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Analysis on the New Energy Transformation of Traditional Automobile Enterprises

--Taking Mercedes-Benz, BMW and Audi as Examples

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Abstract: Under the background of the global "carbon neutral" process, new energy vehicles have become the main development target. The transformation of many traditional fuel car companies has also pushed forward the development of new energy. This paper takes the three giants of traditional car companies - Mercedes Benz, BMW, and Audi as an example. Firstly, we conduct a SWOT analysis and find that the problem of lagging behind in technology and experience internally, as well as the threat from many new energy vehicle companies. Secondly, we analyse the dilemma faced by traditional car companies in terms of global sales and vehicle production capacity in new energy technologies. Their actions will serve as a reference for all traditional automobile companies looking to transition to new energy sources.

Keywords: Carbon Neutral, New Energy, Supercharger, BBA

1. Introduction

Sustainable development has become an important issue in today's world, and the development of new energy vehicles is an important way to promote the future application of renewable energy and the development of electrified transport technology. It is also an important means of ensuring future energy security, alleviating energy shortages and improving environmental quality [1]. As the largest use of vehicles, automobiles can alleviate the problem of environmental pollution in China. At present, China's auto fuel accounts for nearly 55% of the total fuel consumption. Therefore, the development of new energy vehicles needs to be paid more and more attention.

In the new energy market, the traditional fuel car of the three major car companies Mercedes-Benz, BMW, Audi in the current domestic new energy market does not maintain the leading position, but less optimistic. It also shows that they are currently facing great difficulties. Mercedes-Benz's six main new-energy models generated only 35,500 sales in the country for the whole of last year, almost the same level of monthly sales for the new domestic car-making brands in the same period. Audi and BMW are similarly mired in a new energy sales slump. The former's main product Q5 e-tron, last year's annual domestic sales of only 1,629 units, and monthly sales of less than 200 units; the latter last year's domestic sales of new energy also reached only 41,900 units, and the "ai Xiaoli" last year's same period of 100,000 units of sales gap is very big. Based on the above situation, BBA not only

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need to bear the pressure brought by other new energy car companies but also need to improve their own new energy sales, in such a two-way dilemma situation, BBA can only take their own price reduction measures. However, at the moment BBA decided to cut prices, also pushed itself into a deeper abyss. Their common problem comes from the nature of the company, i.e. the emphasis on the role of engineers in the car-making process as well as the stringent requirements for technical quality but slow iteration of soft technologies, which is typical of the artifacts and technologies of traditional car companies. In terms of exterior design, there is a lack of technological innovation. Then there are the high-tech accessories and the maturity of autonomous driving and universal charging facilities that they don't have. In terms of the pricing of the cars, they are overpriced, thus resulting in less value for money. In the first half of 2023 they were all outside the top 30 on the new energy sales charts, with Tesla and BYD occupying most of the top 10 spots. In recent years, as China's car ownership continues to rise, total carbon emission reduction in the automotive industry is crucial to achieving the dual-carbon goal for automobiles. From the working mechanism of new energy vehicles, it can be seen that compared with traditional fuel vehicles, new energy vehicles in the fuel use phase of the carbon emission reduction effect is significant. Therefore, the development of new energy vehicles is a must to achieve the dual-carbon goals of the automotive industry [2]. Currently, the strategies of Tesla and BYD, two typical new-energy car companies, are used to illustrate the threats that BBA encounters in the future and what it can learn from them. As they currently dominate the majority of the market, they pose a significant threat to BBA's future growth. Tesla adopts price cuts and subsidies and continues to use low prices to open up the Chinese market. Policy direction is just as important for Tesla, Chen et al. analyze Tesla's cost issues and point out that getting government support facilitates the approval of charging posts and ease of construction. It can save time and money costs [3]. And BYD's strategy is to master the core technology, relying on technology to reduce costs, control the Chinese market below the 300,000 level of space, and rely on technological innovation to make consumers remember them. Yu et al. analyze BYD's Road to Transformation and point out that it is committed to being a technologically innovative company, fully converting from fuelling to electrification [4].

Facing these problems, BBA has done the same initiative for the transformation. 13 June to 28 June also saw the rare simultaneous commissioning of brand-new production facilities at Mercedes-Benz, BMW and Audi. Mercedes-Benz's latest electric car, the EQE, rolled off the production line at its Shunyi plant; BMW's Shenyang Rieta plant went into production, and the foundation stone for Audi's new FAW PPE plant will be laid in Changchun.

