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Analysis of the Rationale for the Entry of Chinese New Energy Vehicle Companies into Europe: Evidence from Three Chinese Companies

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Abstract: This paper is based on a study of three representative companies in China's new energy vehicle industry and analyses the rationality of Chinese new energy companies entering Europe through the macro context of China and Europe and the companies' own elements. The results show that even though Chinese new energy companies are still on the rise and have many shortcomings, entering Europe is a further development of the company's internationalisation and an important strategy for developing their own technology and competitiveness.

Keywords: New Energy Vehicles; Chinese New Energy Companies; Emerging Market; PESTEL Analysis; CAGE Framework; Five Forces Framework; VRIO Framework.

1. Introduction

News disclosed by the Hong Kong Stock Exchange on August 31, 2022, that Warren Buffett had reduced his holdings in BYD shares caused an uproar in today's stock market: BYD A and H shares both dived sharply at the opening [40]. BYD A shares (002594) fell by up to 8% to 284 yuan during the day. And BYD Hong Kong shares (01211. HK) fell by a maximum of 13% to 229 yuan during the day. This is the first reduction of Warren Buffett's holdings in BYD shares for 14 years, although the reduction accounted for only 2.8% of Buffett's original holdings.

New energy vehicles are an important strategy to address the global energy crisis and environmental pollution. In the case that the traditional automobile internal combustion engine technology cannot solve the demand for oil consumption and carbon emissions, new energy vehicles are an inevitable direction for the development of the automobile industry [38].

This study choose three car companies most representative of Chinese new energy companies were selected which are BYD, NIO and XPEV and hopes to explain the phenomenon of Chinese new energy automotive companies entering Europe[41].

2. Literature Review

2.1. Background

Energy is an important guarantee for the development of society and the country and the importance of energy has always been attached to people [3]. In the world of energy, most of the energy is non-renewable resources, including oil, natural gas and coal other energy consumption every year is geometric growth, and most of the fuel consumption of cars are oil resources [32].

At the same time, environmental pollution issues are also beginning to be taken seriously [34]., such as the United States, which promotes different energy conservation policies at the federal and national levels, the EU's proposed battery regulation announced in December 2020 and the European Pollutant Emission Standards (EES), which further supplement the 2006 Battery Directive. In contrast, conventional energy vehicles have relatively more problems in terms of energy consumption, especially in terms of energy consumption and exhaust emissions [39,42].

New energy vehicles, which have a long industrial chain, a large trade scale, high technical requirements, and up to 265 different types of componentry which has development of the global automotive industry with the new round of technological revolution and industrial change [11,12]. According to the different power sources, new energy vehicles are usually divided into pure electric vehicles, hybrid vehicles and fuel cell vehicles.

2.1.1. Pure Electric Vehicle (BEV)

A pure electric vehicle does not require an internal combustion engine or other power devices, and its power source is only electricity provided by a rechargeable battery.

2.1.2. Hybrid Electric Vehicle (HEV)

Hybrid vehicles are vehicles driven by two or more power sources and are driven by single or multiple power sources together depending on the specific operating status of the vehicle [14].

2.1.3. Fuel Cell Vehicle (FCEV)

Fuel cell vehicles use hydrogen, methanol, etc. as fuel and use the electrical energy generated by the chemical reaction to drive the electric motor, which converts the electrical energy into mechanical energy and then drives the vehicle through the transmission system [16].

2.2. Current Research Directions

Current research on the new energy vehicle itself is focused on technological innovations, such as advances in battery technology or innovations in vehicle body technology, such as material system innovation, structural system innovation and model and application innovation [55, 39]. It is also noted that China currently has around 260 million vehicles in its fleet and is set to overtake the US as the world's largest vehicle owner by the end of 2020[1, 8]. As the world's largest emerging market country, the Chinese market and its companies have business and research implications that are useful to the emerging market theory system.

This paper points out that most of the current research on

new energy vehicle companies has focused on the operational and strategic aspects of the company, particularly the analysis of large new energy vehicle companies, and the financial analysis of large companies to determine their revenue capacity. Almenhali directly analyses whether Tesla's financial performance in terms of solvency and asset utilisation is sustainable for four years [24]; Kikkas compared Tesla's financial performance with that of Nissan Motor Company, using financial statements to analyse the balance sheets and income statements of both companies from 2015 to 2018. Some studies further explain the company's strategy through an analysis of its operations, such as Aslan's analysis of the feasibility of Tesla's entry into the German market through an analysis of the macro environment and the company's internal capabilities [32,42]. Most studies are happy to examine the reactions of large companies to the new energy market. In the case of the Chinese market, its particular market system brings specificity to the research, and scholars prefer to see the effects of government intervention in the NEV industry, so research on such companies will focus more on the impact of macro policies, for example, Yuan et al. review the various policies enacted by the Chinese government to promote the NEV industry, including industrial policies, development plans, demonstration projects, financial subsidies and tax incentives [43]; Li et al. focused on summarising the development of the NEV industry to reveal some of the advantages and disadvantages of these policies [51]; Wu et al. examined the role of technological capability and the relationship between internal technological capabilities in relation to external resources (e.g. ownership, government subsidies and external cooperation), linking them to the R&D of NEVs to investigate the interaction between policies and R&D investment and manufacturing capabilities [20,33].

2.3. Current Development Status of China's New Energy Vehicle Industry

2.3.1. Domestic Production and Sales in China

Compared with rich countries, China started late in the development of new energy vehicles. However, the introduction of various subsidies, tax exemptions and other policies has improved the overall development level. The government has provided subsidies of about 60,000 to 500,000 yuan to help build charging stations[24, 2, 25] In 2019, China issued the "Notice on Further Improving Fiscal Subsidy Policies for the Promotion and Application of New Energy Vehicles." The regulations show that the overall subsidy intensity has dropped from the original level, and the pressure on the profitability of new energy vehicle companies has increased.

