis data should also be combined to make up for the shortcomings of SWOT qualitative method, so that a more reliable competitive strategy can be formulated. To analyse the environmental factors of the company, various analysis tools and other data used to analyse and research the environmental factors of the company, namely the external environment and the internal environment. The external environment includes opportunity and threat factors, which have a significant impact on business decisions and management, and the internal environment includes strengths and weaknesses, which have both positive and negative impacts on the development of the company, and when analysing these factors, it is important to consider both the history and the current situation, as well as future planning.

When creating a SWOT matrix, the different factors can be arranged in order of importance or priority to create a SWOT matrix. In the process of creation, the factors that have direct, significant, substantial, urgent, and permanent influence on the company's operation should be prioritized and analysed, while the indirect, minor, small, less urgent and transient factors can be arranged later. When conducting strategic planning, it is necessary to consider how the strengths of the strategy can be exploited, making full use of

the advantageous opportunities, and reducing the unfavourable and threatening factors. Make full use of the analysis method of system analysis tool to combine internal environmental factors and external environmental factors to give a variety of feasible strategic solutions for company development.

The SWOT matrix model can be divided into four parts (as shown in Table 1 below). The first part is SO, i.e., using its own advantages to obtain opportunities and bring opportunities for enterprise development; the second part is WO, on the basis of knowing its own disadvantages, the enterprise should avoid its own disadvantages and seize opportunities; the third part is ST, the enterprise relies on its own advantages to meet external challenges and provide assurance for enterprise development; the fourth part is WT, again, on the basis of understanding its own disadvantages, the enterprise takes corresponding The fourth part is WT, where the company understands its own disadvantages and takes measures to avoid external threats. One of the major benefits of using SWOT analysis is to help enterprises can build on their strengths and avoid their weaknesses.

Table 1: SWOT matrix model

(Source: Gepneretal. (2022))

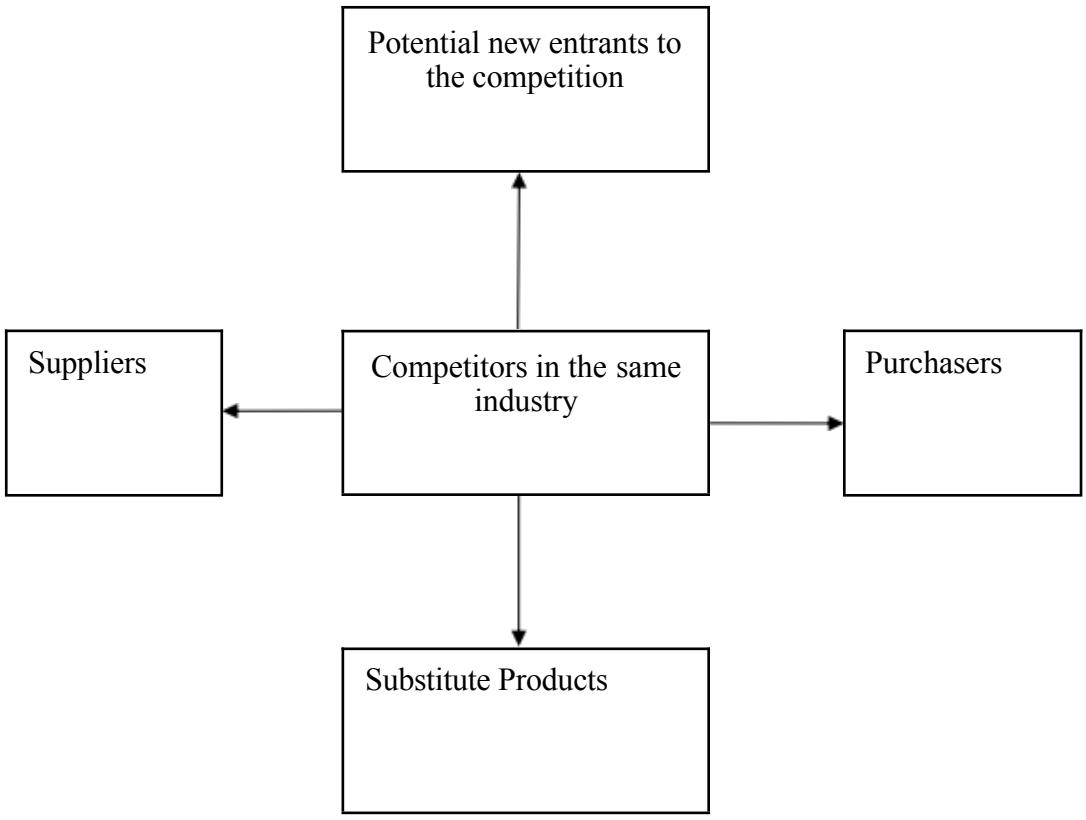
	Internal Strength (S)	Internal Weakness (W)
External Opportunities (O)	SO Strategy. Rely on your own strengths and seize external opportunities.	WO Strategy. Avoid corporate disadvantages and exploit external opportunities.
External Threats (T)	ST Strategy. Rely on the company's own strengths to defend against external threats.	WT Strategy. Circumvent the company's own disadvantages and external threats.

2.2.2 Five forces model

Michael Porter's "Five Forces Analysis Model" is an analysis of the various competitive forces that companies face to understand the basic competitive environment faced by an industry. The Five Forces Analysis Model considers that the five main sources of competition in the industry are: the bargaining power of suppliers, the bargaining power of buyers, the ability of potential competitors to enter, the substitution power of substitutes, and the current competitive power of competitors in the industry, and each of these five forces contains different influencing factors (Porter, 1995). It can be depicted in detail in the following Figure 1.

Figure 1: Five Forces Analysis Model

(Source: Porter (1995))



First, the threat of new entrants. This force itself is a collection of contradictions because new entrants, often bring new vitality to the industry, so that the industry is full of vitality. But at the same time, it will inevitably compete with existing companies for raw materials and market share. It can promote the development of the industry, but at the same

time will also intensify the competition between the industry. The ease of entry of new competitors into the industry depends on the level of the entry threshold. With a low entry threshold, many new entrants are bound to claim market share, and new and old enterprises are bound to compete fiercely for market share. At the same time, with the entry of many enterprises, the industry's demand for resources will increase, the price of resources will rise to varying degrees, and the rise in costs will inevitably lead to a reduction in the profitability of the industry.

Second, the bargaining power of suppliers. It refers to the supplier's ability to control the price of the factors of production provided. The quality, scarcity, and substitutability of the production factors provided by suppliers can affect the bargaining power of suppliers. In addition, factors that affect the bargaining power of suppliers include the number of suppliers and the cost for companies to change suppliers. The bargaining power of suppliers is especially obvious in the supply of high-end products, where the supplier almost has the bargaining power to say no.

Third, the bargaining power of the buyer. In the economic field, the conflict between supply and demand directly affects the price of goods. Buyers force companies to reduce the price of goods by comparison and may also influence the level of profitability and profitability of companies in the industry by demanding higher quality products and high level of service. The bargaining power of buyers is mainly composed of factors such as commodity differentiation, the degree of consumer dependence on goods, the concentration of sellers, the importance of quality, product profit, and conversion costs.