The innovation of this paper is to examine whether the top three traditional automotive companies can successfully transform into energy-efficient vehicles and take the leadership position. They have a huge brand presence but are currently under-appreciated in the new energy sector and therefore need to be given more attention.

In this paper, first, we analyse their situation with SWOT analysis. Then, we review the measures for energy transformation. Finally, we compare the marketing sales of these three companies with the competitors and propose suggestions for future development. The conclusion is that they are still capable of competing in the new energy sector, relying on their accumulated experience in car manufacturing. It's their success or failure that matters. If they succeed, they stimulate competition, but failure will cause a cultural break that, at worst, will lead to the demise of the fuel car.

2. Background Current Status of BBA's New Energy Vehicle Development

2.1. The Development Status of New Energy of BBA

Founded in 1886, Mercedes-Benz is one of the oldest brands. Mercedes-Benz is loved by its users for its safety features as well as luxurious interiors, comfort, and elegant design. BMW was founded in

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1916 and is known for its unique and innovative design as well as excellent driving experience. Founded in 1899, Audi focuses on technological innovation. In the early days of China as a special car for officials, but also in the minds of domestic users it was a representative of the official car.

From 13 June to 28 June, BBA rare at the same time put into production the establishment of a new factory. Mercedes-Benz, BMW, and Audi announced one after another that they would usher in a large-scale production phase of electric vehicles in China. On June 13, Mercedes-Benz's newest electric vehicle, the EQE, rolled off the assembly line at its Shunyi plant; on June 23, BMW's largest investment project in China to date, the Shenyang Rieda plant, went into production, which is equipped with the ability to produce 100 percent electric vehicles; on June 28, The foundation stone of Audi's first production base in China dedicated to the production of pure electric vehicle models - Audi FAW's new PPE plant will be laid in Changchun.

In the first half of 2023, Mercedes-Benz sold 1,019,200 units of its entire model range globally, up 5 percent year-on-year, and sold 102,600 units of pure electric models globally, an increase of 121 percent year-on-year. But the main new energy model EQ series is less than 10,000 units, The new energy model launched 16 models, EQC as the first mass production on sale models, due to high pricing and low innovation, sales of single-month high in April for just over 100 units. EQE and EQB sales relative to the EQC are better, but the overall sales are still low, the highest single-month not more than 1,300 units.

In the first half of the year, Audi delivered 907,100 units globally. During the period, Audi delivered 75,600 units of pure electric vehicles globally, a year-on-year increase of 51.2 percent, accounting for 8.34 percent of the total sales volume, of which 48,000 units of the main model, the Q4 e-Tron, were delivered, and according to the trend of increase, it will continue to be improved in the second half of the year. e-tron GT will set up a benchmark for Audi in the premium electric GT market. The e-Tron GT will set the benchmark for Audi in the premium electric GT market. The e-tron GT will set a benchmark for Audi in the premium electric GT market and will pave the way for Audi's future expansion in the electric vehicle market. Audi's deputy sales manager mentioned that 2023 is the year when FAW Audi's electrification development will gather momentum.

In the first half of 2023, BMW (single-brand) global sales were 1,071,300 units, and the BMW Group's global sales of pure electric models (including MINI) were: 152,900 units, a year-on-year increase of 101.5 percent. The BMW Group's new energy vehicle sales have approached or exceeded those of some of the "new forces" - Azure (54,600 units); Kryptonite (42,600 units); and in 2023, the BMW Group's pure electric products will be expanded to 11 models. In conjunction with this, the BMW Group's new Shanghai R&D Centre was officially opened on 18 July; and in May this year, the BMW sixth-generation power battery project, with an investment of tens of billions of yuan, has also begun full-scale construction in Shenyang.

To sum up, they have some common problems. The first is that the exterior aspect of the design is old-fashioned and does not have a strong sense of technology due to the copying of the design of the fuel car series. The second is that the interior is not smart enough. The third is that the battery-related facilities are also not perfect. The previous "oil to electricity" strategy blunder left consumers with the impression of a "new energy hybrid car".

2.2. SWOT Analysis

2.2.1. Strength

Firmly occupying the position of the leader of the traditional car companies, BBA has a rich historical background, sufficient funds and capital accumulation, the advantages of automotive hardware technology, and the innovation of the management system.

