

Business plan for green shared electric bikes in Nanjing, Jiangsu, China

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Abstract:

In response to the escalating demand for sustainable urban mobility and the intensifying traffic congestion, this business proposal delineates a green shared electric bicycle initiative in Nanjing, designed to establish an efficient and eco-friendly short-distance transportation solution that bolsters the sustainable urban transportation framework. The project leverages “Internet of Things (IoT) + Big Data Analytics” technology, integrating an intelligent vehicle allocation system with a user demand forecasting model to precisely align vehicle distribution with commuter needs, thereby optimizing operational efficiency and reducing maintenance expenditures. Preliminary market analysis reveals a significant service gap in mid-to-short distance connectivity within Nanjing’s existing shared mobility market, with an 82% public acceptance rate for eco-friendly transportation alternatives. The project strategy entails the initial deployment of a fleet of smart electric bicycles across Nanjing’s primary urban zones, encompassing key commercial districts, transportation hubs, and academic institutions, while implementing a membership framework and dynamic pricing mechanisms to enhance user retention. Financial projections indicate the project is anticipated to achieve breakeven in its second operational year and capture a 10% market share by the third year. This initiative not only addresses the regional deficit in green mobility services but also generates substantial social value through carbon emission reduction and traffic alleviation, thereby presenting an innovative paradigm for sustainable urban transportation development.

Keywords: Economic, Tourism, City development, Green travel, Electric bikes

1. Introduction

In recent years, the electric bicycle sector has demon-

strated robust growth momentum within the Chinese market. Sales statistics indicate a consistent upward trajectory, with annual sales escalating from 36.8

million units in 2019 to an estimated 70 million units by 2024, reflecting a compound annual growth rate of 38% (Oriental Express, 2024). Electric bicycles have emerged as a prevalent mode of transportation in China, primarily attributed to their operational convenience, enabling flexible navigation through urban thoroughfares and alleyways, thereby effectively mitigating traffic congestion. Furthermore, their cost-efficiency is noteworthy, with charging expenses substantially lower than fuel costs, and purchase prices remaining accessible to the majority of consumers. Electric bicycles effectively address the last-mile connectivity challenge for contemporary commuters, significantly enhancing travel efficiency while affording urban dwellers the opportunity to appreciate natural scenery during leisure intervals.

The burgeoning sharing economy has further invigorated the electric bicycle market. Originating with shared bicycles, the sharing model has progressively extended into the electric bicycle domain. Shared electric bicycles, characterized by their on-demand accessibility and return flexibility, cater to the fast-paced mobility requirements of modern society, establishing themselves as a preferred option for urban short-distance travel and representing a pivotal development trajectory in future transportation modalities. Within this context, through comprehensive market research encompassing observation of Nanjing residents' current mobility patterns, questionnaire surveys, interviews, and secondary data analysis, this study aims to deepen market understanding, thereby facilitating product enhancement and research initiatives to bolster brand competitiveness.

2. Methodology

2.1 Observation

This research employed a triphasic observational methodology to gather empirical data. The observational approach facilitates the acquisition of primary information with distinct advantages, including high authenticity, robust adaptability, and real-time documentation of phenomena.

In the initial phase, the researcher conducted field observations of shared electric bicycles currently operational in the Nanjing market, examining the operational status of existing shared motorcycle services. Through systematic visits to Nanjing District and Qixia District, photographic documentation was utilized to conduct comparative analyses, recording the advantages and disadvantages of Meituan's shared battery vehicles, as well as subsequent improvements following product upgrades. Brief interviews were conducted to assess user experience, with cor-

responding records meticulously maintained.

The second phase involved monitoring the maintenance status of ten shared bicycles from various brands in Xinjiekou, Nanjing, providing insights into the general wear patterns of shared bicycles in the market. Concurrently, by documenting pedestrian traffic flow within a thirty-minute interval and the corresponding usage frequency of shared bicycles, the study identified strategic placement areas for shared electric bicycles. This data collection serves as a foundation for estimating annual profitability and provides empirical support for operational decisions.

The final observation entailed a comparative analysis of existing urban shared electric bicycle systems. This comprehensive review identified critical considerations for product launch strategies, thereby informing the development of best practices for market entry.