2.3.2. Exports

In recent years, the scale of China's new energy vehicle exports has grown steadily. The export volume of new energy vehicles rose from 147,000 units in 2018 to 255,000 units in 2019, an increase of 73.1%. 220,000 units of new energy vehicles will be exported in 2020, a decrease of 32,000 units from the previous year due to the impact of the new crown epidemic [26,52].

Table 1. China's exports of new energy vehicles to different regions, 2018 to H1 2021 Unit: vehicles

Region	2018	2019	2020	2021		2021	
				Season 1	Season 2	1-2 quarter rate	(%) year-on-year growth
The European	5119	23329	71668	28620	51055	79675	244.8
Asia	136953	224201	136469	37744	34794	72538	76.3
Oceania	132	263	1077	3887	8638	12525	8846.4
In North America	3727	1732	6858	2539	2152	4691	170.7
South America	832	3605	4045	673	2517	3190	44.4
Africa	225	1267	1040	319	440	759	13.1
A combined	146988	254397	221157	73782	99596	173378	151.3

Data source: China Automobile Dealers Association

In China's new energy vehicle export structure, pure electric passenger car exports account for the largest share. According to statistics, from January to November 2021, China exported a total of 503,000 new energy passenger vehicles, of which 45.6 were pure electric passenger vehicles [7,21]. This was followed by plug-in hybrid passenger vehicles, which accounted for 7.7% of the total. The number of new energy buses exported was relatively small, with 2,123 units, accounting for only 0.4%.

China's new energy vehicles are primarily shipped to Asia and Europe, particularly to the European market where they have achieved success and substantially expanded exports [15]. In the first half of 2021, 152,000 new energy cars were exported to Asia and Europe, making up 87.8% of all exports to the region. Asia, which was the top export market for new energy vehicles in China from 2018 to 2020, is now the country's second-largest market, but its share of the market has been falling year over year, from 93.2% in 2018 to 41.8% in the first half of 2021 [43].

Table 2. Export volume, export volume and growth rate of new energy vehicles in China from 2018 to November 202

year	Export quantity (10,000 units)	Long year-on-year growth rate of export volume (%)	Export amount (ten thousand yuan)	Annual growth rate of export volume (%)
2018	14.7	-	340677	-
2019	25.5	73.1	950255	178.9
2020	22.3	-12.5	2240181	135.7
January-November 2021	50.5	151.8	6482558	217.4

Data source: General Administration of Customs of China

Overall, China's domestic new energy vehicle manufacturers have been able to develop been able to learn and develop through technology exchanges in overseas

markets.

2.4. Company Profile

2.4.1. BYD

Founded in 1995, BYD, China's self-developed and self-produced national car brand, is headquartered in Shenzhen and was successfully listed in Hong Kong in 2002 and on the Shenzhen Stock Exchange in 2011. BYD's nineteen business units under the business unit model are dedicated to serving the company's businesses in the three core areas of IT, automotive and new energy [37]. Currently, BYD is a leader in China in new energy vehicles and buses, rechargeable battery technology, and is at the forefront of the IT business and assembly-related businesses involving electronic components.

From 2003 to 2005, BYD entered the automotive industry, acquiring the former Xi'an Qinchuan Automobile Company Limited 2003 and establishing three businesses: fuel vehicles, electric vehicles and hybrid vehicles. Since 2012 to date, BYD's automotive industry has stepped into a stable development phase, gradually becoming a Chinese independent car brand as well as a leader in China's new energy industry [2,48].

2.4.2. NIO

Founded in November 2014, NIO has only been around for about seven years and is one of the first Chinese car makers to engage in the development, production and sales of new energy electric vehicles[35,54]. The company established an FE electric car team and participated in the FIA Formula Electric World Championship. X became the first Chinese team to win the drivers' championship in the FIA race in the 2014-2015 season, making a name for itself without even having a production car. In November 2016, NIO launched its English brand "NIO" in London and officially launched its supercar model EP9 [34].

In September 2018, NIO was listed on the New York Stock Exchange (NIO. NYSE), raising approximately $1 billion, making it the second electric car manufacturer to go public in the U.S. after Tesla [32]. According to NIO's annual report, by the end of 2020, NIO will have more than 7,000 employees and will have established R&D, design and marketing facilities in dozens of countries, including Norway, the United States, Germany and the United Kingdom.

2.4.3. XPEV

Ltd. was established in 2014, headquartered in Guangzhou, the company's registered capital amounted to 612,631.579 million yuan [26]. The founding team of XPEV He, Xia Heng, Tao He and others, with key members from well-known domestic and international vehicle companies such as GAC, SAIC, Tesla and Valeo, well-known Internet technology companies such as Alibaba and Tencent, and large component companies such as Delphi [25].

The main business of XPEV Automotive Technology Co., Ltd. is the research and development of vehicle technology, the sale of vehicle charging modules, the wholesale of auto parts and accessories, the manufacturing of charging piles, the installation and management of charging pile facilities, the construction of charging networks, the investment/ development of autonomous driving, and mobile travel/ financial services[19.53].On the product side, its first production model for the market, the XPEV G3, sold 371 units in 2018 and accumulated 16,609 units in 2019. The company has been able to maintain high growth in an environment where the auto industry as a whole is experiencing a chill.