Fourth, the threat of substitutes. This factor is mainly addressed to firms in different industries, if the products produced or sold between them can substitute each other to fulfil the functions that the other can perform, then there will be a mutual competitive behaviour between them, and this competition is generated by the fear of losing market share. Therefore, the companies involved must resist the threat of substitutes by means of appropriate means, such as improving the quality of their products, increasing their services, or making their products distinctive, otherwise the substitutes may have an unpredictable impact on them. At the same time, if substitutes have an advantage in price, quality, and service, then user switching costs will be low, and the competitive pressure that substitutes can generate will be strong, and the greater the chance that the enterprise will lose market share.

Fifth, the competitive ability of industry competitors. Numerous studies by scholars and many examples have shown that the competitiveness of competitors in the industry is the most influential of the five major competitiveness, which not only affects the survival environment between firms, but also has a great impact on the whole industry. Enterprises in the same industry all want to make themselves the leader in the industry and have the initiative in the competition between industries, so conflicts and confrontations are bound to arise in the process of implementing actions, which leads to competition between enterprises in the industry. Regardless of the competitive means used by the enterprises, it will cause the reduction of profits of each enterprise in the industry.

The five competitive forces of the five forces analysis model are interdependent and involve the whole body. Changes in one force will lead to changes in other forces as well, and the result will be corresponding changes in the industry structure and within the boundaries. Therefore, when analysing the development of the industry, it is necessary to predict the possible changes of each competitive force in the future and take actions to cope with the changes of the competitive environment.

2.2.3 PEST analysis

The external environment of a company is a general term for the various environments that exist outside the company's interior, mainly the political and legal environment, the social environment, the technological environment, the economic environment, the human environment, etc. The influence of these environments on different companies varies. The PEST analysis method is a basic tool for external competitive environment analysis, which is used to analyse the general macro environmental factors and predict the external environment through the influence of these factors in PEST represents four types of factors that affect the competition of enterprises, namely: P (political), E (economic), S (social), and T (technological). The general PEST analysis framework can be shown in the following Table 2.

Table 2: PEST analysis model

(Source: Summut-Bonnici & Galea (2015))

Component	Main content
P (Political factors)	Political system, government policies, laws and regulations
E (Economic factors)	GDP level, economic system, market mechanism, energy supply cost, market demand
S (Social factors)	Social culture, customs, religious beliefs, demographic environment
T (Technological factors)	Product innovation, new technology application

The main political environment affecting new energy vehicles are national policies and decrees, etc. When new energy vehicle enterprises carry out market operation activities and product development design, they need to always pay attention to the national fiscal policy, industrial policy, and investment policy, as well as the level of government subsidies, etc. These factors often directly or indirectly affect the market operation activities of enterprises. Therefore, it is important for enterprises to judge and predict the long-term and short-term political environment when formulating marketing strategies and should have the necessary preparation for long-term government policies. The current policy environment has played an effective role in promoting new energy vehicles, and a series of policies favourable to the promotion of new energy vehicles have been formulated.

The economic environment includes macroeconomic aspects and microeconomic aspects. Macroeconomic developments can determine the income level of the population and can also reflect whether the economy is running healthily. The microeconomic environment mainly refers to the economic activities of individual economic units, but also through the production of individual enterprises, the prices of sales, etc. The micro-economy operates through prices and market feedback oriented to complete self-regulation and balance. Through macro and micro economy, it can be used to forecast the size of the market and the

development of marketing strategies. The increase in the income level of the residents will also effectively promote the promotion of new energy vehicles.

The social environment, in a narrow sense, includes the specific environment in which the organization survives and develops, the political environment, the economic environment, the cultural environment, and the psychological environment. economic environment, cultural environment, and psychological environment, etc. These factors constitute the social environment. The good or bad of political and economic factors is directly related to the people's living conditions, the speed of economic development, and the degree of material and cultural enrichment of the people. Through analysis of social environment factors, we can understand the development direction of the political, economic, and cultural construction of the country or region. The analysis of social environment factors can help to understand the development direction of political, economic, and cultural construction of the country or region, to formulate effective marketing policies. The rapid development of the Internet in China has accelerated the promotion of culture and dissemination of information.

The technological environment is one of the most central influencing factors in business activities, and driven by new technologies, there will be adjustment and upgrading of industrial structure and strategic planning occur. When developing products, enterprises need to fully assess the technology used in the product development, understand the product technology layout and technology development trend of competitors in the company needs to fully evaluate the market competitiveness of the technology used in the product, understand the product technology layout and technology development trend of competitors in the industry, formulate the future technology development plan of the company, and communicate with the industry. We also need to understand the national development plan for the We also need to understand the national development plan for this field, whether there are supporting policies and relevant technical standards, etc. New energy vehicles belong to the national with the integration and penetration of different industries and changes in the overall competitive landscape, the technologies used in new energy vehicles are rapidly changing. With the integration and penetration of different industries and changes in the overall competitive landscape, the technology used in new energy vehicles has been rapidly upgraded and iterated, and the progress of technology will further lead the

development of new energy vehicles. The progress of technology will further lead the development of new energy vehicles.

2.3 Literature review

After finding and reading the literature related to the research topic of this dissertation, it was found that they consisted of three main areas: literature related to the competitiveness of companies, an exploration of the new energy vehicle industry, and research on the competitive environment.

2.3.1 Studies on the competitiveness of enterprises

Since Michael Porter introduced the concept of competitiveness of firms in the 1990s, a growing number of scholars have conducted more in-depth studies.

Varga (2013) analysed the formation of competitive advantage and the existence of a competitive edge of the firm and showed that competitiveness of the firm enhances the stability of the firm. Turyakira et al. (2014) verified the influence of social responsibility of the company on the competitiveness of the company by means of component analysis and the development of structural equation models, and showed that employee, social and market-oriented social responsibility has a significant impact on competitiveness of SMEs.

Barnes et al. (2017) examined the impact of cross-country strategies, national strengths, and policy factors on the development of automotive firms in Thailand and South Africa. They concluded that cost, market, geographic location, favourable trade and industrial policies and supply-side advantages that make Thai automotive firms competitive. By exploring the interplay between product architecture, firm strategy, and national innovation systems in the East Asian automotive industry, Bartnik et al. (2018) found that national and regional frameworks interact with broader technological trends to shape business innovation, which in turn leads to enhanced automotive firm competitiveness.

Hyginus et al. (2020) studied the relationship between competitiveness of small enterprises and low production costs, highly skilled labour and new technology, and their results showed that there was a significant correlation within a certain level.

There are several scholars focusing on the competitiveness of firms in the logistics industry. For example, Yang & Ramachandran (2021) constructed an evaluation model of enterprise logistics competitiveness, and analysed and studied the comprehensive competitiveness of enterprise logistics from two aspects: the actual competitiveness of logistics and the potential for future development of logistics. Similarly, through the evaluation results of dynamic set, Li & Wang (2021) found that the most basic competitiveness of logistics enterprises is profitability, and logistics enterprises must maintain strong profitability to obtain strong competitiveness. Olyanga et al. (2022) examine the impact of export logistics components: shipment arrangements, just-in-time delivery, customs quality, trade infrastructure, and track and trace on the export competitiveness of East African Community (EAC) logistics firms. They conclued that just-in-time delivery and tracking exports were positive and significant predictors of export competitiveness of firms in EAC countries. In contrast, shipment arrangements, customs quality, and trade infrastructure had no effect on export competitiveness.