2.2 Questionnaire survey

The primary objective of the questionnaire was to ascertain Nanjing residents' requirements and anticipated enhancement directions for electric bicycles, thereby informing the formulation of the product's marketing strategy. The questionnaire design encompassed fundamental demographic information, inquiries about the 4P marketing model (Product, Price, Place, Promotion), and solicitation of suggestions from residents across various districts regarding shared electric bicycles. The questionnaire was disseminated extensively online via electronic means, resulting in the collection of 106 valid responses. The participants represented a diverse spectrum of ages, occupations, and genders, thereby ensuring a degree of representativeness and practicality. Following data collection, descriptive statistical analysis was conducted on the questionnaire data utilizing various graphical representations. For instance, bar charts were employed to illustrate the price acceptance levels of battery-operated vehicles across different age groups, thereby elucidating the characteristics of residents' needs. This analytical approach provided robust data support during the composition of the business plan.

2.3 Interview

The purpose of the interview was to have an in-depth discussion of the questionnaire results and further explore the daily needs of Nanjing citizens for battery vehicles. A total of 5 citizens from the target group were interviewed, including office workers who often use electric bikes, college students, and high school students with low monthly incomes. The interview process was recorded and converted into text. The text content was then summarized, and key points were extracted, such as citizens' focus on

the range and safety of battery vehicles, their understanding of the shortcomings of shared bicycles currently on the market, and their needs and expectations for shared electric bicycles. Adopting open-ended questionnaires to gather diverse user perspectives across demographics and professions enables strategic insights. This methodology ultimately enhances product differentiation while strengthening brand competitiveness in the shared e-bike market.

2.4 Secondary research

The secondary sources for this study include China National Knowledge Infrastructure (CNKI), National Bureau of Statistics, professional research reports, etc. The information on these platforms is academic and professional, ensuring accuracy and authority. The material content mainly involves all aspects of the PEST model (politics, economy, society, technology) to analyze the macro envi-

ronment. And at the same time, learn excellent business plans (BP), marketing plans, and financial plan cases. This study uses the principles of CRAAP (timeliness, relevance, authority, accuracy, and purpose) to evaluate the data. For example, for timeliness, the research and data used in this study are from the past 10 years, ensuring that the information is updated and has reference significance. The documents are all for academic purposes, and the news is mostly city official news to ensure reliable information, for non-commercial purposes, and to provide solid theoretical and data support for research.

3. Results & Discussion

3.1 The launch and operation of Nanjing battery vehicles

Table 1. Observation records of 10 shared bicycles in Xinjiekou

	Time observed	Brake	Tyre	Cushion	Basket Cleanliness	Advertisement Traces	Bell	Lock condition
Car No.1 Hello Bike	Have 17:47	Minor damage	Slightly deflated	Comfortable	No garbage	There are traces of having been stuck on.	Ring	Good
Car No.2 Qingji Bike	None	Good	Inflation	Harder	Have	Have	Ring	Good
Car No.3 Meituan Bike	Have 17:52	Minor damage	Inflation	Comfortable	No	There are traces of having been stuck on.	Ring	Good
Car No.4 Meituan Bike	None	Minor damage	Slightly deflated	Comfortable	Have	Have	Ring	Good
Car No.5 Meituan Bike	None	Minor damage	Inflation	Comfortable	No	There are traces of having been stuck on.	Ring	Good
Car No.6 Meituan Bike	None	Minor damage	Inflation	Comfortable	Have	Have ve	Ring	Good
Car No.7 Hello Bike	None	Good	Inflation	Comfortable	No	There are traces of having been stuck on.	Ring	Good
Car No.8 Meituan Bike	Have 17:48	Good	Inflation	Comfortable	Have	Have	Ring	Good
Car No.9 Meituan Bike	None	Minor damage	Inflation	Comfortable	No	There are traces of having been stuck on.	Ring	Good

Car No.10 Qingji Bike	Return the bike 17:30	Minor dam- age	Flat	Harder	No	Have	Dam- age	Good
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Figure 1. A record of 10 shared bikes from Xinjiekou Street, Nanjing