These three companies were chosen to study the entry of Chinese new energy vehicles into Europe for the following reasons: 1) similarity. These three companies are relatively representative of Chinese new energy vehicle companies; 2) differences. The three companies have different birth and operation methods, which also lead to different comparative advantages; 3) representativeness. BYD, as the earliest car company dedicated to the new energy industry while NIO represents a newborn new energy car company that has certain advantages of its own but has difficulties to solve; XPEV represents a new group of newborn companies [26].

3. Methodology

The PESTEL analysis approach will be utilised in the first section of this study to analyse the macro environment in Europe [27,44]. Furthermore, PESTEL, according to Aguilar (1967) and Song, Sun, and Jin (2017), aids in comprehending an organization's complex nature and the power of the large picture. Making knowledgeable decisions concerning company endeavours is also facilitated [49].

The CAGE framework will be used in the second step to analyse potential disparities between the Chinese and European markets. Companies utilise the CAGE framework as a tool to investigate and contrast various nations to comprehend how a market differs in each nation. This aids them in creating business plans for entering fresh overseas markets. Cultural, Administrative, Geographical, and Economic Distance is referred to by the abbreviation CAGE (CAGE Distance Framework, n.d.).

Porter (1979) contends that Porter's five forces framework gives businesses a tool to evaluate the market competition. Since Chinese new energy vehicle businesses are going to enter Europe, the third stage will employ Porter's five forces model to analyse the pressures placed on various parties.

Barney's (2002) VRIO framework is utilised to define the viability of the competitive advantage for the three companies' ownership advantages. Chinese NEM enterprises have a wealth of advantages and resources, but most of them lack the ability to remain competitive in the long term. This highlights the fierce competition in this sector, where firms compete on an equal level and advantages are fleeting [17].

4. Research Objectives

With the "One Belt, One Road" route pointing westward to Europe, Chinese new energy vehicle companies are actively trading with Eastern European countries while also entering the markets of developed European countries[28], aiming to better broaden their internationalization strategy. This paper based on the study of BYD Auto, NIO Auto and XPEV Auto, this paper analyzes the following four questions to determine whether it is reasonable for Chinese new energy companies to enter the European market.

1) Why do Chinese new energy companies want to enter the European market?

2) What are the possible differences between the European market and the Chinese market?

3) What are the pressures on Chinese new energy companies to enter the European market?

4) What are the advantages and disadvantages for Chinese new energy companies to enter Europe?

5. Analysis

5.1. Why do Chinese New Energy Companies Want to Enter the European Market?

This paper argues that BYD's choice of strategy to enter the European market is the result of several factors, which will be analysed at this stage from both the Chinese and European sides.

5.1.1. China

The development of China's new energy vehicle industry cannot be achieved without the support of government policies. For example, the State Council of China has issued a series of supporting policies such as the Development Plan for the Energy Conservation and New Energy Vehicle Industry (2012-2020), the Guidance on Accelerating the Promotion and Application of New Energy Vehicles, and the Development Plan for the New Energy Vehicle Industry (2021-2035), using the power of policy to promote This is one of the reasons why new energy companies such as BYD have been boosted in the face of their internationalisation strategy [46].

The saturation of the Chinese market is also part of the reason, based on the profitability of BYD can be seen, BYD 12-16 years after the blowout growth, in 16 years ushered in a decline and even in 17 years ushered in a precipitous decline. The reason for this is that in 2016 [4,47], China's subsidies for the new energy vehicle industry dropped significantly compared to earlier years and raised the threshold, even to be completely refunded in 2020, which is a blow to BYD's profitability that cannot be underestimated [11]. Secondly, labour costs have risen compared to the past. As BYD Auto attaches importance to R&D and thus increases the number of highly educated technicians, the payroll payable to employees has naturally continued to rise, from RMB 1.2 billion in 2012 to RMB 3.9 billion in 2018. Finally, as R&D and various businesses are rapidly increasing.

Table 3. Profitability of BYD

Indicators		2012	2013	2014	2015	2016	2017	2018
Return on equity (%)	BYD	0.88	3.17	2.75	9.67	11.99	8.52	5.90
	Industry average	8.23	6.96	8.55	6.33	6.85	5.56	3.63
Net profit margin on total assets (%)	BYD	0.32	1.07	0.87	3.00	4.21	3.04	1.91
Net profit margin on sales (%)	BYD	0.45	1.47	1.27	3.92	5.30	4.64	2.73
Operating margin (%)	BYD	-0.65	0.20	-0.31	3.97	5.79	5.11	3.26

Data source: According to Wind database data collation

In contrast to BYD, NIO and XPEV have been facing the problem of not being able to make a profit. According to publicly released financial reports, NIO's total revenue for 2020 was RMB 16,257.9 million, up 107.8% year-over-year [15]. The fourth quarter revenue was RMB 6.64 billion, up 133.2% year-over-year and 46.7% year-over-year. However, in 2020, NIO reported a net loss of RMB5.304 billion for the year [24]. The net loss for the fourth quarter was RMB 1.389 billion, narrowing by 51.5% compared to the same period last year, but increasing by 32.6% compared to the third quarter.

5.1.2. Europe

For this section, this paper will be analysed using the PESTEL analysis method.