It can be seen from the literature on enterprise competitiveness that current researchers have conducted relatively rich research on the relevant contents of enterprise competitiveness, and the influencing factors of enterprise competitiveness, the evaluation index system of enterprise competitiveness and the improvement path of enterprise competitiveness have been covered. However, there are more studies on the overall competitiveness of enterprises in the logistics industry in the literature, but fewer studies on the competitiveness of enterprises in the new energy automobile industry.

2.3.2 Discussion for the new energy vehicle industry

The subject of this dissertation is BYD New Energy Vehicle Company Limited, and before proceeding to analyse the overall competitive environment of this company, it is necessary to review the literature on this industry study.

Carbon emissions have become a global concern, and the transportation sector is a major source of urban air pollution, accounting for 23% of global carbon emissions (United Nations Climate Change, 2022). The transportation sector is largely responsible for the deterioration of air quality and energy security. More than 70% of China's refined petroleum products and 8% of its end-use energy consumption are consumed in the transportation sector. Carbon emissions have increased from 8.5% in 2012 and are scheduled to increase to 30% by 2050. The birth of new energy vehicles as an inevitable choice for low-carbon and green development in the transportation sector provides an effective way to achieve carbon reduction and fuel conservation in the transportation sector (Zhang & Qin, 2018).

Liu & Kokko (2015) pointed out that the government plays an important role in the growth of the new energy vehicle industry, emphasizing that regulations should be adapted to the market, encouraging technological advances, and controlling prices, coordinating a harmonious environment between vehicle companies, and encouraging partnerships between industry players to progress together. The active role of the government in promoting the development of the industry was also studied by Yuan et al. (2015), who reviewed the policies introduced over the years and affirmed the critical position of policies in the development of the new energy vehicle industry. However, the number of charging facilities infrastructure cannot meet the expansion of new energy vehicle sales, and the popularity of new energy vehicles needed to be promoted with more effort.

Lin & Lin (2017) investigate the development process of new energy vehicles in China and point out that the main problems faced in the development of this industry in the country are the lack of advanced technology, inadequate policies, and poor charging infrastructure. To promote the development of China's new energy vehicle industry, it is necessary to increase research funding, do more research on core components, master core technology, and obtain independent innovation and development, to reduce the dependence of key components on foreign brands and reduce manufacturing costs as well as the dependence on foreign brands and reduce manufacturing costs.

Tu & Yang (2019), on the other hand, studied the key factors of consumers' purchase of new energy vehicles from consumer behaviour theory. Through their study, they found that in terms of behavioural intention, consumers' environmental awareness, acceptance of technological products, and peripheral advice significantly affect their behavioural intention to purchase electric vehicles. In terms of behavioural attitudes, consumers show more

positive attitudes towards the purchase of electric vehicles when they perceive them as more beneficial on a personal, environmental, or national level. Promoting sales of new energy vehicles, therefore, requires the government and related manufacturers to consider increasing the promotion of new energy vehicles and introducing more attractive battery and charging solutions to attract consumers.

As battery-powered electric vehicles are the main type of new energy vehicles, there are also scholars having focused on the research of batteries of new energy vehicles. For example, Wang et al. (2023) focused on the negative externality problem caused by end-of-life power batteries and explore how government subsidy strategies interfere with the development of the new energy vehicle market. Their findings suggested that without government subsidies, the market does not guarantee high returns for both parties. It is difficult for both recyclers and consumers to cooperate actively in recycling end-of-life power batteries. Because both battery manufacturers and consumers lack the incentive to pay attention to the environmental pollution of batteries. In contrast, government subsidies for recyclers and consumers can maximize social welfare at the lowest government cost.

From the analysis in this subpart, current academic research on new energy vehicles has addressed both the background of the rapid development of the new energy vehicle industry, the utility of government subsidies, and the discussion of consumer purchase intentions and their influencing factors, as well as the issue of the negative environmental externalities of batteries for new energy vehicles. However, the existing literature has mainly studied the industry, while the analysis of a specific new energy vehicle company is lacking. The proposed dissertation focuses on the individual analysis of BYD's new energy vehicles company, which has a marginal contribution to enrich the research progress of the academy.

2.3.2 Research on competitive environment

SWOT and PEST analyses, as well as the five forces model, are still used in much of the current literature to analyse a firm's competitive environment.

Md Husin & Haron (2020) conducted interviews with 13 micro, small and medium enterprises (MSMEs) owners in the logistics industry in Selangor, Malaysia to examine the competitiveness of MSMEs in the logistics industry. By using SWOT analysis, they measured the competitiveness of SMEs. It was noted that the competitive strengths of MSMEs are advanced infrastructure, an increasing number of new entrants, and contribution to the local economy. The weaknesses are manifested in a lack of digital culture and training and lack of expertise. Opportunities are such as supportive government initiatives and development of mobile internet, while the threats are derived from changing customer expectations and limited financing facilities.

Pandyaswargo et al. (2021) discussed the chronological events leading up to and following the ban from the perspective of media, government regulations, and literature reviews. Their SWOT analysis of the reviewed material suggests that while the Indonesian battery industry is still in its infancy, it needs to diversify its R&D activities and collaborate internationally to optimize resource utilization and meet the purchasing power of the domestic EV market. In addition, six key factors that support Indonesia's emergence as a new regional hub for electric vehicles: pricing,technology, policy, investment, infrastructure, and compliance with sustainability standards, were summarized.

The literature that also takes a SWOT analysis of the competitive environment of a company is for example, Jiang (2022) employed this analysis tool stating that in addition to many increasing threats and competition, Tesla was still struggling to maintain its position by further innovating and reducing costs to retain customers and attract them. The authors also argued that Tesla should now focus more on opening charging stations in the U.S., as these are the main sales areas of the world. Tesla must introduce new products, such as cars that can be used in everyday life so that its buying public can increase further, as today it only produces high-end cars that are inaccessible to the average income group.

Tao et al. (2022), on the other hand, used the PEST model to analyse the investment trends, company comparisons, and future trends of new energy vehicles. Due to political, economic, and environmental reasons, they found that new energy is very worthy of long-term investment. However, the current development of new energy vehicles is not perfect, and there are still problems such as insufficient battery durability and certain safety hazards. New energy vehicle manufacturers can build their corporate competitiveness in the charging, power exchange, battery mobile charging and hydrogen refuelling will constitute an

integrated infrastructure. Using the same analysis, Panget al. (2022), based on the statistical results of an electronic questionnaire, pointed out that the competitive environment for ideal cars in Thailand is intense and has a fixed pricing model and insufficient channel incentives.

As for Porter's five forces analysis model, current scholars mainly use it to analyse the competitive environment of Tesla. For example, Liu (2022) and Yang (2022) both applied the five forces model and the analysis showed that Tesla's competitiveness comes from product innovation, customer development strategy innovation, and more importantly, business model innovation. Tesla fully understood customer needs, strives for excellence, and innovates in the most minor details to solve user pain points. Tesla adopted differentiated marketing strategies to meet different consumer needs and attract different buyers and makes full use of new media word-of-mouth sales models, B2C direct sales, and other methods. The company was conducive to brand positioning and leading market technology advantage, and taking the high-end route is conducive to opening the market and shaping brand value. It also avoided the problem of high cost at the early stage of development, the problem of awareness of ordinary users, and the problem of environmental awareness of ordinary users.