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In terms of funding, the research and development of new energy requires a lot of money, and they all have this ability. On the contrary, the current new energy car companies have had crises because of funding, such as Tesla on 1 July 2003, the initial business plan in the first generation of the projected research and development costs of the first generation of models for 25 million U.S. dollars. But in fact, this figure ended up being US$1.4 billion.

In terms of accumulation, they have three advantages in the electric smart car track: brand, product, and service. Traditional luxury brands have accumulated user recognition of the brand, which is still trusted in the luxury car market. A large number of offline shops meet the user's direct contact with the product, and the current new energy car companies are gradually beginning to develop offline shops. The importance of offline stores is to enable a brand that already has a certain degree of popularity to continue to expand public influence and target customer groups more effectively, in order to achieve the optimal allocation of resources within the enterprise [5].

In terms of technology, BMW still attaches great importance to the aesthetics of exterior design, and designers will spend a lot of time exploring new types of appearance. BMW's Rolls-Royce will also enter the new energy circuit of ultra-luxury models, which is currently the new energy car companies cannot occupy. Audi e-Quattro plus electric four-wheel drive. Audi e-tron is equipped with the latest generation of Audi Quattro electric four-wheel drive system, with front and rear torque distributed infinitely, and the response time (30 milliseconds) is only a quarter of that of mechanical quattro, which is an epoch-making upgrade of quattro technology. Mercedes-Benz uses Magic Carpet Suspension, BMW uses Valvetronic, and Audi uses Quattro 4WD are all technically superior.

2.2.2. Weakness

The initial impression of the user and the inadequacy of the car itself are big disadvantages. Although the brand has a hundred years of car companies, at the beginning of the "oil to electric" models, no user bought them because the range, performance, and intelligence did not have the advantage. All of their car lineups are currently priced higher, BBA is currently unable to enter the price market under than 300,000 dollars. BBA's charging pile system has not yet been established, on the contrary, the number of Tesla's supercharging stations open for use in mainland China has exceeded 900, and the supercharging pile is more than 7,000 piles, with 700+ destination charging stations, 1,730+ destination charging piles, and has covered more than 330 cities in China. It can be seen that this aspect of charging has been pulled apart by a huge gap. The appearance is not very innovative, has no sense of technology, and is not much different from the tanker series.

2.2.3. Opportunity

BBA's new energy development started slowly, but the current trend shows that there are great opportunities for them. At present, new energy car companies occupy the market below 300,000 mainly. BBA can choose to develop high-end new energy vehicles. This market is only occupied by Tesla. Other new energy car companies have very difficulty obtaining the trust of users, and BBA just has the trust of this user group. After obtaining users, then sink the market. Also, at present, although many companies are developing new energy vehicles, some of them have closed down and restructured because they are unable to make a profit, so it is not difficult to analyse the competitive situation of the entire market

2.2.4. Threats

The biggest threat is from Tesla. Tesla adopts the business model of self-developed systems and chips and car manufacturing, which can not only reduce long-term costs but also gain revenue from vehicle sales at the same time. BBA and new domestic car-making forces have adopted a business model of

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cooperation with third parties. From a long-term perspective, Advanced Driving Assistance System (ADAS) does not seem to be cost-effective. This also gives third party suppliers a greater voice. The future rival, Xiaomi Auto, may also be a formidable opponent, and Xiaomi Auto has recently planned to enter the new energy vehicle industry with a super cost-effective stance. Therefore, the competition of Xiaomi Auto will bring new threats.

3. Comparison of Global Sales

3.1. Sales Analysis

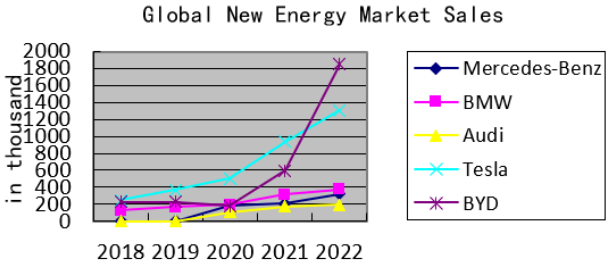

Figure 1: Comparison of New Energy Vehicle Sales Worldwide

Based on Figure 1, comparing the sales of BBA with the two major new energy headliners abroad and at home, it can be found that the gap is very big. Between 2018 and 2019, Audi and Mercedes-Benz's new energy has no voice and has been recalled because of the high failure rate. However, BMW can be counted as one of the most successful within BBA during this period, and BMW i3 series can be seen even on the new energy list. In terms of trends, BBA has been growing fast in the last two years, although the gap remains wide. Surprisingly in 2022, BYD outperform Tesla, which also shows that the strength of the domestic localised car enterprises cannot be ignored.