5.1.2.1 Politics

Europe has always attached importance to energy saving and emission reduction. The European Commission's new European Energy Policy, announced in 2007, aims to reduce greenhouse gas emissions by 20% and increase the share of renewable energy to 20% by 2020, while the EU's research and development budget for the energy sector has been increased by 50% over the next seven years. Furthermore, European countries have taken measures such as financial subsidies and tax breaks on purchases, consumption taxes and personal income taxes to encourage consumers to buy new energy vehicles, which has greatly increased the competitiveness of new energy vehicles, and other countries involved in global trade competition [36]. In the UK, for example, the government has invested £300 million in clean energy projects to promote the development of new energy vehicles, with a tiered policy for the cost of subsidies that provides a subsidy of €4,500 (for passenger cars) or €8,000 (for trucks) for electric and hybrid vehicles that emit less than 50g/km of CO2 and have a range of more than 70 miles in electric mode [49].In Germany, some incentives for alternative fuels for vehicles are provided by the tax law, with tax subsidies amounting to €3 billion per year by 2010 and €5 billion by 2020 The German tax law provides incentives for alternative fuels [46]. However, the German subsidies are only available for vehicles priced up to 60,000 euros, and 300 million euros of the 1.2 billion euros are for the construction of electric vehicle charging facilities and 100 million euros for government purchases.

5.1.2.2 Economy

The European economy has been struggling since the 2008 global financial crisis [5]. Since the third quarter of 2016, the European economy has formally been in a recovery phase, with annual economic growth rates in the EU and the Eurozone of 1.9% and 1.8% in 2016, 2.3% and 2.2% in 2017, and 1.9% and 1.8% in 2018, respectively [58]. Additionally, the European recovery has helped to expand employment, which has raised national income and contributed to the creation of social wealth, all of which have fueled the economic expansion.

5.1.2.3 Society

With a total population of over 740 million and it has a land area of 10.16 million square kilometres. The high level of education, high per capita income, and strong purchasing power of European consumers also contribute to their increased need for high-quality goods and increased openness to novelty [55]. New energy cars are thus more readily accepted by European consumers as new high-tech products.

Table 4. European national or regional policies on new energy vehicles

Countries	Time	Subsidy policy	Other preferential	Ban burning time
Germany	2020-2025.	Up to 40,000 euros: 6,000 euros for EV and 4,500 euros for PHEV	143/5000 The vehicle tax exemption period will be extended to December 31, 2030: By the end of 2020, the VAT rate will be reduced from 19% to 16%	In 2030
		40,000-65,000 euros: 5,000 yuan for EV and 3,750 euros for PHEV		
		The government and the car manufacturer share half of the subsidy		
	July 2020 - End of 2021 (Economic Recovery Plan)	Up to 40,000 euros: 9,000 euros for EV and 6,750 euros for PHEV		
		€4-65,000: €7,500 for EV and €5,625 for PHEV		
		The new subsidies are covered by the German government		
The French	2020-2022.	Below 45,000 Euros: The EV subsidy is divided into 8 categories of 6,000/5000/4,000 euros, decreasing year by year	Exempted from company car tax, registration tax enjoy 50% discount	In 2040
		€45,000-60,000: EV subsidy of €3,000		
	The first 200,000 electric vehicles from January, June, 2019 (Auto Industry Assistance Program)	Below 45,000 euros: EV subsidy of 7,000 euros		
		Up to €50,000, range over 50km: €2,000 subsidy for PHEVs		
		EV subsidies of 5,000 euros		
Britain	2020.03-2023.	Below 50,000 pounds: 35% of the purchase price of EV subsidy, up to 3,000 pounds rust	Evs are exempt from vehicle excise tax	In 2035
In the Netherlands,	2020.07-2025.	12,000-45,000 euros, endurance above 120km: EV subsidy of 4,000 euros	Evs are exempt from registration tax	In 2025
		A subsidy of €2,000 for used electric cars	EV registration fee is waived and parking is free in some areas	In 2040
Spain	From 2020.06 (Auto Industry Assistance Scheme)	If a private car with more than 10 years of age or a commercial vehicle with more than 7 years of age is scrapped, a subsidy of 4,000 euros will be given for the new purchase of EV, and a subsidy of 600-1,000 Euros will be given for the new purchase of a model with carbon emission <120g/km	-	In 2030
The Swedish	From 2018.06	EV subsidy of 60,000 kronor. The subsidy for PHEV is 10,000 kronor	-	2024 (Rome)
Italy	2019.03-2021.12	Vehicles with carbon emissions less than 20g/km will receive a subsidy of €6,000	It is free of sales tax and 25% value-added tax, free of charge, free of city tolls and parking fees, and free of import duties	In 2025

Sources: Autohome, ACEA, KBA, CCFA, China Galaxy Securities Research Institute (PHEV: Plug-in Hybrid Electric Vehicle)

5.1.2.4 Technology

The rapid development of new technologies around the world has changed people's lifestyles and consumer needs. As the birthplace of the automotive industry, Europe has always been a world leader in vehicle manufacturing technology. Additionally, because of Europe's distinct advantages in the manufacturing sector, expanding into that market can give Chinese manufacturers of new energy vehicles more chances to interact with and learn from European counterparts, as well as gain complementary advantages through technological collaboration.

From the above analysis of China's domestic and European macro environment, we can see that BYD chose internationalization after experiencing a bottleneck in domestic growth in search of better growth momentum, and NIO and XPEV chose internationalization in search of better resources to enrich their competitive advantages; at the same time, the reasons for entering Europe are inseparable from Europe's policy support for new energy vehicles and the high recognition of society for new energy vehicles.

5.2. What are the Possible Differences between the European Market and the Chinese Market?

This phase will use the CAGE framework to analyze the possible differences between the European market and the Chinese market.