From the above analysis, there has been a great deal of research in the academic community applying SWOT and PEST analysis tools, as well as Porter's five forces model to analyse the competitive environment of a company. This indicates that the analysis tools and research methods chosen for the proposed dissertation are practical and desirable. While, on the other hand, since the current literature still analyses a single individual company, mainly on the new energy vehicle companies in the United States. Since China has many manufacturers in the new energy vehicle industry, this dissertation targets Chinese new energy vehicle companies, and the analysis is relatively more representative of the situation.

3. Introduction to BYD Company Limited

BYD Company Limited (Co., Ltd.) is an automobile and battery manufacturer listed on the Hong Kong Stock Exchange and the Shenzhen Stock Exchange, founded in 1995. Headquartered in Shenzhen, Guangdong, China, it is one of the world's largest new energy vehicle manufacturers. The company's main business includes products and solutions in new energy vehicles, traditional fuel vehicles, batteries, photovoltaic power generation, etc. As one of the leaders in the world's new energy vehicle industry, BYD has a large technology research and development team and strong technological innovation capabilities. It has developed a number of world-leading forward-looking technologies and established a global leading edge in the field of new energy vehicles. At the same time, with its precise grasp of market and customer needs, its products are also widely used in many fields such as electric vehicles, hybrid vehicles, and electric bicycles. BYD has world-class battery, motor, electronic control, and vehicle core technologies, as well as the world's first dual-mode technology and two-way inverter technology, to achieve the goal of leading vehicles in terms of power performance, and to achieve multiple leaps in safety protection and energy conservation. In 2020, BYD officially announced that it would stop producing fuel vehicles and accelerate the development of new energy vehicles. Currently, BYD's new energy vehicle product lines include electric vehicles (BEV), hybrid electric vehicles (HEV) and pure electric buses. BYD's new energy vehicles are very popular in the Chinese market and also have a certain presence in the international market. The company exports its new energy vehicle products to many countries, including Europe, the United States, and other Asian countries. In addition, BYD has also established production bases in some international markets. (BYD Official Website, 2023).

3.1 Development History of BYD New Energy Vehicles

The development of BYD's new energy vehicle business has to start with Qinchuan Automobile, which was originally a joint venture between the Shaanxi Provincial People's

Government and China Ordnance Industry Corporation. It passed national acceptance in 1993. In 2001, the firm launched the first mini car based on Alto - Flair. In 2003, BYD acquired 57% of Qinchuan Automobile's shares for a total of 269.5 million yuan. After the acquisition was completed, BYD held 77% of the shares in Qinchuan Automobile and changed its name to BYD Automobile. In the same year, it started research and development of electric vehicles. In 2004, BYD acquired 15% of BYDAuto's shares for 52.5 million yuan. After the acquisition was completed, BYD held 92% of the shares. After the acquisition was completed, BYD held 99% of the shares. In 2008, BYD F3DM was released, which is the world's first new energy vehicle that uses a dual-power hybrid system and does not rely on professional charging stations. The new type of the car breaks the dominance of traditional cars (Breevoot, 2021).

BYD's new energy vehicles have seen sales soar through technological innovation and application. According to data disclosed by China Securities Times (2023), its new energy vehicle market share in China will reach 27% in 2022, a year-on-year increase of nearly 10 percentage points. In addition, BYD's full-year sales reached 1.8025 million vehicles, a year-on-year increase of 149.88%. Among them, passenger car sales were 1.7966 million units, a year-on-year increase of 151.83%; overseas sales were 45,300 units, a year-on-year increase of 194.54%. The company's sales are far ahead of other new energy vehicle companies and are firmly at the forefront of the world. All series of products are loved by consumers, and the brand influence continues to expand.

3.2 Main business cost composition and revenue analysis

Since establishing its automotive business in 2003, BYD has occupied a large share of the new energy vehicle market with its accumulated technology and cost advantages in the battery field. Based on the product perspective, BYD's operating income and costs are classified and calculated, which can be divided into three parts: automobiles and related products, mobile phone parts and assembly, and others. As shown in Table 3, expenditures on automobiles and automobile-related products have been BYD's largest cost in the past three years. In terms of amount, the total annual expenditure of this product category was 72

billion yuan in 2020, 107 billion yuan in 2021, and this number continued to climb to 258 billion yuan in 2022. The average annual growth rate in the past three years was 89.30%. This also reflects the company's key investment in automobiles and automobile-related products in the past three years. In addition, the proportion of mobile phones, batteries, semiconductors, and other businesses cannot be ignored, because they are mainly businesses developed for the company's new energy vehicle development.

Table 3: BYD's operation cost breakdown byproduct from 2020 to 2022

(Source: Own work based on BYD annual report)

Product category	2022		2021		2020	
	Amount (billion CNY)	*Proportion of operating costs (%)*	*Amount (billion CNY)*	*Proportion of operating costs (%)*	*Amount (billion CNY)*	*Proportion of operating costs (%)*
Automobiles and related products	258	73.48	107	57.15	72	57.41
Mobile phone parts and assembly	93	26.39	80	42.50	53	42.23
Others	0.49	0.14	0.66	0.35	0.45	0.36

Since 2003, BYD has been applying innovative technologies to electric and hybrid vehicles. At present, BYD has canceled the production of fuel vehicles and is fully developing new energy vehicles. At the same time, it is supplemented by other business layouts to ensure that BYD occupies a pivotal position in the new energy vehicle market. As can be seen from Table 4, BYD's current operating income sources are mainly automobiles and automobile-related products. Moreover, the contribution of this business to the

company's revenue growth has continued to increase in the past three years. Speaking in detail, the annual financial report released by BYD shows that the company's operating income for 2022 was 424 billion yuan, an increase of 96.2% over the previous year. Among them, the revenue from automobiles, automobile-related products and other product businesses was 325 billion yuan, which was 325 billion yuan, an increase of 96.2% over the previous year. An increase of 151.78% in the previous year; product business revenue of mobile phone components and assembly was 99 billion yuan, an increase of 14.3% over the previous year; other business income was 0.55 billion yuan, a decrease of 23.79% over the previous year. The three major businesses accounted for 76.57%, 23.3% and 0.13% of the Group's total revenue respectively.

Table 4: BYD's operation revenue breakdown byproduct from 2020 to 2022

(Source: Own work based on BYD annual report)

Product category	2022		2021		2020	
	Amount (billion CNY)	*Proportion of operating costs (%)*	*Amount (billion CNY)*	*Proportion of operating costs (%)*	*Amount (billion CNY)*	*Proportion of operating costs (%)*
Automobiles and related products	325	76.57	129	59.66	96	61.36
Mobile phone parts and assembly	99	23.3	86	40	60	38.34
Others	0.55	0.13	0.73	0.34	0.47	0.3

4. Competitiveness analysis

Competitiveness is one of the core concepts in corporate strategic analysis. Competitiveness involves an enterprise's advantageous position in the market relative to its competitors, which can be achieved through a variety of factors, such as technology, brand reputation, cost-effectiveness, innovation capabilities, market share, customer loyalty and supply chain management (Drobyazko et al., 2019). Analyzing competitiveness is crucial for businesses. First, it helps enterprises formulate strategies and choose wise strategic directions by understanding internal strengths and weaknesses, external market opportunities and threats. Secondly, this analytical process can improve the performance of the enterprise, achieving better performance and profitability through resource optimization, increased efficiency,and productivity. Additionally, analyzing competitive forces and the competitive environment can inspire innovation and increase market share by identifying new product or service opportunities. It can also be used to manage risks, helping companies identify potential threats and risks and take measures to mitigate these risks. In addition, it helps companies meet customer needs, understand customer needs and expectations, and provide satisfactory products and services. Finally, this process helps to improve the competitiveness of the business by developing strategies to improve its position in the market, attract more customers, and compete with its competitors (Vancil & Lorange, 1997).