Figure 2. The recorder took pictures



Figure 3. Rider records pictures

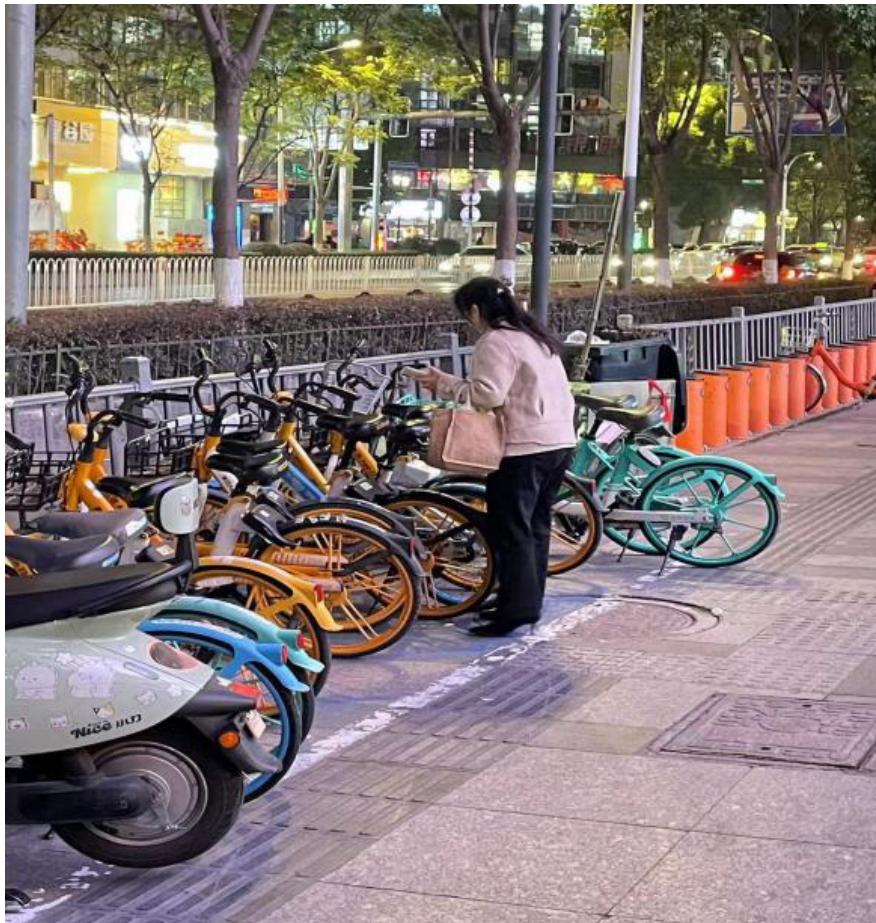


Figure 4. Bikes return record chart.

Through market research and first-hand information, it was found that there are currently few shared electric

bikes on the market in Nanjing, and shared bicycles are the main substitute. From this, RAINY conducted a data analysis: From the table data, Meituan Bicycle has outstanding performance in terms of market share and frequency of use, but the bike's integrity rate needs to be improved. This shows that market competition is fierce, and it also reflects that consumers have a great demand for shared electric bikes, and vehicles wear out quickly. For new products, it is necessary to focus on vehicle quality and maintenance system construction to improve operational efficiency and user experience (Tou tiao, 2025). There are five common problems with shared bicycles currently on the market: random parking and disorderly parking affect order. There is a tidal phenomenon, which means that because a large number of workers ride the subway station or station in the morning, only a small number will continue to flow, with limited efficiency and limited coverage. The proliferation of shared battery vehicles leads to the occupation of public resources. Inaccurate positioning makes it difficult to return the car. In order to save costs, the riding experience is poor. For example, the vehicle starts quickly and has poor shock absorption capabilities. The car body is relatively heavy, and it is difficult to go uphill. Therefore, through the observation method and research combined with secondary literature. The distribution of shared electric bikes in Nanjing will be rationally arranged, and effective solutions will be proposed to balance public facilities and address the common and unreasonable distribution and management problems that have emerged in the market, thereby increasing the usage rate of electric bikes.

3.2 Product analysis



Figure 5. The placement of helmets and baskets on shared electric bikes



Figure 6. Picture of the display screen of the electric bike before the upgrade



Figure 7. The display image of the shared electric scooter before the upgrade



Figure 8. The display image of the upgraded shared electric bikes



Figure 9. Illustration of the arrangement of the basket and helmet on the upgraded shared electric scooter.