3.2. Production Analysis

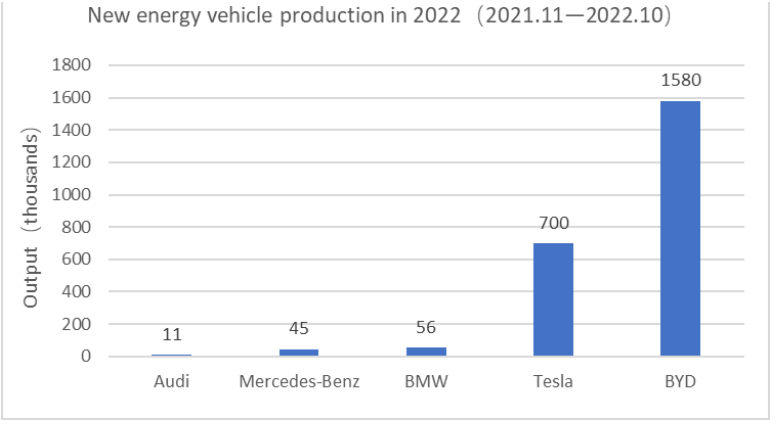

Figure 2: Comparison of new energy vehicle production capacity in China (vehicle numbers)

Based on Figure 2, it can be seen that in 2022, BYD became the only car company to break through one million. Tesla's Shanghai Super factory is ranked second in terms of production capacity, which is not to be underestimated. Audi is behind BMW and Mercedes-Benz in the ranking, and the difference is not small. BMW has invested EUR7.791 billion to support the electrification transition, and it seems to be working. Audi and Mercedes-Benz are also putting EUR28 billion and EUR40

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billion into the electrification transition from 2023 onwards. Therefore, this paper argues that they can weather the storm and make a successful transition.

4. Suggestions

4.1. Optimizing Exterior Design of The Car Needs To Be Futuristic

The appearance of BBA's new energy vehicles is invariably a replica of the fuel model, resulting in a non-conformity to the new energy model. This requires a redesign of the exterior to solve this problem. The appearance of the concept car can be borrowed from such as Mercedes-Benz VISION EQXX, Audi Sky sphere, and BMW VISION NEXT100, but BMW needs to avoid a similar grille design with the BMW Vision Neue Klasse. as a large grille lacks aesthetics. The uniqueness of the exterior is the first factor that attracts consumers.

4.2. Intelligent Driving Will Have a Direct Impact on the User Experience

Car companies can develop their own large AI models and cooperate with general large model companies to explore intelligent interaction and autonomous driving [6]. Intelligent upgrading of vehicle interaction and entertainment is an important element of user experience. Another important one is smart driving, but at the moment, autonomous driving is still a big issue. While even Tesla can't do it successfully, it still needs to be put at the centre of development focus It can be upgraded according to personalization. For example, Audi's headlights are an advantage, and Audi's new energy vehicles can learn from Audi's A9 series of intelligent headlights and use the lights to assist in driving - prompting roadside pedestrians and signs for driving routes. Mercedes-Benz, as a representative of having a luxury interior, can keep the original design in the back of the vehicle but can upgrade the intelligent entertainment system, again taking advantage of the audio.

4.3. Charging Method and Vehicle's Battery Will Influence the User's Choice

At present, NIO, Tesla, and other new forces of new energy car companies are open to shared charging, and there are many third-party charging stations, so BBA should choose to build its own exclusive supercharging station and label it with a logo, which can expand its influence.

5. Conclusion

At present, BBA's new energy is still lagging behind in the ranking, and there is still a big difference between the popular new energy brands. This paper uses SWOT to analyse the situation faced by the three car companies. Next, we use figures of new energy sales and new energy production. Through our analysis, we have three suggestions for the improvements of BBA's new energy vehicles. First, car companies should take advantage of the current well-distributed 4s shops to sell new energy vehicles. There is also a convenient offline experience for users. The second is to improve the appearance and abandon the original copy of the design. There are also intelligent upgrades to the interior. The third is to improve the battery life of the car and the charging station can serve the users at any time. Our suggestions aim to inspire traditional car companies to make the transition to new energy sources.

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