In this part, Porter's five forces model is first used to analyze BYD's competitiveness. The model is astrategic analysis tool proposed by Michael Porter in the 1980s, which is used to evaluate the competitiveness and attractiveness of the industry in which an enterprise operates (Mahat, 2019). By analyzing these five key forces from competitors, customers, suppliers, substitutes, and new entrants, insights into BYD’s market position can be gained.

4.1 Analysis of existing competitors

In terms of existing competitors, BYD has shown relatively solid competitiveness in the electric vehicle market. The main ways existing competitors in the new energy vehicle

industry participate in market competition include lowering prices, launching new products, and optimizing product quality and service quality. From the perspective of new energy vehicle industry participants, it can be divided into two major types. One type is mainstream automobile companies that have transformed from traditional gasoline vehicle manufacturers, such as Shanghai General Motors, Nissan, and Toyota. They have all expanded their business from traditional enterprises and develop and produce new energy vehicles. Due to the different operating characteristics and plans of different companies, there will also be differences in the focus of business routes. Toyota has focused on the research and development and promotion of hybrid vehicles in its past operations and has begun to extend to the research and development of hydrogen-powered vehicles. BYD focuses on developing lithium battery-powered cars, while Tesla, which is enjoying popularity around the world, focuses on high-end pure electric sports cars.

Like other automakers, BYD's ambitions are not limited to traditional gasoline, but also moving towards hybrid and electric vehicle production. On December 15, 2008, the company launched its first plug-in hybrid vehicle, the F3DM, one year ahead of General Motors and Toyota. In April 2009, the pure electric vehicle E6 was unveiled at the Shanghai International Auto Show. BYD's F3DM models are all plug-in hybrid vehicles from GM and Toyota. From the above table, we can see that BYD F3DM has certain price and technical advantages. In terms of price, the F3DM costs 149,800 yuan (approximately $21,700), which is half the price of the Toyota Prius, which costs about 280,000 yuan (approximately $40,580) in China. In terms of maximum speed, BYD's F3DM car is slower than the other two. The hybrid car's battery from BYD's F3DM has a range of 100 kilometers, before being driven by a conventional 1.0-displacement gasoline engine for another 300 kilometers. So, adding the two ranges together, the hybrid has four times the range. As shown in the picture above, it has a longer range than the Toyota Prius and General Motors' hybrid cars. BYD claims that the lithium iron phosphate battery for automotive applications can be charged to 80% of its capacity from an ordinary power socket in nine hours and can reach 80% of its capacity in 15 minutes using industrial charging equipment and has along battery lifecycle. It can be charged 2,000 times for ten years and has a driving range of more than 600,000 kilometers (Wang & Kimble, 2010).

4.2 Bargaining power of buyers

In terms of the buyer's bargainingpower, it depends on the type of buyer or customer. From a macro perspective, buyers of BYD's new energy vehicles can be divided into two categories: government bulk purchases and general public purchases. In the past ten years, our government has been launching various policies and preferential subsidy measures to encourage and stimulate the research and development and production of new energy vehicles, so its procurement behavior also falls within the scope of national policy support. The research and development, launch and widespread use of new energy vehicles can effectively solve problems such as insufficient domestic oil and natural gas resources and air pollution. Government procurement has a certain driving effect. Generally, in order to protect enterprises, the central government and local governments will not maliciously lower prices, and their bargaining power is relatively low. Government procurement behavior is a long-term, stable, and large-scale behavior that serves as a consumption guide for consumers in general society. From a political perspective, it has a certain policy orientation, rather than a single market consumption behavior. Moreover, new energy vehicle technology provides solutions to alleviate problems such as urban exhaust emissions and excessive consumption of oil and natural gas resources. In addition, the government's bulk purchase of new energy vehicles not only increases the confidence of social groups in the effectiveness of reducing air pollution, but also enhances consumers' confidence in the efficacy and durability of new energy vehicles. Therefore, the government's procurement behavior can also be regarded as the government's financial subsidies and incentives for the new energy vehicle industry, and its bargaining power is relatively low. In particular, the increasingly severe haze weather in recent years has also provided environmental opportunities for the promotion of new energy vehicles. However, with the introduction of new policies and the gradual reduction of industry subsidies, the government's bargaining power tends to increase.

However, from the perspective of market consumer purchasing, the bargaining power of consumers is stronger than that of the government. The main reasons areas follows: First, there are many types of cars to choose from, especially internal combustion cars , which have become very mature after more than two centuries of development. , there are various types of cars that can meet different consumer needs, such as cars, off-road vehicles, etc. However, the production time and application technology of new energy vehicles seem to

be inferior to that of internal combustion vehicles, and there are fewer types to choose from on the market. Certification of their If energy conservation and economic efficiency are insufficient, consumers will be more willing to choose to buy internal combustion vehicles. Second, the maturity and scale of traditional internal combustion vehicle technology and production lines have brought them great production cost advantages. However, the core technology of new energy vehicles and the rest of the core links of the assembly line and production testing have not been realized. Large-scale production is a direct reason for its high cost, which leads to consumers' bargaining power.

4.3 Bargaining power of suppliers

In terms of suppliers' bargaining power, BYD's competitiveness is extremely strong. New energy vehicle suppliers include traditional auto parts suppliers, new energy battery or other parts suppliers. Generally speaking, the bargaining power of suppliers is affected by factors such as the number of selected suppliers, the geographical distribution of suppliers, product and technology differences, the selection of substitute parts, the quality and price of parts, and other factors. Since traditional diesel locomotive production lines have existed for many years, the number of suppliers has continued to increase in perennial competition. However, due to high substitutability, large product quantities, and weak bargaining power.

However, suppliers of new energy vehicles are very different from purely traditional internal combustion engine vehicles. Battery manufacturing technology and its related core technologies, as the dominant technology of electric vehicles, will change the automotive supply chain. In particular, there are few suppliers of new energy vehicle parts and there are also few types of parts to choose from. On the other hand, due to the protection of commercial confidentiality, there are even fewer suppliers that can provide core components for new energy, and these suppliers have strong bargaining power. For example, BYD itself has the ability to produce high-volume batteries or battery packs, so it will eliminate low-volume manufacturers and suppliers and act as a supplier of core technology or storage batteries. Because it has lithium batteries Mature experience and leading technology give BYD's new energy vehicles a higher dominant position in business cooperation negotiations.

Therefore, for BYD, which has a relatively high level of manufacturing technology for rechargeable batteries and has always been leading the market with its cost advantage, the bargaining power of suppliers is weak.