Figure 10. Schematic diagram of the upgraded shared electric scooter display screen

Based on the comparison and field observation of Figures 6~8 and Figures 9~11. Before and after the upgrade, Meituan has made a series of upgrades and optimizations to the comfort of seats, the beautiful placement of helmets, the reasonable design and layout of vehicles, unlocking methods, and power display screens. Through analysis and comparison, Meituan's shared electric bikes has the following four advantages: first, the QR code to unlock the shared electric bikes is set on the display screen on the front of the car, making it convenient for passengers to scan the QR code to scan out the mini program, and the usage process is simple and convenient. Second, the body advertisements are cleaned regularly. The overall body of the Meituan shared electric bikes before and after the upgrade is relatively tidy. Third, after setting up a special helmet storage place, the original phenomenon of paper trash in the car basket has been greatly improved. Fourth, the overall weight of the vehicle is lighter, making it more user-friendly for older people or girls.

But there are also shortcomings. For example, first, driving is prone to bumps, and novices can easily fall on uneven driving roads. Second, shared battery vehicles will be inconvenient to use in bad weather, such as rain or snow,

and will also cause certain damage to the vehicle itself, which will reduce the service life of the shared battery vehicles. After the weather clears up, cleaning and maintaining shared electric bikes will also cost a certain amount of money. Third, Meituan's shared electric bikes have been launched in fewer areas in Nanjing. Only a small amount has been launched in Jurong, Jiangning District. Residents and consumers have reported that the overall supply is less than the demand. Fourth, there is little promotion of shared electric bikes in the Nanjing market, including online promotion, offline promotion, and app promotion, which are not very popular.

There are the following problems with shared electric bikes on the market: 1. Public spaces such as blind lanes are occupied due to users parking at will; 2. Fixed return points are set up, but the positioning is inaccurate, resulting in economic damage due to timeout or loss; 3. Due to the safety of cyclists and weak traffic awareness, there are a series of traffic hazards; 4. Limited by battery technology, resulting in limited cruising range. 5. Due to imperfections in the charging and access of shared battery vehicles, there is a certain risk of fire safety hazards (People's Daily, 2021).

3.3 Holidays



Figure 11. Distribution map of shared bikes in Xinjiekou on New Year's Day



Figure 12. Record Map of Cycling Conditions in Xinjiekou Area on New Year's Day in Nanjing

During the holidays, the use of battery cars around popular scenic spots in Nanjing increased sharply, an increase of 150% compared with normal days. For example, in

Xinjiekou, Nanjing, around the old gate of Confucius Temple, there are long queues in front of the shared bike rental points. In this section of Xinjiekou, there are 234

pedestrians passing by in one minute. This can be clearly felt during the New Year and special festivals. Traffic congestion in Xijiekou is extremely obvious, so most people choose bicycles and electric scooters to travel. It can be clearly felt that in this case, the driving efficiency of shared bicycles and shared electric bikes will be much higher than that of cars. Therefore, the usage of shared bicycles and electric scooters will peak during special festivals. A large number of them can be arranged before and after special festivals to facilitate the reduction of traffic congestion in areas with a dense flow of people. At that time, three to four young people at the scene were randomly interviewed. They said that in such a lively and congested urban area, they think bicycles are a more efficient way to travel. They can arrange more bicycles during major festivals to smooth traffic and make travel more convenient. In addition, by combining relevant literature, it is pointed out that (Today's toutiao, 2024) "The success rate of taking taxis on May Day will drop by 8%, college students love to ride small electric donkeys to travel ": Mentioning the sharp increase in travel demand during the May Day holiday, the relevant person in charge of the Ministry of Transport said that during the May Day holiday During the holiday season, the average daily cross-regional flow of people across society will reach more than 270 million people, and the proportion of self-driving travel will reach more than 80%. Electric bicycles are favored by student "cyclists" because of their flexibility, convenience, and high cost performance, and

have become their first choice for travel.

Therefore, through analysis, the concentrated release of travel demand during holidays and the tight capacity of public transportation in popular areas have made battery vehicles the first choice for tourists to travel conveniently. This reminds operators to deploy and maintain vehicles in advance during holidays to meet the surge in travel demand.

3.4 4P analysis

Product: The questionnaire shows that more than 35% of the respondents hope that electric bikes will have more storage space. Based on interviews, we learned that consumers have higher requirements for the safety and comfort of electric bikes. Therefore, product design should focus on expanding storage space and adopting safer braking systems and comfortable shock-absorbing devices. Zhuoshan City, Zhejiang Province, has innovated a safety supervision model for shared electric bicycles: The city has integrated real-time dynamic information such as satellite positioning of vehicles, camera recognition signals, and charging status into the supervision platform. It has also innovatively launched a "voice broadcast" publicity mode, which simultaneously broadcasts fire safety tips when users scan the code to use shared electric bikes. This can effectively enhance the safety of electric bikes and reduce the cost of supervision (Ministry of Emergency Management of the People's Republic of China, 2025).