5.2.1. Cultural Distance.

In terms of automotive culture, China and Europe are distant, but China, the fastest growing emerging country in the world, is also experiencing rapid changes in the automotive industry, especially in the new energy sector. [26]. China also has business ties with the UK's nameplate, which gave the Chinese new energy vehicle company the chance to enter the European market. As it turned out, the company did so by using public transportation as a launchpad to market electric buses and electric taxis in Europe, where energy efficiency and emissions reduction have always been priorities. On the island of Sismonik, BYD received its first order for six electric buses in June 2012. The following year, BYD won the largest pure electric bus order in Europe. The market share of electric buses manufactured by BYD and its alliance partner ADL as of 2018 is over 50% in the UK and 90% in London. The Chinese company's efforts to close the cultural gap are demonstrated by this.

5.2.2. Administrative Distance

China and Europe have similar administrative policies to promote electric vehicles, as they share the same climate change and energy consumption issues, leading them to make similar choices on many policies most of the time. They have

increased incentives for the purchase of electric vehicles and have promoted the manufacture of electric vehicles by providing tax and fiscal incentives (How Electric Vehicle Incentives Work Worldwide, n.d.).

5.2.3. Geographical Distance and Economic Distance

China and Europe are geographically far apart, and European countries are huge market markets, but the time difference will be a barrier to trade [26]. Even though they are both economically sound and the EU is the largest market with high purchasing power parity, it attracts all car manufacturers to invest in these markets and create market share in front of all competitors [26]. Even though today we are deep in an era of economic globalisation, this trend seems to have receded in recent years due to the rampant New Crown epidemic. The Belt and Road Initiative, mentioned above, has a solution for this. In terms of the end result, the Belt and Road Initiative is the best economic and geographical bridge between China and Europe, and a Chinese new energy vehicle company may effectively minimise the costs incurred by this distance with the aid of authorised access.

Combining the above analysis, we can see that there is indeed a certain gap between China and Europe in terms of automotive culture. In terms of administrative distance, both China and Europe make similar judgments about the current situation and therefore make mostly the same choices in terms of relevant policies; as for how to get along with the geographical and economic gap, different companies need to adjust their strategies according to the macro situation.

5.3. What are the Pressures on Chinese New Energy Companies to Enter the European Market?

This section will use Porter's Five Forces model to analyze the pressures that Chinese new energy companies may face when entering the European market.

5.3.1. Bargaining Power

5.3.1.1 BYD

China unquestionably has lower labour, material, and transportation expenses, which significantly lowers costs in the production of new energy cars. By raising the price of inputs and lowering unit prices, BYD, a manufacturer of new energy cars, can improve the competitiveness of its goods while also impacting the profitability of established businesses in the European market. The competitiveness of BYD's new energy vehicle products largely rests on the value of the products they offer to European consumers. BYD has more negotiating power because its new energy vehicles are more affordable than those made by European automakers in terms of labour and material expenses.

5.3.1.2 NIO

With lower material, labour and transportation costs than BYD, NIO has opted for a more innovative asset-light OEM production model - having JAC produce NIO cars on its behalf [36]. The advantage of this is that NIO will not have to pay huge land costs and build a factory, which is undoubtedly good for startups.

5.3.1.3 XPEV

The difference is that in terms of production qualifications and core technology, XPEV has a less competitive advantage and is at a greater disadvantage than BYD, and as a new vehicle manufacturer, XPEV is in a weaker position in this regard. Bargaining power is relatively low [48].

5.3.2. Consumer Power

The price/performance ratio in the purchase and usage process can directly reflect the buyer's recognition of the environmental and economic performance of new energy cars. The buying intentions of customers will be directly impacted by three elements: improved technology, humanized design, and higher cost performance [50]. Additionally, they will eventually focus on product differentiation and personalisation as the grade demanded rises. While NIO and XPEV, as start-ups, will only complete the beginning of the company's internationalisation around 2020 and will have less influence [37]. Overall, BYD is without a doubt the Chinese company with the most advantageous access to the European market and has established a certain reputation for its collaboration with London cab companies.

5.3.3. Potential Entrants in the Industry

The large inflow of foreign capital that has accompanied China's auto industry's rapid development has also resulted in a number of technological spillovers. Chinese companies can take advantage of this opportunity to learn many advanced technologies and experiences, greatly reducing R&D risks and costs, and giving China's auto development a distinctive edge [29]. As a result, China's leaders in new energy vehicles have a significant latecomer advantage and are starting to amass a plethora of expertise as future competitors in the European market.

5.3.4. Threat of Substitutes

Alternatives to new energy electric vehicles are primarily divided into two categories: one is from an energy perspective, where Chinese new energy vehicle companies are primarily manufacturers of pure electric vehicles, and the other is from a market introduction perspective, where the majority of sales are in Japan and the United States and many international automakers are introducing their new fuel cell vehicles [24]. Although fuel cell cars cannot now compete with electric cars in terms of sales or technology, if a significant advance in fuel cell technology occurs in the future, fuel cell cars may eventually displace the current electric car industry.

5.3.5. Internal Competition in the Industry

China's new energy vehicle sales are not optimistic in the fiercely competitive European market, where traditional automakers like Volkswagen, Audi, and others are also making inroads. Additionally, there is the rise of new energy vehicle companies like Tesla, which rely on human resources and policy support [3]. The European new energy vehicle market can be said to have set a high standard for the industry. In contrast to the current internal pressure of Chinese companies, which is not as great, what they have to deal with is a mixed European new energy market[18].

5.4. What are the Advantages and Disadvantages for Chinese New Energy Companies to Enter Europe?

This section will use the VRIO model to analyze the strengths and weaknesses of these three companies.