4.4 Threat of substitutes

In terms of substitutes, the threat of substitution from traditional cars will gradually weaken, and BYD's competitiveness will gradually strengthen. In a market context where the image of traditional cars is deeply rooted in the hearts of consumers, new energy vehicles themselves are new products that enter the automotive industry as a replacement for traditional internal combustion vehicles. However, if the development of new energy sources does not go as expected, traditional internal combustion vehicles may still become the mainstay of the automotive market again. in the mainstream. In addition, the diversified development of transportation vehicles is also an alternative threat to new energy vehicles.

Because the replacement of traditional internal combustion vehicles has gone through years of research and development, use, testing and optimization, consumers are already familiar with the advantages and disadvantages of internal combustion vehicles. Consumers' choice of alternative means of transportation depends on factors such as the cost of the alternative and the convenience of the replacement. For ordinary car consumers, the safety, stability, convenience, and fault repairability of internal combustion vehicles are far superior to those of current new energy vehicles. Consumers can choose internal combustion vehicles at different price points based on their own spending power. , and internal combustion vehicles, which are cheaper than new energy vehicles, have a wider range of options. However, this price relationship may change over time. Mainly due to limited oil resources, the price of domestic automobile fuel continues to rise. However,

The prices of new energy vehicles are gradually decreasing as the technology becomes more sophisticated and mature. On the other hand, from the perspective of sustainable development, government organizations will also use financial support to prioritize the development of new energy vehicles to achieve resource and environmental sustainability. As both traditional internal combustion vehicles and new energy vehicles are

sparing no effort to innovate and progress, the competition between the two parties continues. However, in the long run, the technology, performance, and safety of new energy vehicles will be tested and improved with use, and the sales price will also decrease with large-scale production. At the same time, fuel prices will continue to increase with domestic inflation and resource consumption, resulting in an increase in the cost of using traditional internal combustion vehicles (Wen et al., 2020).

4.5 Potential entrant threat

In terms of potential entrants, BYD's competitiveness is also relatively high. Potential intruders may be newly established companies in the same industry, or companies in other industries that adopt diversified business strategies. Potential intruders will bring new production and competitiveness to the industry and divide the original market share. . The threat from potential intruders lies on the one hand, the technical barriers of the industry, and on the other hand, the competitiveness of the intruders themselves. Potential intruders may have an impact on lithium battery and auto parts supply chain networks, production costs, distribution networks, etc. However, the entry of the new energy vehicle industry is not only a consideration of its capital assets, technical aspects and investment capital, but also must obtain relevant government agency measures for R&D, production, China's labor and material costs maybe lower, and manufacturing and safety standards Requirements are also less stringent, but the biggest reason for China's rapid growth in EV sales may be the subsidies and incentives the Chinese government provides to boost EV sales. These incentives have led to hundreds of domestic companies joining the EV craze, with more than 500 EV companies now competing in China. However, Chinese government subsidies to new energy vehicle companies have been declining since 2013, which is likely to result in the threat from potential intruders diminishing in the coming period (Wu et al., 2022).

5. Competitive environment analysis

The competitive environment refers to the environment in which the enterprise operates, including market, industry, political, economic, social, cultural, and technological factors. These factors affect the competitive position, business strategy and performance of the enterprise. The competitive environment is a dynamic background that has a profound impact on corporate operations and decision-making. In this part, the PEST model and SWOT model are employed to analyze the BYD's competitive environment.

5.1 PEST analysis

PEST analysis is a method of evaluating the external competitive environment of an organization or enterprise. It is used to analyse the impact of four major factors: political, economic, social, and technological.

5.1.1 Political factors

The political environment is non-market, but it can affect business from another dimension. The political and legal environment is a combination of many factors, such as the current ruling party, the degree of politicization of trade and industry, the effectiveness of the current government, government policies, the current legal framework, and public attitudes towards the government. Firstly, the government determines all fiscal policy, monetary policy, and tax policy, so the type of government in power has a huge impact on the economy and the companies that operate and compete in the economy. Secondly,a sound legal system is crucial to the success of any business. Therefore, a country must have a sound and well-functioning legal system, and its laws should protect both consumers and

manufacturers. Furthermore, a country's political environment is a major factor in a company's success (Cuervo-Cazurra & Genc, 2011).

In the past ten years, with the strong support of the Chinese government's policies and sufficient sources of R&D funds, the country's new energy vehicle industry has developed rapidly. In most cities in China, electric vehicles can directly apply for car license plates, which has promoted the development of the electric vehicle industry, because in many major cities in China, in order to alleviate traffic congestion, traditional fuel vehicles need to obtain a license plate through a lottery before they can go on the road. However, companies' reliance on government subsidies as a key channel for profitability is also limited. According to the Chinese government's New Energy Vehicle Development Plan Roadmap, support for the new energy vehicle industry will gradually transition to a subsidy-free policy by 2025 (Kendall, 2018).

China will minimize government intervention and give automakers more freedom to decide the direction of new energy vehicle technology, according to a plan released by MIIT's Ministry of Industry in early December 2019. The plan states that China will give full play to the role of the market in determining product and technology development. Details of the plan are as follows: (1) Raising the nationwide sales target for "new energy vehicles" in 2025, providing further impetus for automakers eager to compete in the world's largest auto market. (2) The government plays a major role in accelerating the "optimization and restructuring" of OEMs and auto parts suppliers by encouraging capital to achieve better resource integration. (3) The government also plans to accelerate the construction of toll infrastructure networks. Real estate developers and toll facility operators are expected to receive government support to jointly provide public charging services and "explore value-added services." The proposal covers the development of new energy vehicles from 2021 to 2035 but does not include sales forecasts or targets for 2030 or 2035 (Hsiao et al., 2023).

5.1.2 Economic factors

Judging from the economic development status of the macro environment, since China began to open up to the outside world and reform its economy in 1978, China's GDP

has maintained a growth rate of more than 10% year-round. Since growing at a double-digit rate before 2013, China's economy has entered a stage of steady and slight upward growth. By 2019, China's total economic growth exceeded US$1.46 billion, becoming the world's second largest economy. quantity. In addition, many industries in China have been fully integrated into the world supply chain, and China is already the world's largest exporter.

While my country's economy is developing rapidly and it is seeking a path for economic transformation and development, it is also actively seeking ways to transform and upgrade its industry and optimize its value supply chain. Currently, China is facing overcapacity and uneven distribution of production factors. It is making large-scale adjustments and changes to its industrial structure, phasing out highly polluting industries, and gradually coordinating the relationship between the economy and the environment. From the perspective of sustainable development of production factors and other types of resources, vigorously promote the development of green economic industries.

In the context of the Sino-US trade war, the aftermath of the COVID-19 epidemic, and the Russian-Ukrainian war, China's economic growth is gradually slowing down. The new energy automobile industry with the characteristics of energy conservation and emission reduction is in line with China's sustainable development and long-term energy utilization. Strategic objectives. As a new energy vehicle company with a long history, BYD's development caters to China's national development strategy.