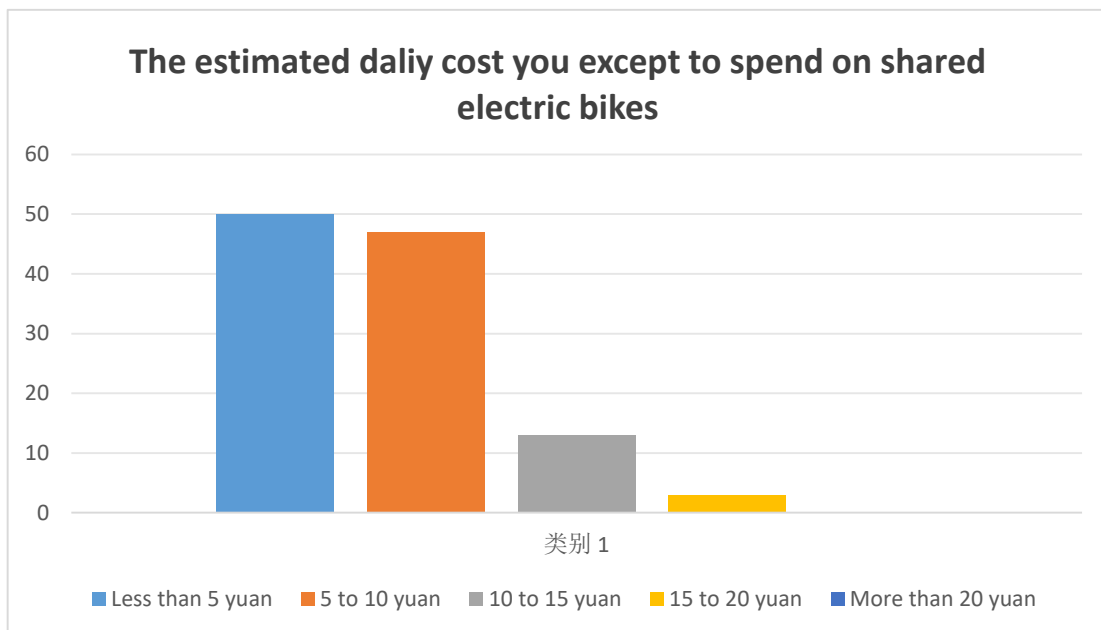


Figure 13. The estimated daily cost you expect to spend on shared electric bikes

Price: According to the questionnaire survey, there are differences in the price acceptance range of battery vehicles

among different income groups. This table shows the prices that each of the 106 people who filled out the questionnaire is willing to spend daily on shared electric bikes, and it can be concluded that the price that citizens generally spend on transportation every day is usually between 0 to

10 yuan. Therefore, when setting the price of a single ride on a shared battery scooter, it should be designed based on the economic conditions of citizens and the price they can afford.