5.4.1. BYD

5.4.1.1 Technical Advantages

Power battery is the most important component of new energy vehicles and is regarded as the core of new energy vehicles, and itstheirits their quality is directly related to the performance of new energy vehicles [17,31]. In 2007, BYD

launched the world's first lithium iron phosphate battery "E-powder", which can be used for car charging. In addition to its strong technological advantage in power batteries, BYD is also a leading thermal technology company in China with 12,580 patents, much higher than other domestic automotive companies.

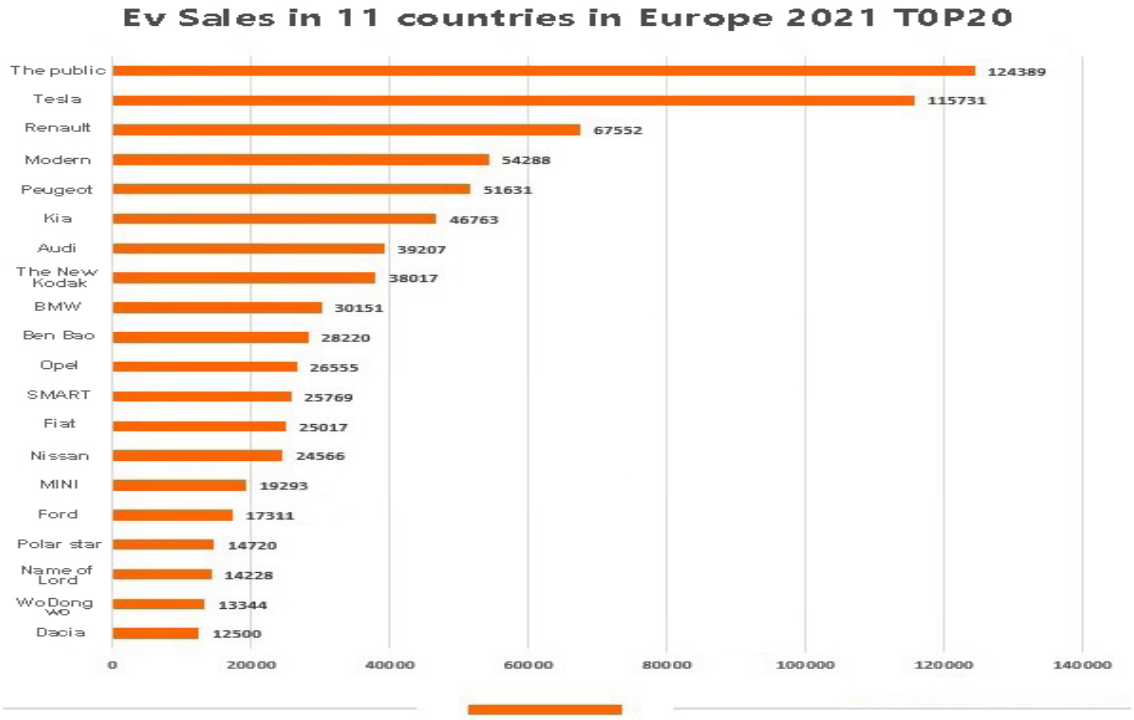

Figure 1. Top 20 new energy vehicle sales in Europe in 2021

Table 5. Parameter comparison between BYD and best-selling models in European mark

	Tesla mode13	The BMW i3	Renault's zoe	Byd E6
Maximum speed (km/h)	233	150	140	140
100 km acceleration (S)	4.8	7.3	9.5	15.26
Range (km)	560	359	394	400
Price (Euro)	57900	34950	21090	59500

Data source: European Automobile Industry Association (https://www.acea.be/)

5.4.1.2 Low-cost Advantage

Compared with the new energy vehicle brands in the United States, Japan and Europe, Chinese new energy vehicles generally have the advantage of low cost, and BYD's IT industry can provide power batteries, interior trim, interior wiring harnesses, lights, air conditioning assemblies, etc. for the production of new energy vehicles, and the automotive industry can provide the vehicle manufacturing process for the production of new energy vehicles [8]. At a time when cars are becoming more and more popular and gradually penetrating low-income people, consumers are still more sensitive to product prices, while new energy vehicles are still in the market introduction period, production costs are also higher, in competition with traditional cars will be in a more disadvantageous position, from this point of view, BYD grasps the low-cost advantage to a certain extent to grasp the initiative in the market [22].

5.4.1.3 The Advantage of Chinese Self-owned Brand

As a future trend of automobile development, new energy vehicles are highly valued and supported by the Chinese government. In addition, the Chinese government implements a fiscal subsidy system for consumers who purchase new energy vehicles of independent brands and gives priority to purchasing new energy vehicles of independent brands in government procurement [10]. The Chinese government has also given policy preferences for the export and internationalization of new energy vehicles and is striving to make new energy vehicles a new export growth point.

5.4.1.4 Quality Disadvantage

Compared with international well-known automobile enterprises, BYD's new energy vehicles have certain advantages in performance parameters, but there is still a large gap in overall vehicle manufacturing technology and techniques compared with domestic Chinese and foreign joint ventures and international multinational car companies [22,30]. In addition, BYD's new energy vehicle sales have increased significantly in recent years, to seize market share and continuous expansion, low production costs, coupled with the car manufacturing process itself lacking, will inevitably lead to some problems in quality. For example, transmission rattling, transmission stuttering.

5.4.1.5 Brand Disadvantage

BYD did not start to get involved in the field of automobile production until 2003, although it has developed rapidly in the past decade and has become a more influential independent automobile brand [18].There is still a large lack of brand awareness and reputation, and compared with the earlier and stronger automobile companies in the domestic market, there is a gap in brand influence, and the internationally renowned Toyota, BMW, Mercedes-Benz, Ford, etc., the gap is even greater[24]. In the "Top 100 Auto Brands 2016" released by brand evaluation agency Brand Finance, Japan's Toyota Group topped the list with a brand value of $43.064 billion, followed by Germany's BMW and Mercedes-Benz. The top 10 auto brands are mostly Japanese, American and German cars.