5.1.3 Social factors

The sociocultural environment refers to a set of beliefs, beliefs, cognitions, values, development methods, and each person's ideology and personality that are shared by everyone living within a certain geographical range. The first is the improvement of residents' education level, professional and technical abilities, and personal qualities. At this stage, people's lifestyle has become more convenient due to the emergence and popularization of cars. As the main tool for people to travel, cars have become an important part of the lives of social residents. As residents' disposable income increases, the number of families

purchasing cars also gradually increases. Looking at China's potentially huge consumer market, car sales will have excellent development potential.

Chemical waste and vehicle exhaust have caused great pollution problems to domestic air and have also awakened more and more consumers' environmental awareness. Many consumers are beginning to realize the importance of clean air and environment to personal physical and mental health. With the depletion of petrochemical resources and the increase in prices, many consumers are becoming more active and independent in protecting the environment. This is also a new trend. The reason for the rise of the "environmental protection" proposition of energy vehicles. Electric refueling offers some advantages that traditional internal combustion engine vehicles cannot provide, making new energy vehicles have huge potential to radically reduce local air pollution. The spread of electricity and the growing emergence of low-carbon, renewable energy sources have boosted this potential and made it compelling.

5.1.4 Technological factors

Technological progress is greatly reducing the production cost of new energy vehicles. The key factors are the development of battery chemistry and the expansion of manufacturing plant capacity, as well as the high demand for batteries, which has promoted technological progress in the field of battery storage. The technology for chargers used in new energy vehicles is advancing, in part due to the growing focus on electric vehicles for heavy-duty applications (mainly buses, but also trucks). BYD has made breakthroughs in many technologies in recent years. The most prominent ones include DMII, DM3, bidirectional inverter charging and discharging, TID powertrain technology and remote driving control. It can be seen that BYD has strong independent research and development and innovation capabilities. In recent years, with the development of other automobile companies in the market, BYD has paid more and more attention to the fashionable appearance design of its cars. Generally speaking, BYD is now gradually getting rid of its past imitation development routine and has begun to enter the stage of independent research and development and design (Qudrat-Ullah, 2022).

5.2 SWOT analysis

A SWOT analysis comprehensively summarizes all aspects of the company's internal and external competitive environment, analyzes the company's strengths, weaknesses, opportunities, and threats, thereby providing an analytical method for the company's strategic choices. Through this analysis method, enterprises can make better use of their resources and advantages and make their strategic choices clearer and more competitive (Gürel & Tat, 2017).

5.2.1 Strengths

Firstly, BYD has strong cost control capabilities. Before BYD laid out its new energy industry and entered the automobile market in January 2003, it had already made outstanding achievements in battery R&D and manufacturing. The battery products produced by BYD include lithium iron phosphate batteries, ternary lithium batteries, lithium-ion batteries, automotive lithium batteries, AGV car power lithium batteries, UPS lithium batteries, etc. Customers using BYD batteries include Apple, Samsung, Microsoft, Dell, Toshiba, HP, Huawei, Lenovo, ZTE and other leading domestic and foreign electronic product companies. The technical foundation in battery application enables BYD to encounter smaller technical resistance and reduce costs in the development and production of new energy vehicles.

Like many domestic companies, BYD adopted a "creative imitation" approach to produce products and gain a firm foothold in the early stages of entering the automobile market. In an environment where the domestic automobile policy environment is unclear and the domestic automobile market is dominated by several major joint venture car brands, BYD launched its first mid-level household fuel vehicle-BYD F3. The appearance and performance of the F3 imitated the Toyota Corolla and Fit, which were popular among Chinese people at the time. While borrowing from foreign non-patented technologies, the F3 also had independent intellectual property rights. Due to its relatively low price, first-class appearance, and impressive Although the power performance is highly controversial, once it rolled off the assembly line, sales reached 32,500 units in the first half of the year.

Although BYDF3 is a fuel vehicle, it has accumulated experience and pioneered new energy vehicle products for BYD to continue to expand the automotive market. the road.

Secondly, BYD's new energy vehicle technology has obvious advantages. Since June 2015, BYD's new energy vehicle technology research and development has used "542" as the technology standard to improve vehicle quality from three aspects: vehicle performance, safety, and fuel consumption, where 5 represents acceleration to 100 kilometers per hour within 5 seconds. 4 stands for comprehensive and extremely fast electric four-wheel drive, and 2 stands for fuel consumption of less than 2 liters per 100 kilometers. BYD has always attached great importance to technology as its core competitiveness. It has the Central Research Institute, the Automotive Engineering Research Institute, the Automotive Smart Ecology Research Institute, the Commercial Vehicle Research Institute, the Product Planning and Automotive New Technology Research Institute, the 21st Business Unit, and the 20th Automotive New Technology Research Institute. There area total of eight research institutes in the three business divisions, with more than 20,000 technical talents engaged in hardware, software development and testing. Among them, core technologies such as ultra-fast electric four-wheel drive technology, two-way inverter charging and discharging technology, and special starting batteries and management systems for electric vehicles are world-class. On March 29, 2020, BYD announced the official launch of the "Blade Battery" at an online press conference. In order to prove its safety performance, BYD showed the public that the "blade battery" has undergone the highest standard needle penetration test together with ternary lithium batteries and ordinary lithium iron phosphate batteries. The test results showed its excellent safety and stability. According to reports, its volume utilization and battery life have also been significantly improved. Currently, "blade batteries" are only installed on BYD's new flagship model Han EV and 2021 Tang EV. As the technology continues to mature, more styles of BYD new energy vehicles will use "blade batteries" in the future.

Thirdly, BYD has a mature and complete industrial chain system, especially in the seamless connection between the research and development and manufacturing of power batteries and vehicle processing. BYD is the first in the world to have the three major new energy vehicle features of battery, motor, and electronic control. An automobile company with core technologies. Taking batteries as an example, in the research and development stage, BYD takes basic material research and development as the cornerstone, performance

as the center, innovative technology as the guide, and carries out a comprehensive research and development layout, including: mineral resource development, material research and development and manufacturing, process research and development, battery cells R&D and manufacturing, BMS R&D and manufacturing, module R&D and manufacturing, battery pack development and manufacturing, and cascade recycling. From meeting customers' performance needs to providing comprehensive and high-quality after-sales services and meeting environmental protection needs, BYD can rely on its industrial chain to achieve everything (Mu, 2023).

5.2.2 Weaknesses

One of BYD's key weaknesses is its insufficient international market share. Despite its strong performance in China's electric vehicle market, its share in the international market is relatively small. This is because the company entered the international market relatively late, while some international competitors have already established strong market shares and brand reputations in Europe, North America, and other regions. Overcoming this challenge requires BYD to increase its efforts in international market expansion, invest more time and resources to expand its international market share, establish more sales networks, increase the visibility of its products in the international market, and adapt to local regulations and market needs. . Building and maintaining international market share will require a company's strategic long-term commitment and investment of resources (Qudrat-Ullah, 2022).

Another significant disadvantage is BYD's limited visibility in international markets. Although it has a certain popularity in China, the company's brand reputation is relatively low in the international market. This may result in consumers in the international market not being familiar with BYD's products and brands, thereby reducing their willingness to purchase. Building international brand awareness requires a lot of marketing and branding efforts, including advertising, participating in international exhibitions, cooperating with international brands, etc. The company also needs to strengthen its brand image in the international market to win the trust of more international consumers.