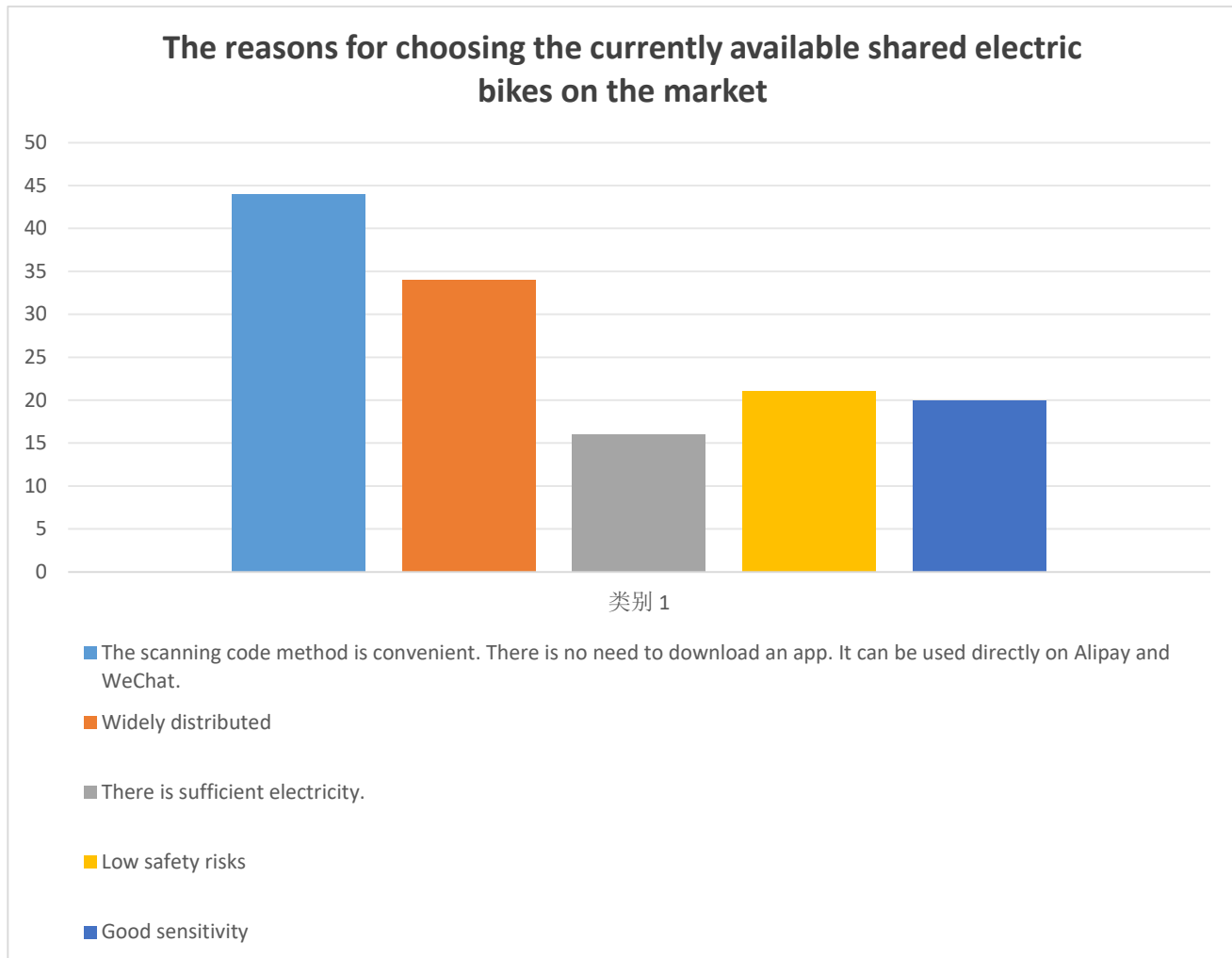


Figure 14. The reasons for choosing the currently available shared electric scooters on the market.

Channel: Most respondents said it is most convenient to rent an electric bike through the APP. The interview also mentioned the hope of adding offline rental points to facilitate temporary use. Therefore, product promotion should

strengthen online APP operations and online promotion, including Weibo and Douyin official accounts, while rationally arranging offline rental points and broadening sales channels.