5.4.1.6 After-sales Disadvantage

China's independent automobile brands have a long-term

gap with joint venture cars in terms of technology, management, brand, etc. In the "2015 China Automotive After-sales Service Ranking" released by the world-renowned consulting company Jingdong Power[23], the user satisfaction indicators were measured by five factors: service quality, delivery period, facility maintenance, service consultant and service start-up, and only three Chinese brands of Dongfeng Fengshen, Chery and FAW were listed, and the rest were joint venture car brands. Compared with traditional cars, new energy vehicles are different in vehicle structure and require different maintenance, and at present, the after-sales system of China's new energy vehicles, including BYD, is under construction, and it is completely unable to cope with the substantial growth of new energy vehicle sales ([9,25].

Through the above analysis, it is possible to determine the strengths and weaknesses that BYD currently possesses, and the following table can be obtained through integration.

Table 6. BYD's VRIO analysis

Resource/ Capability	Value Creating	Rare	Inimitable	Organisation	Implications
First Mover Advantage (BEVs)	YES	NO	NO	YES	Competitive Parity
International Brand Equity	YES	NO	NO	NO	Temporary Advantage
International EV Customers Knowledge	YES	NO	NO	NO	Temporary Advantage
Open Source Proprietary Technology	YES	YES	YES	YES	Sustainable Competitive Advantage
Huge Factories and Automated Facilities	YES	NO	NO	YES	Competitive Parity
Network of Superchargers	YES	YES	NO	YES	Temporary Advantage
Efficient Supply Chain	YES	YES	NO	YES	Competitive Parity
Strategic Production Locations	YES	NO	NO	YES	Competitive Parity

5.4.2. NIO Corporation

5.4.2.1 Low-cost Advantage of OEM Production

The first advantage of NIO is its production model. Unlike other OEM models, NIO's OEM production is a collaborative production model with deep involvement. First, although the production plant, equipment, assembly line and personnel belong to JAC, NIO will propose a set of production, quality control and inspection standards to ensure the quality of the final product [43]. Secondly, NIO and JAC will work together to develop and test some components and production processes that are unique to new energy vehicles, thus ensuring smooth production.

5.4.2.2 Highly "Intelligent" Image Advantage

From the very beginning of its development, NIO has defined its products as truly "smart" cars. On top of being purely electric, NIO relies on "NOMI+Autonomous Driving" to enhance its technological content and appeal to customers. Based on the in-vehicle local computing power and the connected cloud computing platform, NOMI can interact with users by voice or touch [45].

5.4.2.3 Profitability Disadvantages

As mentioned above, according to publicly released financial reports, NIO's total revenue for 2020 was RMB 16,257.9 million, up 107.8% year-over-year. Revenues for the fourth quarter were RMB 6.64 billion, up 133.2% year-over-year and 46.7% sequentially[48]. In 2020, NIO reported a net loss of RMB 5.304 billion. The net loss for the fourth quarter was RMB 1.389 billion, a 51.5% decrease compared to the same period last year, but a 32.6% increase compared to the third quarter.

Now NIO is the darling of the capital market. By issuing convertible bonds, bank loans, government investments and subsidies, NIO has achieved a large cash inflow. As of the end of 2020, NIO had cash reserves of 42.45 billion RMB, total assets of 54.642 billion RMB and total liabilities of 22.780 billion RMB [57]. Although NIO's losses are significant, the company's cash flow position is relatively healthy and has not affected the company's growth.

5.4.2.4 Technology Disadvantage

As a new car company, NIO does not have much experience in-car technology. Its hardware production is outsourced to partner companies, and core components such as motors and batteries are also sourced. NIO's R&D is focused on intelligent vehicle control and interaction systems and autonomous driving. To gain a competitive advantage in this area, NIO has invested heavily in its ownR&D team and has also used foreign acquisitions to strengthen its capabilities [51]. In terms of results, NIO's software systems have been well received by users, but it has not yet been able to build up its technological strengths.

5.4.2.5 Supply Chain Disadvantage

In October 2021, NIO's momentum suddenly hit a snag. Only 3,667 units were delivered in October, 6,961 units less than the 10,628 units delivered in September, a 65% drop. In response to the sharp drop in deliveries in October, NIO President Qin Lihong said it was due to the renovation and upgrade of NIO's production plant. BYD's October 2021 sales exceeded 100,000 units in a single month, while XPEV, RISO, and even the previously unknown Nezha all saw their sales soar, surpassing those of NIO in a single month. NIO must have had its reasons for choosing to upgrade its production

capacity at this critical point in time [14]. The OEM model helped NIO quickly gain low-cost production capacity. But as it grows, the question of whether this model is still suitable for the company's long-term growth is one that NIO will have to ponder.

From the above analysis, it is possible to determine the strengths and weaknesses that NIO currently possesses.