5.2.3 Opportunities

BYD's competitive environment in terms of opportunities is mainly reflected in two aspects. On the one hand, the current demand for crude oil in various countries is reduced, and international oil prices continue to fall. With the recession of the world economy in the context of the COVID- 19 epidemic and the Russo-Ukrainian war, and the gradual awakening of environmental awareness among policymakers and consumers in various countries, countries are seeking ways out for sustainable development. At the sametime, countries are seeking to enhance their international competition in the world energy market. It also needs to reduce its external dependence on crude oil, and its demand for oil is gradually shrinking. As a substitute for fuel vehicles, the development of new energy vehicles has also gained new opportunities. More and more countries are gradually announcing timetables for banning the sale of fuel vehicles in their countries, heralding the arrival of a new industrial revolution. For example, the Netherlands and Norway will ban the sale of fuel vehicles in 2025, Germany will ban the sale of traditional internal combustion vehicles in 2030,and UK and France will ban them in 2040 (ETEnergyworld.com, 2023).

On the other hand, the Chinese government strongly supports the development of new energy vehicle companies. The country's government's support for the development of new energy vehicles is reflected on multiple levels. The first is the subsidy policy. In 2009, the Ministry of Finance and the Ministry of Science and Technology issued the "Notice on Carrying out Pilot Work on Demonstration and Promotion of Energy-saving and New Energy Vehicles", marking the beginning of the country's comprehensive implementation of the industrialization of new energy vehicles. In 2014, the state promulgated the "Notice on Exemption from Vehicle Purchase Tax on New Energy Vehicles", "Notice on Financial Support Policies for the Promotion and Application of New Energy Vehicles from 2016 to 2020", and "Notice on Issues Concerning the Electricity Price Policy for Electric Vehicles", which have further fueled the booming new energy vehicle market (Zhang et al., 2022).

As a domestic new energy automobile company with deep development accumulation, complete industrial chain layout and leading sales volume, BYD can rely on the help of national brand strategy and manufacturing power strategy to enjoy more with its technological advantages, product advantages and a wider range of customers subsidies.

5.2.4 Threats

The threats facing BYD mainly come from the rise of new energy vehicle companies at home and abroad. Although BYD is a leading company in the new energy vehicle industry, fierce competition within the industry continues to make it face greater challenges. For example, Tesla dominates the global new energy vehicle market with its superior product performance, low maintenance costs and world-leading intelligent systems. The core competitiveness of its products stems from its unique advantage in intelligence. Tesla uses the "FSD" chip to concentrate all controllers on the vehicle on three controllers, enabling the entire vehicle to achieve an electronic and electrical architecture. Tesla's independently developed OTA (Over-the-Air Technology) technology uploads data just like a smartphone and updates various software applications to make the driving experience more outstanding, and car manufacturers can quickly obtain information from drivers. first-hand feedback. With its technological advantages, Tesla has become one of the best-selling new energy vehicle companies in the world (Qureshi et al., 2022).

As the world's largest new energy vehicle market, China's national incentive policies and good business opportunities have prompted domestic automobile companies to attach great importance to the expansion of the new energy vehicle market. In addition to established state-owned enterprises such as SAIC Group and BAIC Group, NIO, Xpeng, etc. Emerging new energy vehicle companies have also attracted a group of consumers with their excellent performance, leading Internet integration capabilities and excellent pre-sales and after-sales services. Besides, while new energy vehicle companies are making rapid progress, traditional and established car companies are also beginning to turn their attention to the new energy vehicle market. Take the BMW Group as an example. The company attaches great importance to its expansion into the field of new energy vehicles. The group’s new CEO Oliver Zips has publicly stated that from 2021 to 2023, the Group will produce 250,000 more new vehicles than originally planned. Energy vehicles, by then, one out of every five cars sold by BMW will be an electric vehicle. In addition to BMW, other traditional car manufacturers have also launched or are about to launch their latest pure electric models. The diversification of new energy vehicle brands and the increase in the number of styles have further intensified competition in the new energy vehicle market (BMW Group, 2021).

6. Conclusion

Globally, the new energy vehicle industry is rapidly emerging and becoming a key area of the global automotive industry. The rise of this field is primarily driven by two key issues: energy conservation and environmental protection. Over the years, the mass production and use of traditional fuel vehicles has led to increased environmental pollution, greenhouse gas emissions, and dependence on limited fossil fuel resources. Therefore, in order to reduce the adverse impact on the environment and improve energy efficiency, active exploration and investment in clean energy transportation have begun globally.

In this context, this paper aims to deeply explore BYD's competitiveness in the field of new energy vehicles and evaluate its competitive environment by applying analytical tools such as Porter's five forces model, SWOT model and PEST model. Through this research, we will better understand BYD's position in the global new energy vehicle market, reveal its strengths and weaknesses, as well as market opportunities and threats, thereby providing strong support for the company's strategic decisions. In addition, this study will also help the broader automotive industry decision-makers and relevant stakeholders to better understand the competitive landscape and environment of the new energy vehicle market to promote the development of sustainable clean energy transportation.

By using Porter's five forces model, the study found that among existing competitors in the new energy vehicle market, BYD is highly competitive, especially in the Chinese market. However, the company's technological prowess and diversified operations help maintain its leadership position. Since BYD has a relatively complete industrial chain, this helps reduce the bargaining power of suppliers. However, the company needs to continue to consolidate its supply chain to ensure a stable supply of batteries. In terms of buyer power, BYD's buyer negotiation power in China and international markets is relatively low due to the growing market demand for new energy vehicles. However, price-sensitive markets may pose challenges to a company's pricing strategy. In terms of substitutes, the continuous development and technological innovation of the new energy vehicle market have reduced the threat of substitutes for traditional fuel vehicles. BYD's product diversification and battery technology advantages help mitigate the risks posed by substitutes. However, potential competitors in the new energy vehicle industry are increasing, but entering this

market requires a large amount of capital and technical resources. BYD's technological strength and brand awareness have reduced the threat from potential entrants.

The PEST model found that the competitive environment faced by BYD is as follows: At the political level, government policies have an important impact on the new energy vehicle market. Government support policies, such as subsidies and emission reduction targets, provide business opportunities for BYD. At the economic level, global economic conditions have an impact on the market demand for new energy vehicles. The economic downturn may lead to market instability, but the low operating costs of new energy vehicles may still be attractive. At the social level, environmental awareness and consumer demand for clean energy transportation are increasing, which provides BYD with market opportunities. At the technical level, technological innovation is crucial to the new energy vehicle industry. BYD needs to continuously improve its battery technology and vehicle performance to meet changing market demands.

Finally, the SWOT model found that BYD's strong technical strength, especially its outstanding performance in battery technology, and its diversified business model are regarded as its main advantages. These factors not only improve the quality and performance of the company's products but also help the company establish a solid position in the market. However, despite its strong technological capabilities, BYD has relatively low market visibility in international markets, which may constrain its global expansion plans. In addition, fierce competition in the new energy vehicle market has led to price wars, which may pose a threat to the company's profitability. In a competitive environment, active support from government policies and growth in the global market provide BYD with broad opportunities. The government's environmental protection policies, emission reduction targets, and subsidy programs for new energy vehicles have encouraged market growth and provided strong market momentum for the company. However, intensifying market competition and rapid technological advancement pose potential threats, requiring companies to continue to innovate in order to remain competitive.

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Year of publication: 2023

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