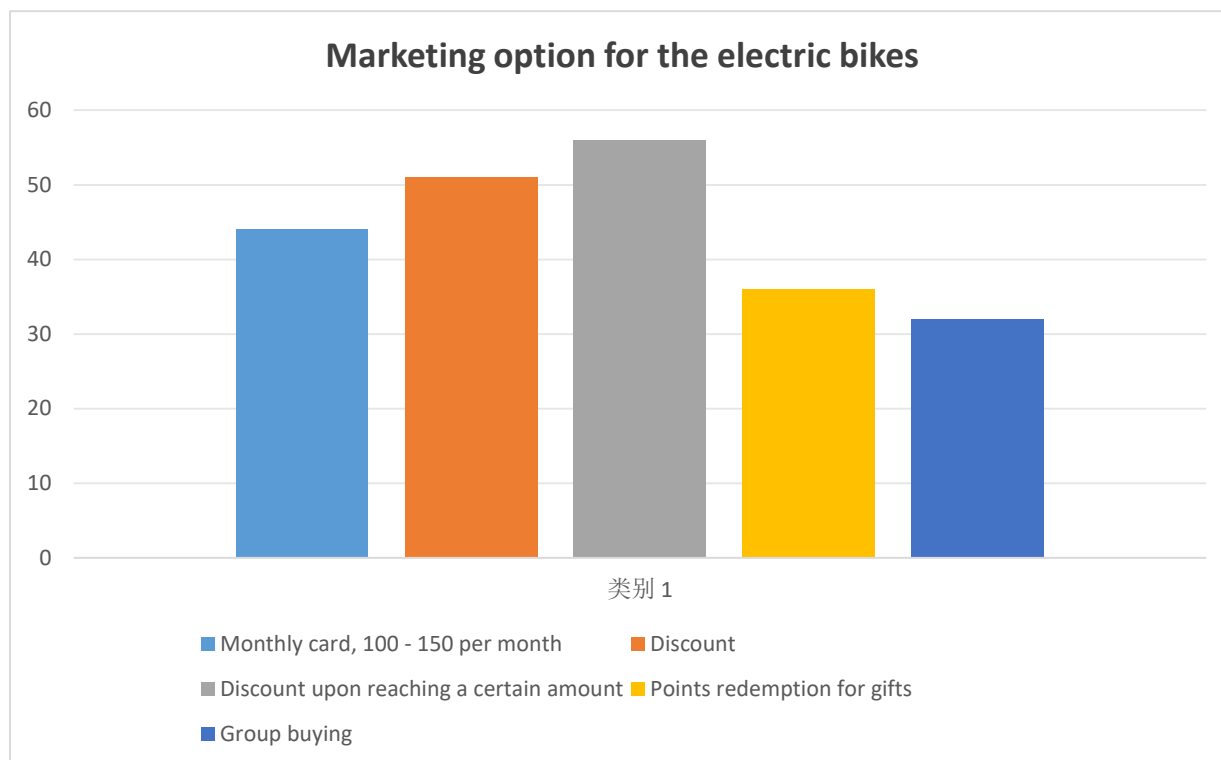


Figure 15. Marketing Options for Shared Electric Bikes

Promotion: According to the questionnaire, consumers are more willing to choose promotional methods such as discounts, full reduction, and setting monthly cards. This can increase the usage rate of the product by consumers. Therefore, we can set up more monthly cards, discounts, and full reductions as our marketing methods.

Evaluation & conclusion

The research methods are rich and diverse, covering observation, questionnaire, interview, and secondary data research, and a comprehensive and in-depth exploration of Nanjing's electric scooter market and Nanjing citizens' travel needs for shared motorcycles and product expectations. In the early stage, the researchers invested a lot of time in field research, visited various areas of Nanjing, took photos, and analyzed the current situation of existing battery vehicles on the Nanjing market through various forms. They obtained first-hand real data and had an intuitive grasp of the current situation of the Nanjing market. At the same time, through rigorous screening of authoritative second-hand information, the research was ensured to have a profound theoretical foundation. The observation method truly records the traffic phenomena in the Nanjing market, the questionnaire survey extensively collects citizens' opinions, the interviews explore deep-seated needs, and the secondary data provide a macro perspective. Various methods complement each other to build a compre-

hensive market cognitive system.

The number of questionnaire samples is relatively small, with only 106 questionnaires collected, which may not fully represent Nanjing's huge citizen group, leading to bias in some conclusions. There is randomness in the observation locations, and the selected areas may not cover all types of regional characteristics in Nanjing. The reflection of the overall market is not comprehensive enough, which affects the universality of the survey results to a certain extent.

In all, this report uses a variety of methods to investigate the Nanjing battery car market, clarifying market launch operations, product advantages and disadvantages, holiday demand, and 4P-related situations. Despite the limitations of the sample and observation location, it still provides a valuable reference for understanding the Nanjing battery vehicle market, and provides a direction for new products to enter the market and the optimization of existing products.

After the completion of the business plan, feedback on its feasibility was sought from the economics teacher and the major course instructor. Their evaluation is as follows:

This business plan has conducted thorough research. It has carried out a PEST analysis of the market environment and conducted a questionnaire survey on market demand. In addition, it has conducted on-site observations, collect-

ed timely and first-hand information on competing products, and conducted a competitive analysis. Therefore, this business plan is based on a solid research foundation and is not divorced from reality. Secondly, the product has been upgraded and improved on the basis of existing electric vehicles, highlighting comfort and environmental friendliness, which is consistent with the brand concept and feasible. If such a product and pricing model were implemented, it would likely attract a high level of user willingness and acceptance.

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