Table 7. NIO's VRIO analysis

Resource/ Capability	Value Creating	Rare	Inimitable	Organisation	Implications
First Mover Advantage (BEVs)	YES	NO	NO	YES	Competitive Parity
International Brand Equity	YES	NO	NO	NO	Temporary Advantage
International EV Customers Knowledge	YES	NO	NO	NO	Temporary Advantage
Open Source Proprietary Technology	YES	NO	NO	YES	Competitive Parity
Network of Superchargers	YES	YES	NO	YES	Temporary Advantage
Efficient Supply Chain	YES	YES	NO	YES	Competitive Parity
Strategic Production Locations	YES	NO	NO	YES	Competitive Parity

5.4.3. XPEV Corporation

5.4.3.1 Outstanding Differentiation Advantage

The success of XPEV's differentiation strategy can be seen in model G3, the first XPEV new car manufacturer to achieve mass production and achieve significant sales. the G3, the main XPEV model, highlights the three core strengths that differentiate the XPEV: high intelligence, high cost-effectiveness, and high value. The first is the highly intelligent, self-driving operation of "PILOT" and the independent AI intelligent system "Xmart OS" intelligent new technology, making the XPEV excellent in intelligent performance in the same price range. Secondly, the design is outstanding [15]. The XPEV is positioned among the young Internet technology crowd, and the shark-style front face and LED light strip design can meet their demand for a stylish appearance [13]. Thirdly, it is cost-effective, with the XPEV G3 2020 car in the price range of RMB 150,000-200,000, which is excellent price competitiveness.

5.4.3.2 Charging Network Construction Layout Advantage

XPEV launched a customized version of the XPEV G3 net car alongside its own net car platform, Young Travel, with the aim of expanding its own charging network (XPEV Superchargers) and partnering with third-party platforms (Tesco, etc.).

5.4.3.3 Financial Disadvantage

The initial investment in new energy vehicles is very high. After four rounds of financing, XPEV Automotive Technology Co. has raised a total of US$16.8 billion, which is US$13.2 billion away from its target of US$30 billion. The autonomous factory in Zhaoqing, Guangdong, China, and the 1,000 charging stations planned for the next three years will require significant financial support [6].

5.4.3.4Product Disadvantage

As the XPEV is still in its infant market stage and has not yet been scaled up, only one model, the XG3, is in mass production and therefore consumer choice is limited, with high production costs and limited profit margins. Although sales of new energy vehicles are increasing year on year, the scale remains small, which is not conducive to amortization of production line costs, resulting in high costs per vehicle.

5.4.3.5 Disadvantages of the Brand Effect

Customer acceptance and recognition of the brand are not as high as that of joint venture brands, and the incident regarding the rights of XPEV owners had a significant negative impact on the company [18].

From the above analysis, it is possible to determine the strengths and weaknesses that XPEV currently possesses, and the following table can be obtained through integration

5.5. Comparative Analysis

From the analysis of the above four problems, the macro market environment and differences and the pressures and the different advantages and disadvantages of the three companies, and a compare analysis will be shown here.

5.5.1. Product Competitiveness

Compared to the other two companies that started late, BYD is undoubtedly the most competitive brand in terms of products, as their IT industry business gives them the ability to invest in the research and development of battery technology for new energy vehicles. NIO has an advantage over BYD in terms of operating systems and design, but due to their OEM production model, it is difficult to have their own hardware technology; XPEV was also born from the internet and as an emerging representative with a late start, but at the beginning of their entry into Europe, without the support of sales and factories [5]. In general, BYD, as an established car dealer, has a relatively large competitive product category among Chinese companies.

Table 8. XPEV's VRIO analysis

Resource/ Capability	Value Creating	Rare	Inimitable	Organisation	Implications
First Mover Advantage (BEVs)	YES	NO	NO	YES	Competitive Parity
International Brand Equity	YES	NO	NO	NO	Temporary Advantage
International EV Customers Knowledge	YES	NO	NO	NO	Temporary Advantage
Open Source Proprietary Technology	YES	NO	NO	NO	Competitive Parity
Network of Operations	YES	YES	YES	YES	Sustainable Competitive Advantage
Efficient Supply Chain	YES	NO	NO	YES	Competitive Parity

5.5.2. Corporate Operations

In general, the three companies in the enterprise's industrial chain and production mode are different, BYD as a representative of the traditional automobile transformation of the new energy industry. OEM production in China may not have too much problem, with the production chain after entering Europe can keep up with their own production and sales is the test they must go through [17]; XPEV has although the amount of export trade required is now within an acceptable range, expanding the production and product value chain upgrade after four rounds of financing is the most difficult problem for XPEV at present.

5.5.3. Financial Aspects

In contrast, the three companies face different financial problems. BYD in the full commitment to the research and development of new energy vehicles after the stage of profitability [25]. NIO currently exists in the huge problem is long-term losses. XPEV has experienced several failed financing experiences and has not yet reached the listing standard.

6. Conclusion

6.1. General Conclusion

Based on the development of Chinese new energy vehicle companies, this study examines the rationality of Chinese new energy vehicle companies entering Europe, using BYD, NIO and XPEV as examples. The results show that the analysis of the Chinese domestic and European environment can explain the motivation for internationalisation by understanding that Chinese new energy vehicle companies choose to internationalise in pursuit of greater development momentum, driven by Chinese policy and the multiple attractions of European automotive culture, talent, technology and policy to enter Europe; there may be some administrative, and cultural and other distances, but as the current Chinese and European attitudes towards the new energy vehicle industry are broadly the same, there is an approach to friction. The pressure to enter Europe comes from all sides, whether it is peer competition, brand pressure, or their own shortcomings, but they can overcome and resolve these difficulties by playing to the relative advantages they possess. Even though the companies that are the first to enter Europe as part of China's new energy industry have a core, relative and leading technologies, how to take this step of internationalisation strategy needs to be seriously considered.

6.2. Limitations

As the analysis is based on three representative Chinese new energy companies, the sample size is necessarily limited; and as the internationalisation strategy of Chinese new energy companies into the European market is still in progress, some data may not be up to date; and as the study is on China, it is questionable whether it can be extended to other emerging markets.

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